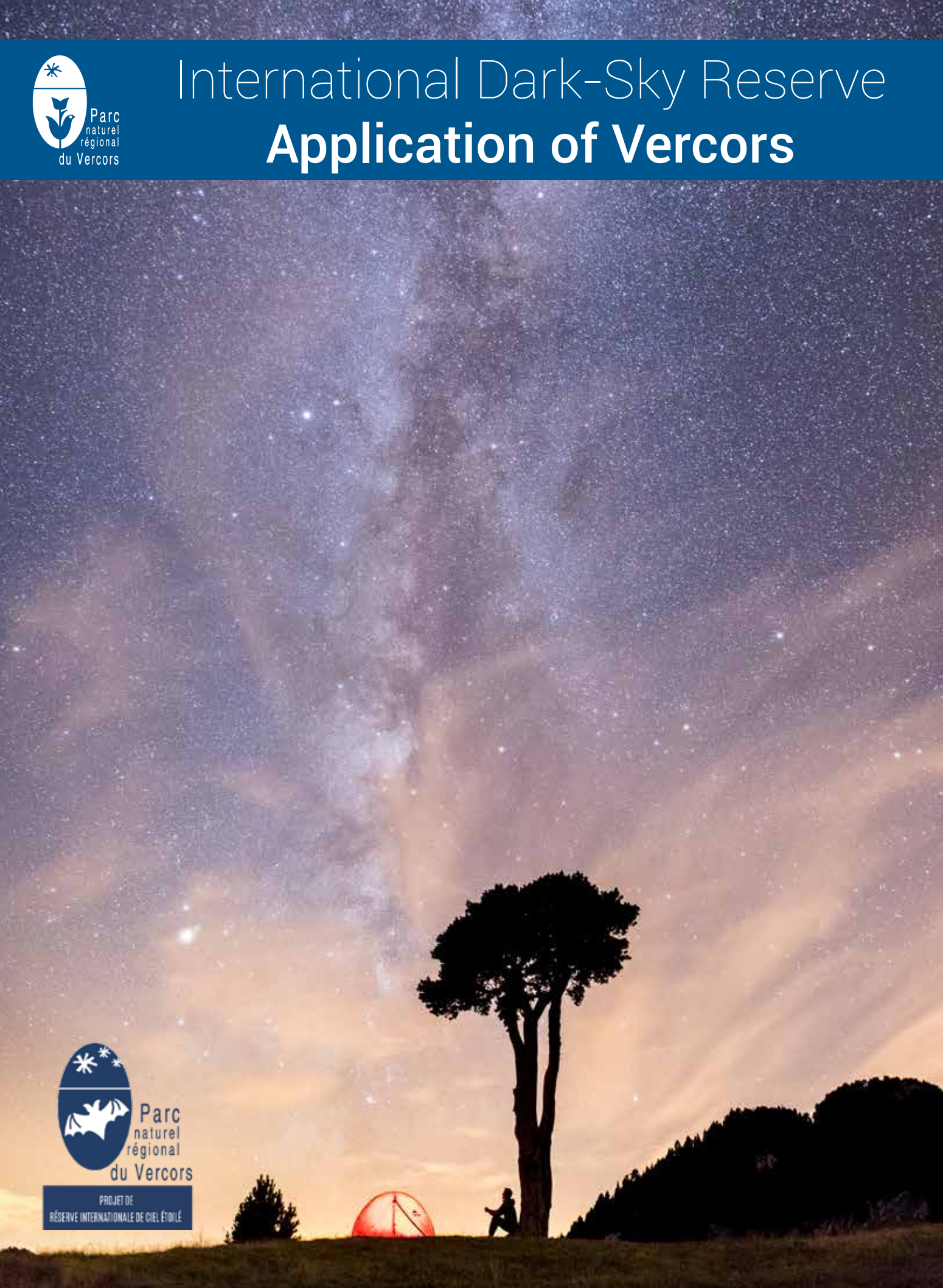
Parc naturel régional du Vercors

International Dark-Sky Reserve
Application of Vercors



Parc naturel régional du Vercors

PROJET DE RÉSERVE INTERNATIONALE DE CIEL ÉTOILÉ

«The night is supposed to be a space and an alternative time to the day, a moment where the source of light is no longer the only sun (...). And contemplating the stars is maintaining another relationship with the world.»

Michaël Foessel, French philosopher

© Diverticimes

Bivouac night on high plateaus

Bellow : Oreillard montagnard bat

© Yoann Peyrard-LPO

© Fabian Da Costa

In the middle : Beaufort-sur-Gervanne village

© Diverticimes

Night on high plateaus, Aiguillettes hut and Grand Veymont (2341m)

© PNRV/Jean Andrieux

Chevêchette owl

© Vincent Astier-Perret / Regards d'en haut

Observation night on high plateaus

Starry night on high plateaus, Queyrie plain

© Prises2vues (m)

© Pascal Conche

© Fabian Da Costa

Grassland on high Ambel plateaus

Milky Way in Trièves above Mont Aiguille

PHOTO : PNRV

The Vercors is a land of welcome. Its inhabitants and visitors are attached to the quality of its landscapes, its environment and its heritage that the Park has helped to preserve for over 50 years. In this logic, the Night of Vercors is a common good that the Park must protect and enhance for the greatest pleasure of humans, but also to improve the living conditions of other species that live there.

The middle mountain is at the forefront of the climate change impacts. It is high time for it to voluntarily commit to diversifying its activities and expanding its economic model. This asset, the quality of the night, is an opportunity that we must seize.

Let's hope that the wonderment of the spectacle of the celestial vault, by putting Man in his modest place, contributes to the awareness of the beauty and fragility of our natural environment. This is necessary so that each one invests in the ecological transition today impossible to circumvent.

The sky of the Vercors is very beautiful. With its IDSR project, the Regional Natural Park aspires to make it wonderful, recognized for that and shared with the greatest number. This is why we hope with all our heart that the work undertaken for several years will obtain the recognition of the label of International Dark Sky Reserve delivered by the International Dark Sky Association.

«In the middle of the ocean of light, night cannot be born, But in the middle of the ocean of night can be born and appear the stars.»

Shitao

Jacques Adenot, President

IDSR PROJECT APPLICATION I Octobre 2022

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EXECUTIVE SUMMARY

For the past fifteen years, the Vercors Regional Natural Park has been working to reduce light pollution on its territory in collaboration with municipalities, associations and energy syndicates. Since the drafting of the Park's charter (2008-2020), these orientations have been included :

- the reduction of the impact of public lighting in order to reduce light pollution creating nuisances for wildlife.
- encouraging a rational and economical use of public lighting in the municipalities (energy consumer and source of light pollution).

In 2008, the control and reduction of public lighting was already a priority to limit energy consumption and preserve biodiversity.

We have come a long way since then! Study trips, seminars, conferences, organization of the «Jours de la Nuit» (The Day of the Night) and the «Nuits de la Chouette» (Night of the Owl), public lighting audits and renovation work in the municipalities, encouragement to switch off and modulation tests, etc.

All these actions have helped to raise the awareness of elected officials and residents and to start improving public lighting in a concrete way. But these actions were carried out in a piecemeal and scattered manner without any real global project.

NIGHT OF THE OWL
Les 3 et 4 mars 2023 à Corrençon-en-Vercors et Gresse-en-Vercors


Photo : LPO AURA

In 2017, the idea of building a federative project on a territorial scale was born to pursue and amplify this mobilization. The example of the Pyrenees IDSR had been presented at a conference organized by the Park in October 2016. The RICE project then appeared as an obvious choice.

In 2017, a first study was launched with DarkSkyLab to determine the quality of the night sky in the Vercors and to take a first look at possible zoning. This validated our high sky quality with several measurements made with Ninox giving background sky brightness (NSB) values ranging from 21.7 to 21.9 mag/arcsec2.

Since then, the Park has been working hard to mobilize municipalities, departmental energy syndicates, private actors and tourism professionals to inform about the challenges of preserving the night sky and to support the change of practices.

In addition to the preparation of the IDSR application, here are the highlights of the last few years that have enabled us to progress towards the label :

- in 2019, the determination of the zoning of the RICE involving 39 municipalities of the Park, 17 of which are in the core zone and 22 in the peripheral zone,
- in 2020, the publication and distribution to all the municipalities of the Park of a guide to quality lighting in the Vercors, including the recommendations of the light management plan integrated into the RICE application,
- the construction of a charter of commitment for the improvement of lighting and involvement in the RICE project and its signature by 32 municipalities,
- the inventory of the lighting points according to the databases of the energy syndicates completed by a field campaign in 2021,
- in 2021, the organization of the first edition of the Month of the Night in October involving four territories, the Metropolis of Grenoble and two other parks (Chartreuse and Belledonne), the signing of an agreement between these four communities acknowledging the common will to protect the night sky,
- training courses for tourism professionals, hiking guides and accommodation providers in 2020, 2021 and 2022,
- in 2022, a survey and awareness-raising campaign for shopkeepers to extinguish their windows and signs.

All these actions are detailed and presented in this file.

1. The Park's charter is a framework document approved by the municipalities and the Regional authority that sets the strategic orientations of the territory for 15 years. The validation of the Park charter by the State services renews the status of Regional Natural Park for the next fifteen years.

1. INTRODUCTION

1.1. The choice of the territory, Vercors and its IDSR project

In the present application we made the choice to talk about the Vercors as a whole and not only about the IDSR project area. Why this choice ?

Fisrt of all it is important to understand that the Regional Natural Park of Vercors is a large inhabited territory and also a public authority composed by elected officials and staff. This entity composed by municipalities, other local autorithies and diverses actors decided to have a common sustainable development project including preservation.

This project is written in our Chart approved and voted by all the authorities for 15 years. In Vercors it is like that since more than 50 years (the Park was created in 1970). Today, Regional Natural Park of Vercors leading the IDSR project application, because it has been working against light pollution for more than 15 years.

The IDSR project now covers 39 municipalities of the Park of Vercors. This choice was made because the quality of the sky is today very good in this part of the territory and the 39 municipalities chosen perfectly surround the delimited core zone.

However the ambition of the Regional Natural Park of Vercors is to extend the perimeter of the IDSR project to its entire territory. This is why, in our application, we have chosen to mention the actions implemented on the whole perimeter of the Park. The Park has been working for many years with its municipalities on the reduction of light pollution, better control of public lighting and also on awareness and education.

The idea of creating an IDSR project was born in 2017. Since then, the Park and its partners have come a long way. The reduction and improvement of the quality of public lighting has already begun. We hope that the Park will be able to make this beautiful idea a reality with the support of IDA.

Summer night in Vercors

Photo : Trekking-et-voyage

1.2. Night conservation in Vercors, an old story

The Vercors natural regional Park works for many years on light pollution. Since 2008, two goals of the park chart are related to light pollution by the biodiversity protection approach and energy consumption approach. Several events for elected officials and the public are organized each year to promote night environment and dark sky and to explain what light pollution is and how to avoid it.

Table showing the events since 2010

Date	Title of the event	Description
30/10/2010	Jour de la Nuit (Day of the Night)	St-Laurent-en-Royans : afternoon with childrens, animation movies on light pollution and sensitization games. Conference with Philippe Stref on nocturnal wildlife. Exhibition "Trop de lumière nuit" (Too much light hurt)
19/03/2011	9th Owl's night	Col de Romeyère with Coulmes vacation center : lookout and listening of raptors. Discussion with children on their perception of night. Movie extract from "Reconnaitre les rapaces nocturnes" (To recognize nocturnal raptors)
16/09/2011	Studying trip on public lighting in Haut-Jura	Purpose : to accompany local elected official in the way of extinction of refection of their public lighting devices. Sharing time and information with Haut-Jura territory which is engaged in this process for several years.
01/10/2011	Jour de la Nuit (Day of the Night)	In four municipalities of the Royans sector : public light extinction St-Jean-en-Royans : Movie "La face obscure de la lumière" (The dark face of the light) Auberives-en-Royans : night walk. Saint-Laurent-en-Royans : astronomy Saint-Just-de-Claix : municipalities observation without light. Glandage (outside Royans) : Public meeting on Why and how to light soberly ?
01 au 07/10/11	Exhibition : Trop d'éclairage nuit « Too much lighting hurts »	Saint-Jean-en-Royans : in the city hall.
11/09/2012	Seminar : Which lighting for tomorrow ?	Sainte-Croix monastery : Conference on lighting issues, initiatives, methods and procedure.
09/10/2012	Event : Public Lighting and light pollution	Autrans : presentation by ANPCEN and recap of Autrans's project on the subject.
10, 11, 12 et 13/10/2012	Day of the Night	Monestier de Clermont: public light extinction Mens : Public meeting on public lighting, IDSR project and impacts Clelles : Movie projection: "La face obscure de la lumière" (The dark face of the light), planetarium and astronomy initation by the local astronomic association Astrièves. Public lights extinction. Miribel Lanchâtre : Public light modulation presentation
22/03/2013	10th Owl's Night	Col de Romeyère with Coulmes vacation resort, listening, games and "Chouette Rencontres" movies (Nice/Owl gathering)
19, 20 and 21/04/2013	Ode to the Night	Noyarey : Cultural and informative event on light pollution. Concert in the dark, projection of the schools work on shadows, light extinction. Discussion with ANPCEN, quirky conference on the night by Heiko Buccholz, walk at nighttime. Exhibitions.
04/2013	Ode to the Night	Noyarey : Books on night were highlight at the library and exhibition "Songe d'une nuit étoilé" (Dream of a starry night) and "Trop de lumière nuit" (Too much light hurts) in the school and in the city hall.
12/10/2013	Day of the Night	Lans en Vercors : Light extinction, reading while walking and sky observation, planetarium.
17/06/2014	Evening on bats	"Who are these individuals that squat our attics and go out only during the night ?" with LPO Drôme. Conference and movie projection.
30/08/2014	Bats International Night	Lans-en-Vercors, goals of participatory science on bats and sensitization on the importance of bats, listening of bats (with specialized tools).
20/09/2014	Day of the Night	Quatre-Montagnes municipalities : light extinction, animation on light pollution, dark sky, and nocturnal biodiversity

Table showing the events since 2010

Date	Title of the event	Description
18/10/2014	Bats of La Molière	Gathering to celebrate the end of the participatory bats inventory, Movie projection "Au rythme des chauves-souris" (At bats rhythms). Discussion with Myrtille Bérenger who worked on Molière bats in 2013.
04/04/2015	11th Owl's Night	Saint-Julien-en-Vercors : Animations, exhibitions, conferences. Walk in Herbouilly on mountain owls.
05/04/2015	11th Owl's Night	Rencurel with Coulmes vacation resort. Movie on a scarce Owl from the Natural Reserve of Vercors High Plateau, discussion.
02/05/2015	Ode to the night	Saint-Julien-en-Vercors and Saint-Martin-en-Vercors : walk, sensitization to light pollution and public light extinction. Movie : "La nuit est une femme à barbe" (The night is a women with beard). Exhibition "Too much light hurts" (trop de lumière nuit)
6/10/2016	Seminar on lighting and light pollution	Lans-en-Vercors : one afternoon with elected officials and technicians, professional and shopkeeper. Sensitization to light pollution issues, official rules and technical answers. With FRAPNA, ANPCEN, elected official feedback, Energy Syndicates, BE, IDSR project du Pic du Midi.
26/09 au 08/10/2016	Day of the Night	Lans-en-Vercors : town extinction, exhibition "songe d'une nuit étoilé" (Dream of a starry night) and "Trop d'éclairage nuit" (Too much light hurts). Stars observation, reading, conference performance, reading while walking, performance : Face à la lumière (Facing the light) Beaufort-sur-Gervanne (8/10): conference and debate with ANPCEN, Tales, ... Sassenage (2/10) : during the Nature Fest
11/03/2017	12th Owl's Night	Corrençon-en-Vercors : Listening and observation walk with some readings and plays.
26/04/2017	1rst contact with IDA	Declaration of intention and email exchanges with John Barentine
14/10/2017	Day of the Night	Gresse-en-Vercors : Animation in school, exhibition, light extinction, reading : "En attendant les étoiles filantes" (Waiting for the shooting stars), sky observations, presentation on the nocturnal biodiversity.
04/2018	Mountain guide training on nocturnal raptors	Enrich the knowledge of mountain guides on this subject and threats (as light pollution) that nocturnal raptors face.
13/10/2018	Day of the Night	Saint-Agnan-en-Vercors : Writing activity, shared meal, IDSR project presentation, light extinction, nighttime walk, star observation.
02/03/2019	13th Owl's Night	Herbouilly plain : Nocturnal Raptors discovering.
11/10/2019	Seminar on public lighting	Beaufort-sur-Gervanne : one afternoon of conferences on light pollution issues, feedback of mayor, ... for elected official, lighting professional and technicians. Conferences by Romain Sordello (National Museum of Natural History), Drôme Energy Syndicate, Biovallée, national police, LPO (naturalist association) and local astronomy association Astrièves and Marignac à ciel ouvert.
12/10/2019	Day of the Night	Laval d'Aix : conference, night walk, writing activity and town light extinction
30/06/2020	Mountain guide training on nighttime environment	Gresse-en-Vercors with the local astronomy association Astrièves
06/07/2020	Official application	Mail from the Park President to IDA, with a support letter of Mr Bonavitacola
oct 2020	Day of the night cancelled	Due to sanitary reasons the event has been cancelled
oct 2021	Month of the Night	See dedicated pages chapter six

Table showing the events since 2010

Date	Title of the event	Description
01 Oct. 2021	Signature of the partnership agreement with Grenoble	Press conference and signature of the agreement by Presidents in Saint-Nizier, municipalities of Vercors
October 2021	1rst edition of the Month of the Night	Many municipalities of Vercors (9) and Grenoble Metropolis participating
5 Oct. 2021	Night walk in Saint-Andéol	Night walk in Trièves at the foot of the cliffs of Vercors
9 Oct. 2021	Day of the Night in several municipalities	In buffer zone Gresse-en-Vercors, Saint-Andéol, Monestier-du-Percy, and 6 municipalities in the Park
19 Oct. 2021	Training for tourist accommodation providers	With the collaboration of Trièves tourist office and Astrièves
2 June 2022	Training session for tourist accommodation providers	With the collaboration of the tourist office of Vercors Drôme
28 Sept. 2022	Launch of the Month of Night with Presidents	Press conference by Presidents of the four territories
October 2022	2nd edition of the Month of the Night	Many municipalities of Vercors (14) and Grenoble Metropolis participating
9 Oct. 2022	Event in Gresse-en-Vercors	Nocturnal visit of the Park
15 Oct. 2022	Event in Saint-Andeol	Night walk to listening to the nocturnal biodiversity with a Park guard
18 Oct. 2022 31 Oct. 2022	Event in Chichilianne	Public meeting on turning off the light with ANPCEN. Moonlight Sonata, animations with the associations of the village
29 Oct. 2022	Event in Saint-Martin-de-Clelles	Conference ANPCEN. Observations with Astrièves. Night walk with a Park guard

Starry night on Mont Aiguille

2. PRESENTATION OF VERCORS NATURAL REGIONAL PARK

2.1. Geographical position

The core and buffer zones of the Vercors IDSR project are located in Europe, South-East France. They are part of the Vercors pre-alpine massif, on the border with the Alps. The Vercors massif is located in Auvergne-Rhône-Alpes region, and partly recover two departments : Isère and Drôme.

LOCATION OF THE VERCORS IN FRANCE AND CONNECTIONS TO THE MAIN CITIES

TOPOGRAPHY MAP OF VERCORS PARK AND ITS MUNICIPALITIES

The Vercors is 65 km long and 35 km large, that is an area of 2 062.08 square kilometer. The landscapes shape a limestone fortress with forest, gorge and farming.

This mountainous landscape is bordered by important city : Grenoble, Valence, Isère Valley and Rhône Valley and not far from Lyon, the second biggest french city. The area is easily accessible thanks to major circulation axes, but the Vercors keeps its specific identity because only few ways enter the massif.

The Park is divided into eight sectors : Vercors-Drôme, Royans-Isère, Royans-Drôme, Trièves, Quatre Montagnes, Diois, Gervanne and Piémont Nord. Each of this sector has its own particularity.

They are separated by topological features as cliff, that isolates them from each other. The climate and the biodiversity, the accessibility and human activities, also vary from one sector to another.

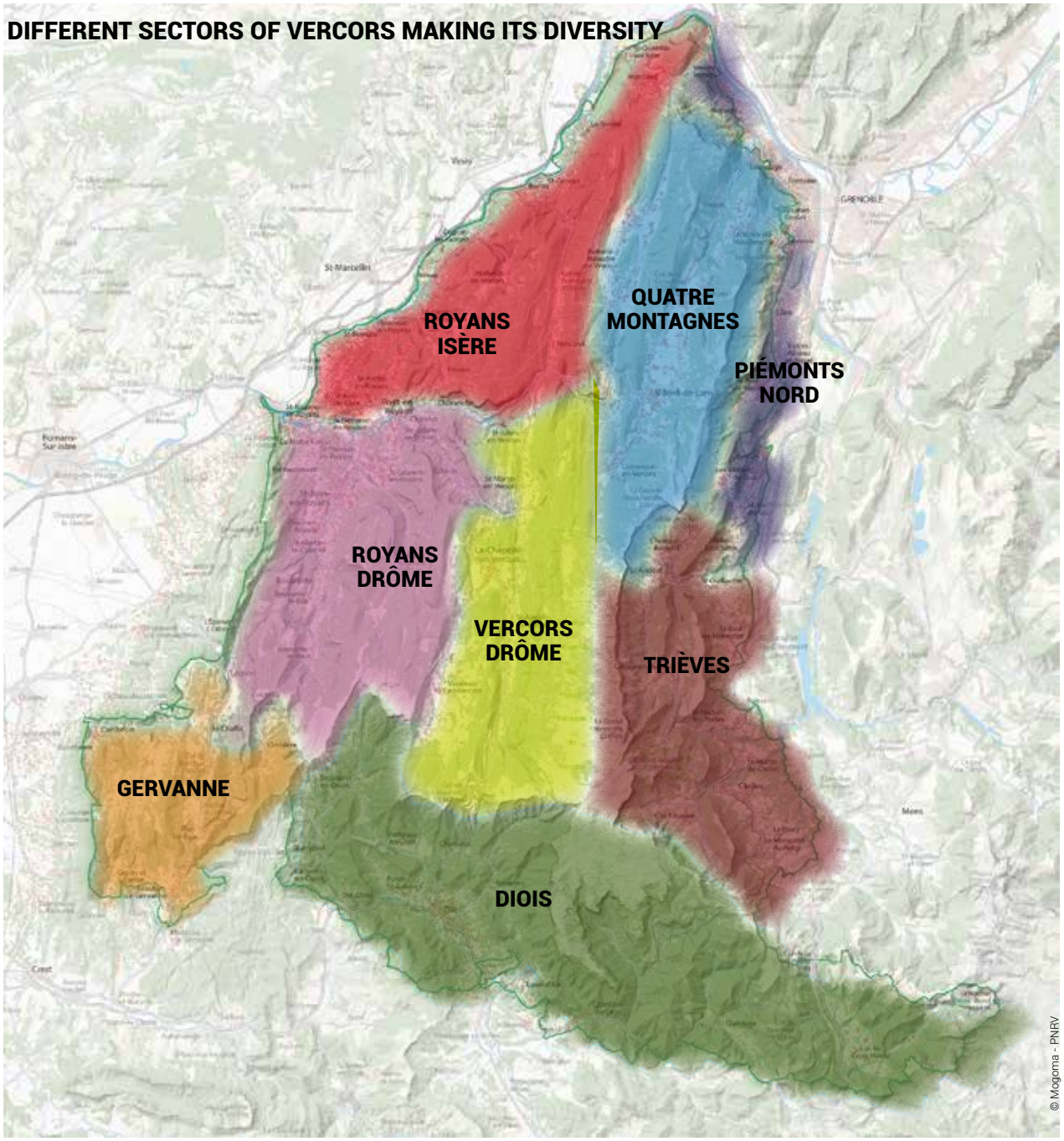
In another hand, sectors are united by their mountain identity and a relative rurality.

The Vercors IDSR project is based on the South part of the Park, where the urban pressure is lower and the sky quality better. That includes : Royans-Drôme, Vercors-Drôme, Trièves, Diois, Gervanne and some municipalities in the South of 4 Montagnes and Royans-Isère.

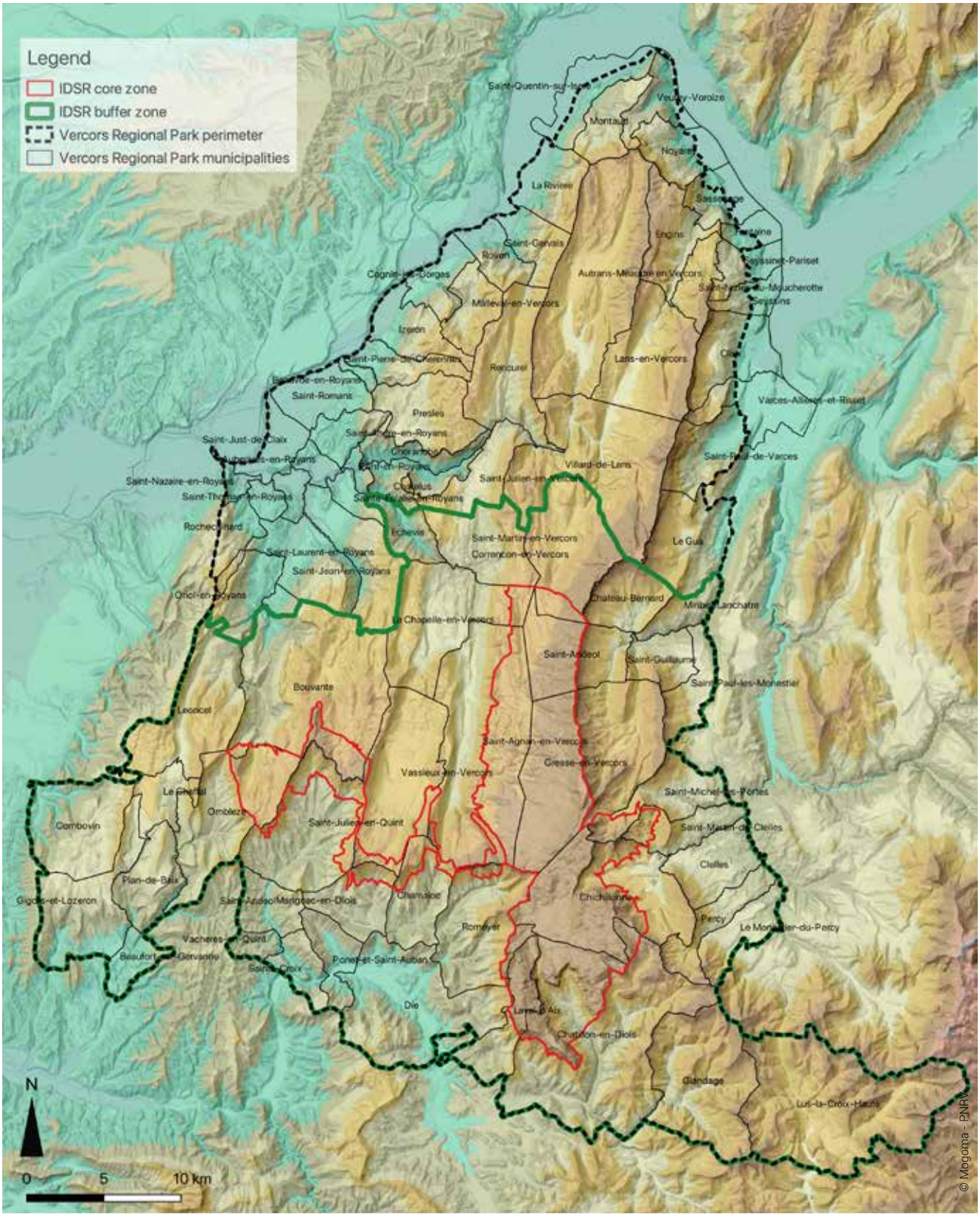
The Park of Vercors is often qualified as a limestone fortress, because massif of Vercors is made of high plateaus surrounded by steep cliffs. As the second map below shows it our IDSR project is situated in altitude which guarantee its protection from intrusive lights coming from neighborhood urban areas.

The mean altitude of the IDSR project area is about 1500m while the cities in the valleys around (Grenoble and Valence-Romans) are about 100 to 200m high.

DIFFERENT SECTORS OF VERCORS MAKING ITS DIVERSITY



RELIEF BASE LAYER MAP - VERCORS REGIONAL PARK



2.2. Administrative organization

The smallest administrative entity in France is the municipality or "commune". The municipality manages the public lighting of its territory. That's why it is a crucial contact for the IDSR project. Municipalities are grouped into a bigger administrative structure. There are three types of municipalities group: "communauté de municipalities" or municipalities community for small rural municipalities, communauté d'agglomération for bigger cities and metropolis around main cities

The IDSR project cover one Regional Park, the Vercors natural regional Park, 39 municipalities, 8 communities of municipalities, two departments and one region. Regional Parks have been created to protect and promote large inhabited rural areas.

Parks are territories where landscapes, natural environment and cultural heritage are remarkable but fragile. Their missions are : to protect and manage natural environments, cultural heritages and landscapes, to help and coordinate the different land uses, to support the economic, social and cultural development, to educate and to welcome the public and to experiment. The Vercors Regional Park has been created in 1970. It is a public instance (a syndicate) managed by elected officials from municipalities, group of municipalities, region and department.

The purpose of the park is to defend the interest of the territory and promote it, to link the different territory players, to help the sustainable development of the territory.

Its goals are explained in a document that is the base of every Park action : the Park chart, which is voted by all the elected officials. **In its charter 2008-2020, two goals are directly linked with lighting issues :**

- Goals 1.3.1: to promote renewable energies and energy economy in a territorial perspective. **To incite municipalities to rationally and thriftily use public lighting, which consume energy and is a source of light pollution.**

- Goals 1.1.2 : to take into account the biodiversity in ordinary area. **To dim public lighting impact in order to reduce light pollution which create troubles to fauna.**

Thus, the IDSR project is completely consistent with the Park chart.

A Park interacts with different organizations that work on specific subjects such as energy or water management. For IDSR project, the Park works in collaboration with the departmental energy syndicates, which cooperate with municipalities on their lighting features, to write the lighting recommendations. Two energy syndicates are active on the Park territory : 'Territoire d'énergie SDED" in Drôme department and "Territoire d'Energie Isère" in Isère department. Municipalities of each department can choose to delegate authority for public lighting to the syndicate of its department. In this case, the local energy syndicate takes care of light fixture maintenance and accompany municipalities for renovation.

Bivouac night on hight plateaus

Photo S & M Booth

2.3. Deliberation and partnership agreement

Deliberation taken by the Park on February 24, 2021 (in appendix)

The deliberation taken by the Park on February 24, 2021 concerned the support to the finalization of our application. This decision of our elected officials allowed us to devote a budget to the bid, but at the same time to validate the Park's investment in the IDSR project.

The text describes the main characteristics of our project, the perimeter, the actions to be carried out on the lighting in terms of awareness, etc.

It is specified at the end of the act :

«The Bureau unanimously decides:
- to APPROVE the provisional financing plan for the accompaniment to the finalization of the application in order to obtain the International Dark Sky Reserve label as presented above,
- to AUTHORIZE the President to apply for funding from partners,
- and to AUTHORIZE the President to sign all the acts and documents relating to this project».

Partnership agreement between the Park of Vercors, the metropolitan area of Grenoble, the Park of Chartreuse, and Belledonne (in appendix)

This agreement signed at the occasion

This agreement has been signed on the occasion of the launch of the first edition of The Month of the Night. It formalizes the cooperation between the Vercors Park and the Metropolis of Grenoble, and two other neighboring territories of the Metropolis. It was signed by the Presidents of the four structures, in Vercors on October 1st, 2021 (see the attched press article).

Photos PNRV/Nicolas Antoine

This agreement describes the territory concerned (209 municipalities), the common challenges of reducing light pollution, the strategic orientations, the roles and missions of each, and the common work areas.
Among the common work areas :

<u>Support for municipalities :</u>
- To jointly inform on the implementation of public lighting renovation measures.
- Promote the sharing of experiences on exemplary public lighting renovations.
- Provide communication tools.
- To help in the search for financing contributing to the renovation and renewal of its public lighting assets.

<u>Awareness and support of other actors in the territory :</u>
- Sensitize and mobilize private actors managing outdoor lighting installations so that they commit themselves to join this approach of lighting sobriety by ensuring, at a minimum, that they respect the existing regulatory requirements.
- Organize a common communication to the inhabitants on the challenges of public lighting, with a focus on light pollution.

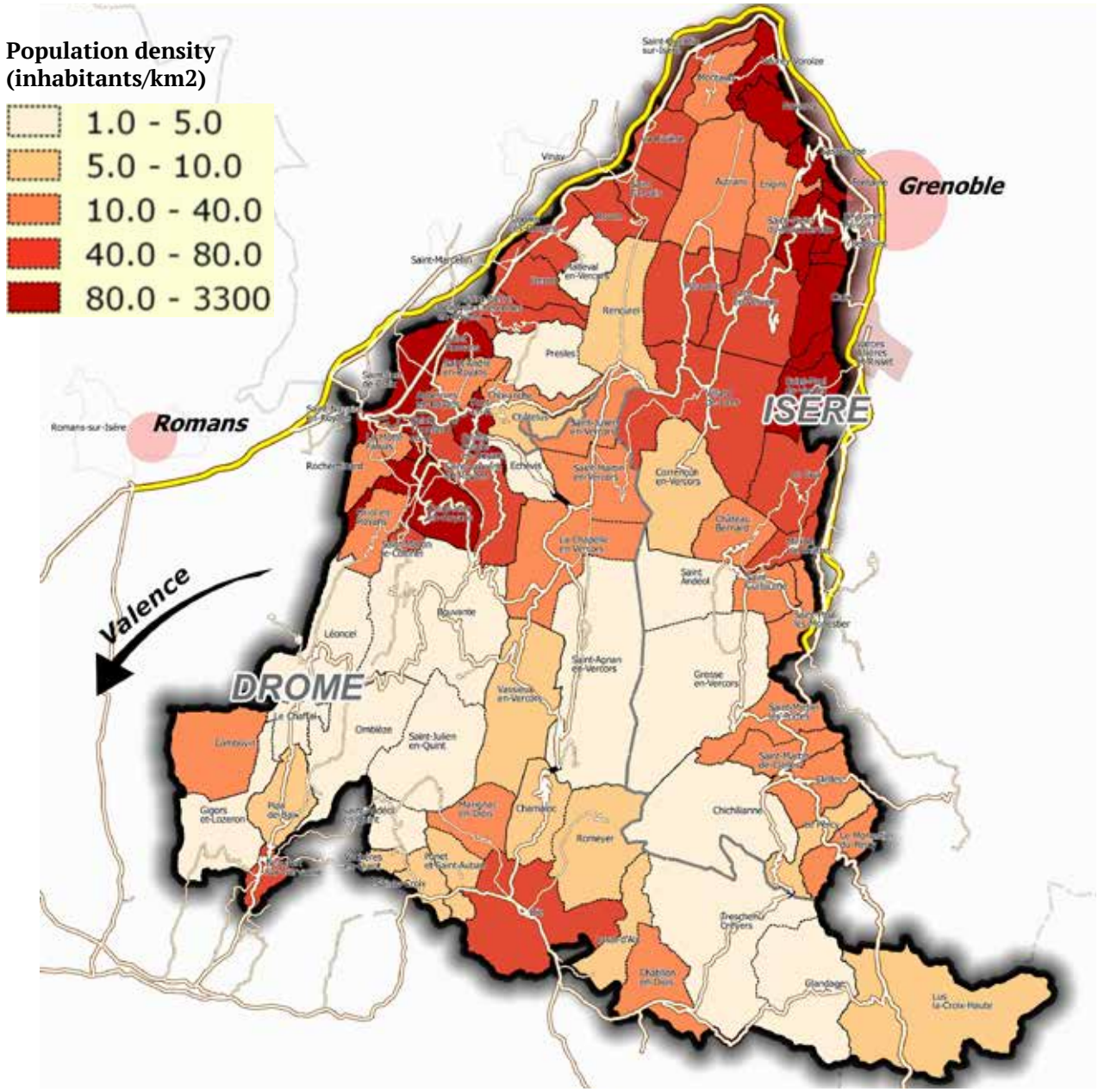
Launch of the second edition of the Month of the Night with elected from Metropolis of Grenoble

2.4. Census of population and housing

There are 53 000 inhabitants in the Vercors and a population density relatively high for a rural territory (40 inhabitants/km²) but very heterogeneous. The North is close to Grenoble, with some municipalities directly linked to Grenoble urban area. Without the border directly close to Grenoble, the inhabitant density is only 19 hab/km². 80 % of the population live in the North part of the Park, that means that in the South the density is even lower. For reminder, in France, the mean inhabitant density is 115 hab/km².
The territory is globally attractive. The population is growing, especially in the North. The most attractive part is close to Grenoble, on the border of the Park: Trièves, Quatre Montagnes, Grenoble Piemont. It's the most urbanised area.

There are 39 municipalities in the IDSR project area, 16 of them have a part of their territories in the core zone, (that represents 14300 inhabitants and a density of population of 10,55 inhabitants per square kilometers).

POPULATION DENSITY PER MUNICIPALITY



Census of poputation and surfaces in the IDSR project area (in brown = municipalities having a part of their territory in the core zone)

Name of the municipality	Sector	Population (2015)	Area (km²)	Density (hab/km²)
Beaufort-sur-Gervanne	Gervanne	466	9,58	48,64
Bouvante	Royans -Drôme	252	84,56	2,98
Chamaloc	Diois	129	22,07	5,85
Château-Bernard	Trièves	276	18,33	15,06
Châtillon-en-Diois	Diois	667	110,58	6,03
Chichilianne	Trièves	284	61,79	4,6
Clelles	Trièves	571	20,65	27,65
Combovin	Gervanne	405	35,68	11,35
Corrençon-en-Vercors	Quatre Montagnes	353	39,28	8,99
Die	Diois	4576	57,28	81
Echevis	Royans-Drôme	49	11,23	4,36
Gigors-et-Lozeron	Gervanne	163	35,41	4,6
Glandage	Diois	115	52,5	2,19
Gresse-en-Vercors	Trièves	395	80,46	4,91
La Chapelle-en-Vercors	Vercors-Drôme	685	45,46	15,07
Laval d'Aix	Diois	124	19,8	6,26
Le Chaffal	Gervanne	44	11,67	3,77
Le Monestier du Percy	Trièves	249	15,18	16,4
Léoncel	Royans-Drôme	58	42,96	1,35
Lus-la-Croix-Haute	Diois	549	88,02	6,24
Marignac-en-Diois	Diois	204	18,52	11,02
Miribel-Lanchâtre	Trièves	415	9,55	43,46
Omblèze	Gervanne	70	45,1	1,55
Le Percy	Trièves	165	15,84	10,42
Plan-de-Baix	Gervanne	137	19,57	7
Ponet-et-Saint-Auban	Diois	127	13,42	9,46
Romeyer	Diois	203	40,09	5,06
Saint-Agnan-en-Vercors	Vercors-Drôme	397	84,11	4,72
Saint-Andéol	Trièves	125	29,77	4,2
Saint-Andéol-en-Quint	Diois	78	13,48	5,79
Saint-Guillaume	Trièves	265	13,51	19,62
Saint-Julien-en-Quint	Diois	157	47,75	3,29
Saint-Martin-de-Clelles	Trièves	181	14,99	12,07
Saint-Martin-en-Vercors	Vercors-Drôme	388	26,92	14,41
Saint-Michel-les-Portes	Trièves	268	21,35	12,55
Saint-Paul-lès-Monestier	Trièves	257	13,86	18,54
Sainte-Croix	Diois	103	10,97	9,39
Vachères-en-Quint	Diois	32	5,24	6,11
Vassieux-en-Vercors	Vercors-Drôme	318	47,96	6,63
Total/Mean	**IDSR project**	**14300**	**1354,49**	**10,55**
Total/Mean	**Core's municip.**	**4544**	**792,29**	**5,74**

2.5. A territory around urban area

Influence of Grenoble urban area

The active population of the Vercors (25 167 persons) is mainly working outside the Park (56%) and 25% of them work in Grenoble agglomeration, which is the biggest city of French Alps and very accessible by the Vercors massif. Grenoble is the main source of urbanization and light pollution in the North of the massif. That is why it was critical to work together.

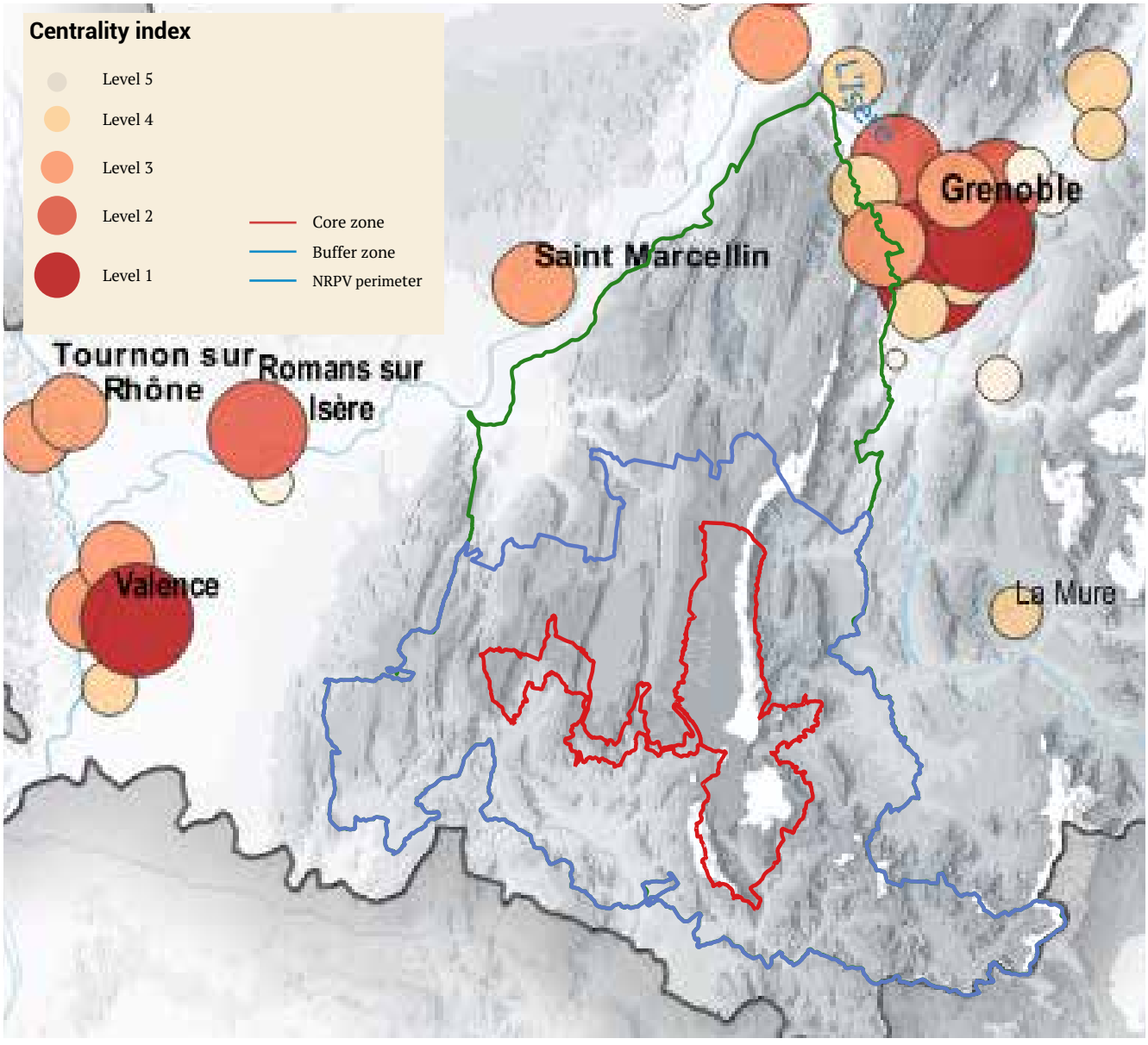
The IDSR project designation is supported by Grenoble metropolis, which has a specific plan on public lighting since 2020. We coordinate our recommendations with them and another regional Park near the metropolis (Chartreuse Regional Natural Park) so that our lighting management plans are consistent and follow the IDSR project requirements.

Influence of Valence-Romans urban area

Valence-Romans urban area has an influence on urbanization and in term of light pollution on the west part of the massif. The impact on the west part of the massif is lower than Grenoble impact on the north part of the massif but noticeable.

The south-west of the Park, in the Gervanne sector, is where the main bats colonies are. **A cooperative work with Valence-Romans urban area is important for these specific biodiversity.**
It is also crucial to work with these municipalities to dim light pollution and assure that it will not grow and impact the sky quality of the IDSR project territory.

MAIN CENTRALITIES AROUND VERCORS

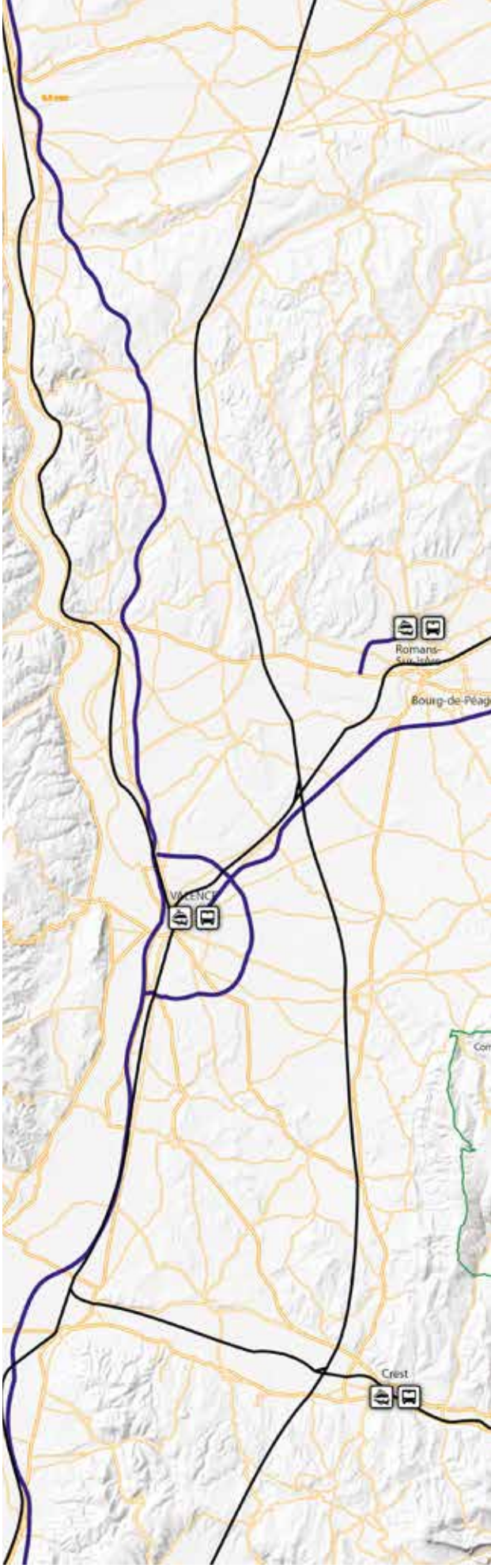


2.6. Accessibility

Mobility is an important line of work of the Park. To be consistent with its environmental values, the Park promotes and develops tools to facilitate "soft mobility" as bus, train, bike, carpooling and hitchhiking.

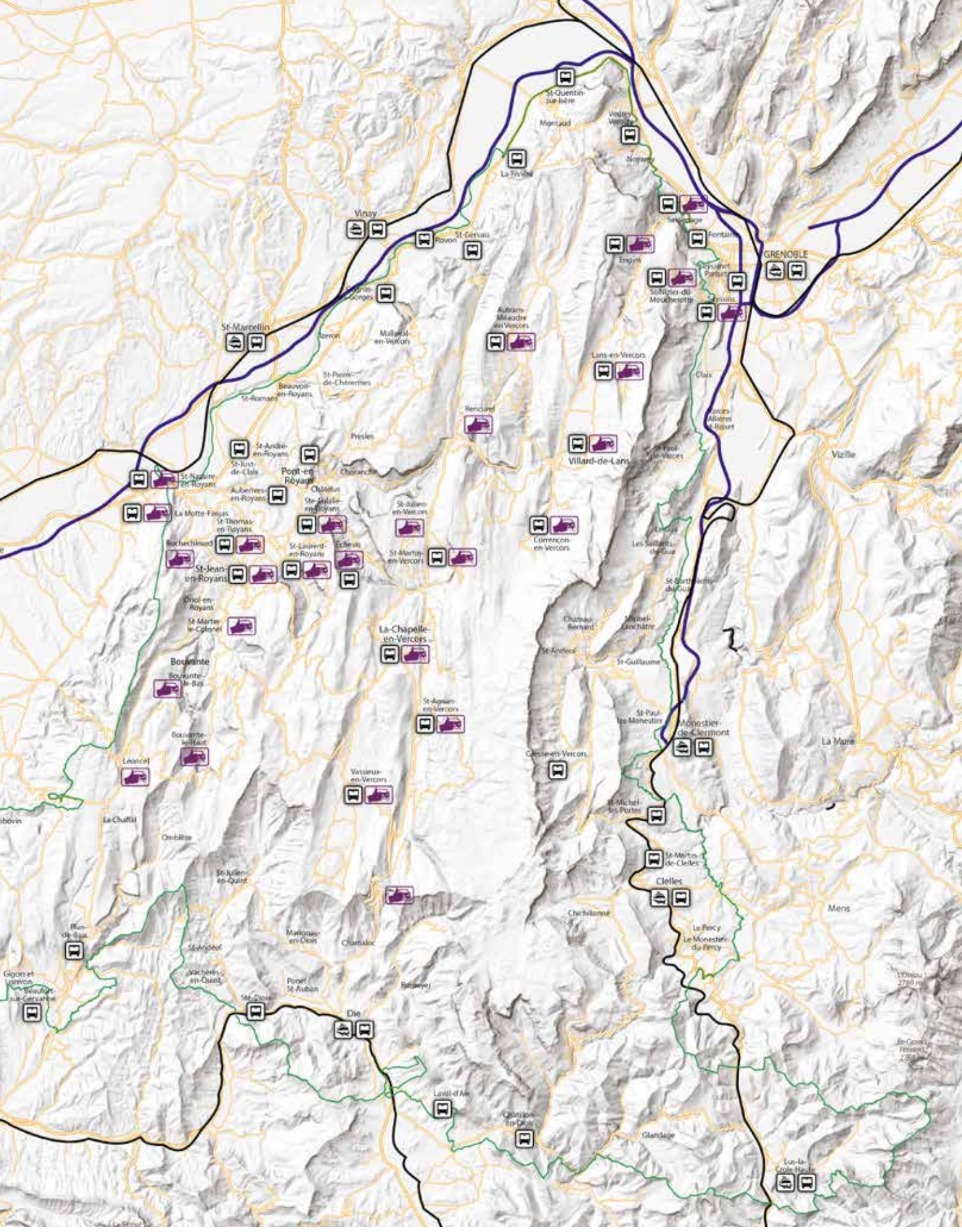
Main access to the Vercors massif are : Grenoble, Die, Crest, Saint-Marcellin and Romans. There are few train stations inside the Park and some bus service. Access to the IDSR project of the Vercors is part of the reflection on mobility.

ACCESSIBILITY MAP OF VERCORS



LEGEND

- Train station
- Bus stop
- Hitchhiking point
- Road
- Railway
- Highway


St-Quentin-sur-Isère
Monsteud
Voreppe
Noyarey
La Rivière
Vinay
St-Gervais
Rovon
Fontaine
Engins
GRENOBLE
St-Nicolas-de-Macherin
Sassenage
St-Marcellin
Auturans-Méaudre-en-Vercors
Lans-en-Vercors
Claix
Beauvoir-en-Royans
St-Pierre-de-Chérennes
Rencurel
Villard-de-Lans
Vizille
St-André-en-Royans
St-Just-de-Claix
Pont-en-Royans
St-Nazaire-en-Royans
Choranche
Presles
Auberives-en-Royans
Châtelus
La Motte-Fanjas
St-Julien-en-Vercors
Corrençon-en-Vercors
St-Thomas-en-Royans
Rochechinard
St-Laurent-en-Royans
Echevis
St-Martin-en-Vercors
St-Jean-en-Royans
Onot-en-Royans
St-Martin-le-Colonel
La-Chapelle-en-Vercors
Bouvante
Bouvante-le-Bas
St-Agnan-en-Vercors
Monestier-de-Clermont
La Mure
Bouvante-Vallaut
Léoncel
Vassieux-en-Vercors
Gresse-en-Vercors
St-Michel-les-Portes
Le Chaffal
Omblèze
St-Julien-en-Quint
St-Martin-de-Clelles
Clelles
Mens
Chichilianne
Marignac-en-Diois
Chamaloc
St-Andéol
La Piercy
Le Monestier-du-Percy
Pont-St-Auban
Die
Luc-la-Croix-Haute

3. CHARACTERISTICS OF THE VERCORS TERRITORY

3.1. A united and contrasted mountainous territory

Royans Isère

Royans Isère is on the West border of the massif. Presles cliffs, hanging houses of Pont-en-Royans town, Nan gorges next to Cognin-les-Gorges, Coulmes forest and walnut fields are typical landscapes of the sector.

This sector is close to Valence and Grenoble and close to smaller important cities (Saint-Marcellin).

There is less tourism than in the rest of the massif. The altitude is between 200m and 1000m.

Photo : Cloclem

Hanging house in Pont-en-Royans

Royans Drôme

Royans Drôme sector is composed of a succession of majestic places : roads perched on the cliff side as Combe Laval, carved in a gorge as Grand-Goulet or Fond d'Urle cliffs and mountain pastures.

The influence of Valence-Romans agglomeration is relatively important on the West border.

Cliffs, forests and verdant hills marked by agricultural meadows follow one another from the East to the West of the sector.

Photo : S & M Booth

Vertiginous road in Saint-Jean-en-Royans

Photo : Fabian Da Costa

View of Piémont Nord and Grenoble urban area

Piémont Nord

The Northern Piedmont is the most urban part of the Park.

The influence of Grenoble is high as a significant part of the municipalities are part of Grenoble metropolis.

The population is dense and growing. Trois Pucelles, Sassenage gorges are typical landscapes of the sector.

Photo : Pascal Conche

Chichilianne village and Mont-Aiguille in Trièves

Trièves

Trièves is located in the south-east of the Park. It has some modest ski resort and is appreciated for several emblematic hikes and climbing site (on the picture, the Mont-Aiguille).

The population is growing, and the territory has a strong link with Grenoble thanks to an easy access. The south of the Trièves is more isolated. The population is primarily active and works in Grenoble.

The landscape is marked by agricultural meadows and forest and the massive cliff that are the frontier with the largest French National Natural Reserve.
The valley is cut out by medium relief. This shapes an attractive picture for ecotourism.

Photo : Fabian Da Costa

Saint-Martin-en-Vercors plain

Vercors Drôme

Vercors Drôme is the center of the Vercors and the historical core of the territory. Partly cover by the largest National Natural Reserve, it is maybe the most isolated and wild zone of the massif. The territory is attractive for its hikes and natural landscapes are preserved thanks to its isolation.

This sector is also marked by the World War II history, it was indeed a high place of resistance. A museum and memorial in Vassieux en Vercors share this memory.

They are a Prehistory Museum as prehistoric traces of human activities were found in different places and caves.

Gervanne

Between Vercors Drôme and Diois, the Gervanne Valley open one of the doors of the Park. It has a contrasted landscape: high cliffs rub shoulders with green hills and forest. La Gervanne is also a river. Omblèze gorges, known place for climbing, Druise waterfall, Ambel plateau are part of the emblematic landscapes of the sector.

Gervanne is also a key place for bats. It counts numerous breeding gite and hunt areas that are protected thanks to a large protected area (Natura 2000) managed by the Park.

Photo : Fabian Da Costa

Rock of Vellan in Plan-de-Baix

Diois

The Diois has a Provencal influence and is a major touristic spot in summer. The climate is mild in comparison with the rest of the massif. The Drôme is an emblematic river that traverse the territory. The relief is marked. Some spectacular landscapes are protected as Le Claps, that is the result of a major landslide close to Luc-en-Diois, or Archiane cirque.

The Glandasse Mountain that dominate the valley, the vine used to produce the typical sparkling wine Clairette de Die and lavender are emblematic landscapes of the sector. Die is the chief town and has an interesting cultural heritage, with an imposing church.

Photo : Emilie3838

Die Market

Quatre Montagnes

Quatre-Montagnes sector is one of the most developed sector of the massif. Ridge and cliff associated with an agricultural high valley shapes the landscape. Molière plateau, Pic Saint-Michel and Ramées Plateau are emblematic landscapes.

Quatre-Montagnes is close to Grenoble and easy to access for the urban population of the city. It also where the biggest ski resort is. The touristic attendance is strongly linked with outdoor activities and is high in winter and summer.

Photo : S & M Booth

View of Trièves from Northern crests

3.2. Structural activities in the Vercors massif

Photo : Pascal Conche

The main part of the population works outside the massif. Inside the Vercors area, tourism, farming and forestry are the structuring activities.

Only 2% of the active population has a farming or foresting activity. Farming and foresting activities do not have a major economic weight but it shapes landscapes and is a showcase of the territory. There are diverse farming productions, linked to the different geographic and climate contexts :

- Diois is marked by sheep farming in altitude, wine and aromatic plant as lavender in the valley, as the climate is warmer and dryer than the rest of the massif.
- Royans is a land of walnut and grain farming.
- Vercors Drôme and Quatre Montagnes are a land of livestock breeding with numerous pasture.

Photo : Lucie Moraillon

- In Trièves, farms produce milk, meat and cereals.
- Gervanne is the most diversified sector with numerous small farms with specialized production as aromatic and medicinal plants and vegetable growing. This sector is the cradle of the Biovallée which promote agroecology and organic farming.

There is a significant part of traditional production: Grenoble walnuts, Clairette de Die (wine), Bleu du Vercors-Sassenage (cheese), cheeses. These traditional products are protected and promoted by national labels that guarantee how the product has been farm and prepared and where it comes from. There are 8 AOP (Apellation d'Origine Protégée) and 13 IGP (Indication Géographique Protégée) on the Park territory. The Park also has its own brand to promote local product that share Park values.
Even if 40% of farms are breeding livestock, farm productions recently evolved to a more diversify offer. Organic farming increases by 20% between 2012 and 2017. It represents 30% of the farm and 14% of the area.

As everywhere else in France, the number of farm decreases and farms tend to become bigger. Nevertheless, farming activity is evolving to a quality approach and more diversified production.

Photo : Bertrand Claeyssen

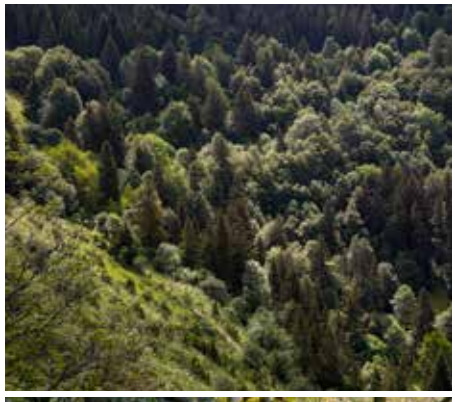
Photo : Fabian Da Costa

Forests represent 69% of the territory, thus it shapes the main part of the landscape. About 50% of the forest belongs to private owners.

Forests and farms are vulnerable to climate change and practices have to accommodate. Water resource and vegetation changes are the main stakes to take into account. For example, lack of water in pasture could stop pastoralism in some area.

That would mean that forest could grow instead of grassland. Landscapes are shaped by forest and farming activities and are an important part of the massif identity.
That's why the Vercors natural regional Park works close to these issues. Night conservation is not directly linked to these issues. But IDSR project contributes significantly to the biodiversity conservation and to the energetic and climatic bill reduction by a better management of lighting. This is an added value for all the productions from the territory.

Photo : Gaetan Mah



Photos : Paul-André Coumes

3.3. Touristic development and environmental friendly approach of tourism


Photo : S & M Booth

Sunset on high plateaus

Approximately 4% of the active population work in the tourism sector. **Tourism constitutes the major economic sector of the massif.** Vercors is is a well known touristic place : all the tourist sites register a total of 433 000 visitors by year and this number does not count visitors which come for the nature and ski resorts.

Tourism is shown by the proportion of secondary houses, that reach 57% in Quatre-Montagnes sector, 48,7% in Trièves, 45,5% in Vercors Drôme, and 29% in Diois. In total, it represents 18,5% of dwellings on the Vercors natural regional Park territory. **The main component of tourism is winter tourism. It represents 1.3 million trips and 755 106 nights by year.**

There are 9 ski resorts on the Vercors massif mainly located in Quatre-Montagnes area, where the biggest ski resort are. All in all, there are 530 km of tracks for cross country skiing and 86 slopes for downhill skiing. The main ski resort is Villard-de-Lans. Winter tourism also takes place in the Vercors drômois for cross country skiing mainly. This type of tourism is threaten by climate change as snow cover decreases and becomes more irregular. Years considered as "bad" will take place each three year by 2050 instead of each five year currently. It means that tourism and especially winter tourism has to evolve.


Starry night on high plateaus

Photo : Vercors nature

Summer tourism represents 885 000 days of excursion by year. People are attracted by outdoor activities offer and especially hiking.

There are 4,000 kilometers of hiking tracks that allow people to cross all the massif. In summer, tourism is homogeneous all over the territory. Excursionists are families and people attracted by outdoors activities.

They are often local, from cities around the massif as Grenoble. Tourists, which stay a longer time, are mainly from Île de France Region, PACA Region or from other countries as the Netherlands or Germany.

The development of outdoors activities sometimes creates conflicts of use and can become a threat for the biodiversity and natural environment in general when attendance is high. This added to the fact that winter tourism is threaten, incite tourism professional to change their practices. The Vercors natural regional Park works to create a touristic offer consistent with its values of environment preservation and territory development.

Inspiration Vercors as been developed to answer this challenge. "Inspiration Vercors is a collective of actors (public and private) who share the love of the Vercors and wish to unite to reinforce the notoriety and brand image of the Vercors." Their values are "Freedom", "Transmission", "Protection" and "Resourcing". They aim to create an environmental friendly tourism that is adapted to the territory and based on the resources of the territory. This demands to create a united communication between professionals and to create tools to inform the public.

The night sky represents a valuable resource of the territory that makes sense with the tourism orientation of Vercors. The IDSR project designation fits in the orientation of Inspiration Vercors and the aim of a respectful tourism.


Photo : Inspiration Vercors

Cycling excursion in Plan-de-Baix

Nordic ski in Vercors


Photo : Pascal Conche

3.4. Historical heritage of the Vercors massif

Archaeological site of flint knapping in Vassieux-en-Vercors

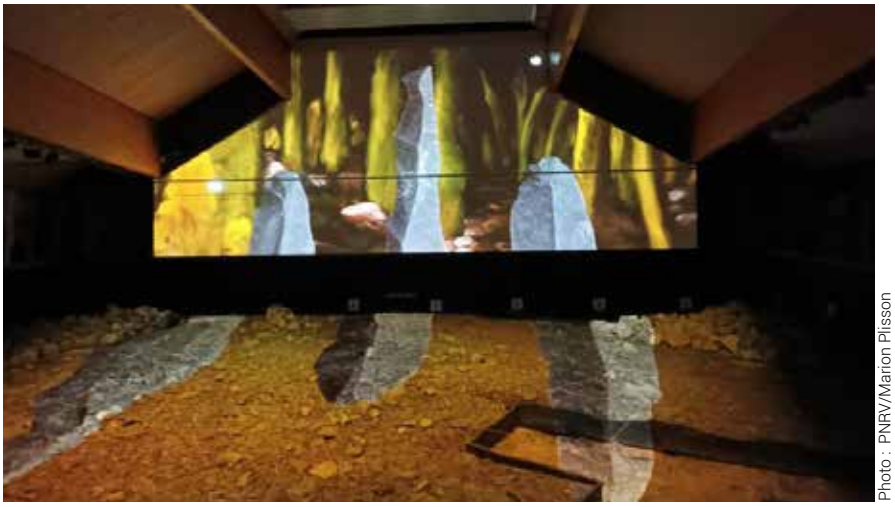


Photo : PNRV/Marion Plisson

The Vercors massif has been traveled and **inhabited for 50,000 years by the women and men of prehistory** : marmot hunting, flint knapping, mountain exploitation, ornamental and art making, animal domestication...

The climatic softening puts an end to the ice ages : Neanderthal makes his first incursions on the Vercors massif to hunt a varied fauna such as ibex, chamois, wild boar, cave bear... and exploits an **abundant raw material in the Vercors, the flint.**

Then Cro-Magnon succeeded Neanderthal : it is the Paleolithic. Groups of mobile **hunters set up camp in the open air or in shelters under caves**, as in Presles, in the Prélétang cave (Isère). It is a new civilization marked by technical innovations, the emergence of artistic thought (the ticked bone of the cave of Thaïs, in Saint-Nazaire-en-Royans is a beautiful example) and the appearance of funeral rites (like the tomb of a Paleolithic hunter found in the cave Joëlle in Saint-Agnan-en-Vercors).

Photo : Yves Juvin

Camp at the Pas de l'Aiguille

Finally, following the Mesolithic hunters who developed new hunting weapons, including the bow, women and men domesticated animals (the dog or the «tamed» bear of the Grande Rivoire in Sassenage), became breeders, farmers and settled. This is the time of the Neolithic.

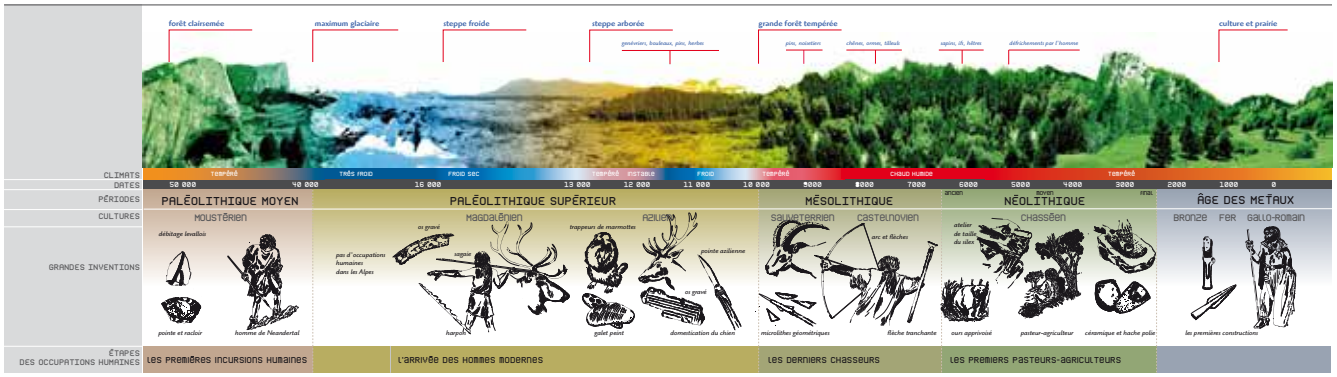
It was at this time, 4,000 years ago, that craftsmen came to carve flint in Vassieux-en-Vercors, on the site of the current Museum of Prehistory.

It is only in the 12th century that the imprint of man begins to deeply mark the landscape. From then, the agricultural domains will not cease to grow and the population to increase.

This evolution will reach its peak in the middle of the XIXth century. The landscape is then that of a humanized mountain with as a corollary the development of natural risks linked to water : erosion upstream and flooding downstream of the watersheds. The national policy of restoring mountain land, during the second half of the 19th century, laid the foundations for the formation of today's landscapes through reforestation, agricultural conversion (development of cattle breeding), the creation of new roads...

More recently, the evolution of agricultural activity, combined with the influence of the urban centers of Grenoble and Valence, has reduced the population of the villages and hamlets, leaving a large part to the wasteland and the forest.

The landscapes of the Vercors bear a multitude of traces testifying to a past of great richness like a history book.



Conception graphique JP. Bos, illustrations Y. Juvin

Chronology of human settlement in Vercors

On the High Plateaus

On the High Plateaus, **the first traces of human occupation date back to the end of the Upper Paleolithic (about 12,000 years ago)** with, in particular, traces of exploration of deep cavities (torch marks).

It was during the Mesolithic and Early Neolithic periods that prehistoric man exploited this area the most, probably in search of more abundant game than in the plains.

They have left us numerous remains, reflecting relatively long seasonal habitats. In the Final Neolithic, men came here episodically, to carry out hunting raids.

Forestry and pastoralism are the two activities that have most shaped our territory, their origin is very distant. The current landscapes and biodiversity are partly linked to these two activities.

The High Plateaus were a place of passage between Grenoble and Die. To connect these two cities by our contemporary roads, it is necessary to count a hundred kilometers. If you cut the route «as short as possible» through the mountains, the journey is reduced to 65-70 km, which means a time saving of one day for a man on foot or a mule, and half a day for a horseman.

This route was used in Roman times to bring down the stones cut from the Roman quarry located in the plain of Queyrie at 1700m altitude.

The Resistance during the Second World War

The Vercors is a high place of organization of the resistance during the Second World War since it sheltered a great number of resistance fighters. The territory experienced several tragic episodes during the summer of 1944 when the Germans took the Vercors and put an end to the resistance.

On the high plateaus, there are many places and sites that bear witness to these years of war: the Darbounouse meadow, the Pas de l'Aiguille, shepherds' and foresters' huts. In some places, steles and monuments remind us that this territory, although very remote, has not escaped the imprint of history and, to a certain extent, has constituted a fortress within a fortress.


Photo : Pascal Conche

The Memorial of the Resistance in Vassieux-en-Vercors


Photo : Régis Picavet

Excavation campaign at Pré Peyret (Chichilianne) - Mesolithic

3.5. Landscapes and Natural environments

The natural environments are diverse because of contrasted climate and contrasted geographical conditions. There is a rich biodiversity : the six French wild large ungulates are present, the specific limestone relief created a large network of caves where live a diverse cavernous fauna and 1 800 species of plants exist in the Park. In the National Natural Reserve of the Vercors High Plateaus, there are 600 different plant species associated with hook pine forest, arid lawn and rock outcrop environments.

This diversity of natural environments associated with the traditional human activities shaped typical and remarkable landscapes : altitude pasture, meadow, dry lawn, forest, ravines, gorges and waterfalls…

- Forests cover 67% of the Park territory.
- Meadow came from traditional agriculture, they are decreasing since agriculture decrease: hardly accessible plots are abandoned and progressively colonized by forest.
- Lawns are part of the original environment of the subalpine stage. They are located on altitude plateau and particularly on the Natural Reserve. This natural environment is fragile and is the shelter of characteristics plant species.
- The moors are located on the slope of the South of the Park. They are dominated by shrubby species as the dwarf juniper. They often shape a mosaic with forest environment.
- There are many rock environment – scree, escarpment and cliffs - in the Vercors. Cliffs are the physical limits of the massif, where you can find remarkable plant species.
- Humid zones are scarce on karstic system as the Vercors. There are approximately 200 humid zones on the massif. Climate change and human activities threaten them and they regress. They are fundamental for water circulation regulation.

Valley of la Jarjatte, Lus la Croix Haute

Photo : S & M Booth

Valley of Combau in South part of the National Reserve

Photo : Fabian Da Costa

The emblem of the Vercors regional Park is the wild tulip and a black grouse. This shows the importance of the biodiversity issue for the territory. It is an element that the Park want to highlight for the IDSR project designation.

A large part of the territory is protected for environmental purpose. The protection of the environment and the biodiversity is part of the missions of the Regional Park. The main protected area is the National Natural Reserve of the Vercors High Plateaus, created in 1985. It's the biggest National Natural Reserve in France. It measures 170 km2. The Park is the manager of this Reserve. **This area is the base of the Vercors IDSR project core zone**. To which have been added : two Biological Reserves, one Important Zone for Bird Conservation, Natura 2000 areas, protected sites for their landscape or their cultural heritage.

Réserve Naturelle
HAUTS PLATEAUX DU VERCORS

Nature reserves are protected territories created on the initiative of the State and placed under its authority. There are now nearly 350 of them spread throughout France. They play an active role in the conservation of natural heritage. The Hauts-Plateaux du Vercors is listed as a «National Nature Reserve» since 27 February 1985.

The Hauts-Plateaux Reserve is unique in its size : **17.000 hectares, that is 170 square kilometer. It covers about 8% of the territory of the Vercors natural regional Park. The altitude is between 1.050 m and 2.341 m (with the Grand Veymont as its highest point) and the Reserve is subject to very contrasting climatic influences, at the hinge between the northern and southern Pre-Alps.** Pastoralism and forestry has shaped the Hauts-Plateaux since prehistoric times. Pastoralism has been practised there for more than two thousand years. Nowadays, other activities are also practised: hiking, scientific research, hunting...

The reserve is marked by an **alternation of mountain pastures and forests and has the largest forest of hooked pine in the limestone alps.** It has a rich flora of about a thousand species. The animal life is discreet but rich. Most mountain species can be observed: marmot, black grouse, golden eagle, chamois... As well as rarer species such as the rock ptarmigan, the mountain hare, the wolf, the little owl or the Tengmalm's owl. Some species have been reintroduced such as the Alpine ibex, the bearded vulture, the griffon vulture or the marmot. Although the reserve today keeps a wilderness aspect, it demands daily management, provided by the Parc du Vercors. Work aims in particular to preserve the fauna, flora and built heritage. The guards carry out the main missions of the Reserve: scientific, reception and information of the public, environmental education and nature policing.

The Reserve, because of its particular geographical situation and high biodiversity, fulfils the function of a scientific laboratory. Some species are meticulously monitored by inventories and studies. Other researches are carried out : historical or geological. **Observatories permit to monitor the long-term impacts of tourist numbers and climate change on biodiversity.**

3.6. Geographical and natural caracteristics of Vercors


Photo : PNRV / Nicolas Antoine

A massif rising from the sea and from the night of time

23 million years ago, the Vercors emerged from the depths of the ocean. The main features that constitute it are indissolubly linked to a geological adventure that founds the main lines of its landscape gathering cliffs, plateaus and gorges in an immediate environment of plains and more modest hills.
This massif, **made up of sedimentary rocks** (limestone family) is the heritage of a history in three stages: sedimentation - emergence - erosion, direct consequence of the movement of the continents on the surface of the Earth (plate tectonics).

A crossroads of climatic influences

Located at the transition between the Northern Alps and the Southern Alps, the Vercors is subject to **the triple climatic influence of altitude, oceanic precipitation and Mediterranean regimes.**


Photo : Fabian Da Costa

These influences, visible in both rainfall and temperature, make the Vercors a particular pre-Alpine massif and contribute greatly to the richness of the environments and species found in the area. In the future, if the announced climate changes are confirmed, the balance of these three influences will be modified. What are the repercussions on the evolution of the biodiversity of the Vercors ?


Photo : Grégory Loucougaray

A territory rich and diversified in fauna and flora

In the plains and on the first slopes of the massif, the pubescent oak makes up the wooded areas. With the altitude, the forest stands evolve. One can walk through the beech-fir forests, typical of the montane level, or the pine forest of hooked pines, more characteristic of the subalpine level.

Crops, meadows or mountain pas**tures, the open environments are very** diversified. There are lavender fields as well as hay meadows, wild ungulates and domestic species.
The rocky environments are omnipresent in a limestone massif like the Vercors. Lapiaz, scree, cliffs, caves and karstic networks are the trademark of the landscapes here.

If **water is a rare element on the surface of the Vercors**, wetlands are all the more important. One can find for example wetlands, rivers, ponds, peat bogs, vast networks of underground river

The Parc du Vercors is also home to preserved areas such as the Hauts-Plateaux du Vercors Nature Reserve; Sensitive Natural Areas (ENS) and Natura 2000 sites (European network of natural sites, that have high heritage value because of the exceptional fauna and flora they contain).


Photo : Fabian Da Costa

3.7. Species sensitive to light pollution present in Vercors

Numerous species sensitive to light pollution are present on the territory of the Vercors Park and more particularly on the part of the territory concerned by the IDSR project.

These species are listed in the following table and are mainly nocturnal birds of prey (owls) and bats.

Group	Common name	Scientific name	Status in the Parc	IUCN
Strigiform	Grand-duc d'Europe	Bubo bubo	Nester	LC
Strigiform	Hibou moyen-duc	Asio otus	Nester	LC
Strigiform	Petit-duc scops	Otus scops	Nester	LC
Strigiform	Effraie des clochers	Tyto alba	Nester	LC
Strigiform	Chouette hulotte	Strix aluco	Nester	LC
Strigiform	Chouette de Tengmalm	Aegolius funereus	Nester	LC
Strigiform	Chevêche d'Athéna	Athene noctua	Nester	LC
Strigiform	Chevêchette d'Europe*	Glaucidium passerinum	Nester	NT
Chiroptera	Petit Rhinolophe	Rhinolophus hipposideros	Certain presence	LC
Chiroptera	Grand Rhinolophe	Rhinolophus ferrumequinum	Certain presence	LC
Chiroptera	Rhinolophe euryale	Rhinolophus euryale	Certain presence	LC
Chiroptera	Murin à moustache	Myotis mystacinus	Certain presence	LC
Chiroptera	Murin de Brandt	Myotis brandti	Certain presence	LC
Chiroptera	Murin d'Alcathoé	Myotis alcathoe	Certain presence	LC
Chiroptera	Murin de Daubenton	Myotis daubentoni	Certain presence	LC
Chiroptera	Murin de Bechstein	Myotis bechsteini	Certain presence	NT
Chiroptera	Murin à oreilles échancrées	Myotis emarginatus	Certain presence	LC
Chiroptera	Murin cryptique	Myotis crypticus	Certain presence	NE
Chiroptera	Murin de Natterer	Myotis nattereri	Certain presence	LC
Chiroptera	Grand Murin	Myotis myotis	Certain presence	LC
Chiroptera	Petit Murin	Myotis blythi	Certain presence	NT
Chiroptera	Noctule commune	Nyctalus noctula	Certain presence	VU
Chiroptera	Noctule de Leisler	Nyctalus leisleri	Certain presence	NT
Chiroptera	Grande Noctule	Nyctalus lasiopterus	Certain presence	VU
Chiroptera	Sérotine commune	Eptesicus serotinus	Certain presence	NT

Group	Common name	Scientific name	Status in the Parc	IUCN
Chiroptera	Sérotine de Nilsson	Eptesicus nilssoni	Certain presence	DD
Chiroptera	Sérotine bicolore	Vespertilio murinus	Certain presence	DD
Chiroptera	Pipistrelle commune	Pipistrellus pipistrellus	Certain presence	NT
Chiroptera	Pipistrelle pygmée	Pipistrellus pygmaeus	Certain presence	LC
Chiroptera	Pipistrelle de Nathusius	Pipistrellus nahusii	Certain presence	NT
Chiroptera	Pipistrelle de Kuhl	Pipistrellus kuhli	Certain presence	LC
Chiroptera	Vespère de Savi	Hypsugo savi	Certain presence	LC
Chiroptera	Oreillard roux	Plecotus auritus	Certain presence	LC
Chiroptera	Oreillard gris	Plecotus austriacus	Certain presence	LC
Chiroptera	Oreillard montagnard	Plecotus macrobullaris	Certain presence	VU
Chiroptera	Barbastrelle d'Europe	Barbastrella barbastrellus	Certain presence	LC
Chiroptera	Minioptère de Schreibers	Miniopterus schreibersii	Certain presence	VU
Chiroptera	Molosse de Cestoni	Tadarida teniotis	Certain presence	NT

* Chevêchette d'Europe is diurnal.
VU = vulnerable ; NT = near-threatened ; LC = low concern ; DD = data deficient ; NE = not evaluated

Myotis mystacinus

Glaucidium passerinum

Aegolius funereus

Nyctalus leisleri

The natural environments (and sometimes anthropic for the isolated buildings which offer a shelter to certain bats) are in a good state of conservation on the territory of the Vercors Park and offer favorable living conditions to these species. Globally, on the territory, the ecosystems in which these species are found are said to be «functional», that is to say that they play their roles and provide all kinds of ecological services.

These species that contribute to these ecological services are for the most part also considered as **indicator species of their good functioning**. They are especially strongly impacted by light pollution which can profoundly modify their habitat, to the point of making it unusable by them. The conservation of natural habitats is therefore an important issue for the territory, and the Park Charter currently being validated specifies this in one of its 18 measures: measure 1.2 aims to **«preserve natural environments and their functions».**

Many actions are carried out on the territory to respond to this measure. **The Vercors Park manages many protected natural areas in its territory** : Natura 2000 sites, Sensitive Natural Areas and National Nature Reserve. The conservation of these species and the preservation of these natural environments are at the heart of the management documents of these sites.

With its partners, the Park monitors many of these species :

- for the group of strigiformes: Great Horned Owl, Long-eared Owl, Tawny Owl, Barn Owl, Tengmalm's Owl, European Pygmy-Owl, and Little Owl are monitored.
- and for the group of chiropterans: monitoring operations are carried out by sound recordings and/or captures.

The classification of a part of the Vercors Park as an IDSR will undoubtedly be an asset for these sensitive and sometimes endangered species.

Glaucidium passerinum

Photo : PNRV / Jean Andrieux

4. ELIGIBILITY CRITERIA

4.1. Criteria 1 - Nature of the core

The core of the Vercors IDSR project is made up of many sites known nationally or internationally, which are points of interest for scientific, natural, cultural or tourism reasons.

The Park has chosen to propose a IDSR project with the National Reserve in its core zone, because of the total absence of lights and for its frequentation by hikers all around the year (about 100,000 visitors/year). To this area, we added in the core zone another preserved area : Natura 2000 zone of «Rebord médidional du Vercors», also thanks to the sky quality of this area and its frequentation.

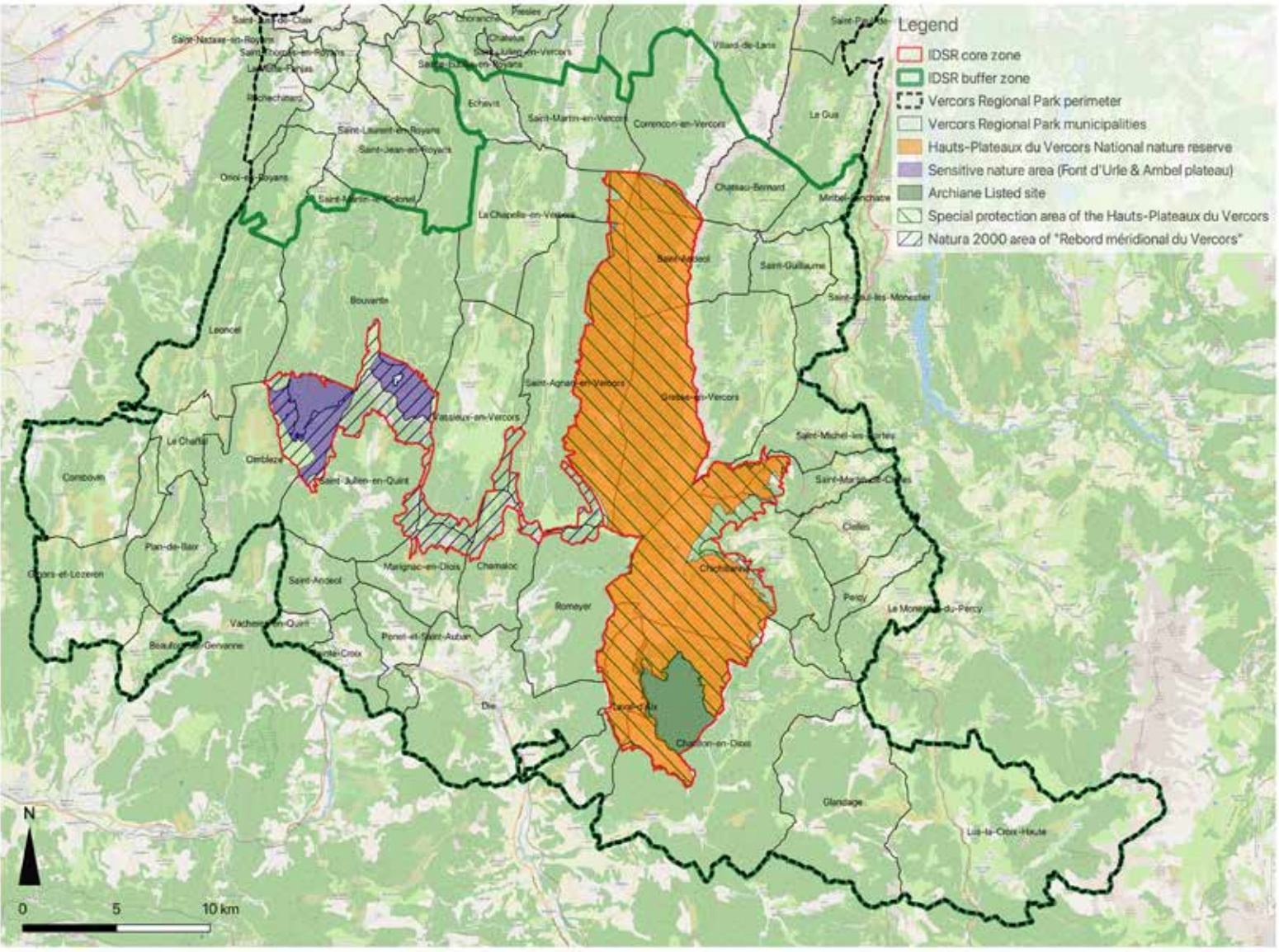
The two sensitive nature areas of Font d'Urle and Ambel Plateau (contained in the Natura 2000 zone) are very specific and well know places for wild fauna observation having between 25,000 an 35,000 annual visitors, as many additional chances to raise awareness of public.

This choice brings the core zone to 245 km2 (see the attached map). The Park has a very good knowledge of the chosen zoning as the core zone, since these are natural spaces that the Park manages. It is also the sector where the brightness of the sky is the best with 21.54 mag/arcsec2 on average.

Despite its protected status, this area is of course fully accessible to the public, by road, as well as by numerous hiking trails. It also includes two hamlet settlements, Font d'Urle and Achiane that turn off the lights during the night.

LEVEL	STATUS	NAME	AREAS
Europe	Natura 2000 Habitats Directive.	Rebord méridional du Vercors (partially), site code : FR8201782	47.3 km² 100% in the core
		Hauts-Plateaux et contreforts du Vercors oriental (partially), site code : FR8201744	
Europe	Natura 2000 Birds Directive (ZSP)	Hauts-Plateaux du Vercors, site code : FR8210017	175.9 km² 100% in the core
France	National nature reserve	Hauts-Plateaux du Vercors	170.2 km² 100% in the core
France	Biological integral reserve	Vercors, site code : FR2400206	
		Archianne, site code FR2300175	
Region	Regional Natural Park	Vercors natural regional Park (partially)	
Departement	Sensitive Nature Area (ENS)	Plateau d'Ambel	12.4 km²
		Alpages de Font d'Urle	6.0 km²
Departement	Registered sites	Cirque d'Archiane	12.7 km²

PROTECTED ZONES MAKING UP THE CORE ZONE



© PNRV

Hauts-Plateaux du Vercors National Nature Reserve

Located between 1050 m and 2341 m of altitude, the Hauts-**Plateaux du Vercors national nature Reserve is the largest part of the core zone.** It was created on February 27, 1985 and extends over the departments of Drôme and Isère for a surface area of 17,030 ha (10% of the current territory of the Park), which makes it the largest national nature Reserve in metropolitan France.

Open to the public with specific rules, the activities carried out on the reserve are numerous : hiking, pastoralism, scientific research, and hunting. Rich of 738 floral species, it is also a place of reintroduction of species like the Alpine ibex, the Griffon vulture, the Bearded vulture or the Marmot.

Created on the initiative of the French State, the National Reserve is managed by the Park, on the field the reserved is under the control of rangers. Their missions are numerous, they ensure the respect of the rules and ensure a function of police, carry out a scientific and naturalistic follow-up, help with the good progress of the pastoralism and communicate and sensitize the visitors.

The Special protection area of the Hauts-Plateaux du Vercors measured 175.9 square kilometers and cover all the national nature Reserve. It's an add-on to the protection of the area.

Photo : PNRV/Nadia Roblet

Eastern barrier of hight plateaus of Vercors

Sensitive Nature Area of Ambel plateau

The sensitive nature area of Ambel plateau measures 12.2 square kilometers. **The land is owned by the Drôme department, which ensured the management of the area, since 1954.**

The site have multiple functions : pastoralism, forestry, touristic (hiking, ski, mountain bike,..) and area for biodiversity such as deer, wolf, bat, bird and flora. In this site there is no permanent habitation, only 3 shelters.

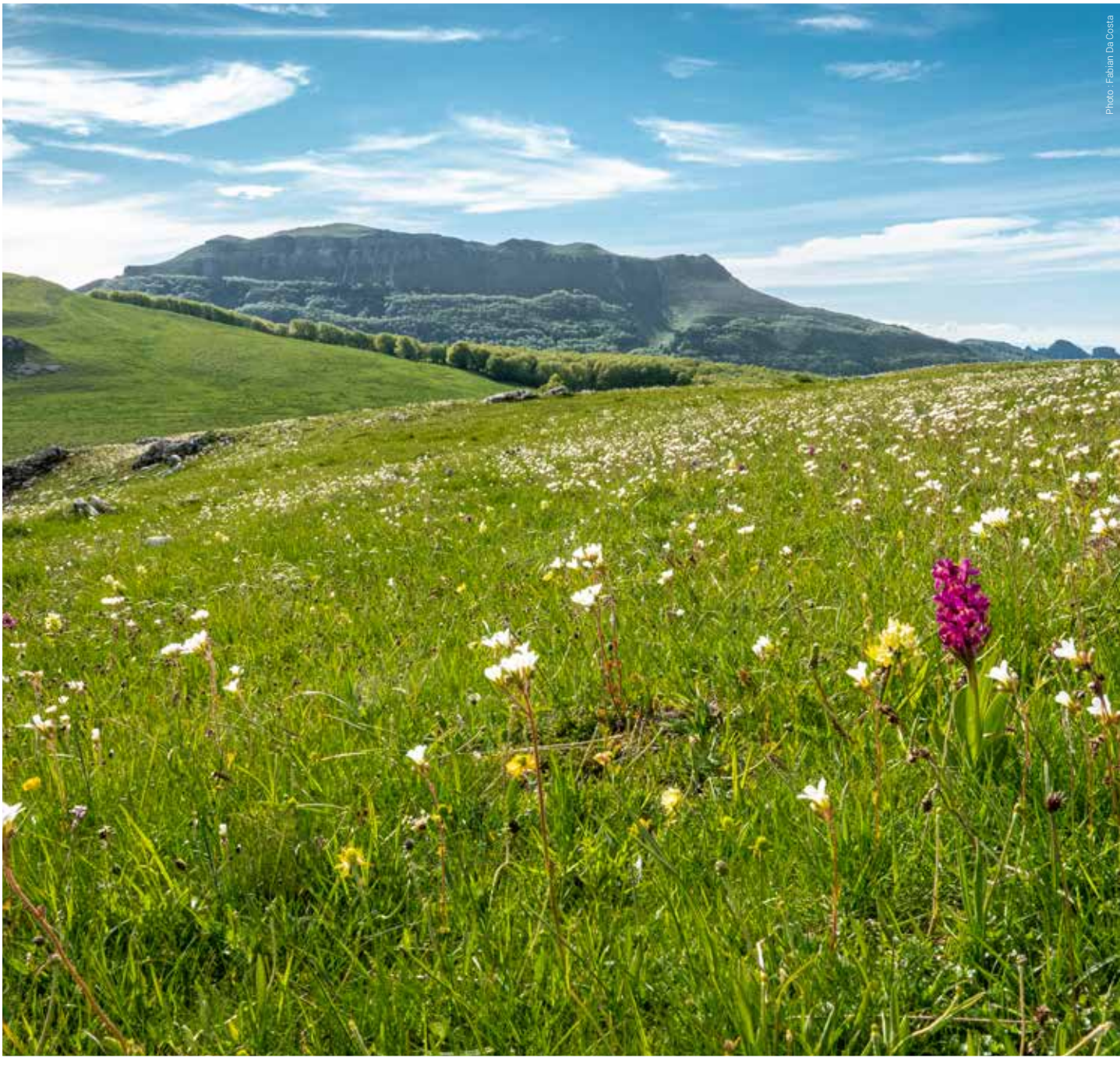


Photo : Fabian Da Costa

Grassland on high Ambel plateaus

Sensitive Nature Area of Font d'Urle Alpage

The sensitive nature area of Font d'Urle Alpage measures 6.0 square kilometers. The land is owned by the Drôme department, which ensured the management of the area since 1953.

The site of Font d'Urle is mainly known for its ski resort. One of the main challenges on the site is to is to take into account the environmental, heritage and economic issues of the ENS in the management of the site.
As Sensitive Nature Area the Font d'Urle Alpage is rich in biodiversity with various habitats, fauna and flora diversity. For centuries, the main activity in summer is pastoralism with the transhumance of horses, sheep and cattle.

The hamlet of Font d'Urle is not include in the Sensitive Nature Area but, it will have no sens to not include it in the Vercors IDSR project core zone cause some lighting fixtures are present in the hamlet.

Font d'Urle alpine pasture

Natura 2000 area of “Rebord méridional du Vercors"

The Natura 2000 area of “Rebord meridional du Vercors” measures 47.3 square kilometers. The management is ensured by the Park.

This area is composed of diversified natural environments : large cliffs and mountain ridges, beech and oak forests, slope and ravine forests, moors and grasslands.

- 23 habitats of EU community interest

The floristic and faunistic richness of the site reflects the Mediterranean and mountain climatic influences

- 11 animal species of EU community interest including 7 bats
- 10 birds of EU community interest
- 1 plant species of EU community interest and the presence of rare plant species endemic to the southwestern Alps.

Human activities: forestry, breeding, tourist activities tourist activities.

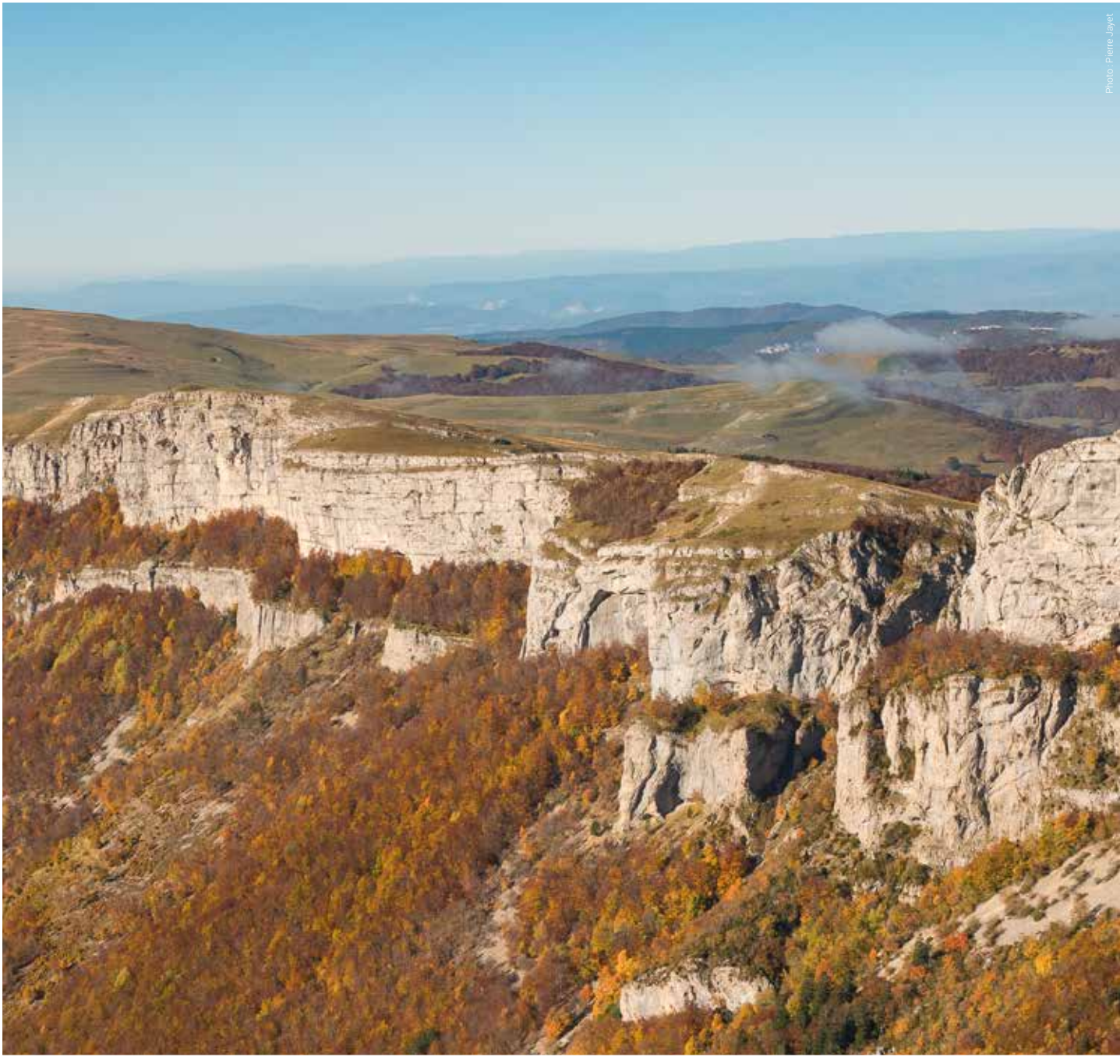


Photo: Pierre Jayet

Southern edges and Font d'Urle plateau

Biological integral reserves of Vercors and Archiane

The Vercors biological integral reserve is situated to the north of the Hauts-Plateaux du Vercors National Nature Reserve, at the heart of theVercors PNR. It covers an area of 2160 hectares, and it is integral to the core zone .

The Archiane biological integral reserves is situated to the south of the Hauts-Plateaux du Vercors National Nature
Reserve. It covers an area of 710 hectares, and it is integral to the core zone .

It is managed by the National forest office (ONF), the public body responsible for the management of public forest in France.

Biological integral reserves are a tool for the proper protection of public forests, a national political contribution to protecting natural spaces, and a sign of the commitment of France to international agreements and actions.

It is an area available for scientific research by research bodies and associations for the study and protection of nature.
Working in partnership is a major objective for this type of reserve.

The partnership allows the sharing of scientific, research and welcoming the public.

Photo : Fabian Da Costa

View of the south limits of hight plateaus of Vercors

Classified site of Archiane

The cirque of Archiane integrated in the core zone is classified by the State as a remarkable place for its landscapes. All works likely to modify the state of the site or its appearance are submitted to a prior agreement from the State services.

Photo : Office de Tourisme Pays Diois

Walk in Archiane cirque

4.2. Criteria 2 - Compliance of landowners

The Vercors core zone is mainly situated in uninhabited sites. The few buildings one finds are shepherds' huts, helters. We find only 2 hamlets on the Vercors IDSR project core zone : Font d'Urle in municipality of Bouvante and Archiane in the municipality of Châtillon-en-Diois.

Major part (97%) of the core zone is solely based on public land, owned by municipalities (40%), departments (29%) and the State (28%). Only 3% of the total area is owned by private individuals. In the periphery area it is more balanced as 51% of the land are public and 49% are private.

Nevertheless, the park is trying to raise public awareness (especially amongst residents of protected areas and tourists), by explaining light pollution and its impacts. Many activities are proposed for the public such as conferences, exhibitions, nighttime walks to discover the fauna, astronomy evenings and night walks around villages to assess public lighting and how to improve it. Similarly, a slideshow on light pollution is regularly presented to the local councils and at public meetings. Private landowners are invited to these meetings which prove to be productive exchanges.

Municipalities of Bouvante and Châtillon-en-Diois, where few houses are in the core zone are very well informed about our IDSR project. They have signed the IDSR chart to respect the IDSR project Lighting Management Plan (see appendixes).

Focus on the core zone :

The two small hamlets of Font d'Urle and Archiane located in the core zone are not very inhabited. Archiane (altitude 770m) and Font d'Urle (altitude 1450 m) include respectively about 20 houses and 50 houses. The great majority of these houses are secondary residences that are not very busy.

In Archiane the fixtures have been totaly renovated by the energy syndicate at the end of 2022. The old fixtures have been replaced by 6 points at 1800K in LED and ULR=0 in compliance with the LMP.

It is important to note the these retrofits have been facilitate thanks to the IDSR project carried by the Park. Indeed, **the Park has been selected for a call for projects from the State for the renovation of public lighting respecting biodiversity.** Thanks to these funds, we will be able to renovate 600 light points in 13 communes of the IDSR project, together with the energy syndicates. The hamlet of Archiane with the commune of Beaufort-sur-Gervanne, is part of the first achievements.

New fixtures installed in Archiane hamlet
(ULR=0 / 1800K)

Ligth points in the core zone before the renovation planned in 2023

Municipality	Technology	Power	ULR	Temperature (K)	Number	Extinction	Compliance with LMP
Bouvante (Font d'Urle hamlet)	HPS	100	5-10	<=2000	21	Yes 23:00-6:00	
Chatillon-en-Diois (Archiane hamlet)	DEL	42	0	1800	6	Yes 23:00-6:00	6

Font d'Urle hamlet is also included in the renovation project supported by the Park, the works are planned in 2023 with the energy syndicate of Drôme. **The planned renovation of the lighting will involve both the removal of some light points and improvements to the remaining ones.** The work will involve removing at least 5 of the 21 existing light points and completely renovating the remaining points (probably 17). All the new points will be identical to those installed in the hamlet of Archiane (1800 K, ULR = 0) in order to comply with the LMP.

The renovation project in the hamlet of Font d'Urle has already begun, the lighting studies have been carried out and the work should be completed by the end of 2023. Thanks to the Park, the municipality will benefit from an 80% subsidy for this renovation.

Touristic activities in the core zone / compliance with the IDSR project

There is little touristic activity in the hamlets of the core area. There is one lodging in each hamlet and a small ski resort in Font d'Urle, used on a daily basis by skiers coming from surrounding towns and villages.

«Gîte du bout du monde» in Font d'Urle (Albert et Florence Molina)

There is only one lodging located in Font d'Urle core zone. For one year the gite has not reopened. The owners are thinking about their activity. **There is no outside lighting** at the gite.

Font d'Urle ski resort

There is a small ski resort in Font d'Urle, between 1250m and 1700m. There are 52 km of alpine ski (8 ski lifts, and 16 ski slopes) and 132 km of nordic ski. This station is generaly opened from mid-December to end of March. But due to climate change the winter season is getting shorter.

https://www.lesstationsdeladrome.fr/stations/font-durle/

In a letter addressed to the Park, **the director of the ski resorts of the Drôme and manager of the station, confirms that there is no lighting on the slopes** of the resorts of Font d'Urle (and Col de Rousset) and that he has no plans in this direction (see appendix page 45) and the link to the letter.

Refuge d'Archiane (Jean-Luc Massera)

There is only one lodging located in Archiane core zone.

https://www.ladrometourisme.com/fiches/gite-detape-refuge-darchiane/

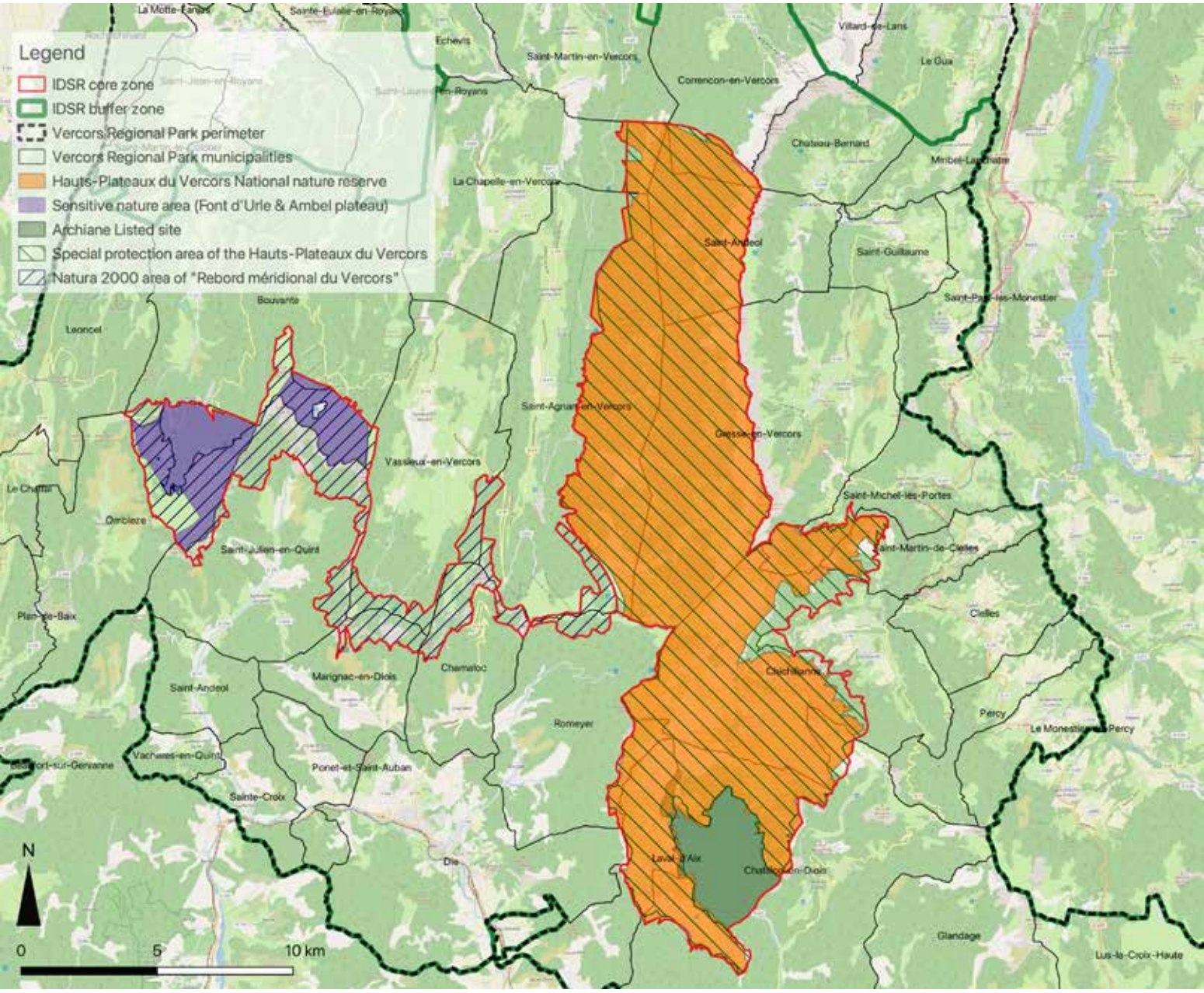
After an exchange with the owner of the Archiane refuge, he confirms **that there is no outdoor lighting.** He is very sensitive to the preservation of the environment in general and has no plan to install lighting.

4.3. Criteria 3 - Design of the core

The core area has a surface of 245 km2. The different protected areas that make up the core zone are accessible to the public by road and without any restrictions on walking.

As shown on this map, the core zone of the Vercors IDSR project is drawn with the boundaries of natural or cultural following sites : the Hauts-Plateaux du Vercors National Nature Reserve and Natura 2000 area associate, the Sensitive Natural Area of Alpages de Font d'Urle and Plateau d'Ambel, the classified site of Archiane and the Natura 2000 area of Rebord méridional du Vercors.

PROTECTED ZONES MAKING UP THE CORE ZONE



4.4. Criteria 4 - Design of the peripheral zone

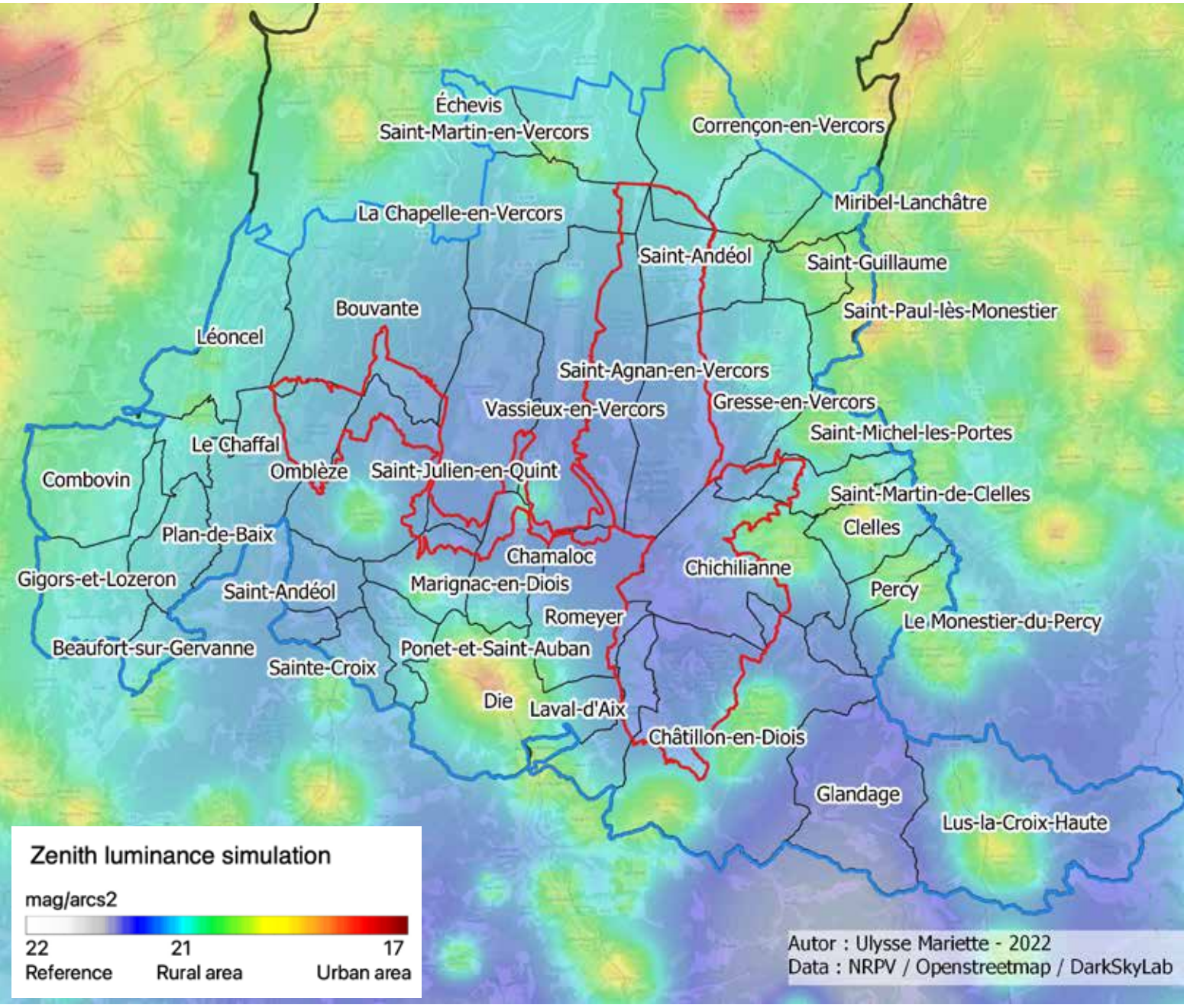
The buffer zone is an area of 1354 km² around the core zone (itself of 245km2). It contains 39 municipalities, including Die, a town of approximatly 4700 inhabitant. The boundaries of the buffer zone are the limits of the Vercors regional natural Park for the south part. For the north part it's the altitude witch decrease with the beginning the gorges of La Bourne.

The core zone fully encompass the boundaries of the National Reserve, and is additionaly extend to the West including Natura 2000 area.

The total area of the core zone is quite logical because made up of relatively flat highlands, naturaly protected from the intrusion of light pollution (higher than the urban areas of about 1000m to 1500m).
For those reasons, the buffer area is for sure sufficient to mitigate 80% of the light pollution despite the fact we do not reach the theoretical buffer of 15 km around the core zone.

The buffer zone is bound to grow with the extent of the limit of the Vercors Park and the addition of other municipalities with the goal to have the entire Park as buffer zone in 2038 like it is written in our chart.

MAP OF THE MUNICIPALITIES IN THE BUFFER ZONE (BLUE OUTLINE) AND THE CORE ZONE (RED OUTLINE)



4.5. Criteria 5 - Drawing of boundaries

No boundaries of the Vercors IDSR project, for both the core and buffer zones, were drawn in a way to avoid problematic areas. None of the zones have gaps or holes.
The core zone is entirely within protected areas, and follow these existing boundaries.

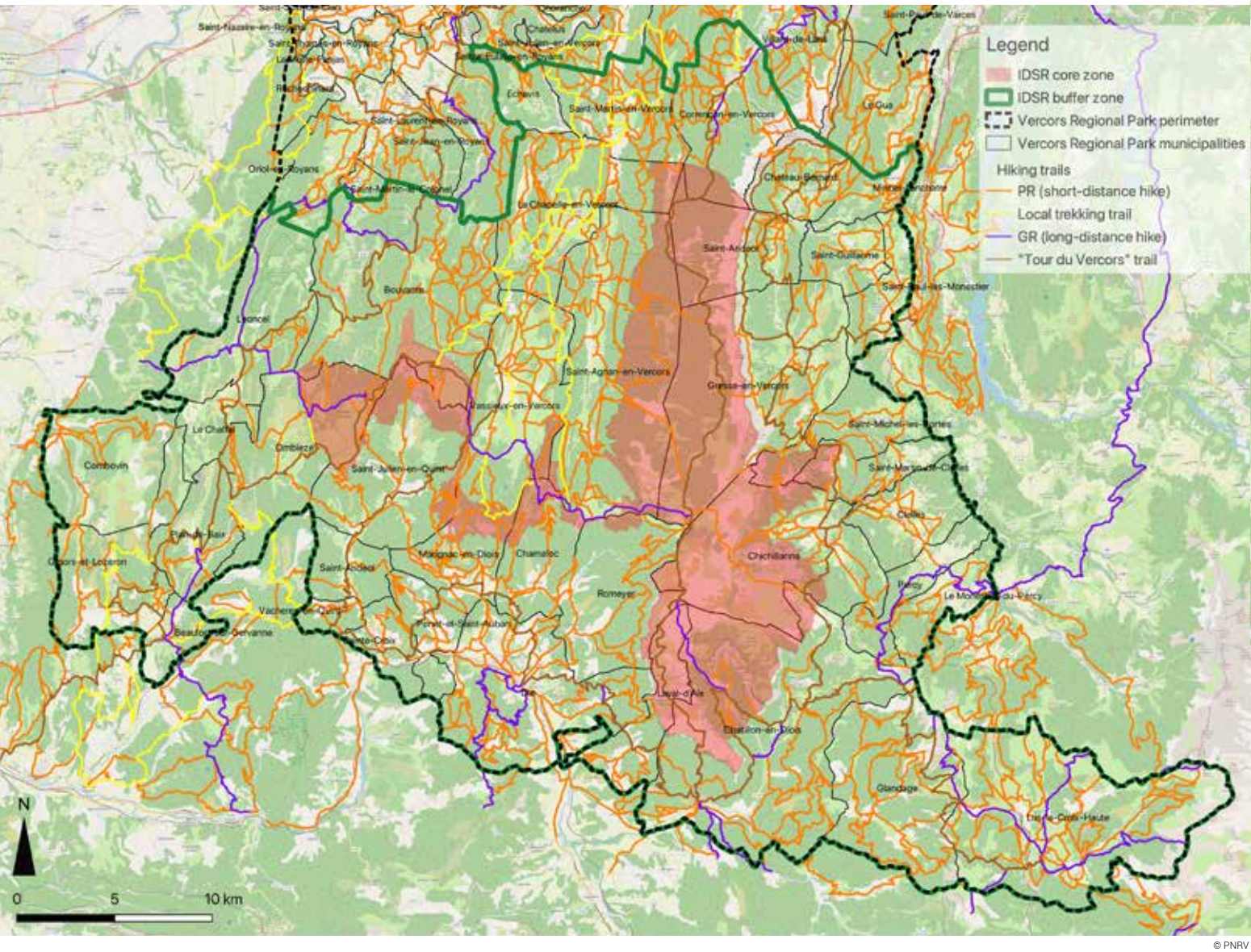
The boundaries of the buffer zone follow logical geographical limits, such as valleys and ridge lines or administrative limits. See the maps illustrating previous criteria.

4.6. Criteria 6 - Accessibility of the core

The access to the core zone is quite good, and in some places possible by car (see 4.4 Accessibility, page 24-25). The two hamlets of Font d'Urle and Archiane are located in the core zone and allow permanent access.
Tourist accommodations are present there and offer a welcome all year round (hotels and gites).

Vercors is also famous for its hiking trails. The Park is maintaining 4000km of trails on the whole territory. The core zone is also a large area made for hiking as it contains 310 km of tracks (see the map bellow).
The access to the core zone is quite good, in some places possible by car. But it is also a large area made for hiking as we have 310 km of tracks in the core zone.

HIKING TRAIL MAP

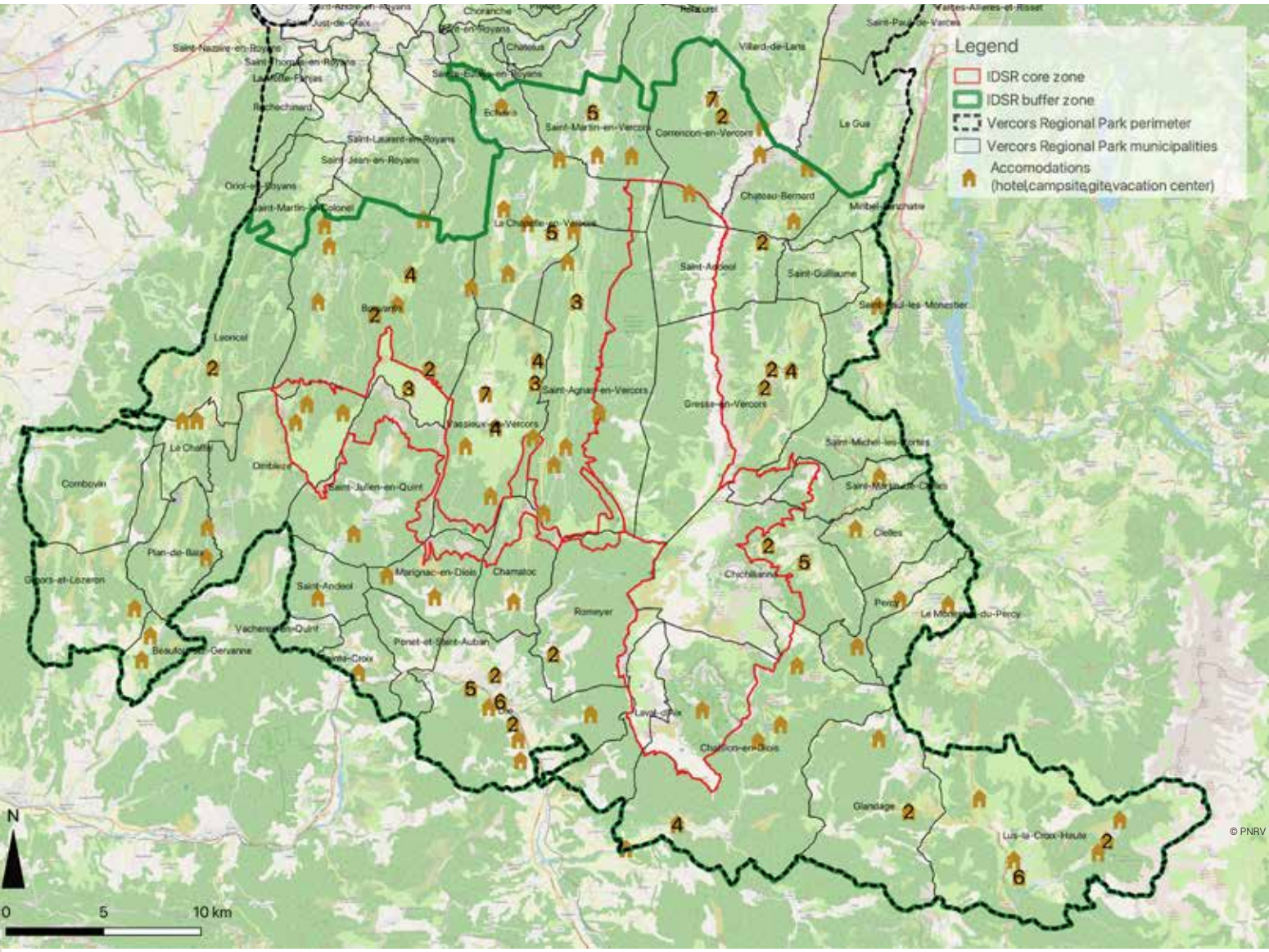


© PNRV

A lot of accommodations are close to the core zone. Several accommodations are located in the core zone : three hotels and gites are located in Font d'Urle and one in Archiane.

There are also huts used by hikers: to the north of the core zone the Carrette hut and on the Ambel plateau the Gardiol hut and the Tubanet hut (renovated in 2021), as well as the Ambel hut.

ACCOMMODATION LOCATION MAP (NUMBER MEANS THE NUMBER OF ACCOMMODATIONS AT THE SAME LOCATION)



4.7. Criteria 7 - Exceptional dark sky ressource of the core

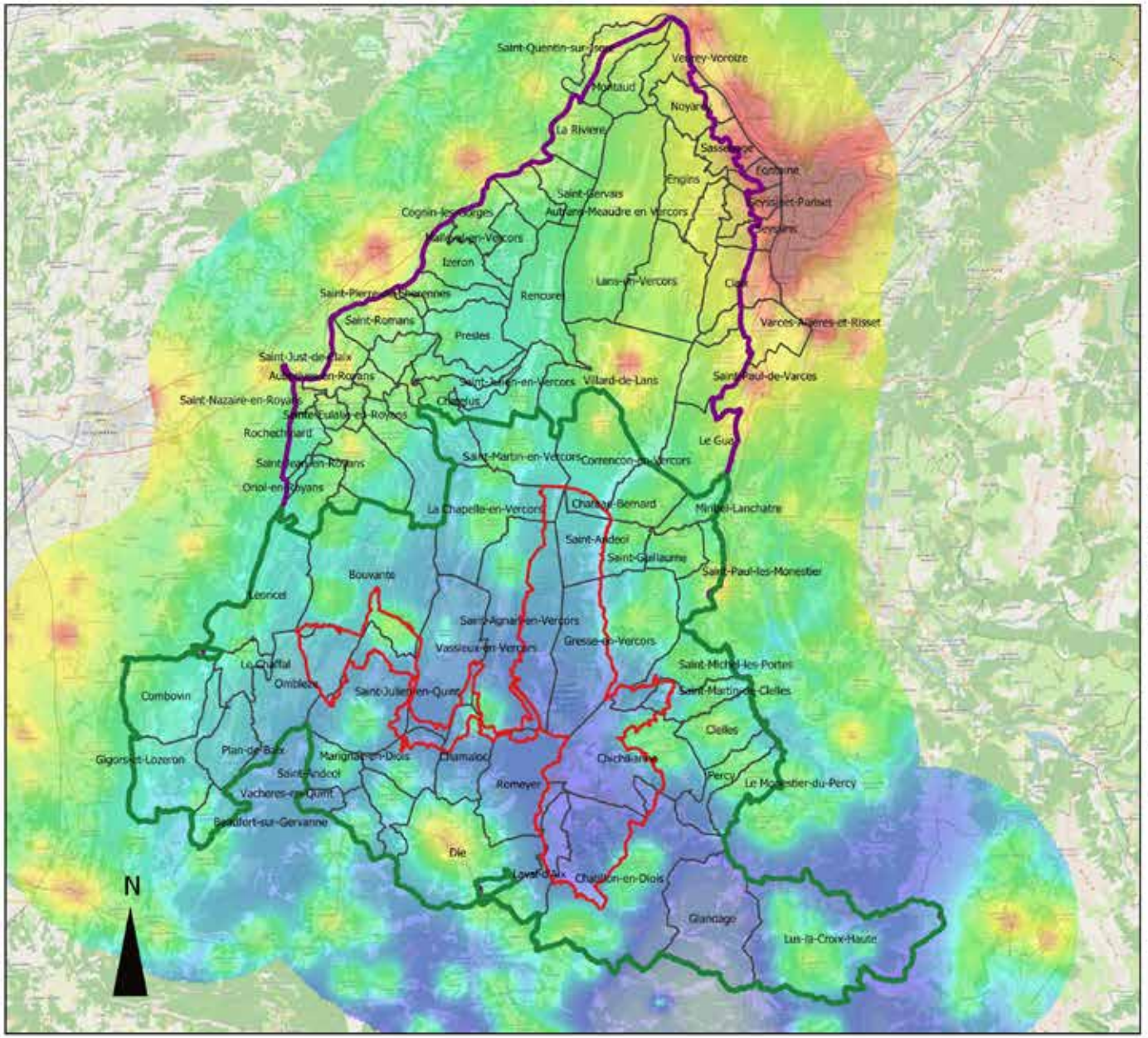
According to the last edition of the world atlas of Light pollution (2016 Fabio Falchi et al), one third of humanity cannot see the Milky Way. In Europe, this ratio goes up to 60 % of the population.

On the map below, one may see the proximity of the Grenoble and Valence urban areas, strongly affected by artificial lighting, and the Vercors IDSR project forms a protected space.

The core zone in particular constitutes spaces, at the heart of which the night sky is of exceptional quality in light pollution modeling map.The mean NBS in the core zone is about 21,54 mag/arcsec2 and about 21,44 mag/arcsec2 in the buffer zone. In comparison the mean NBS in the city of Grenoble is about 18,50 mag/arcsec2 and the closest distance between the core zone and the city is 24 km.

Bivouac night on the high plateaus of Vercors

IDSR/RICE of Vercors boundaries



Legend

- Municipalities
- Park's prerimeter
- Core zone
- Buffer zone

zenith luminance simulation

mag/arcsec²

22	21	17
Reference	rural area	urban area

Number for the Vercors IDSR/RICE

Area of the core zone : 244.97 km²
Mean zenith luminance in the core : 21.54

Area of the buffer zone (without core zone) : 1 353.26 km²
Mean zenith luminance in the buffer (without core zone) : 21.44 mag/arecsec²

author : Florian Chevereau le 08/17/2021

Sources : DarkSkyLab; OpenStreetMap Standard; OpenStreetMap 2021.

0 10 20 km

4.7.1 Sky quality mesurements

Two measurement campaigns have been conducted in the Vercors with the technical support of the Darkskylab consultancy, one in 2018 and another in 2022. The Park was the first territory to benefit in 2018 from the Ninox measuring device developed by Darkskylab.

DarkSkyLab has developed this integrated platform called Ninox to measure Night Sky Brightness. This platform operates in a continuous and autonomous manner without human intervention nor the necessity to be connected to the Internet. Data is collected night after night in all kinds of conditions and is then processed in a statistical way rather than relying on discrete individual measures.
The characterization of a location in terms of Night Sky Brightness quality can be achieved in a much more efficient and thorough manner than with the manual usage of the Sky Quality Meter (SQM). Indicators such as the evolution of the NSB over a clear night or the averaged difference between a cloudy night NSB and a clear night NSB can be used to improve the characterization of a given site or to compare the sky quality between several different sites.

2018 measurements campaign

Measures has been done in 11 sites using the tool Ninox. In total, 405 nights of measurement has been realized, which represent 194 ,135 individual measures. The frame bellow shows the number and the period of measurments done.

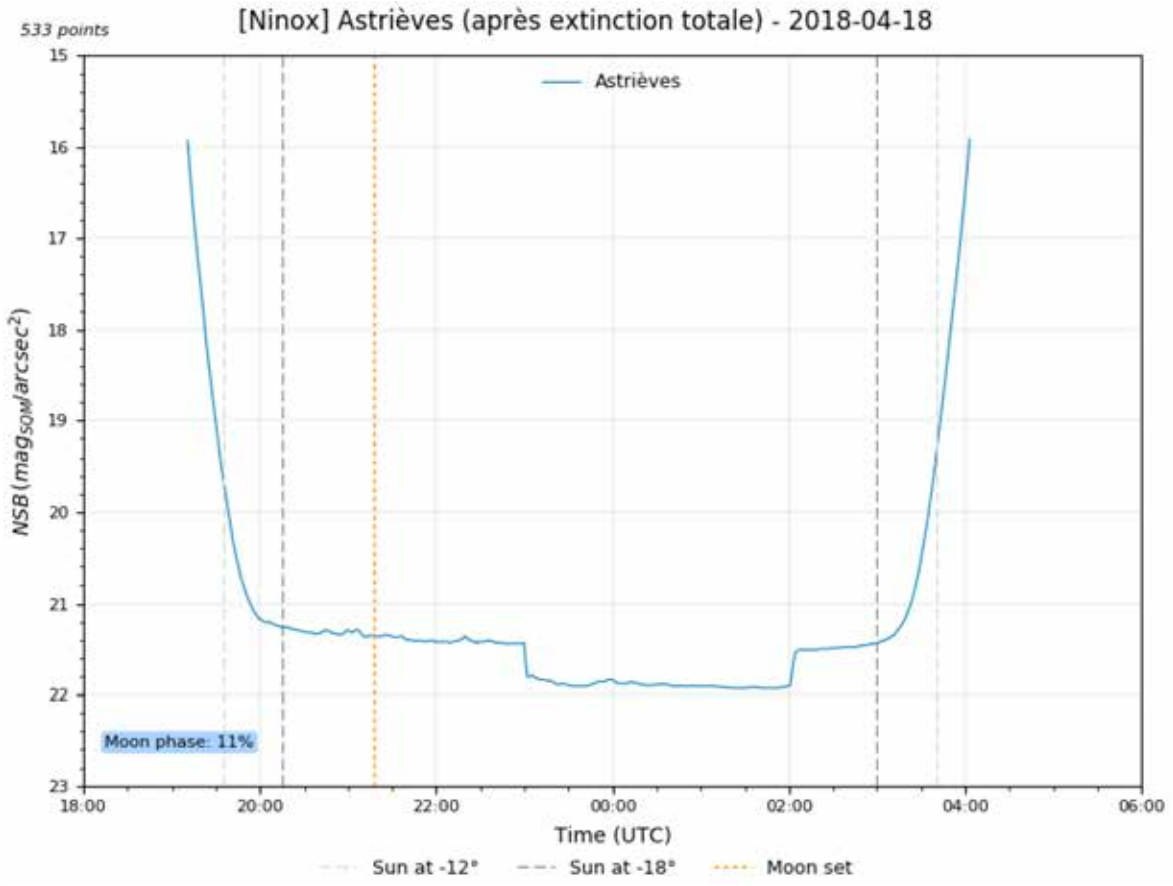
Ninox	Place	Number of nights	First night	Last night
Ninox005	Les Merciers	52	2018-04-16	2018-06-20
Ninox005	Tussac	6	2018-06-21	2018-06-26
Ninox006	Astrièves	46	2018-03-10	2018-04-24
Ninox006	Saint-Michel-les Portes	62	2018-05-04	2018-07-05
Ninox007	Chamaloc	44	018-03-31	2018-05-13
Ninox007	Laval d'Aix	32	2018-05-14	2018-06-14
Ninox007	Villard les Pierres	14	2018-03-12	2018-03-25
Ninox008	La Chapelle-en-Vercors	53	2018-05-08	2018-06-29
Ninox008	Saint-Agnan-en-Vercors	38	2018-03-24	2018-04-30
Ninox009	Corrençon-en-Vercors	37	2018-03-19	2018-05-28
Ninox009	Gerland	21	2018-06-14	2018-07-04

For each site, the ideal situation was to obtain data from a night without the moon and without clouds to evaluate the best possible NSB on the site. It has been possible on each site except in Tussac.
NSB values measured during this first study show a good natural obscurity but impacted by local light pollution on which it would be easy to act.

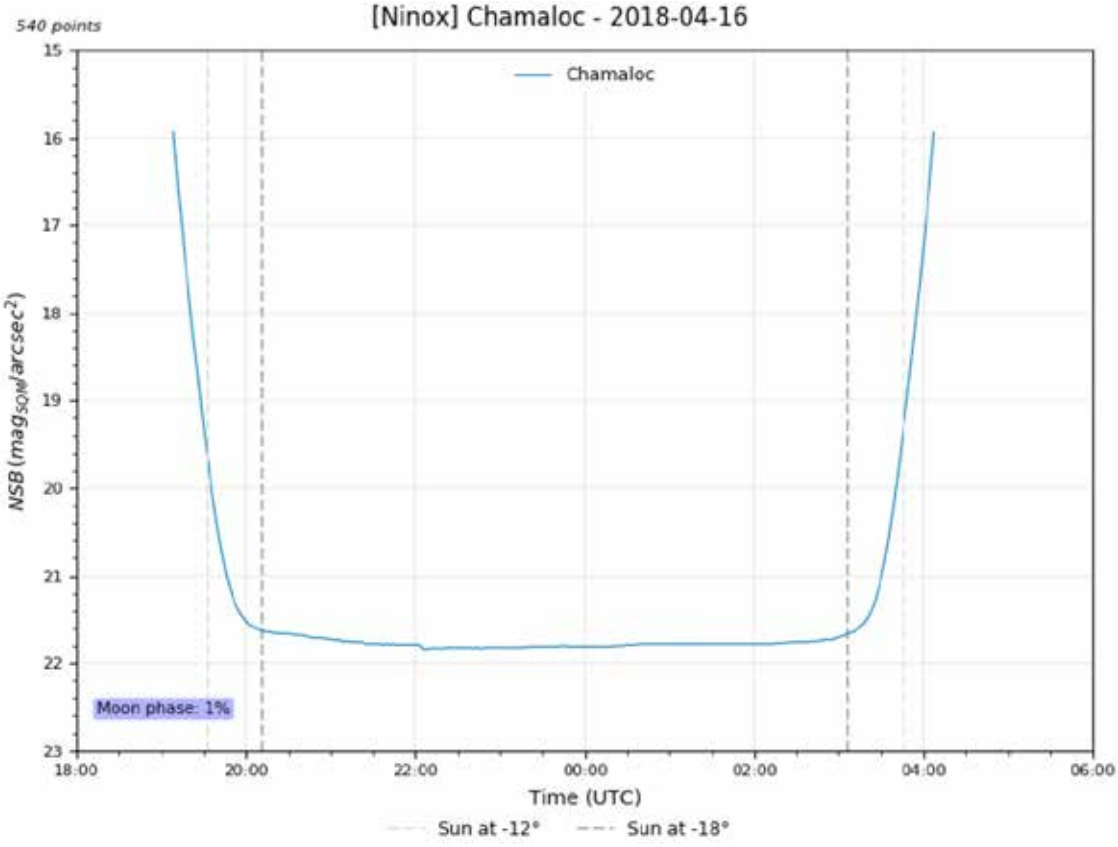
Distant light pollution is harder to treat and come mainly from Grenoble urban area light.
The best skies are located in the south and in the center of the Park, where the proposed core zone is located. Best measure have been obtained on Astrièves observatory (Gresse-en-Vercors) site where 21,9 has been reached.

Best nights obtained on the choosen sites

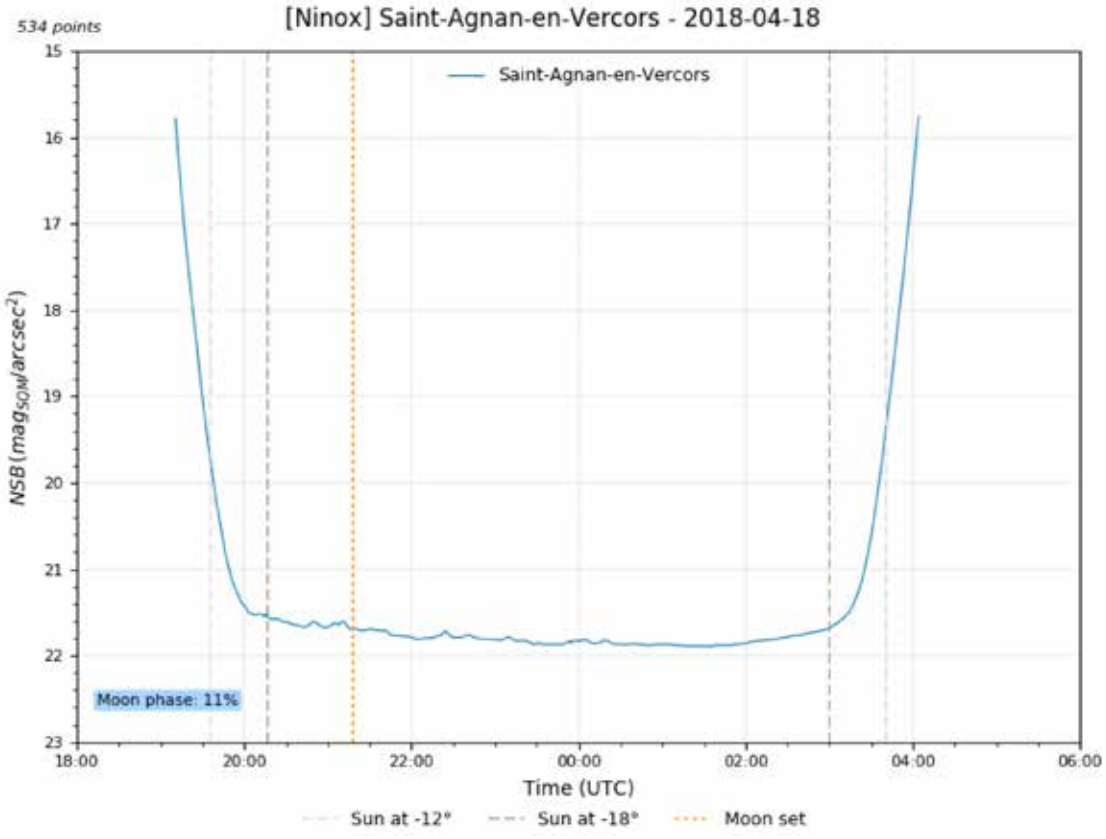
The curves below show examples of measurements made in the Vercors during very clear nights.



This curve was realized after the total extinction of the public lighting in Gresse-en-Vercors (Astrièves observatory) was restored (before March 21, some districts remained lit at night). The extinction is very clearly visible between 22:30 and 02:00 UT.



On the measurement site of Chamaloc, a weak extinction is visible shortly after 22:00 UT.



Few clouds reflexion are visible on the curve. Sky of good quality.

2022 measurements campaign

The first core zone was supposed to be only on the Hauts-Plateaux du Vercors National Nature Reserve. In 2020 the Park decided to extend to the western part in order to include more accessible areas like Font d'Urle ENS and Ambel ENS.
That's why we decided to make additional measurements of sky quality. Measurements have been done in the 2 sites using the tool Ninox, which allows automatic and continue measurement of the NSB. In total, 65 nights of measurement has been realized, which represent 27.024 individual measures.

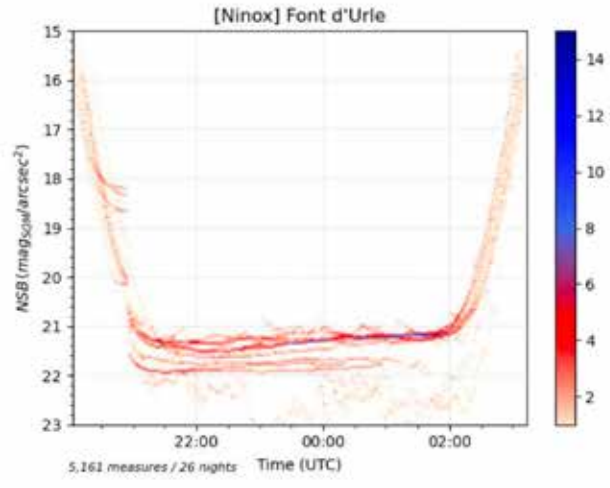
Ninox	Place	Number of nights	First night	Last night
Ninox029	Font d'Urle	27	2022-06-29	2022-07-25
Ninox032	Refuge Gardiol	38	2022-06-17	2022-07-24

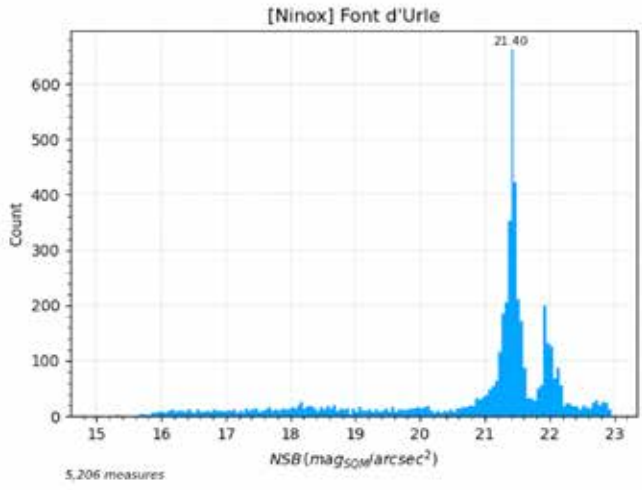
Font d'Urle measurements

A recording period of approximately one month was conducted at the Font d'Urle site in July 2022.

The density histogram on the left below shows that there was a recording problem on part of the session.

The measured NSB are too high and approach the value of 22 mag/arcsec2, which is not possible on sites in Metropolitan France (this level of sky luminance is too low). These abnormal measurements made to wards the end of the session after July 14 are due to the presence of dirt on the Ninox window.
Moreover, from this date, a very strong extinction is visible a little before 21: 00 UTC (23:00 in local time). During the summer, the Milky Way passes at zenith and increases in a very significant way the luminance of the sky at zenith (the characteristic NSB is thus decreased). This causes this characteristic shape of rising curves in the density histogram.





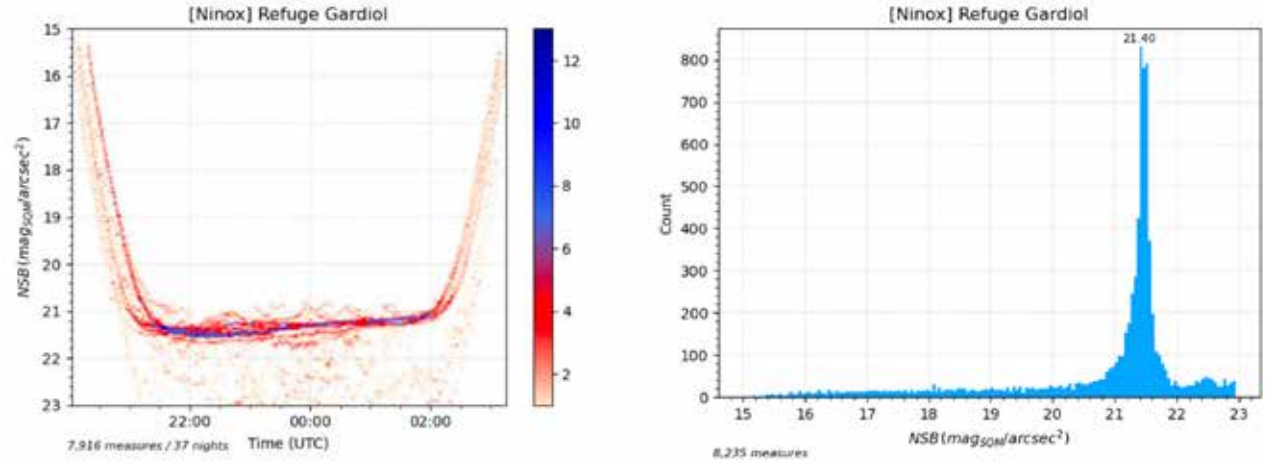
If we do not consider the obviously incorrect measurements, the best NSBs obtained under clear skies are around 21.50 mag/arcsec2, which is characteristic of a good rural sky, but also indicates the presence of a fairly constant level of light pollution linked to the very brightly lit areas of Valence and Romans-sur-Isère at distances between 20 and 30 km.

The high altitude of the Font d'Urle site means that the presence of clouds often masks the light pollution of the lower areas to the west, inducing a darker environment than the natural cloudless sky.

Refuge de Gardiol measurements

A recording period of over a month was conducted at the Gardiol Refuge site in June and July 2022.

The recording session was very clean with a well characterized density histogram as shown on the left figure below. The presence of the Milky Way is well visible with a progressive rise in luminance at the zenith during the night. Overcast NSBs are distributed on both sides of the clear sky plateau, but mostly below, indicating a level of light pollution that is still present.



The magnitude histogram above shows a characteristic NSB of 21.40 mag/arcsec2. So we are at a site with good rural skies, but the proximity of the Rhone Valley about 25 km to the west prevents us from regularly climbing to characteristic dark site NSBs of the order of 21.60 mag/arcsec2 or better.

The fairly large streak at high NSB levels to the right of the clear sky peak on the magnitude histogram is evidence of the frequency of cloudy conditions that obscures the light pollution of the Rhone Valley. This is due to the high altitude of the site and the base of the cloud layer should probably drop below this altitude and effectively mask the light sources at a distance.

On the best clear nights we reach an NSB of about 21.55 mag/arcsec2, which shows that good quality skies can be obtained at the site on very clear nights with little humidity and aerosol loads.

Map of the 2018 and 2022 measurements

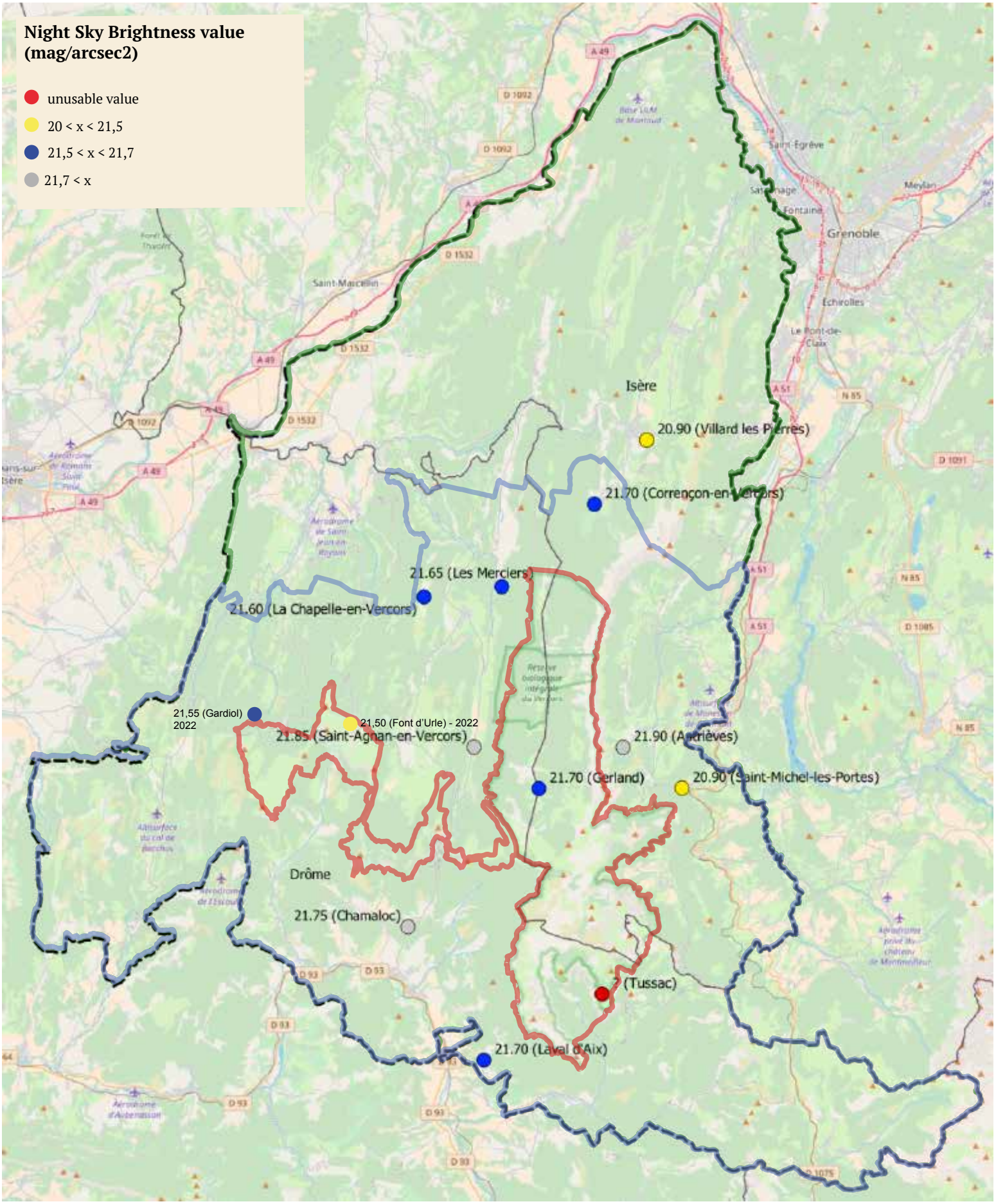
In conclusion we can say that the measurements made with Ninox show a high quality sky on the Vercors plateau. However we can notice that the more the measurements are located in the west the less good is the quality.

This is mainly due to the light pollution of the Valence-Romans agglomeration whose propagation is not prevented, contrary to that of the Grenoble agglomeration thanks to the eastern barrier of the Vercors.

The measurements are nevertheless contained between 21.5mag/arcsec2 and 21.9mag/arcsec2 with several locations presenting a NSB value of 21.7mag/arcsec2 or more which is remarkably good.

The map bellow shows all of the NSB measurements made in the Park with Ninox (the best measured NSB value is also shown). The color of the points refers to the NSB scale. The value of the best NSB obtained in the middle of a clear night is plotted on this map.

LOCATION OF THE NINOX MEASURMENTS DONE IN 2018 AND 2022 CAMPAIGNS



4.7.2 Illustration of the sky quality by photos taken in the core area

Photographs have been taken in different places in the heart of the IDSR project to show the quality of the night sky that a visitor could feel (photos taken by Vincent Astier with Canon EOS 5D Mark III). These places have been chosen by their significant attendance by hikers.

Photos : Vincent Astier-Perret / Regards d'en haut

Pruned tree - Plaine de la Queyrie
UTM coordinates : 31N 698 100 / 4968 000
Altitude : 1770 m
Aiming axis : azimuth 220°
Technical specs : 20 mm - f/2 - 15 sec
September - New moon - 4 days.
Sky of exceptional clarity.
Luminous halo Die perceptible near horizon, very quickly attenuated.
Heart of the Highlands reserve.

Close to the Chaumailloux shelter
UTM Coordinates : 31N 698 480 / 4964 100
Altitude : 1670 m
Aiming axis : azimuth 180°
Technical specs : 20 mm - f/2,2 - 19 sec
August- Full moon - 2 days
Very clear sky - Despite of the presence of the rising moon, very good visibility on stars.

Pas de Chabrinel - Pré Peyret
UTM Coordinates : 31N 696 360 / 4966 560
Altitude : 1650 m
Aiming axis : azimuth 220°
Technical specs : 24 mm - f/1,6 - 17 sec
August - New Moon + 1 day. Sky absolutely clear.
Orientation 220° in the precise axis of DIE
Point of view slightly «high» southern edge of the Highlands.

Pas de la Trappe (500m south of Puy de la Gagère)
UTM Coordinates : 31N 685 050 / 4971 900
Altitude : 1550 m
Aiming axis : azimuth 225°
Technical specs : 20 mm - f/2 - 19 sec
August - New moon
Aimed towards Montélimar. In spite of light pollution of the Rhone valley, very clear sky above the above the horizon. Val de Quint and Val de Drôme relatively spared. Planet Mars on the left (the most visible).

Sky quality by showing surrounding halos

The quality of the night sky can also be apprehended by trying to represent by the photo the luminous halos perceptible in different places.
The photos below show in different directions, the halos of the surrounding towns. It is important to note that these images were taken from a high point quite isolated (at 1656 m altitude) above the pass of Rousset. This viewpoint allows a 360° view on the whole territory of the Park, the High Plateaus, and on the core area of the IDSR project.

- Advantage : Overall view and far projection (> 100 kilometers).
- Disadvantage: the high character of the place reinforces the appearance of light pollution (urban lighting and atmospheric halos).

Shooting location :

- But de Neve - Sud Vercors - Altitude 1656m
- Coordinates : UTM 31N 689 200 / 4968 670
- Heure : 23:00 (local time) - 22:00 UTC

Technical specs :

- Canon 5D Mark IV
- Objectif 20mm (Sigma Art)
- Iso 6400 - 15 seconds - f/2

Shooting conditions :
New moon. Very clear sky - very fine veil of high altitude and some contrails - atmospheric pollution in low layers (>15 days of anticyclonic conditions)

It's interesting to note that the halo effect is very variable depending on the direction.
On the 360° view below, we can clearly see that the halos are mainly visible in the western half (between the South and the North through the West). Towards the East the halo effects are much less present. In this direction, the dark area can be clearly distinguished, which corresponds to the high plateaus reserve, which constitutes the major part of the core area of the project.

Photo : Vincent Astier-Perret / Regards d'en haut

360° panoramic view centered on the South showing the effects of distant halos

Photos : Vincent Astier-Perret / Regards d'en haut

Zoom of the previous picture, 180° panoramic view centered on the East showing the effects of distant halos

Zoom of the previous picture, 180° panoramic view centered on the West showing the effects of distant halos

4.7.3 Light pollution maps

Types of simulations made in this study

To produce light pollution maps, DarkSkyLab has developed a software called Otus which allows to model and simulate light pollution on a territory, from different data sources.

Within the framework of this study, two types of simulations were carried out:

- at the heart of the night, based on satellite radiance data. This is VIIRS-DNB data, from annual average radiance sets corresponding to average clear sky conditions. A simulation was performed with data from the year 2020, another with data from the year 2017.
  It is assumed that the times of passage of the satellites are such that the radiances obtained are representative of conditions in the middle of the night (between 1:00 and 5:00 am), that is to say, after the public lighting has been turned off in the municipalities that have adopted this practice.

- in the middle of the night, with all the light sources turned off in the IDSR project municipalities. The satellite data used are for the year 2020.

This simulation is based on the theoretical assumption that no lighting, neither public nor private, is active in the middle of the night in these municipalities.

Representation of light pollution

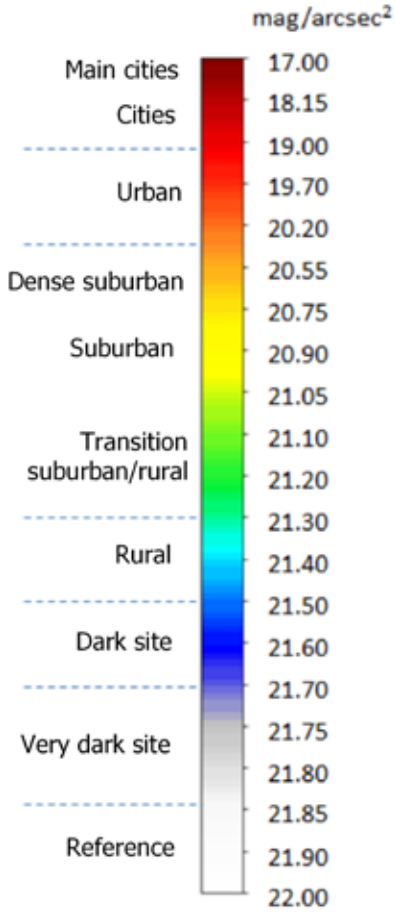
This scale shows what the different colors used in the light pollution maps provided in this report correspond to.

The brightness of the night sky background is called NSB (Night Sky Brightness). It is expressed in magnitude per arc second squared (mag/arcsec2).

This unit is that of a luminance and it is a logarithmic measure derived from the photometric magnitude widely used in astronomy (inspired by human vision). On this scale, the highest values correspond to the lowest brightness.

The color scale shows the correspondence between the values of zenith luminance and the environments in which they are encountered.

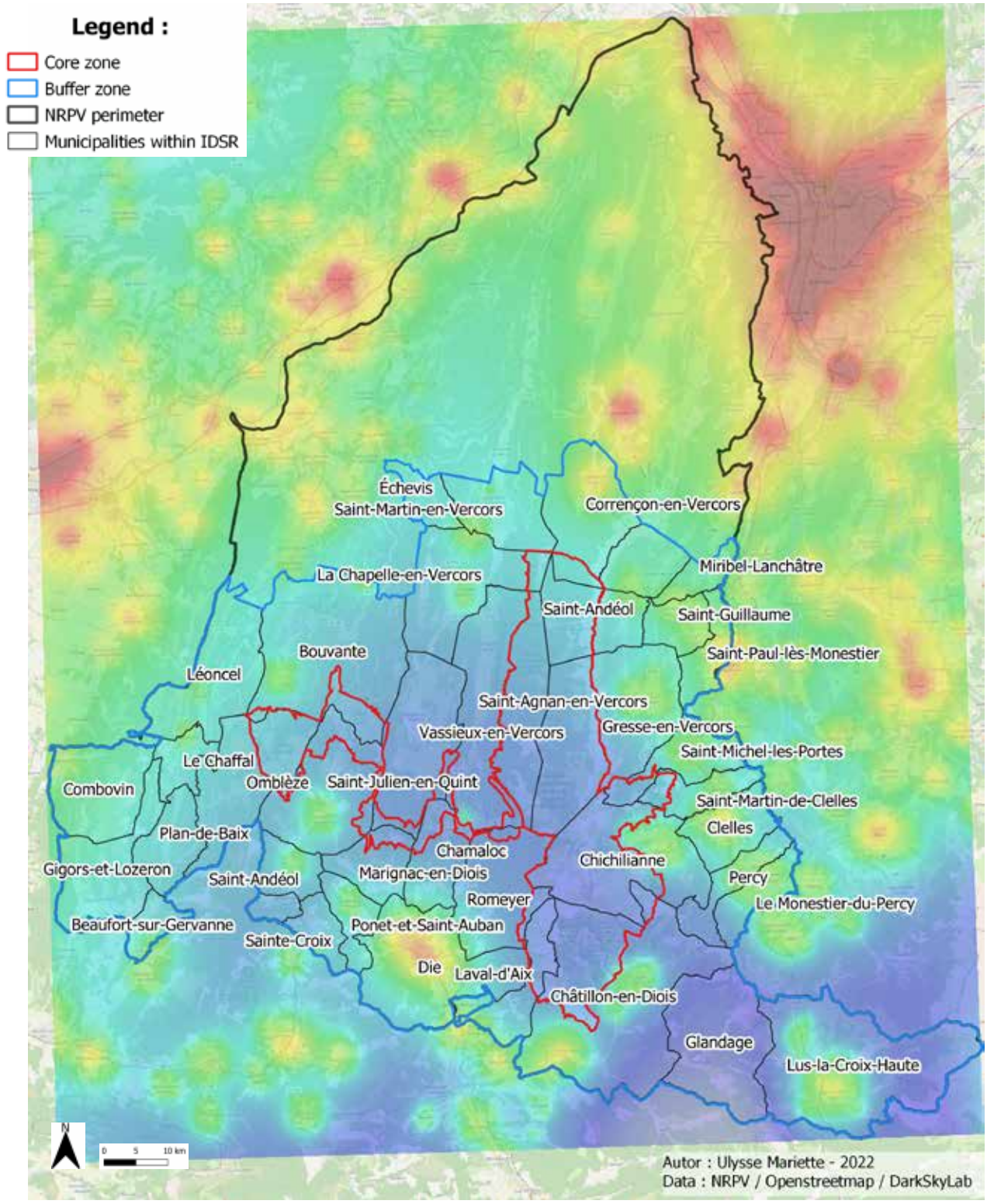
Note on this scale that a small change in zenith luminance value has a greater effect in the low brightness area of the sky (dark sites) than in the high brightness area (polluted skies).



Situation in the middle of the night

Simulation based on 2020 data

SIMULATION OF LIGHT POLLUTION IN THE VERCORS PARK MIDDLE OF THE NIGHT IN 2020



The map below shows the result of the simulation in the middle of the night, based on the satellite radiance data of the year 2020. An OpenStreetMap background map has been added to better locate the various benchmarks on the territory.

While the northeastern fringe of the Park, impacted by the nearby presence of the Grenoble metropolis, has a suburban type of sky (yellow), the level of light pollution gradually decreases as it moves away from the northern edges.

In its interior, the northern third of the park has a transitional suburban/rural sky (green), visible for example in Rencurel. The situation in this area is nevertheless degraded by the large light halo of Villard-de-Lans, and to a lesser extent Corrençon-en-Vercors.

Moving south and entering the perimeter of the IDSR project, the sky becomes mostly rural (cyan) in the interior, while the edges remain subject to more light pollution in the west (including Saint-Laurent-en-Royans) and especially in the east (from Château-Bernard to Monestier-du-Percy).

In the southern part of the Park and the IDSR project, large areas of dark sky (blue) appear between Vassieux-en-Vercors and Glandage, the sky even becoming very dark at the extreme south of Glandage. Nevertheless, important sources of light pollution remain active on the edges of the territory. On the southern fringe, Die is the main light source, but light halos are also produced by Saint-Julien-en-Quint or Saint-Andéol. On the eastern fringe, the village of Chichilianne and its satellite hamlets, as well as Lus-la-Croix-Haute, are the most emitting areas.

Finally, two areas of light come to disturb the territories of dark sky in their heart: the ski resort of Col-de-Rousset, on Saint-Agnan-en-Vercors, and especially the hamlets located on the territory of Treschenu-Creyers (former municipality, attached since 2019 to Châtillon-en-Diois), whose light emissions create a real pocket of sky surburbain / rural in the midst of the darkness. It is important to notice that important works are done in 2022 in Châtillon-en-Diois to renovate public lighting with the energy syndicate.

Starry night on hight plateaus

Comparison of simulations based on 2017 and 2020 data

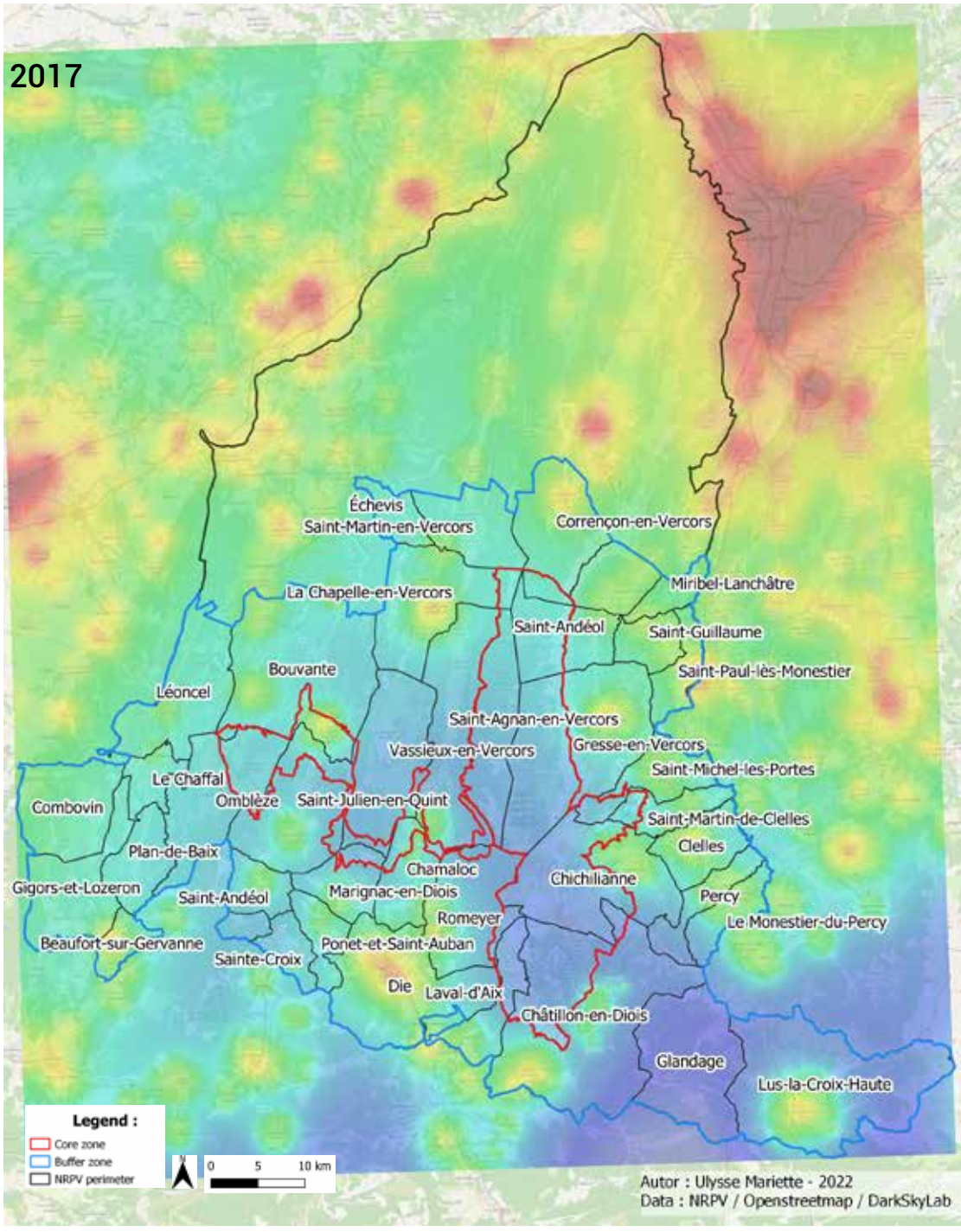
The two maps below show, side-by-side, the results of middle of the night simulations performed on the basis of satellite radiance data from the year 2017 (left) and the year 2020 (right).

An OpenStreetMap background map has been added to better locate the different benchmarks on the territory. However, the transparency rates have been modified to better highlight the different colors and facilitate comparison.

The comparative results of the two simulations show a significant decrease in light pollution between 2017 and 2020, particularly in the core zone of the IDSR project.

In the northern half of the Park, progress is particularly visible in the interior zones: total or partial extinctions in the middle of the night have clearly been implemented in municipalities such as Rencurel, Saint-Julien-en-Vercors or La Chapelle-en-Vercors.

EVOLUTION OF LIGHT POLLUTION IN THE VERCORS PARK DURING THE NIGHT BETWEEN 2017 AND 2020



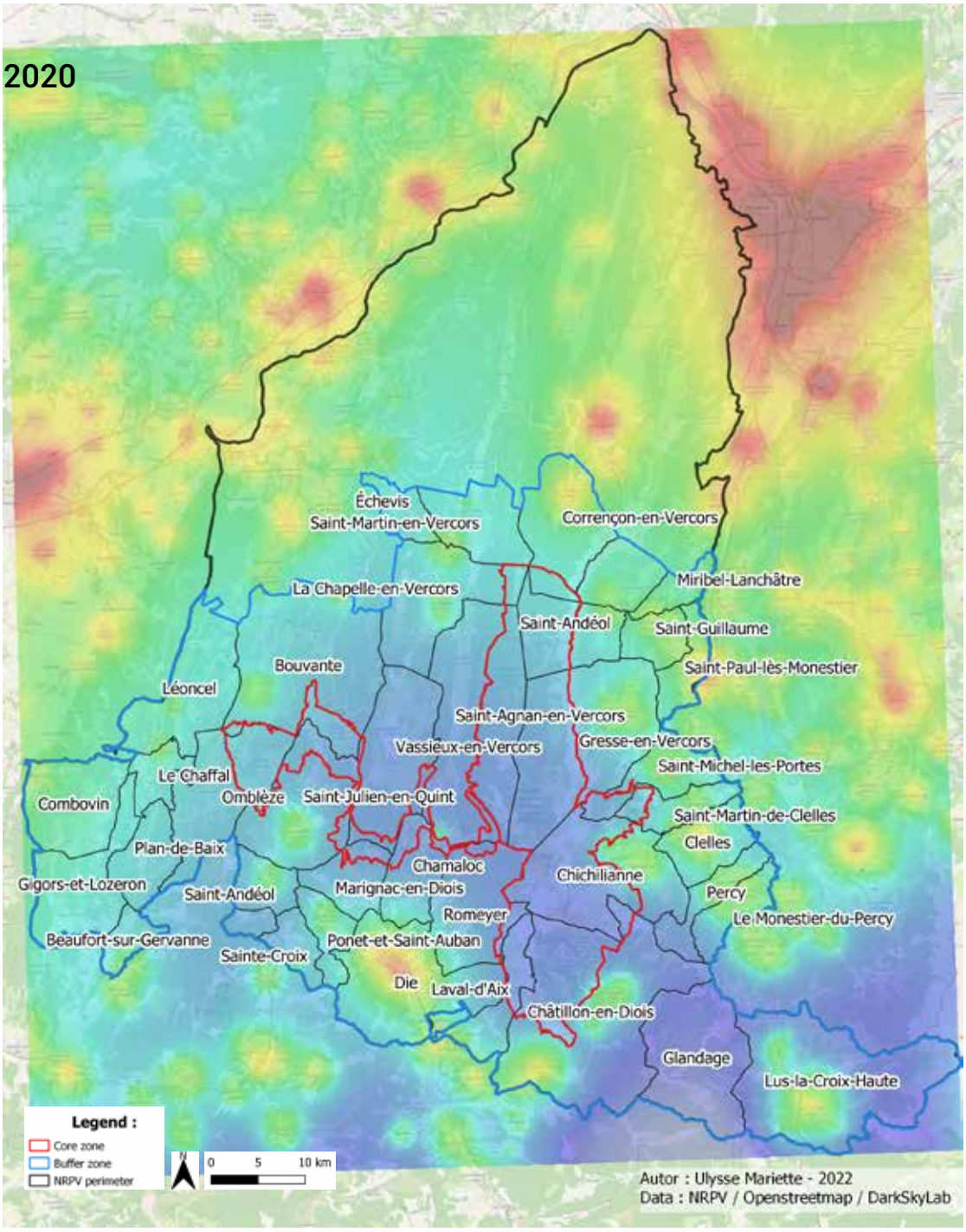
But it is especially in the southern half that the improvements are the most remarkable, contributing not only to further improve the quality of the sky in areas that were already experiencing high darkness in 2017, but also to extend the dark sky areas.

Extinctions have been set up in the ski resort of Font-d'Urle (commune of Bouvante) in core zone as well as in several municipalities bordering Die (Marignac-en-Diois, Chamaloc, Romeyer). We can also easily see the effect of the retrofit at the col de Rousset very close to the core zone North from Die.

To a lesser extent, positive developments are also perceptible in certain municipalities on the eastern flank of the Park, particularly between the Col de l'Arzelier ski resort (commune of Château-Bernard) and Gresse-en-Vercors.

A notable exception is that light pollution seems to have increased in the territory of Lus-la-Croix-Haute, the satellite radiance detected being higher in 2020 than in 2017 in the hamlets located between the Col de la Croix-Haute and the main town of the commune.

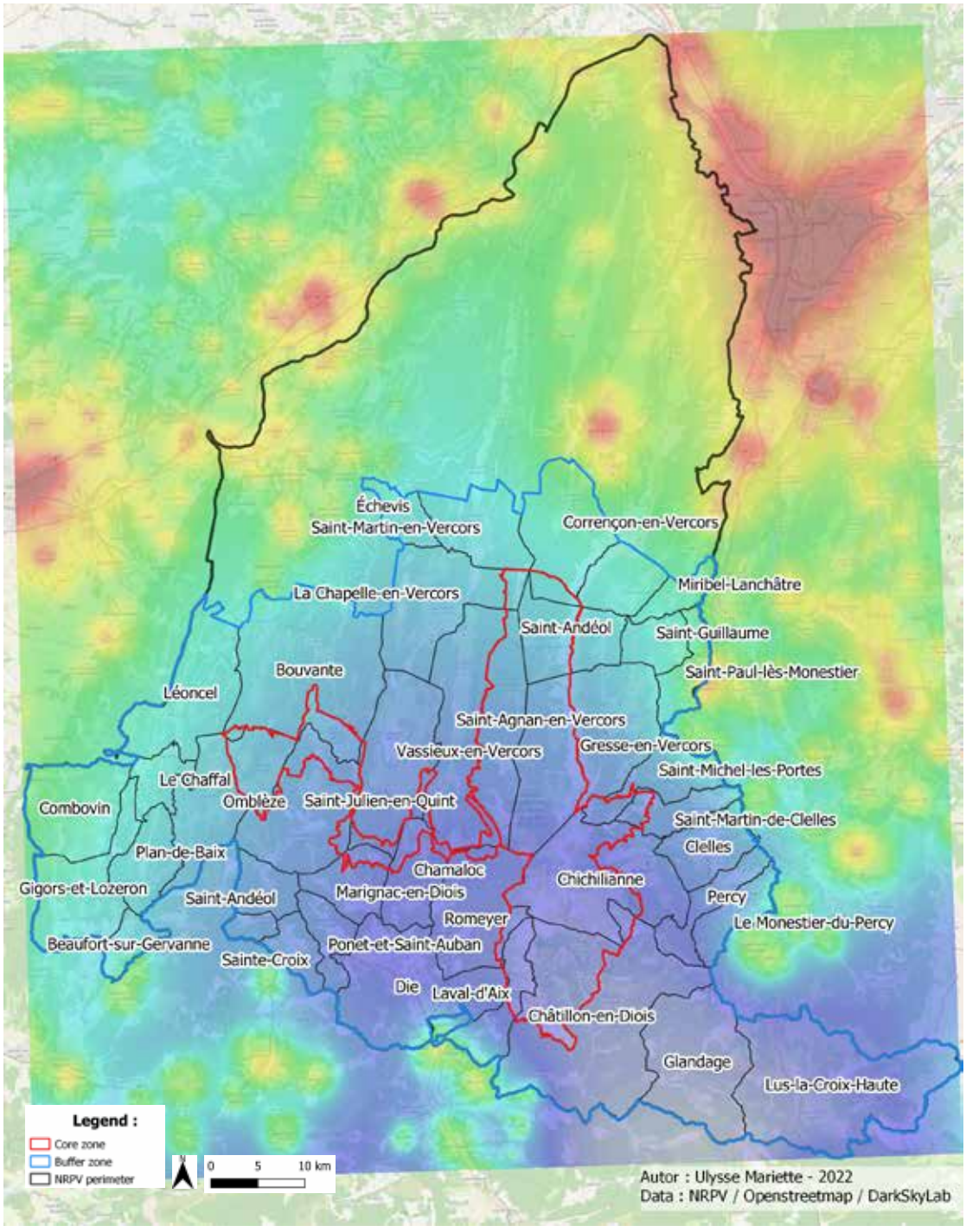
EVOLUTION OF LIGHT POLLUTION IN THE VERCORS PARK DURING THE NIGHT BETWEEN 2017 AND 2020



Simulation of extinction in the 39 municipalities of the buffer area

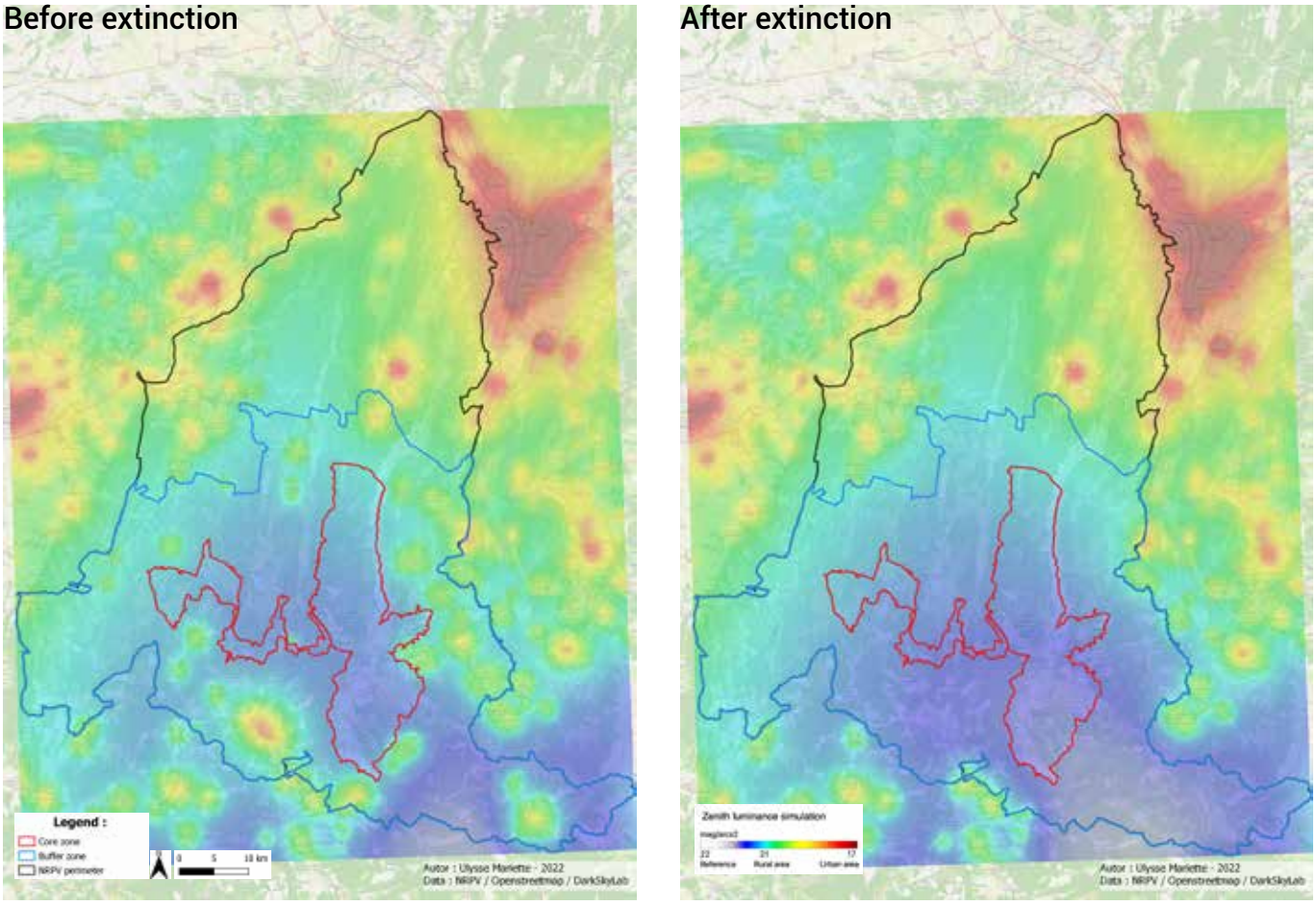
The map below shows the result of the simulation in the heart of the night based on satellite radiance data of the year 2020 and on the theoretical assumption that no lighting, neither public nor private, is active in the heart of the night in the municipalities of the IDSR project.

SIMULATION OF LIGHT POLLUTION IN THE VERCORS PARK IN THE MIDDLE OF THE NIGHT IN 2020, WITH EXTINCTION OF LIGHT SOURCES IN THE MUNICIPALITIES OF THE IDSR PROJECT



In order to better identify the gains in darkness that would be achieved by extinguishing light sources in the IDSR project municipalities, the two maps below show, side-by-side, the results of simulation in the heart of the night in 2020 without extinguishments (left) and with extinguishments (right). However, the transparency rates have been modified to better highlight the different colors and facilitate comparison.

COMPARISON OF LIGHT POLLUTION IN THE HEART OF THE NIGHT IN 2020, WITH OR WITHOUT LIGHT SOURCE EXTINCTIONS IN THE IDSR PROJECT MUNICIPALITIES



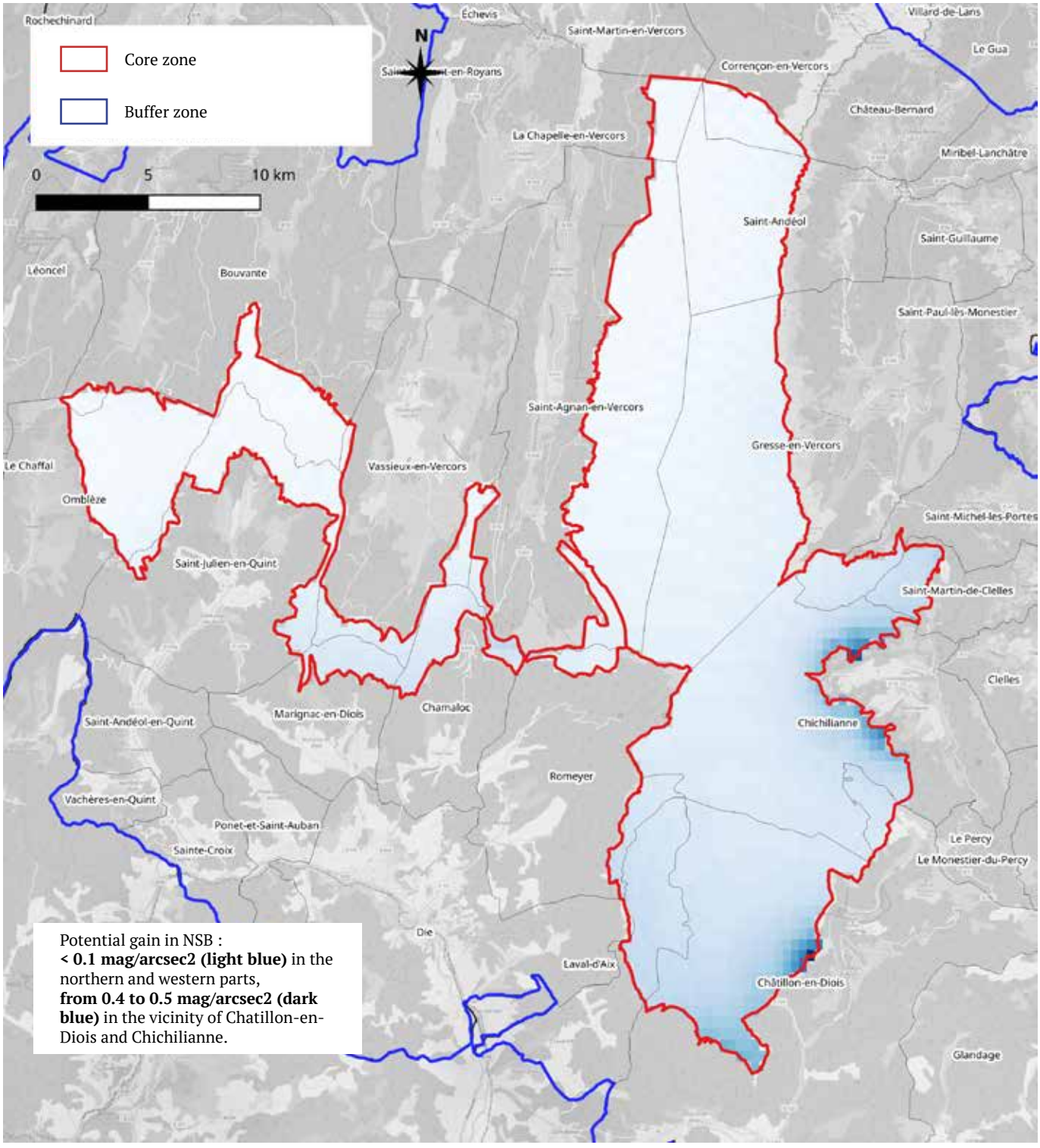
A total extinction of light sources in the municipalities of the IDSR project would make it possible to improve the quality of the sky in the whole perimeter of the reserve.

Nevertheless, it is especially in the southern and eastern parts of the reserve that the progress would be the most spectacular, where the municipalities producing the most light pollution are located : Die and the municipalities of the Diois country, Lus-la-Croix-Haute, and all the municipalities along an axis going from Monestier-du-Percy to Corrençon-en-Vercors.

The quality of the sky in the core zone would be particularly improved by the extinctions of lighting sources closest to this perimeter, especially in the municipalities of Châtillon-en-Diois and Chichilianne.

The map below, resulting from the comparison of the values of NSB (zenithal luminance) in the core zone with and without extinctions, allows to locate more precisely the territories whose sky quality would improve the most in case of extinctions.

LOCATION OF POTENTIAL ZENITHAL LUMINANCE GAINS (NSB) IN THE CORE AREA IN CASE OF LIGHT SOURCE EXTINCTIONS IN THE IDSR PROJECT MUNICIPALITIES



Potential gain in NSB :
< 0.1 mag/arcsec2 (light blue) in the northern and western parts,
from 0.4 to 0.5 mag/arcsec2 (dark blue) in the vicinity of Chatillon-en-Diois and Chichilianne.

Bivouac night on high plateaus

5. EDUCATIONAL AND AWARENESS-RAISING PROJECTS RELATED TO NIGHT PROTECTION

The Vercors Park and its partners have been working for many years on night and light pollution with the general public, elected officials and technicians, socio-professionals, but also young people and schoolchildren. This process began in 2010 with the set up of «Odes to the night» in order to raise awareness about light pollution with a more poetic than technical approach. The goal was to enhance the interest of the general public regarding the night sky and its beauty. From one event to another, the technical aspect was slowly introduced into the meetings to equip elected officials and residents and show that more sober public lighting solutions are possible. These meetings have become regular and have gone beyond the Day of the Night action, which returns every year.

5.1. Review of recent years

The year 2016

For the first time in 2016, the Park decided to mobilize more of its municipalities to participate in the Day of the Night by sending them a letter to encourage them to take part in this operation.
Among them, Lans-en-Vercors proposed a whole week dedicated to the night. The performance hall is mobilized to program a show for the general public, the media library organizes an evening walk with tales reads, the children's and youth service of the Community of Municipalities is also mobilized to organize a time of exchange at the school complex, etc.

This participation has allowed the city to go further with its public lighting and to set up a switch-off in the middle of the night. This switch-off take place from 23:30 to 5:30. The Communauté de Municipalities du Vercors, located further south in the territory, also took up the Day of the Night in 2016 and, accompanied by the Park, it has put in place interventions in secondary schools, writing workshops, the installation of a planetarium and observations of the sky.

Other municipalities such as Le Gua, Beaufort-sur-Gervanne and Sassenage are also taking part in the Night Day, with the support of the Park.

A technical seminar on lighting and light pollution for elected officials and technicians of the municipalities was organised in Lans-en-Vercors on 6 October 2016. It raised awareness among twenty or so participants about the control of public lighting by bringing in specialists, an engineering office and the Departmental energy syndicates.

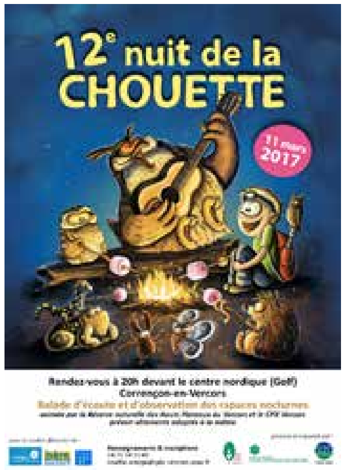
For the first time, we spoke about the IDSR project by presenting the feedback from the Pic du Midi IDSR project in the Pyrenees and inviting Nicolas Bourgeois, who was working on the project at the time, to speak.

The year 2017

The 12th "Owl's night" **in Corrençon-en-Vercors** was organised in link with the Vercors Highlands National Nature Reserve. This owl's night brought together nearly 60 people for an indoor time to discover owls living on the territory of the Park and then for a field trip to listen to the nocturnal birds of prey, punctuated by writing games for the youngest.

For this owl's night, a small **educational booklet** was produced in support of the outing, to accompany the public, to keep track of what they learned and to give tips and tricks to encourage the reception of these species in their garden.

Night Day **in Gresse-en-Vercors.** In partnership with the **Astrièves association** and the media libraries of the Trièves, an evening combining storytelling shows on the night «Waiting for the shooting stars», commented stargazing thanks to the observatory and planetarium of the Astrièves association as well as a night out to listen to the night and its inhabitants with an eco-guardian of the Vercors Park. Participation of about thirty people.



The year 2018

Night Day in Saint-Agnan-en-Vercors.
This evening brought together the inhabitants of St Agnan around a writing workshop, a presentation of the International Dark Sky Reserve project, a shared meal and then a night walk punctuated by amplified listening to nature at night and stargazing with an amateur astronomer from the association «Les Montreurs de Grande Ourse» to a small chapel which hosted a candlelight reading of texts produced by the inhabitants during the writing workshop.

Night Day in Seyssins.
With the mobilisation of the Park, the commune of Seyssins organised a walk to discover nocturnal species with the FRAPNA.

Training for mountain guides and environmental educators on nocturnal birds of prey.
In Corrençon-en-Vercors, the evening was devoted to providing information on the seven species present in the Vercors massif, on the studies about small mountain owls carried out by the Vercors Highlands National Reserve, and on the threats to these species (in particular : destruction and fragmentation of living environments, road traffic, use of phytosanitary products, light pollution, etc.) 14 people present.


Formation réseaux touristiques – Accompagnateurs en Montagne
Les rapaces nocturnes
mardi 17 avril - 18h00
Salle des Hauts Plateaux – Corrençon en Vercors

Le massif du Vercors accueille 7 espèces de rapaces nocturnes : les deux petites chouettes de montagne que sont la Chouette Chevêchette et la Chouette de Tengmalm, les Chouettes Hulotte et Effraie mais aussi trois hiboux : Petit-Duc (dont la présence est ponctuelle car c'est un migrateur), Moyen-Duc et Grand-Duc.
La Réserve naturelle des Hauts Plateaux du Vercors mène depuis de nombreuses années des études - en particulier sur les petites chouettes de montagne, au sein de la réserve, et plus généralement dans le massif – pour en apprendre d'avantage sur leur comportement et mieux connaître les populations.

Ces rapaces nocturnes sont plus ou moins menacés par des causes multiples : la destruction et la fragmentation de leurs milieux de vie, le trafic routier, l'utilisation des produits phytosanitaires qui nuisent aux insectes et aux micro-mammifères et de fait à leurs prédateurs, la fermeture des clochers ou encore la pollution lumineuse, *etc*…

Le Parc du Vercors travaille actuellement sur un projet de Réserve Internationale de Ciel Etoilé. Ce projet, en plus de travailler techniquement à la réduction de la pollution lumineuse et aux économies d'énergies, entend placer le territoire comme un site où la qualité du ciel nocturne pourrait devenir une vitrine pour la diversification touristique. Aussi, dans ce souci d'accueil, nous avons souhaité proposer une formation à destination des accompagnateurs en montagne pour développer et enrichir les connaissances sur un sujet en lien avec le monde nocturne.

Programme :

18h00 : accueil Salle Les Hauts Plateaux du Vercors – Corrençon-en-Vercors (au dessus du Golf)

18h15 : (en salle)

- présentation des 7 espèces
- écologie des espèces
- les études menées par la RNHPV
- le projet de Réserve Internationale de Ciel Etoilé

20h00 : repas tiré du sac, sous la forme d'une auberge espagnole

21h00 : départ sur le terrain, en direction de la réserve pour une sortie d'écoute

23h00 : (environ) : fin de la formation

Intervenants :

Hervé Tournier, garde de la réserve naturelle des Hauts-Plateaux, référent scientifique

Emmanuel Jeanjean, chargé de mission énergie et mobilités au Parc du Vercors

En pratique :

- Prévoir : vêtements adaptés à la météo / de quoi prendre des notes / pique-nique tiré du sac
- Co-voiturage : https://covoit.net/evenement.html?id=1235256mll0312pm1z0q1vjk0
- inscriptions avant le 13 avril auprès de noellie.ortega@pnr-vercors.fr, attention, places limitées !

The year 2019

Owl's night in Saint-Martin-en-Vercors, Roybon inn, in connection with the Vercors National Nature Reserve of the Highlands. Indoor meeting and walk to listen to the nocturnal birds of prey. 30 people present.

Day of the Night at Laval d'Aix. This evening brought together about fifteen people in the extreme south of the massif around the following proposals : writing workshop on the theme of night, shared meal, talk on the International Dark Sky Reserve project and extinction of public lighting, walk to discover the night and reading of texts produced during the workshop. 15 people attended.

A technical seminar on "Controlling public lighting and preserving the nocturnal environment, issues and feedback" was organised in Beaufort-sur-Gervanne on 11 October 2019. 30 people participated during an entire afternoon.

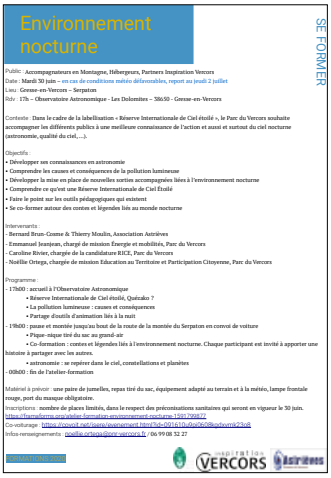
Interventions from specialists (Romain Sordello, Paris Natural History Museum/CNRS) and feedback from municipalities and energy syndicates associations were very interesting. This was an opportunity for the Park to present the progress of the IDSR project project.

The year 2020

Training for mountain guides and environmental educators on the nocturnal environment.

Developing knowledge of astronomy, understanding the causes and consequences of light pollution, developing new guided outings linked to the nocturnal environment, acquiring animation tools were some of the objectives proposed for this training workshop which took place in partnership with **the association Astrièves in Gresse-en-Vercors.** 13 people attended.

Day of the night in St Andéol. A night walk with a ranger of the Park, a shared soup and then the observation of the starry sky with Astrièves brought together the inhabitants of Saint-Andéol in a village that was turned off for the occasion.



The year 2021

Owl's night, scheduled in St Martin en Vercors, (cancelled for sanitary reasons).
This Owl's Night was proposed by the pupils of the school of Saint-Martin-en-Vercors within the framework of their educational project of Educational Land Area.

School projects on the Communal Biodiversity Atlas (ABC) in 10 schools of the territory (municipalities of the IDSR project perimeter and gateway towns of the Park).
Pupils aged 8-11 years, will discover one of the 4 taxa to be inventoried within the framework of the ABC : bats. The ecology of the different species present in the Vercors massif, the inventory in the commune, the threats to them and their environment, as well as the concrete actions to be carried out, will punctuate the 2021-2022 school year, allowing the participating pupils to discover a facet of the world of night.

School projects for the creation of Educational Land Areas in 5 schools in the Park (municipalities within the IDSR project perimeter and gateway towns to the Park). The aim of this educational project is to give the management of a small land to pupils so that they can carry out an inventory, discover the issues at stake and set up actions to raise awareness or restore biodiversity. Photo traps are provided to pupils so that they can discover what happens on their plots at night when they cannot be present.
These thematic school projects help pupils to learn about species and environments that also live at night. In this way, they can acquire knowledge about nocturnal biodiversity but also on light pollution.

The Night month (Mois de la Nuit) - October 2021
The Vercors Park **in partnership with Grenoble Alpes Metropolitan** area, the Chartreuse Regional Nature Park and Espace Belledonne (park project) are working in partnership to preserve the sky and the night-time environment in urban and rural areas. This collaboration was formalized on 1 October **with the signing of a partnership agreement on night-time lighting** and the launch of the Month of the Night.

The signatories aim to promote a public lighting policy that meets the safety issues of users while providing controlled, sustainable and high-quality public lighting: reducing energy consumption, limiting light pollution and preserving night-time biodiversity throughout the territory.

One of the first actions borned of this collaboration was the organization of a Night month in October 2021. For municipalities, academics and associations, this was an opportunity to organize events **(guided night-time walks, stargazing, conferences, film debates, shows, switch offs of public lightings, tales reads, photo workshops, astronomy evenings, etc.)** to raise public awareness of the importance of night quality and the need to reduce light pollution. The Vercors Park was present in the municipalities of Saint-Nizier-du-Moucherotte, Saint-Andéol and Saint-Thomas-en-Royans.

Municipalities of the IDSR project in which an event was organized :
- **Gresse-en-Vercors - 9 October** : Night walk - Who wakes up ? Who falls asleep ?
- **Saint-Andéol - 5 October** : Night walk in Trièves at the foot of the cliffs of Vercors
- **Saint-Andéol - 9 October** : Night walk with a Park's guard and sky observation with Astrièves
- **Monestier-du-Percy - 9 October** : Told night walk and extinction of public lighting.

Events in Park municipalities outside of the IDSR :
- Fontaine - 1rst October and 20 October
- Seyssinet-Pariset - 6 October
- Le Gua - 9 October
- Saint-Nizier-du-Moucherotte - 9 October
- Varces Allières et Risset - 9 October
- Seyssins - 15 October

Training for tourist accommodation providers on the night environment and the control of lighting. In partnership with the Trièves Tourist Office, a training session was organized on 19 October 2021.

It gathered about ten professionals, for an information and exchange session with Athena Lum (a specialized study office) and an evening outside to observe the night sky with the help and equipment of Astrièves association (amateur astronomers). It was a first training organized with this public, but it was very rich to exchange with tourism professionals about their perception of night and the potential actions they can develop. The Park will organize more session like this one for sure.

Over the years, the participation of the municipalities in the various "Night Days" events and other actions has motivated a majority of municipalities to set in place the extinction of public lighting in the middle of the night, and some to register for **the national competition «Villes et Villages Etoilés» (Starry Towns and Villages) with the award of the label.** This is the case for Saint-Martin-en-Vercors, Miribel-Lanchâtre and Autrans-Méaudre-en-Vercors.

International Dark-Sky Reserve of Vercors

GRENOBLE-ALPES MÉTROPOLE, LES PARCS NATURELS RÉGIONAUX VERCORS ET CHARTREUSE, L'ESPACE BELLEDONNE ET LEURS PARTENAIRES VOUS PRÉSENTENT

Éteignons tous la lumière, rallumons les étoiles

DU 1er AU 31 OCTOBRE 2021
Dans la métropole grenobloise, en Chartreuse, en Vercors et en Belledonne

Des dizaines d'évènements pour sensibiliser à la pollution lumineuse : extinction de l'éclairage public, observation des étoiles, conférences, ciné-débats, spectacles, balades nocturnes, et veillées contées...

www.grenoblealpesmetropole.fr/moisdelanuit

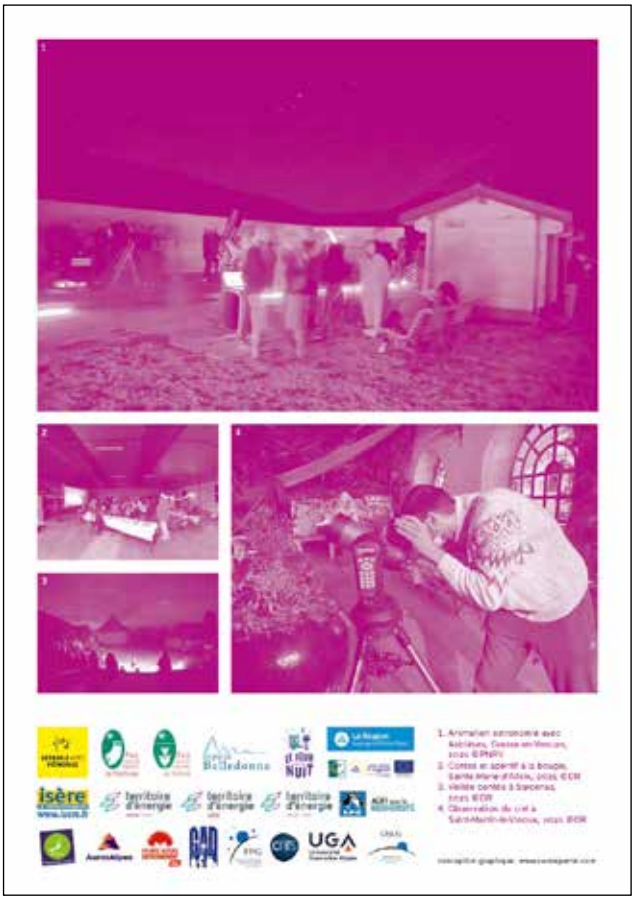
5.2. Highlighting of events organized and planned for 2022 and 2023

Events organized in 2022

Mois de la nuit / Month of The Night 2022 (multiple events, see complete program in appendix)
Organized in cooperation with Grenoble Metropolis, Park of Chartreuse and Belledonne

Municipalities of the IDSR project in which an event was organized :

- **Gresse-en-Vercors - 9 October** : Nocturnal visit of the park «Odyssée verte»
- **Saint-Andéol - 15 October** : Night walk to listening to the nocturnal biodiversity, soup offered and meal shared
- **Chichilianne - 18 October** : Public meeting, public meeting on turning off the light and impact on biodiversity
- **Chichilianne - 31 October** : Moonlight Sonata, animations with the associations of the village
- **Saint-Martin-de-Clelles - 29 October** : Conference animated by the ANPCEN. Sky observation with Astrièves. Night walk listening to the sounds of the night accompanied by a Park guard.



Events in Park municipalities outside of the IDSR :

- Beauvoir en Royans - 1rst October
- Saint Laurent en Royans - 1rst, 14-15 and 21-22 October
- Fontaine - 4 and 12 October
- Seyssins - 1rst, 4, 14 and 21 October
- Varces Allières et Risset - 7 and 14 October
- Seysinnet-Pariset - 13 and 15 October
- Le Gua - 14 October
- Noyarey - 15 October
- Claix : 15 and 21 October
- Saint Nazaire en Royans - 21 and 28 October

Training session
The Park organized a training session for accommodation providers in Vassieux-en-Vercors on June 2, 2022, in cooperation with the tourism office of Vercors.

Organized and planned events in 2023

In 2023, three Owl Night events have already been held, and more events are planned for this summer and fall.

15eme Nuit de la chouette / 15th Owl's Night

The Park organized 3 different events :

- **3 March in Gresse-en-Vercors**

A presentation of the owls of the Vercors, and a night walk of about one hour animated by a guard of the Natural Reserve of the High Plateaux of the Vercors. Also a presentation of the International Dark Sky Reserve project and the Atlas of Communal Biodiversity. Approximately 80 people took part.

- **4 March in Corrençon-en-Vercors**

A presentation of the owls of the Vercors, and a night walk where exploration and tales have been mixed, co-animated by a guard of the Nature Reserve of the High-Plateaux of the Vercors and a mountain guide | From 6 years old for the walk. 42 people took part.

- **24 March in Saint-Martin-de-Clelles**

A presentation of the owls of the Vercors, and a night walk of about an hour animated by a guard of the Natural Reserve of the High-Plateaux of the Vercors | Family public. 35 people took part.

Information on our newsletter : https://www.parc-du-vercors.fr/infolettre_mars_2023

Planned events

Fête du solstice / Solstice Feast

In cooperation with an artist's residence (Villa Glovettes)
20 June : Astronomy evening and night under the stars for an elementary scholl class
30 June : closing evenig with Astro & Musique (https://www.astronomie-et-musique.com/)

Séminaire sur l'éclairage et la nuit dans le Trièves / Seminar on lighting and night in Trièves

In September ; in construction with the community of municipalities of Trièves

Mois de la nuit / Month of The Night 2023 (multiple events)

Like in 2021 and 2022, in October ; in construction with Grenoble Metropolitan area, Park of Chartreuse and Belledonne.

Inflatable planetarium - Le Gua commune

5.3. Perspectives

The continuation and expansion of meetings, events and exchanges is the key to mobilizing more and more inhabitants, young and old, elected representatives and socio-professionals to take into account the maintenance of the quality of the night sky in the Park and the International Dark Sky Reserve.

General public

- **Night Day**

Night Day, a national event that now brings together a large number of municipalities in France in October, will continue in the Park's municipalities. The aim is to raise awareness of light pollution and to protect nocturnal biodiversity and the starry sky. **The Park will continue to diversify its approaches in order to attract a wide audience.**

Technical approaches (quality of public lighting, astronomy, consequences of light pollution on biodiversity, etc.) will be combined with more sensitive approaches (poetry, literature, culture, tales, sounds, fears of the night, etc.) in order to offer a range of actions accessible to everyone. The modes of action will be as diverse: conferences, meetings, night-time outings, starry sky observation, writing workshops, readings, etc.)

In addition to the Day of the Night, the Park aims to mobilize even more people since, for the second consecutive year, in partnership with the Metropolitan area of Grenoble and other Parks, **the Vercors Park wishes to mobilize the municipalities for the Month of the Night during the whole month of October 2023.**

- **Night of the Owl / Night of the Bat**

Alternately every other year, either the Owl's night in March or the International Bat Night at the end of August will be proposed in the IDRS.

Owl's night : this national event takes place in odd years. It aims to raise awareness on owls and their nocturnal companions. The Vercors is fortunate to have on its territory the presence of 7 species of nocturnal birds of prey out of the 9 present in France.

The International Bat Night. The idea is to make a large public discover the biology, the way of life, the threats but also the actions of protection set up to preserve the chiropterans. This event can be scheduled throughout the summer between June 20th and September 20th, with a highlight on the last weekend of August. The Vercors is home to 29 of the 35 bat species found in France, a richness that it is important to share with inhabitants and visitors.

Elected representatives and technicians of local authorities

Raising awareness and informing elected representatives of local authorities is essential to progress in the control of public lighting. It is the Park's mission to support local authorities in this progress and to help them integrate the various issues. This is why, with the IDSR project, **the Park is committed to organizing a seminar or technical conference for these audiences at least once a year.**

In addition to the municipalities that manage public lighting, **we have a particular effort to make to raise awareness and support the owners of private lighting.** Indeed, shops, business areas, condominiums and tourism professionals must be informed of their regulatory obligations (switch-off at a certain time, witch is not always respected) but also on how to go further in reducing and improving the quality of lighting.

An awareness-raising campaign is planned with the publication of an information document and workshops **to provide concrete technical solutions and information on possible financial aid for improving lighting.**

Schoolchildren and young people

While raising awareness among residents is essential, working with young people is a major challenge and the Park wishes to provide more support to this type of public in the future.

- **Educational projects in schools**

Each year during springtime, Vercors Park offers a call for thematic projects to all schools in the area, based on three pillars :

- Environmental and territory education : getting to know and understand the functioning of natural environments and placing them in a Park territory

- education for citizenship: understanding that each citizen has the power to act at his or her own level, to carry out concrete actions for his or her school, his village or territory, in connection with public policies.

- Artistic and cultural education: practicing an artistic medium and enhancing learning through artistic practice.

A specific school project on the night will be proposed in the years to come with these same entries and could deal with astronomy, nocturnal biodiversity on the specific sites of the Vercors Highlands National Nature Reserve or the Sensitive natural area of Drôme department (Ambel and Font d'Urle in particular).

The intervention of artists to accompany the pupils in the practice of an artistic medium will enhance the learning in different forms (shadow theater, show, photographic exhibition, comic strip, illustration, etc.) and will make it possible to propose a report to the parents and inhabitants of the municipalities, thus extending the meetings on the theme of the night to a wider public.

The above-mentioned educational projects on the Educational Land Areas will also continue in the coming years.

- **Educational projects outside school hours: 1001 Alpine Nights**

From 2022, the Vercors Park will offer groups of young people from the area, in collaboration with social centers and accommodation centers for young people, **two-day and one-night short stay to immerse themselves in the mountains, in natural areas (Sensitive natural area, National naturer reserve). The bivouac will be an opportunity to discuss issues related to the night** (light pollution, nocturnal biodiversity, fragility of the night, fears of the night, astronomy, tales and legends) with this young audience.

The preparation of the stay will also be an opportunity to raise awareness among young people: packing a bag to spend a night in the mountains, what to take and how to organize oneself so as not to leave any trace of its passage, but to enjoy a collective moment in the mountains at night.

Two **short stays** will be organized each year in the summer and will be called «1001 Alpine Nights» to fit in with a scheme that already exists and is supported by the Educ'Alpes network. (https://1001nuitsalpines.wixsite.com/1001na).

- **Workbooks and educational tools**

In order to accompany the projects mentioned above (schoolchildren and young people outside school time), and to equip pupils, teachers and facilitators, **an educational booklet will be produced on the night with ideas for activity sessions,** global and more local information, and links to resource persons (trained environmental educators, astronomy clubs, etc.).

This pedagogical booklet will be think with the goal to make the link with the school programs of the French National Education institution so that the learning also serves as a framework for teachers. An inventory of existing educational tools will be carried out and, if necessary, new ones may be created, adapted to the territory and the IDSR project.

Tourism and education professionals

The organization of training courses for tourism and education professionals will be continued in order to move towards a training cycle that will enable all players to take account of the specific characteristics of the night: nocturnal biodiversity, astronomy, public lighting and light pollution, marketing, etc.

These training sessions will alternate between fieldwork to allow observation and indoor time with the intervention of specialists (astronomers, ecologists, communication and marketing trainers, etc.).

Each time, it will also be an objective to propose to the public present pedagogical tools or animation tools allowing mediation on different themes related to the night. Multiple approaches will be favored: playful, scientific, sensory, etc.

These training sessions will therefore equip professionals to propose new outings highlighting the quality of the territory's night sky and will enable them to diversify their offer. In this way, they will become true ambassadors of the night, helping to make the richness of this nocturnal world known to the territory's inhabitants and visitors.

6. COMMUNICATION PROGRAM

6.1. Use of the Park's communication tools

Pages of the Park's website dedicated to light pollution

The website of the Vercors Park has been completely updated in 2019. It receives between 300 000 and 400 000 visits per year. It contains a page dedicated to the IDSR project : «preserving the quality of the night sky» on which many documents can be downloaded such as :

- the guide for a quality lighting in Vercors
- the practical guide for the implementation of public lighting extinction for municipalities
- the experience feedback of a municipality on public lighting management
- the video clip the sky in our hands

Park magazine dedicated to the Night

The Park of Vercors publishes twice a year a magazine that is distributed in all mailboxes of residences located on its territory, and sent to all elected officials and partners of the Park. The print run is 30,000 copies.
In October 2021, an entire edition was devoted to night preservation, containing a dossier on lighting in the municipalities and on the IDSR project (see appendixes).

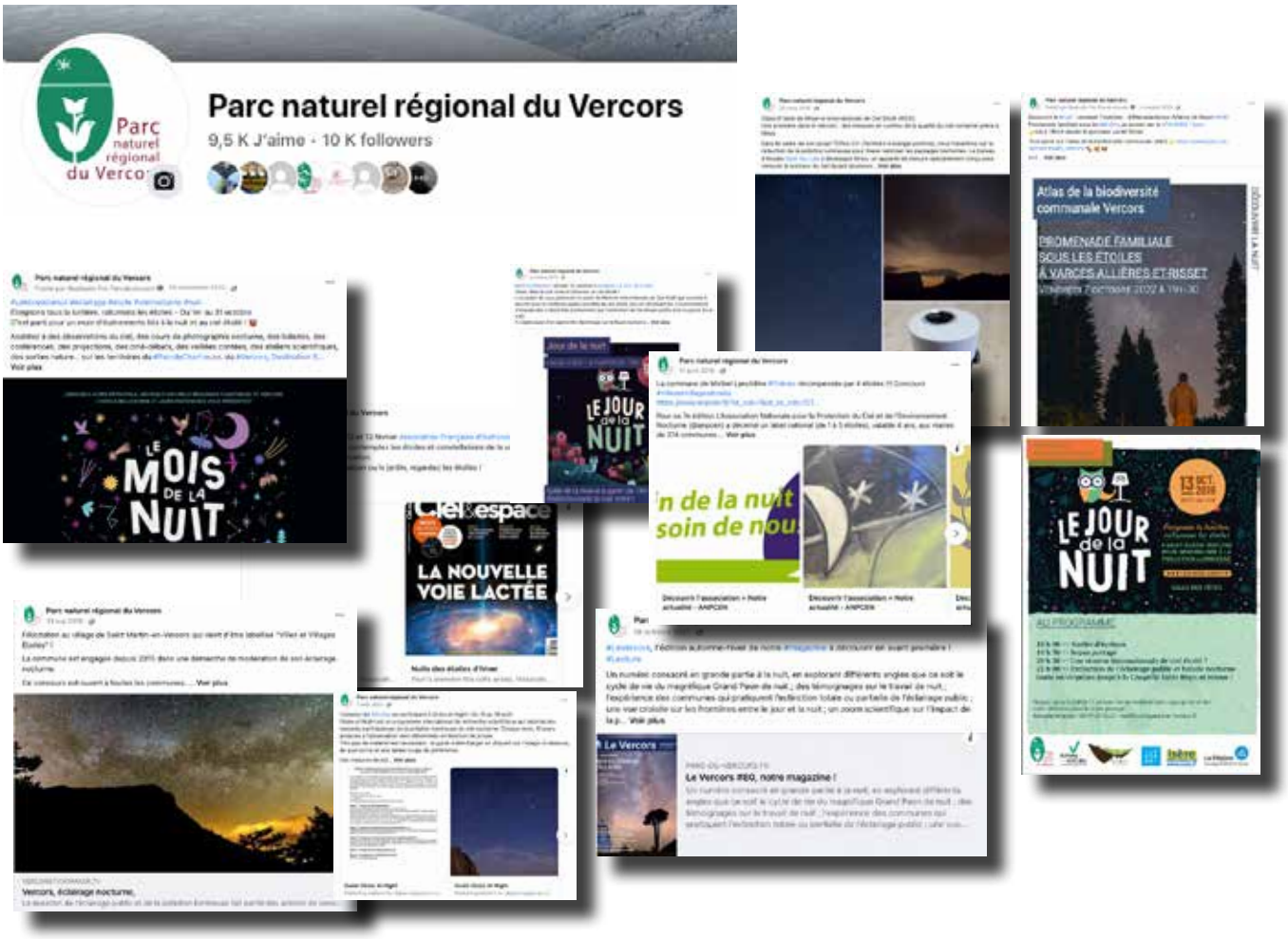
The monthly newsletter of the Park

The Park distributes a monthly newsletter to 2,800 subscribers. Over the past three years, a lot of articles on the preservation of the night sky have been published.

For example
October 2021 - december 2021 - june 2022 - October 2022 - January 2023

The Facebook page of the Park

Facebook posts have been made in recent years to announce events such as the Day of the Night. The number of subscribers to our page is 10 000.



The Instagram page of the Park

The number of followers to our page is 6176.
Publications have been made on instagram to announce events and give advices regarding reduction of light pollution.

[Owl's night 2023]
[The Night month 2022]
[Night sky quality]
[Owl's night 2022]
[Light pollution]

6.2. Guidelines for light pollution reduction

Realization of a lighting guide to all the municipalities of the IDSR project

In 2020 a guide for quality lighting was produced to explain to the municipalities the technical recommendations for public lighting. This document presents the stakes of lighting control (biodiversity, energy, protection of the sky, human health), explains the technical notions related to lighting, presents the regulatory obligations in parallel with the recommendations for the municipalities of the core zone and the buffer zone (see the guide in appendixes).

Guidelines for quality lighting in Vercors distributed to all the municipalities of the IDSR project

In 2020 a guide for quality lighting in Vercors was produced to explain to the municipalities the technical recommendations for public lighting. This document presents the stakes of lighting control (biodiversity, energy, protection of the sky, human health),
explains the technical notions related to lighting, presents the regulatory obligations in parallel with the recommendations for the municipalities of the core zone and the buffer zone . This guide has been produced in partnership with the energy syndicates,
who validated the technical recommandations (see the guide in appendixes).

Thanks to the energy syndicates who contributed financially, the guide has been printed to 500 copies, distributed both by the syndicates and the Park in municipalities. The Park has sent a copy to each of its elected representatives of the communes, and some copies have also been dispersed at the occasion of meeting in municipatlities.

Guidelines for implementing the extinction of public lighting

In order to respond to recurrent requests from municipalities on «how to go about switching off public lighting at the heart of the night ?», the Park has produced a practical guide for the implementation of the switch-off. This document includes advices, models of questionnaires for consulting the population, models of municipal by-laws, and feedback from experience. This guide is available on the Park's website.

6.3. Design of a logo dedicated to the project

In 2021, the Park team worked internally to produce a logo for the IDSR project. This one uses the shape of the logo of the Vercors Park but changes the color and the symbolism. It thus allows to draw the attention on a graphic object known by the general public by recalling the logo of the Park. The bat was chosen for the representation of a nocturnal animal belonging to a fragile and protected species well present in the Vercors.

This logo gives an identity to the IDSR project. It is used for the moment with the subtitle «Projet de Réserve Internationale de Ciel Etoilé» meaning IDSR project.

Parc naturel régional du Vercors

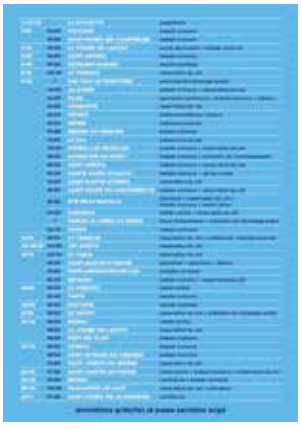
PROJET DE
RÉSERVE INTERNATIONALE DE CIEL ÉTOILÉ

6.4. Press articles and conferences

The press conference of October 1, 2021 in Saint-Nizier-du-Moucherotte

A press conference was organized on October 1, 2021, by the Vercors Park in partnership with Grenoble Urban Area , the Chartreuse Natural Regional Park and the Espace Belledonne for the signing of a partnership agreement on night lighting and the launch of the Month of the Night.

The partners are working on common objectives to preserve the sky and the night environment of urban and rural areas. The signatories aim to promote a policy of public lighting and lighting developments that will meet the safety issues of users while ultimately achieving a controlled, sustainable and qualitative public lighting: reducing energy consumption, limiting light pollution and preserving nighttime biodiversity throughout the territory.




VOS COMMUNES

Une convention sur l'éclairage nocturne a été signée

Presse articles
Since 2015 many articles have been published.

VOS COMMUNES

SAINT-MARTIN-LE-VINOUX

Photographie et balade en forêt pour redécouvrir la nuit

Dans le cadre du Mois de la nuit de la Métro, quatre animations étaient proposées ce mardi à Saint-Martin-le-Vinoux. L'occasion d'essayer la photographie à la tombée de la nuit, d'observer le ciel ou de marcher… les yeux fermés.

Les photographes amateurs ont pris leurs clichés de la Casemates à la tombée de la nuit, avec les conseils de Marc Boulay, photographe et conseiller municipal à Saint-Martin-le-Vinoux.

À 20 h 30, les participants étaient invités à un buffet, les mets proposés par l'association des platanes des hauts de Charmeyran.

Grégoire Gil, de l'association Montagn'arbres, a emmené un petit groupe de marcheurs découvrir la forêt et ses mystères nocturnes.

Didier GAUTHY

La nuit, la luminosité a un « impact sur la faune et la flore »

TERRITOIRES

RÉSEAUX EXTINCTION DES CONSIGNES DE TRI À VIENNE CONDRIEU AGGLOMÉRATION

Le bassin grenoblois s'engage contre la pollution lumineuse

La Métropole de Grenoble s'associe aux trois massifs environnants pour réduire l'impact de leurs dispositifs d'éclairage public sur la biodiversité, la santé humaine et la consommation d'énergie.

ENVIRONNEMENT

UNE CONVENTION « CRÉATIVE »

EXTINCTIONS NOCTURNES

POLLUTION

SEYSSINS

Éclairage public : un dispositif plus économique

La commune a procédé le 19 mai dernier à la modification des plages horaires d'extinction de l'éclairage public en liaison avec l'Agence locale de l'énergie et du climat (Alec) dans un triple objectif : réduire les dépenses énergétiques, lutter contre la pollution lumineuse et préserver la biodiversité nocturne.

L'extinction se fait désormais de 1 h 30 à 4 h 45 dans le secteur de la Plaine et du Prisme, dans le respect notamment des horaires des services de transports en commun, de 22 h 30 à 5 h dans la rue du Haut-Seyssins et de 23 h à 4 h 45 dans le reste de la commune. Ce qui représente, au total, 2 h 45 d'extinction quotidienne supplémentaire.

Par ailleurs, pour gérer plus efficacement le parc d'éclairage, un dispositif de 10 disjoncteurs radio commandés et pilotés par une application dédiée, vient d'être installé. Il permet de procéder à l'allumage ou à l'extinction des points lumineux à distance en cas d'événements particuliers ou encore lors des opérations de déneigement, gage d'une meilleure sécurité des usagers et des agents des services techniques.

L'éclairage public, un gisement d'économies d'énergie.

L'AGGLOMÉRATION | LE VERCORS

La onzième édition du "Jour de la nuit" se tiendra ce samedi à Laval d'Aix

EXTINCTION ÉCLAIRAGE PUBLIC de 23h30 à 5h30 PRUDENCE !

90 nouveaux romans ont été acquis par le réseau des bibliothèques du Vercors

Des histoires de goût et de goulu

Donner son avis pour "le parc de demain"

Tournoi de hockey féminin à André-Ravix samedi et dimanche

6.5. Videos to raise awareness of inhabitants, elected officials and partners were produced in 2015

https://www.vercors-tv.com/Eclairer-pour-rien-la-nuit_v927.html

https://www.vercors-tv.com/Quel-eclairage-public-pour-demain_v925.html

7. TOURISTIC DEVELOPMENT

The valorisation of the IDSR project in the natural regional Park of Vercors needs to enhance the collaboration between the institution that carries the IDSR project and the private actors interested in this labelling.

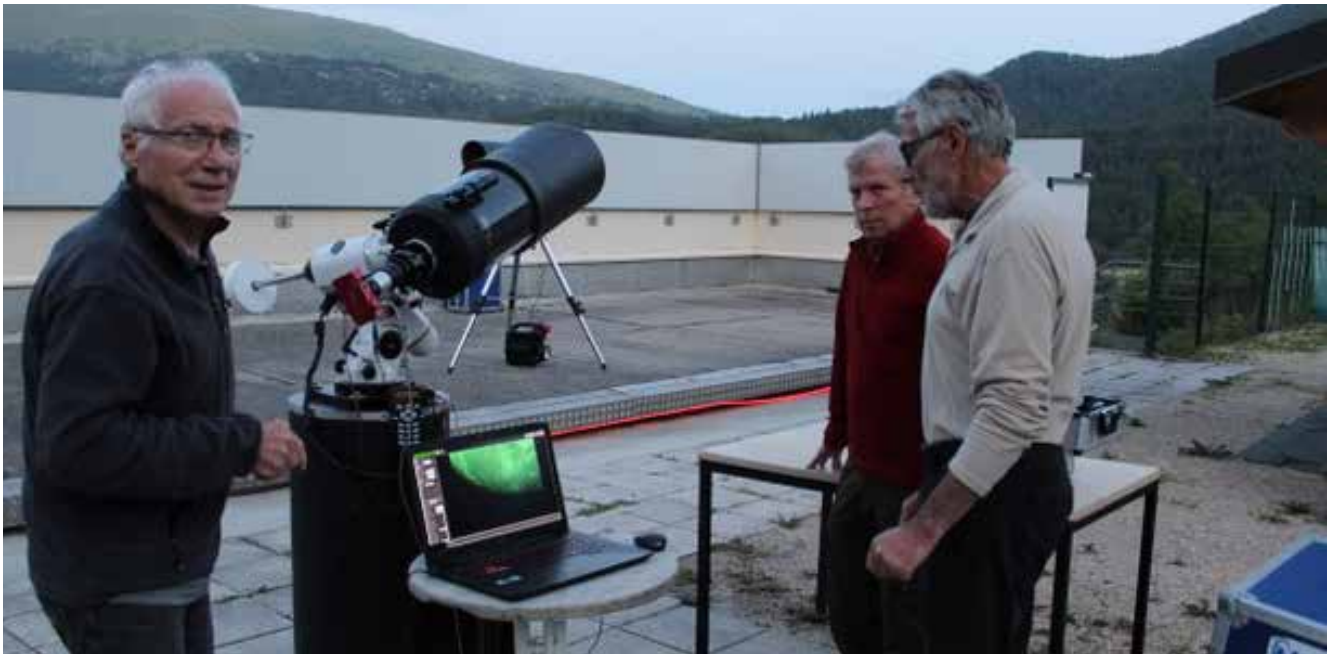
The creation of the IDSR project implies to meet these actors to understand their work, evaluate their motivation in the project and understand how the Park could help these actors. Concretely, this help could be :

- Meetings to discuss how to develop night tourism in the IDSR project and enhance the quality of the existing prestations
- Publish a lighting guide specifically for host and tourists actors to sensibilize them to light pollution
- Identify different observation sites to facilitate access to astronomy on the territory (as it was made in PNR of Millevaches)
- Other axis of reflexion to develop

Different evenings of training organized by the Park have already gathered actors of the future IDSR project (host, mountain guides…). The goal is to sensibilize these actors to light pollution, explain the process behind the creation of a IDSR project, give them ideas and tools to develop their night activity, listen to professionals (consulting firms specialized in light pollution, astronomers…).

A group enjoys the sunset next to the Mont Aiguille in Trièves during a night outing
Photo : belledonneenmarche.fr

Second edition of the night pollution training on 2th of June, 2022. This time, the evening was intented for hosts (cottages,bed and breakfast, lodges...) of the territory.
Photo : PNRV- Ulysse Mariette



Theses trainings are opportunities to gather different types of actors interested by the IDSR project and able to provide offers and services linked to the night .

The goal was also to let people meet each other and share their professional experience and projects considering their common interest for astronomy and light pollution.

In 2022, a trainee was hired to improve the knowledge of the « night tourism » on the territory of the Park.

The following figures are a basis to understand what type of activity is offered and by who, in order to develop a network of actors likely to intervene in the events related to the IDSR project.

Preparation of the instruments before an evening of observation on the site of Astrièves
left page ...
Photo : PNRV- Ulysse Mariette

right page...
Starry sky observation session
https://www.cosmodyssey.fr/, 2022

7.1. Mountain leaders

What are they doing ?

Guide night hikers
Ensure their safety and provide the itinerary
Share their knowledge of the region and its natural and cultural assets (fauna, flora, heritage...)

What offer ?

Night outings

- Astronomy: (Good connoisseurs of the sky)
- Dark Sky Observation: Designated as "less complex" than astronomy
- Listening to the sounds of the night, storytelling, evenings, games...
- Bivouacs, trekking...
- Snowshoeing: hikes to high altitude restaurants

Seasonality :

Classic summer
winter
bi-seasonality.
Peak activity in July/August.

Booking :

Directly through a partner
Mail / Phone
On line
Via the offices of the AMM / guides

Partners :

Campsites
Restaurateurs
Lodgers
Tourist offices

Frequency (depending on the guide...)

Summer: 1 to 5 outings per week
Winter : 0 to 3 outings per week

Group size :

5-6 people on private evenings
25-30 people for groups

Observation evening at the Clariant Inn (Corrençon-en-Vercors)

Mountain leaders	Activity type	Sector of work
Vincent Désestret www.nature-vercors.fr	Starry sky observation Astronomy (Master degree in Astronomy et Astrophysic) Tales reading about myths, constellations and universe	4 Montagnes Royans-Vercors
Marine Champalle https://marinechampalle.wixsite.com/rando-contes-vercors	Starry sky observation Astronomy Tales reading and et night vigils Trapper's evening Snowshoeing to refuges high altitude restaurants (partnerships) Bivouacs	4 Montagnes
Laurent Caillot https://www.gites-en-vercors.com/sejours-de-randonnee/	Starry sky observation Astronomy Trapper's evening Snowshoeing to refuges high altitude restaurants (partnerships) Bivouacs	4 Montagnes
Caroline Bringuier	Starry sky observation Astronomy Donkeys treks night hikes and snowshoeing to refuges and restaurants Bivouacs	4 Montagnes

More to come...

7.2. Specialized animators

What are they doing ?

Experienced astronomers, sometimes by training, they accompany groups of all levels in the discovery and understanding of the starry sky.

Cosmodyssey company by Axel Tholens, located in Die

Nadège Perrot, the « shepherdess of the stars » (Grenoble, Gap, Briançon)

What offer ?

General public
- Astronomy courses for beginners
- Group nocturnal vigil, use of a planetarium...
- Discovery of an observatory
- Learning how to use observation instruments

Professional training
- For mountain leaders, naturalists...
- Conferences

Young audience training
- Various educational workshops on astronomy and celestial objects
- Astronomy classes

Seasonality :

Peak activity in the summer and during the February vacations.
Low demand the rest of the year. Animations with school children.

Partners :

Campings
Observatories (CosmoDrôme)
Lodging centers
Festivals (Coupe Icare...)
Tourist offices
Ski resorts

Frequency

Between 60 and 100 days of activity per year. Mostly in summer.
Reservation : Mail / Phone / Online

Group size :

25 max in the planetarium
15-20 for the animations
Larger groups possible depending on the speaker

The shepherdess of stars (Grenoble, Gap, Briançon)

Activities	Rates
Planetarium	200€ first session with installation 120€ second session 100€ following sessions
Telescope observation evening	Summer – 170€* Winter – 130€* **(total pIDSR project divided between participants)*
Astronomy exhibition	Assembly / disassembly 150€ 50€ / day of use
Various animations	120€ per animation + material
Scolaires	On quotation

Cosmodyssey – Diois et Sud Vercors

Activities	Rates
Telescope observation evening	20€ - Adults 10€ - Childs under 15 years
Cosmodrôme observatory visit	*20€ - Adults* 10€ - Childs under 12 years
Astronomy course and learning of observation tools	70€ (with observation equipment)
Training ½ day theory and night observation for mountain leaders	600€ with provision of sky maps (divided by the number of mountains guides registered)
Conferences	On quotation

Chaumailloux hut on high plateaus

The planetarium, useful in all weather.
http://labergeredesetoiles.com/ - 2022

A "solar system model" animation
http://labergeredesetoiles.com/ - 2022

7.3. Astrièves observatory

The observatory is located in Gresse-en-Vercors a village of Trièves sector, located at the foot of the eastern barrier of Vercors. This commune has a quite good touristic activity with its skiing resort and its wonderfull natural setting.

The observatory has been carried for 13 years by passionate volunteers (gathered in an association). This observatory of astronomy is a unique place in the Vercors.

It is equipped with powerful tools of observation :

- Telescope C14 (350mm diameter) with Paramount mount driven by computer
- Telescope diameter 200 mm equipped in «visual assisted», ideal to see appearing on screen the objects of the deep sky)
- Itinerant planetarium
- Many other observation telescopes ...

Each year, Astrièves receives between 1500 and 2000 visitors from more than sixty departments and from abroad. Days of initiation to astronomy are organized in about twenty establishments, schools and high schools, of the academy of Grenoble and surrounding departments (2000 students per year).

Astrièves welcomes the public for evenings organized during the school vacations, for the end of the year celebrations or during particular events (Alpine festival, nights of the stars, Month of the Night...) A planning of the events is available on the website of the observatory.

Observation evening at Astrièves

Services	Public	Events
Presentation of the night sky / planetarium **Presentation of the constellations / panels** **Observation of the night sky** **Observation of the sun** **Animation of training course in astrophotography**	From beginner to specialist.	Weekly in summer and winter Exceptional events : • Eclipses, Night of the stars • Mountain pasture festival in Gresse en Vercors, • Schools : Schools of the canton and beyond • Socio-cultural centers on request

Actions carried out by Astrièves to monitor and reduce light pollution

As an astronomy association, Astrièves has established a partnership with the Park of Vercors in the framework of the IDSR project led by the park to reduce the nuisance of lighting on the environment of the reserve.

This has allowed, **after a campaign of measurements carried out in collaboration with the Darkskylab study office commissioned by the Park, to confirm the excellence of the night sky of Gresse-en-Vercors.** A part of the territory of the municipality is in the National Nature Reserve and also in the core zone of the IDSR project.

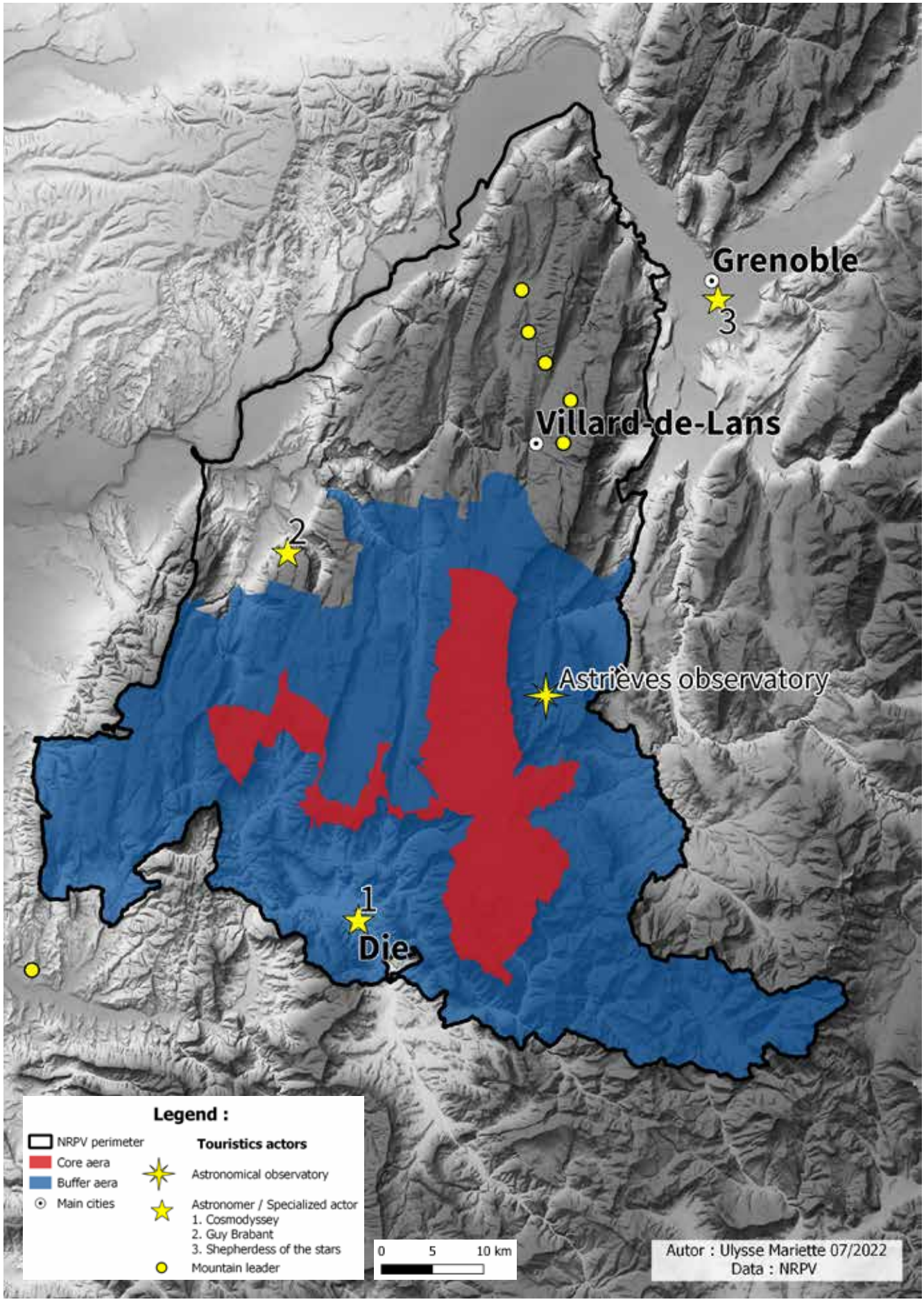
The will of the pioneers of the association to promote the starry sky is reinforced by this result which allows to affirm that the sky of the commune represents an additional tourist asset. The measurements made with our Ninox sensor, used by the DarkSkyLab, help to improve the monitoring tools of the sky quality (NSB).

The elected officials of Gresse-en-Vercors have initiated a reflection on the improvement of the quality of public lighting. The recent adhesion to the energy syndicate TE38 should allow to work quickly on the reduction of the power and to optimize the quality of the public lighting of the commune.

Astrièves has been working for many years to reduce light pollution. But the volunteers of the association are still confronted with the residual light pollution which affects the astronomy activities, namely the private lighting of individual houses and residences. In particular vacation homes with corridors that remain permanently lit all night.

Information and communication with these structures and their inhabitants have started. But this is also the charge of the elected officials to engage the setting in conformity, with regard to the current regulation and to reduce the light pollution.

Observation evening at Astrièves


Grenoble
3
Villard-de-Lans
2
Astrièves observatory
1
Die
Legend :
NRPV perimeter
Core aera
Buffer aera
Main cities
Touristics actors
Astronomical observatory
Astronomer / Specialized actor
1. Cosmodyssey
2. Guy Brabant
3. Shepherdess of the stars
Mountain leader
0 5 10 km
Autor : Ulysse Mariette 07/2022
Data : NRPV

Interviewed between march and june 2022, these actors explained their type of work, their interest in he IDSR project. Particular attention was paid to their « night » offer, their experiences and their vision about night tourism.

The goal of the Park in this approach is to compare the night offer of the territory to others experienced territories like IDSR project in France (Pyrénnées, Mercantour...) or abroad to ameliorate its own offer. The development of astro-tourism is also a leverage to reduce light pollution.

If tourists are satisfied with the quality of the sky it becomes more important to lower light pollution for towns, hosts, campings...

At this stage of reflection the Park tries to understand the needs and the pratice of these tourism professionals. One of the objectives is to develop pedagogical tools that will be used during night animations. Few tools already exist (games, tales, and other animations related to night).

The Park could possibly lend observation devices to facilitate the organization of night activities for tourism professionals who are new to this field and have not invested in equipment yet.

Festival des étoiles 2022 - Marignac-en-Diois
Photos : PNRV- Ulysse Mariette

8. POST-LABELLING

8.1. Future outreach and communication program

«Month of the Night» event

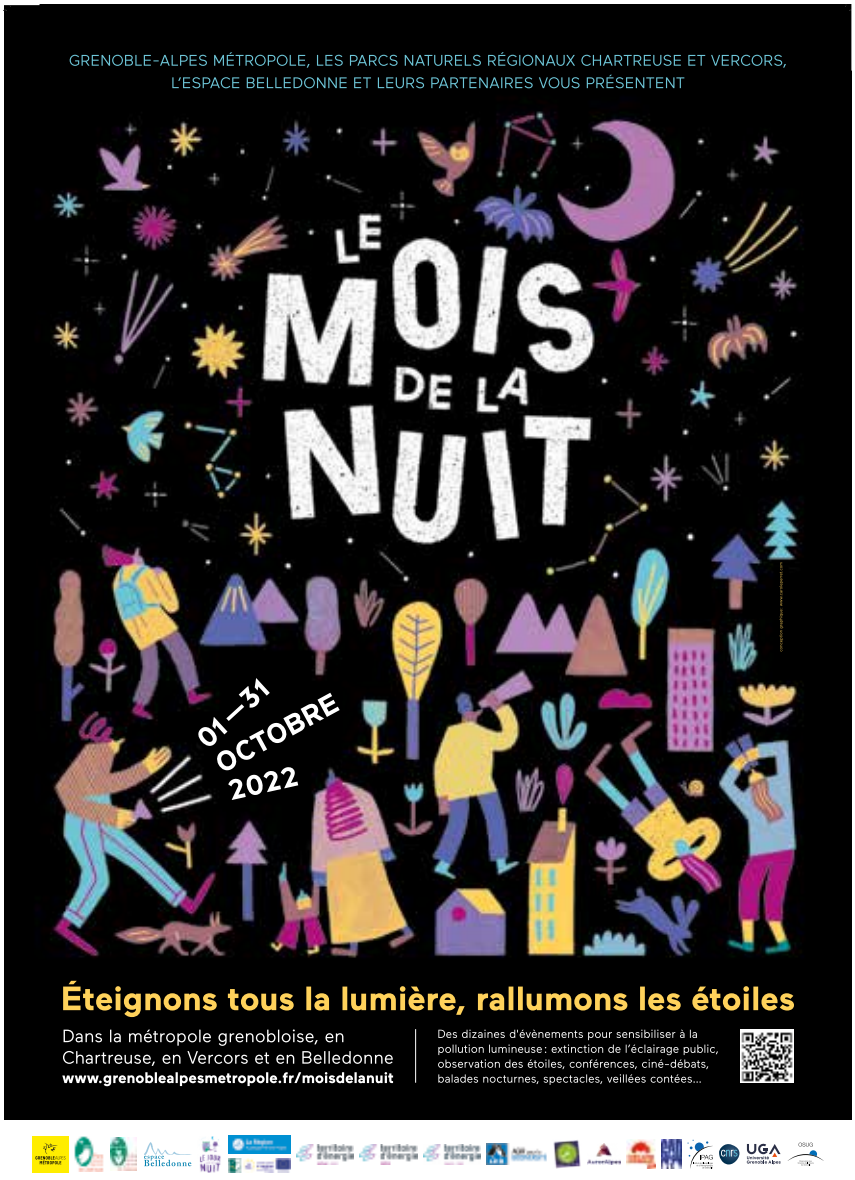
The Month of the Night was organized for the second consecutive year in October 2022. The partnership between the Vercors Park, the Grenoble Metropolis, the Chartreuse Park and the Espace Belledonne is well established.

These four territories represent a total of 248 municipalities and nearly 600,000 inhabitants who are potentially affected by this event.

The continuation of the organization of the Month of the Night is not in doubt.

It will be renewed each year with the objective of involving more and more partners and reaching a growing number of people.
In 2022, the three energy syndicates of Isère, Drôme and Savoie have already responded by offering support to municipalities that have not yet implemented the extinction of public lighting to test the extinction for one month.

A large number of associations and universities are still mobilized to offer activities in the municipalities.



An astronomical event during the summer

The Park wishes to plan an event around astronomy during the summer.

A good number of actors present on the territory of the IDSR project propose animations around the observation of the night sky, can be involved.

The night of the stars is organized every year at the beginning of August by the French Association of Astronomy.

This period is interesting to take advantage of the summer sky and to mobilize the actors of astronomy in order to propose animations to the inhabitants as to the tourists.

With the tourist offices, these actors will be mobilized to imagine a diversified program.

Contacts with interested tourist offices (Trièves, Royans-Vercors) are in progress, in order to organize this event which could be held in 2024 for the first edition.

Setting up a label for committed private actors

Work on private lighting has been started in order to raise awareness among private actors (see the dedicated paragraph).

Within the framework of the IDSR project, the Park wishes to develop a recognition label for private actors who make a particular effort on their lighting.

The Park is used to brands and labels. For example, it manages the «Valeurs Parc» brand recognizing the quality of agricultural food products (meat and fish, cheese, aromatic and medicinal plants, honey...).

To date, 41 producers have received the Valeurs Parc mark on their products. The audits to integrate this mark will continue. The producers marked Valeurs Parc are supported in their communication tools: digital communication campaigns, leaflets, professional photos, posters and other stickers were made with the help of the Vercors Park. Collective actions on the margins of progress are regularly proposed.

Through its «Inspiration Vercors» brand, the Park also manages the labeling of tourism partners: the Partners. The Partners network is made up of accommodation providers, restaurant owners, activity providers and tourist sites. They can be recognized by the presence of the Partner Inspiration Vercors logo in their communication tools.

The Partners represent the spirit of the Vercors: men and women of high human value and respect for their environment. Their commitment is to guarantee visitors a quality experience in our territory based on the values of resourcing, transmission, protection and freedom.

The goal of our lighting label is to establish a recognition for merchants or hosts who are committed to controlling their lighting. This commitment will allow to sensitize their public to the preservation of the sky and the night environment and will especially have an incentive effect on the non committed actors.

This guarantee can be obtained by respecting a set of specifications, by participating in collective actions and by promoting the IDSR project.

VALEURS PARC* NATUREL RÉGIONAL

PARC NATUREL RÉGIONAL DU VERCORS

inspiration VERCORS V PARTNER

8.2. Plan to address threats to night sky quality

Ski resorts in Quatre-Montagnes

The ski resort of Villard-Corrençon is the most important of the Vercors massif and its management is private. This station is nevertheless of average size and its frequentation is mainly family. Today the lighting of the slopes is not topical. It should be noted that the two communes where the resort is located have recently made efforts to reduce lighting :

Villard-de-Lans has deliberated on September 29, 2022 on the extinction of the village, from 1:00 to 6:00 in the agglomeration and from 23:00 to 6:00 in the hamlets.

Corrençon-en-Vercors is going to realize works with the Energy Syndicate of Isère in the summer of 2023, with the help of the «green fund» of the State mobilized by the Park. A global renovation of the public lighting and a lowering of the intensity in the heart of the night are planned.

These decisions of the local elected officials are going in the right direction and we can assume that the manager of the station will not go against these measures. An elected official and a technician of the Park will meet with the manager before the 2023-2024 season to ensure that the RICE project is well known and taken into account in the resort's development projects.

Ski resort in Col-de-Rousset and the hamlets in Treschenu-Creyers

At the Col de Rousset resort, the lighting has been renovated, as it is the case at Saint-Agnan-en-Vercors in which the resort is located. Concerning the small ski area, **the letter from the director of the Drôme resorts confirms that the lighting of the slopes of the Col de Rousset is not planned**, in the same way as at the resort of Bouvante (see letter in appendix).

Concerning the hamlets in Treschenu-Creyers, three hamlets have already been renovated (Les Nonières, Mensac and Archiane see 5.2 and 5.10) with the help of the Energy Syndicate. There are still two hamlets to be renovated, this is foreseen in the framework of the transfer of competence to the Syndicate in 2024.

Ski resort of Col de Rousset

Growing lights in Lus-la-Croix Haute

The municipality of Lus-la-Croix-Haute has transferred the management of the public lighting to the Energy Syndicate. Renovation work has begun in accordance with the LMP. Changes in the hamlets are taken into account either by a removal of light points or by a renovation with a ULR = 0.

Communities of Valence and Grenoble, in addition to the remainder of the Regional Park

The Grenoble Metropolitan area is engaged in a process of renovating all the public lighting with its municipalities. The technical criteria for the renovation of public lighting are consistent with the LMP of the IDSR project.

With Valence-Romans urban area, work needs to be developed to strengthen collaboration on this subject. In particular if, as is planned, new municipalities of the agglomeration join the Vercors Park in 2024 and we wish to extend the scope of the IDSR to these new communes of the Park.

Photo : Philippe Riot

View of Grenoble metropolitan area from crests of Vercors

8.3. Monitoring strategy for the quality of the night sky

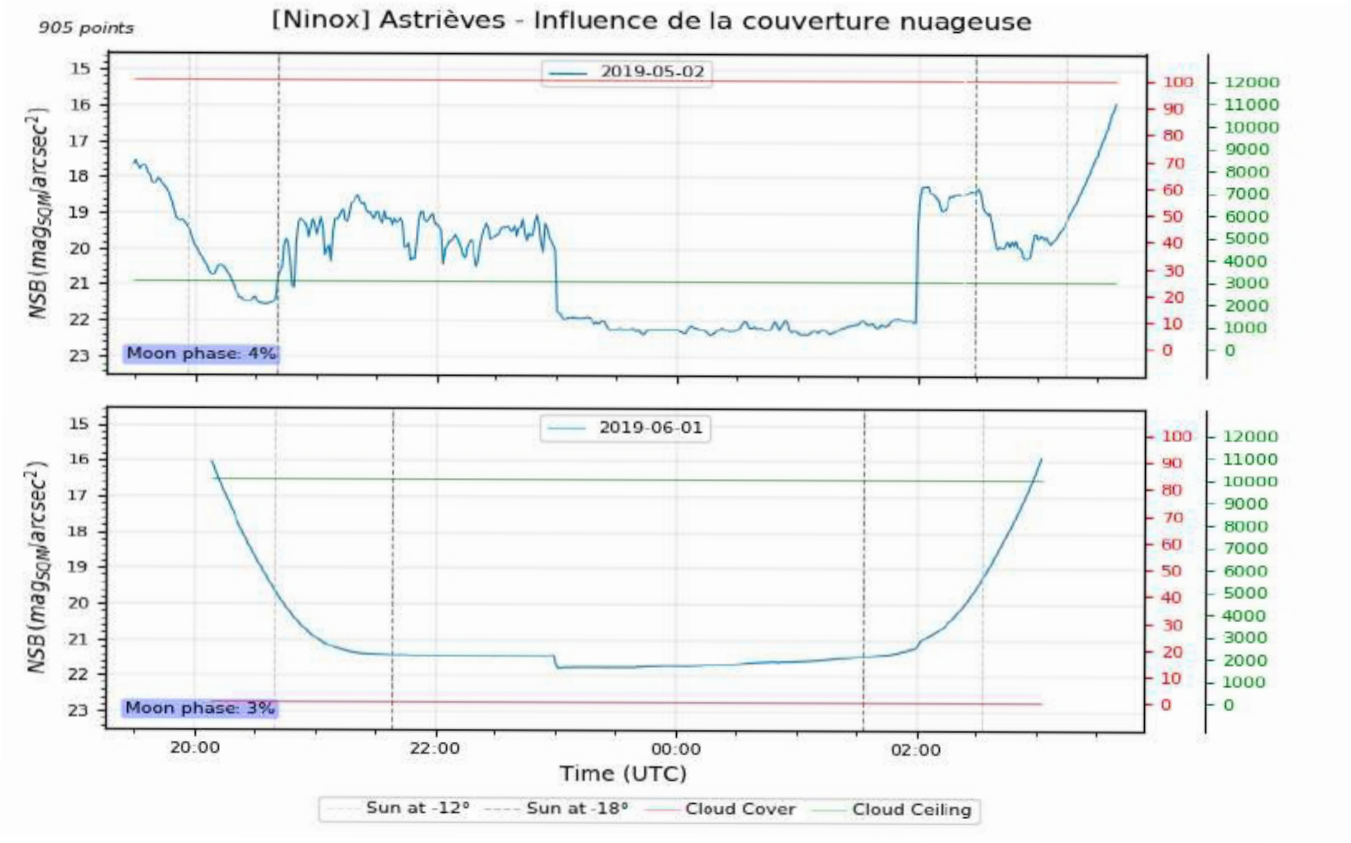
Monitoring through continuous measurements :

The Astrièves association located in Gresse-en-Vercors has been carrying out for 4 years continuous measurements of NSB with a Ninox installed at the astronomical observatory at 1260 m of altitude at the feet of the high plateaus of Vercors. The data are regularly sent to DarkSkyLab which processes them.

Astrièves has already valorized measurements, in particular by studying the influence of the cloud cover on the measured values of NSB.
The graph below, shows the strong influence of cloud cover on the values of NSB in connection with the extinction of public lighting in the middle of the night. The top graph shows the NSB measurements made during a night with a 100% cloud cover located at about 3000m.

The lower graph shows the NSB measurements made on a cloudless night. In both cases, we can clearly see that the public lighting of the village of Gresse-en-Vercors, located below the measurement site, was turned off at 23:00 UTC. And we can see that the effect on the NSB values is very different according to the cloud cover.

Ninox installed in astrièves observatory (Gresse-en-Vercors)



NSB measurements showing the influence of cloud cover on extinction

The measurements carried out by Astrièves allow a continuous monitoring of the quality of the sky on the sector of Trièves. These measurements will be used to monitor the evolution of this quality.

In order to complete these measurements on the Trièves, the Park wishes to install a second Ninox in a fixed way on the high plateaus of Vercors, the precise sector is still to be determined.

Monitoring by punctual measurements :

In addition to the continuous measurements, a monitoring protocol by punctual measurements of sky quality has been agreed with the staff of the National Nature Reserve of the Vercors Highlands. Six permanent guards and two seasonal guards are regularly on the field. They are mobilized to carry out measurements with the help of Sky Quality Meter (SQM)

The guards are present in the field all year long, even if in winter the movements are more complex because of the snow. Wildlife counts and scientific surveys are carried out regularly, sometimes very early in the morning (ptarmigan and black grouse) or at nightfall (mountain owls). Different huts are used to spend the night on site and facilitate these operations. On these occasions the guards can easily carry out night measurements with the help of SQMs without the need for a specific trip. A measurement protocol has been developed and tested by the guards..

This follow-up will make it possible to carry out tens of measurements per year in various places of the Natural reserve of the high plateaus and thus of the heart zone of the IDSR project.

In the years to come, the Park also wishes to train partners (accommodation providers, mountain professionals, etc.) in the measurement of sky quality using SQM. This will allow us to create a measurement network. At the same time, this will allow the concrete involvement of local actors who will thus become ambassadors of the IDSR project.


Fiche méthode prise de mesures Sky Quality Meter

Mode d'emploi :

Matériel nécessaire :
- SQM
- GPS

Lieu dit	Date	Heure	Point GPS	Mesure 1	Mesure 2	Mesure 3	Observateur

SQM and measurement protocol used by the gards


Photo : PNRV / Nadia Roble

Team of the National Reserve

8.4. IDSR project steering comitee

A steering committee for the IDSR project has been set up and has already met three times. This committee meets approximately once a year to validate the orientations given to the IDSR project (see minutes in appendixes).

Members

Name	Position	Structure	Nature
Michel Vartanian	Vice-President deleguate to land use planning and National Reserve	Parc naturel régional du Vercors	Public authority
Alice Mollon	Deleguate to energy transition	Parc naturel régional du Vercors	Public authority
Séverine Dupuy	Head of public lighting department	Territoire d'énergie Drôme Energy syndicate of Drôme	Public authority
Sylvain Chautemps	Head of public lighting department	Territoire d'énergie Isère Energy syndicate of Isère	Public authority
Sophie Thomine	Fragile natural area coordinator	Drôme Department	Public authority
Anne-Sophie Croyal	Fragile natural area coordinator	Isère Department	Public authority
Stéphane Gusméroli	Head of public lighting department	Grenoble Alpes Métropole Metropolitan urban area of Grenoble	Public authority
Alain Lodo	Head of public lighting department	Valence Romans Agglo Urban area of Valence-Romans	Public authority
Jean Deschatres	Administrator	LPO Isère Bird protection league Isère	National NGO
Julie Leprince	Ecological monitoring and expertise officer	FNE Isère National association for nature conservation	National NGO
Alain Amselem	Local contact point	ANPCEN National Association for the Protection of the Night Sky and Environment	National NGO
Alain Amselem	Representative	GAD Dauphiné Astronomy Group	Local NGO
Guy Brabant	President	Les montreurs de grande ourse Association for astronomy education	Local NGO
Gilles Allemand Bernard Brun-Cosme	President Vice-President	Astrièves Association for astronomy education	Local NGO
Michel Bonavitacola	Expert / IDA Member / Research and Development Manager	International Dark Sky Association / DarkSkyLab	Qualified Personality
Benoît Betton	Manager of the National Natural Reserve of Hauts Plateaux du Vercors	Regional Natural Park of Vercors	Public authority

The presence in the steering committee of representatives of the agglomerations testifies to the collaboration of the Park with the urban areas and the common will to progress on the reduction of light pollution.

The Park's elected officials wish to extend the IDSR project to the entire Park in the coming years. The involvement of all the municipalities in the various events (Month of the Night, training, ...) contributes to this. Moreover, the collaboration with the energy syndicates that cover the whole department facilitates the link with new communes to involve them.

Some municipalities member of the Park of Vercors but located outside the peripherical area of the IDSR project have already approved the IDSR Charter :

- Autrans-Méaudre en Vercors (3068 inhabitants)
- Fontaine (municipality of Grenoble metropolitan area, 23049 inhabitants)
- Lans-en-Vercors (2673 inhabitants)
- Rencurel (331 inhabitants)
- Seyssinet-Pariset (municipality of Grenoble metropolitan area, 11792 inhabitants)

All of these municipalities have switched off their public lighting and have started to renovate their public lighting systems. **These commitments prefigure the expansion of the peripherical area.**

The northern part of the Vercors Park is the most touristic. The ambition of the Park is to make the Night a tourist argument. A certain number of actors are already interested and active in this theme, such as mountain guides and accommodation providers. To extend the peripheral zone, we will be able to use this tourist argument and rely on motivated professionals.

9. INVENTORY OF LIGHTING

9.1. Public lighting in the buffer zone

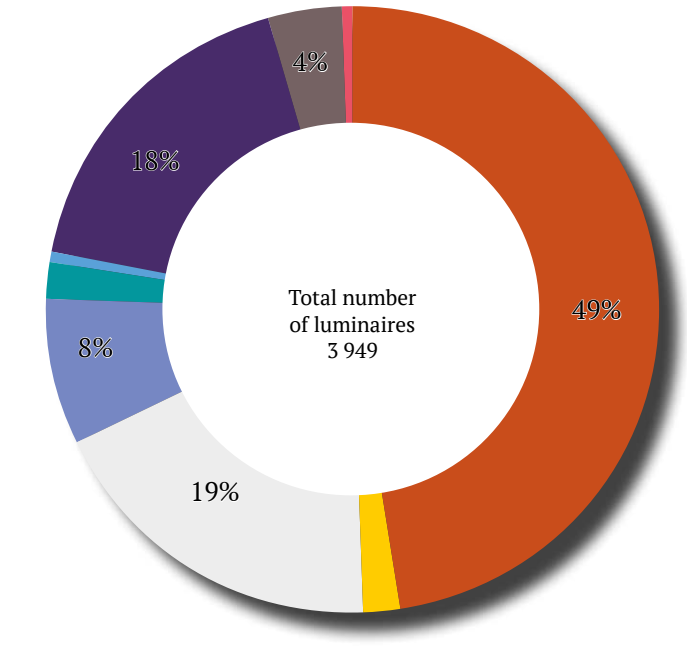
This section aims to offer a global overview of the public lighting park of the municipalities in the IDSR project.

High-pressure sodium is predominant (49% of the lighting stock in the IDSR project municipalities), but the proportion of this type of lamp is much lower than the national average.

The proportion of fluorescent balloons (19%) is high, and clearly higher than the national average. It should be noted that the sale of this type of mercury vapor lamp has been banned since April 13, 2015 and the renovation of the fraction of the lighting fleet that uses this technology should be considered as a priority.

The proportion of metal halide lamps (8% of the fleet) is lower than the national average.

Finally, the proportion of LED-based devices (18%) is relatively high, **which seems to indicate that the municipalities within the IDSR project perimeter have well underway with the renovation** of their lighting fleets and the migration to new lighting technologies.



DarkSkyLab - 2022

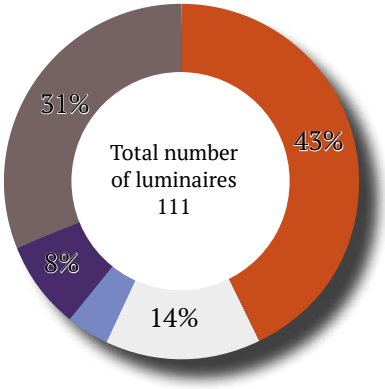
9.2. Illustrated inventory of lighting in few municipalities

This section gives an illustrated view of the public lighting park of a few municipalities. Selected municipalities have a part of their territory in the core zone, but the light points illustrated are located in buffer zone.

Corrençon-en-Vercors

Correncon-en-Vercors is a touristic village, having a skiing resort. There is an important number of private luminaires in residences. A work is already engaged to contact this condominiums with the goal of convincing them to reduce their lighting at night.

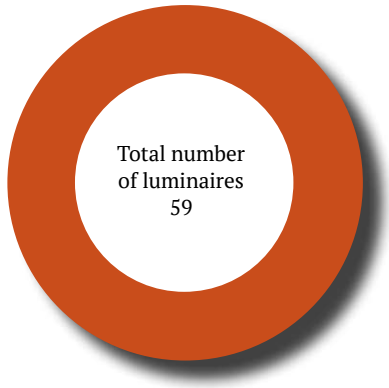
Public lighting is managed by the municipality itself. The lighting is aging and not well controlled also regarding the illumination of the monuments. The lighting of the village is one of the renovation priorities in the coming years.

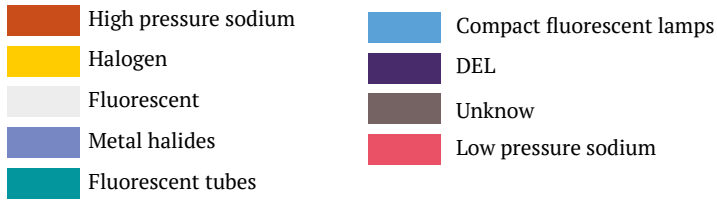


Saint-Andéol

The public lighting park is globally outdated and energy-consuming, but entirely in sodium. Untill 2021 the luminaires were managed by the municipality.

Saint-Andéol has delegated its lighting to the energy syndicate in 2022. Audit has been done and the renovation works are committed for 2022 and 2023.





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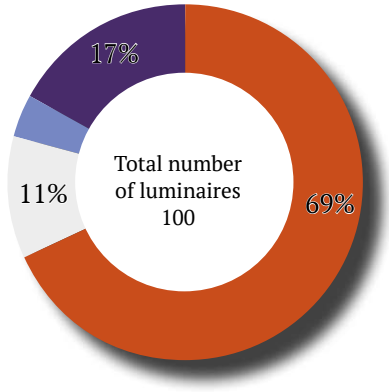
Romeyer

The municipality of Romeyer chose to replace its HPS bulbs by 4000K DEL in 2017. This choice is in contradiction with the recommendations given by the Vercors PNR (2700K maximum into agglomerations, 2400K maximum outside agglomerations).

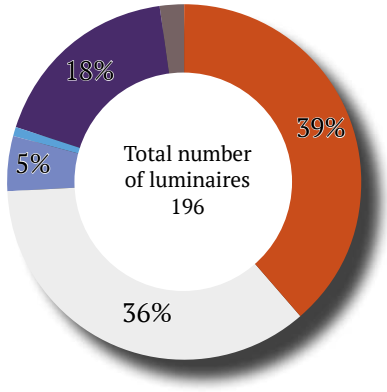
Nevertheless, the ULOR is improved on DEL luminaires compared to oldest HPS installations. Renovation of all the fluorescent lamps is planned in 2023.



Saint-Agnan-en-Vercors

St-Agnan is a good example of an effective renovation. The decision to delegate public lighting competence to TE26 (energy syndicate of Drôme) was made in 2014.

The data presented here is from before the renovation. Since then, several phases of renovation permitted to save 75 % on the electricity bill, and to replace the fluorescent balloons.



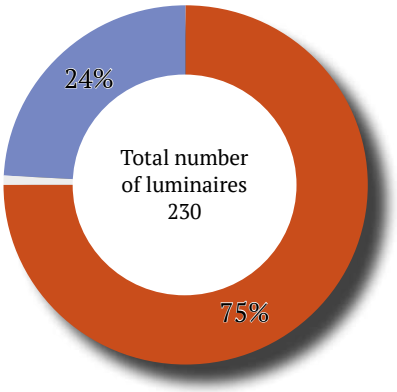
Before renovation

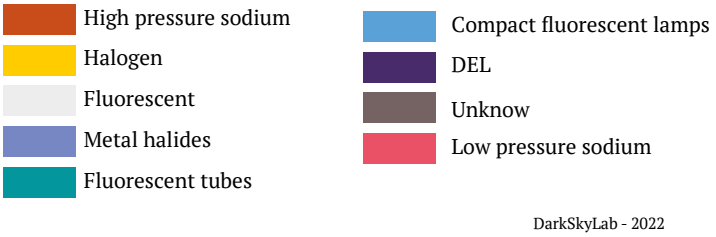
After renovation

Gresse-en-Vercors

The public lighting park is globally outdated, but hopefully the municipality switches off public lighting in core night between 0:00 to 4:00. Public lighting management was recently delagated to the energy syndicate.

Thanks to this decision, the renovation of the public lighting is planned for 2023.

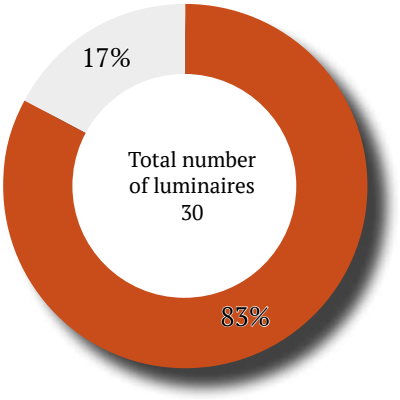




DarkSkyLab - 2022

Saint-Martin-de-Clelles

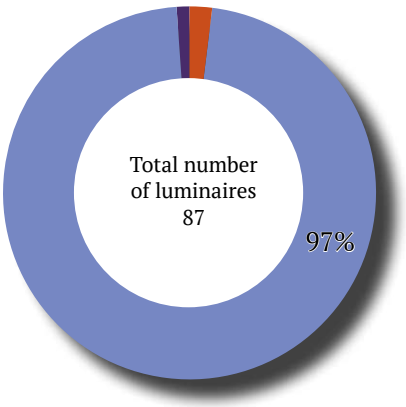
This municipality has a majority of HPS which is not so bad, but the power of the lamps should be reduced.



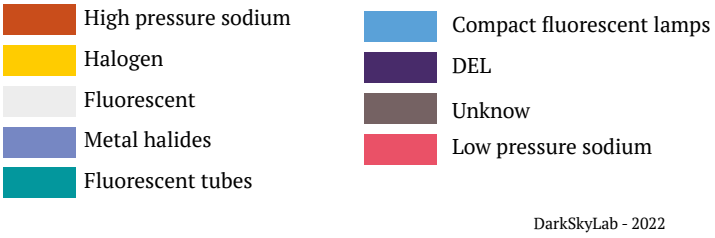
Chichilianne

Public lighting in Chichilianne is managed by the municipality. Luminaires are relatively osbolete. The total renovation of the lighting park was finished in the early 2022 (before the time we got the data).

Metal Halides were replaced by LED. There is no total cutoff in this commune, only a modulation of 50 % of the intensity of DEL.



Lighting in Chichilianne before renovation

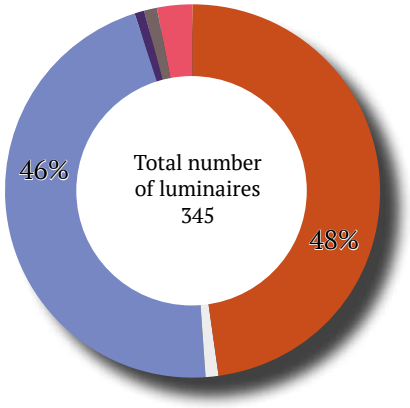


DarkSkyLab - 2022

Châtillon-en-Diois

The lighting park in Châtillon-en-Diois has been renovated at the end of 2021 and beginning of 2022 with the help of the Drôme energy syndicate.

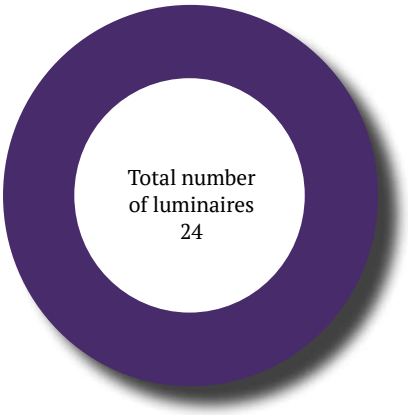
The data presented here correspond to the old lighting.
Most of the fluorescent lamps have been changed by LED lights at 2200K with a ULOR of zero. This renovation is exemplary from the point of view of the respect of the biodiversity.

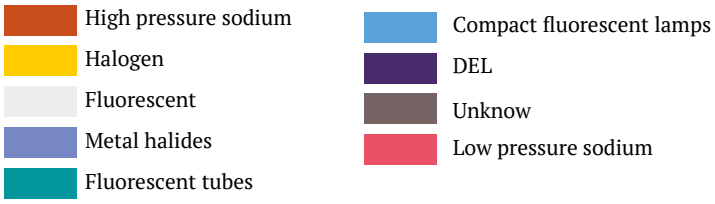


Laval d'Aix

Laval d'Aix renovated entirely its public lighting park in 2019. The municipality chose to install amber DEL to replace fluorescent bulbs (high energy consumption) and HPS bulbs. The picture was taken in 2018 (before the renovation).

Since the renovation, the intensity of DEL lighting is reduced to 30 % during core nigth.





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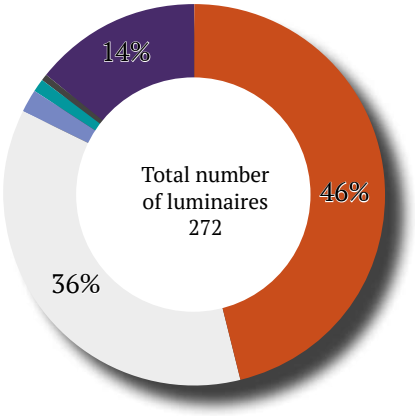
La Chapelle-en-Vercors

La Chapelle-en-Vercors (and Saint-Agnan-en-Vercors) are two examples of municipalities that have reduced their number of lights since 2017 (-9% of the total number of light points).

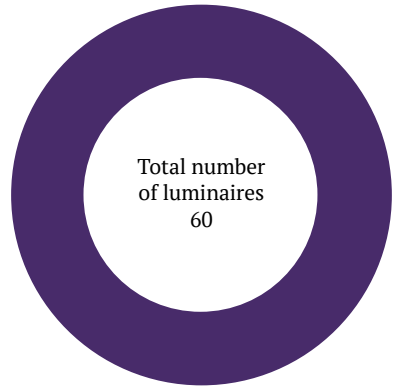
Public lighting extinction was partially etablished in 2018 (Artisanal zone only). The extension of this mesure is planned.



Saint-Michel-les-Portes

Saint-Michel-les-Portes has renovated his entire public lightng park in 2017, with the help of the energy syndicate of Isère (TE38). The equipment is now composed of 100 % of 3000K DEL with ULR to zero.

It is a good example of renovation with LED a little too cold achieved 5 years ago. Today it would be done in a different way with a lower temperature 2400K to 2700K.



- High pressure sodium
- Halogen
- Fluorescent
- Metal halides
- Fluorescent tubes
- Compact fluorescent lamps
- DEL
- Unknow
- Low pressure sodium

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10.LIGHTING POINT'S EVOLUTION

The Vercors Natural Park is the home of the Hauts Plateaux Reserve, which is exceptional for its size of over 17,000 hectares (10% of the Park). Extending over the territory of 12 municipalities, the reserve is also exceptional for the quality of its starry sky, still relatively preserved despite the luminous halo of the Grenoble metropolis. In a previous study returned in December 2018, DarkSkyLab conducted a detailed analysis of the public lighting databases of 7 of the 12 municipalities in the reserve :

- 6 municipalities in the Drôme, for which the Energy Syndicate of Drôme (SDED) had the necessary GIS data dating from 2017
- one commune in Isère, Gresse-en-Vercors, where the involvement of the Astrièves astronomy club had been decisive for the measurements and the constitution of the lighting database.

The new data provided in 2021 by the SDED (for the municipalities of the Drôme) and by the municipality of Gresse-en-Vercors make it possible to study the evolution of the public lighting park between 2017 and 2021 in the municipalities concerned.

The commune of Treschenu-Creyers being attached to Châtillon-en-Diois since 2019, the 2021 data retained for this comparison concerns 6 municipalities (and not 7 as it was the case in 2017).

10.1. Evolution of the number of light points

Overall, the number of light points in the study area has decreased very slightly over the last four years : 1167 are referenced in 2021, while there were 1189 in 2017, **a reduction of 22 light points over the period.**

However, this overall result masks different developments in the different municipalities. La Chapelle-en-Vercors and Saint-Agnan-en-Vercors are in fact the only two to have reduced their number of lights since 2017: they now have 34 fewer lights than four years ago, a decrease of about 9% of their respective number of lights.

On the contrary, the number of light points has remained stable or increased very slightly in all the other municipalities compared (8 additional points for example in the merged territory of Châtillon-en-Diois and Treschenu-Creyers).

Chichilianne village in Trièves, room for improvement !

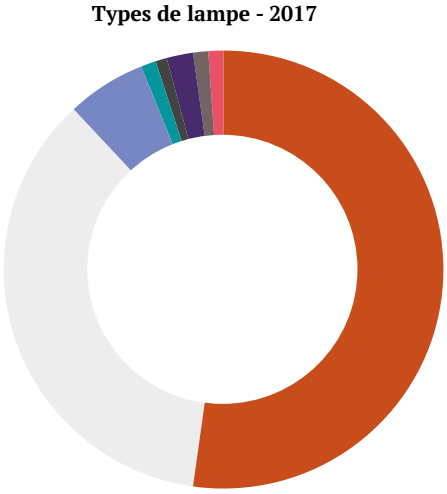
10.2. Evolution of light sources

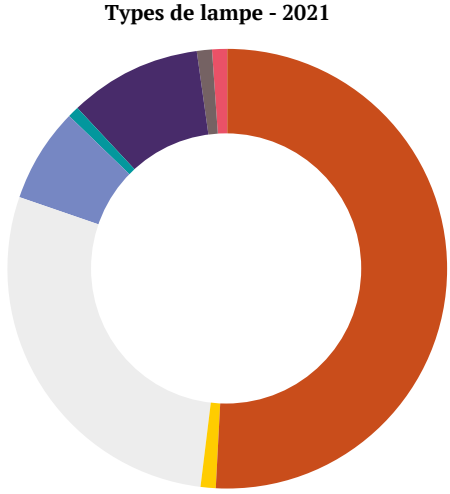
A comparison of lamp types in 2017 and 2020 shows two main changes:

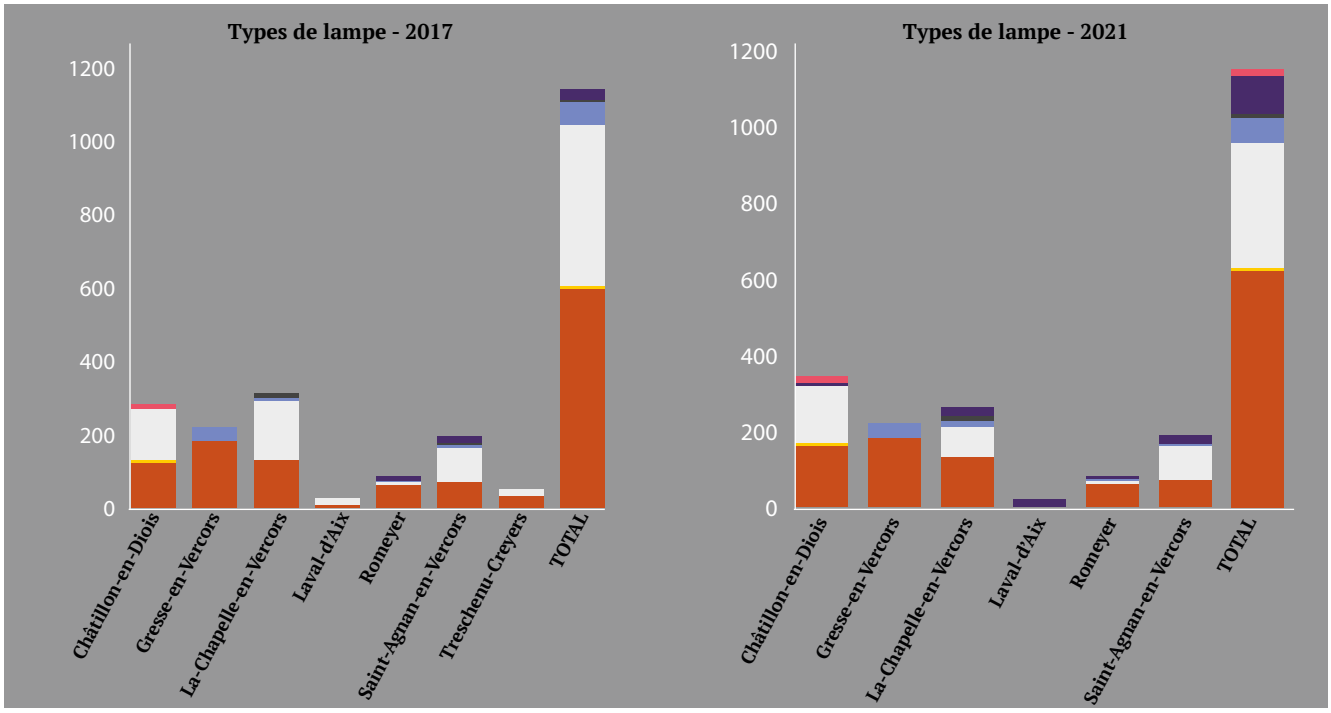
- **a clear reduction in the proportion of mercury vapor lamps (96 fewer light points)**
- **a clear increase in the proportion of LEDs (63 more light points)**

Nevertheless, there are also significant disparities between municipalities.

Two of them have worked particularly hard to transform their public lighting : La Chapelle-en-Vercors (removal of more than a third of the mercury vapor lamps, and installation of 36 new LEDs) and Laval-d'Aix (all the light points have been converted to LEDs, i.e., 24 points, replacing high-pressure sodium and mercury vapor lamps).







The commune of Treschenu-Creyers being attached to Châtillon-en-Diois since 2019

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10.3. Evolution of light power

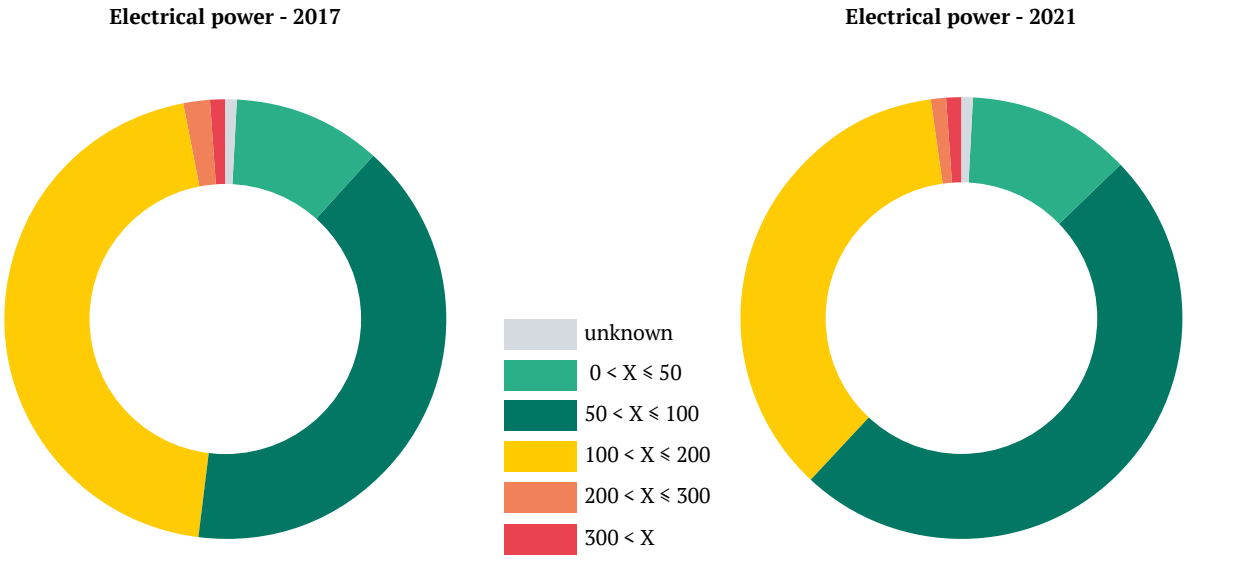
The comparison between the 2017 and 2020 data shows, overall, a clear trend towards a reduction in installed power.
The number of light points of more than 100 W went from 566 to 443 (-123) during the period, while at the same time the number of light points of less than 100 W went from 614 to 718 (+104).

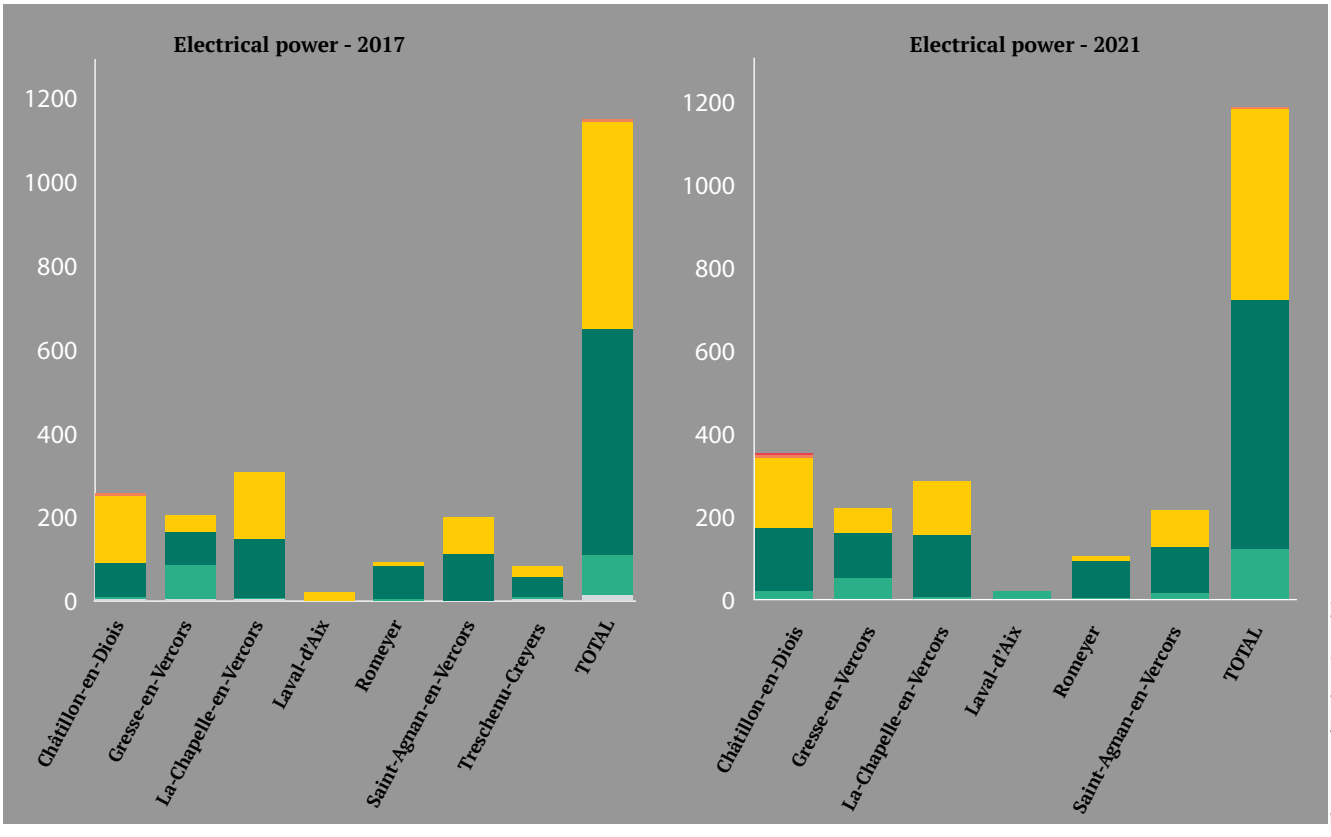
Here again, the most virtuous municipalities were La Chapelle-en-Vercors, Laval d'Aix and Saint-Agnan-en-Vercors.

The data for the commune of Gresse-en-Vercors, on the other hand, seem to indicate an increase in the power of a significant number of light points, to the detriment of light points of lower power.

Nevertheless, this observation is based on the comparison of data from two different sources: the Astrièves astronomy club for the 2017 data, and the commune of Gresse-en-Vercors for the 2021 data.

Under these conditions, it seems preferable not to establish a conclusion on the basis of this comparison.





The commune of Treschenu-Creyers being attached to Châtillon-en-Diois since 2019

10.4 Renovation of public lighting in two strategic municipalities

Measures implemented by the municipality of Die

The city of Die has started **renovation work** to improve the quality of its public lighting. It has also implemented **lighting management measures** and initiated an **awareness campaign for shopkeepers** to reduce light pollution.

Street lighting retrofits implemented :

A complete audit of the public lighting was conducted by a consulting firm in 2019.
The study identified the 897 lighting points :

- 60% HPS
- 20% fluorescent balloons
- 8.6% DEL
- 7.2% metal iodide
- 2.8% halogen
- 1.4% fluorescent tubes

The priorities of the intervention are the upgrading of the electrical boxes and the replacement of the fluorescent balloons and tubes. All new lamps installed are LEDs with color temperatures between 2,200 K and 3,000 K depending on the sector.

Since 2018, 300 luminaires have been changed for LEDs. **The municipality plans a complete renovation** of its lighting at a rate of about 60 luminaires per year. This work is being carried out with a local company that is familiar with the commune's public lighting stock.

New fixtures installed in the small streets of Die

New fixtures installed on the main road of Die

Extinction measures since January 2023 :

Public lighting represents 15% of the city's energy expenses. In order to reduce this budget by 50% as well as light pollution, within the framework of the International Dark Sky Reserve program supported by the Park, the reduction of public lighting is planned in 3 phases :

- Since the end of January, extinction from 1: 00 to 5: 00 on all the electrical boxes except those supplying the streetlights located along the main road (RD93), and from 23: 00 to 5:00 for the areas of the Tour de l'Aure and the hamlet of Plas.
- By the end of April 2023, all crosswalks on the RD93 road will be made safe and the lights will be switched off between 1:00 and 5: 00.
- By the end of June 2023, change some lighting cabinets and equip all the cabinets with a connected and possibly communicating clock allowing for remote control of the extinction from 23: 00 to 5: 00.

Raising awareness among private actors :

Concerning the private lighting, a reflection carried by elected officials has led to the need to raise awareness of the shopkeepers in the city center. The operation began with a visit to some shopkeepers to remind them of the regulations and how they could contribute to the collective effort to reduce light pollution. This action needs to be continued.

Renovation of public lighting done in Chatillon-en-Diois

Thanks to the transfer of the public lighting competence to the energy syndicate, the municipality of Chatillon-en-Diois has been able to renovate a large part of its public lighting park :

In 2020, **renovation of the 40 light points of 2 isolated hamlets** «Les Nonières» and «Mensac».
All the fixtures with old mercury vapor lamps were changed for new fixtures with LED and a ULOR=0. The color temperature has been reduced from 4/5000K to 2700K. The average illumination level is 6 to 8 lux. The powers have been reduced from 140W to 18W, 28W and 42W depending on the location.

In 2021, renovation of all the old mercury vapour lamps and obsolete fixtures **in the center of Châtillon-en-Diois**. This concerned 55% of the lighting park with **144 renovated points.**
The color temperature has been reduced from 4/5000K to 2700K and 2200K depending on the case and all these points are LED with an ULOR=0.
The average illumination levels are 10 lux on the main road and 8 lux in the adjacent streets; 6 to 8 lux in the residential area and the old village.
In the center, realized in 2700K, the power levels went from 140W to 30W and 45W. In the old village, realized in 2200K, the powers went from 140W to 18 and 28W. In the residential, realized in 2700K the powers went from 80W to 19W.

2022, on the 5 isolated hamlets, replacement of all the astronomical clocks to make the lighting duration more relevant. Implementation of the extinction on these hamlets since July 1, 2022 from midnight to 6:00.

End of 2022 renovation of Archiane hamlet (in the core zone) has been done with 6 points at 1800K in LED and ULOR=0 (see part 5.2 focusing on the core zone).

Fixtures installed in the hamlets of Nonières and Mensac

Fixtures installed in heart of the village of Châtillon-en-Diois

11. LIGHTING MANAGEMENT PLAN

The present Lighting Management Plan (LMP) intends to define the technical criteria which have been jointly developed within the Working Group (Vercors regional natural Park and Energy Territories of Drôme and Isère) since the start of the IDSR project application.

11.1. Lighting management by IDSR project partners

In France, management of street lighting is primarily the responsibility of each municipality. It includes maintenance, replacements and new projects. However, **this responsibility can be transferred to a departmental organism : the local Energy Authority**. For rural municipalities, which represent a large part of Vercors municipalities, it is an opportunity to get better knowledge about their lighting features.

The local Energy authority gives advices, technical and financial support and manage the lighting features in cooperation with the municipality.

* For the Drôme Department, Local Energy Authority of Drôme "Territoire d'énergie 26"- TE26

* For the Isère Department, Local Energy Authority of Isère "Territoire d'énergie 38" - TE38


Photo : Axel Fabrier

Retroffiting of public lights in Beaufort-sur-Gervanne by energy syndicate

Lighting management by the Drôme Local Energy Authority

territoire d'énergie
DRÔME - SDED

The Departmental Energy Authority of Drôme (Territoire d'Energie SDED or TE26) is a public cooperative institution created in 1964. It covers 364 municipalities on different subjects including public lighting. TE26 offers an all-inclusive service : it manages maintenance, new networks, retrofits, energy performance, and energy purchase. TE26 also offers temporal management of lighting and light color temperature adaptation to become more respectful of the biodiversity.
In the Drôme Department, almost 50% of the municipalities gave the responsibility of street lighting to TE26.

15 municipalities have deleguated the lighting to the energy syndicate in Drôme and in 5 municipalities in Isère. This represent 51% of the municipalities engaged in the IDSR project, and 56% of the light points.

Lighting management by the Isère Local Energy Authority

territoire d'énergie
ISÈRE

The Departmental Energy Authority of Isère (TE238) is a public cooperative institution created in 1994. It gathers municipalities and group of municipalities and cover 95% of the Isère department. Public lighting is part of the otional competences that TE38 offers to its member municipalities. It offers different types of support : advice and financial support for the municipalities that retain their competence, occasional delegated project management, transfer of competence for municipalities wishing to entrust TE38 with the upkeep, maintenance, works, energy improvement and control of consumption of their public lighting.

In the Isère Department, 194 municipalities gave the responsibility of street lighting to TE38.

Partnership agreement between Vercors natural regional Park TE 26 – TE 38

Thanks to the collaboration on the realization of the guide of quality lighting in the Vercors, the Park and the two energy syndicates have agreed on the criteria of renovation of public lighting. This agreement specifies the technical requirements compatible with IDA IDSR guidelines.

This agreement acts as a support and partnership between the Park and the two local energy authorities in charge of lighting conversion program.

Photo s : Christophe Morini

Retrofitting of public lights in Saint-Agnan-en-Vercors (before / after)

Lighting management in municipalities, which kept the lighting responsibility

The other municipalities conserve the competence. In these case, the Park has to be very careful to communicate with the municipalities and verify if their lighting management is consistent with IDSR project LMP.

Several meetings has been done with each municipality to present the IDSR project and the Local Energy Authority work.

The goal was to encourage municipalities to work with their local energy authority to make sure that they will respect the LMP requirements.

11.2. Technical Specification of the Artificial Lighting

This section is intended to guide the selection, placement, installation, and operation of all new and replacement/retrofitted lighting fixtures in the PNRV IDSR project. Its function is to regulate the use of artificial light at night in the PNRV IDSR project in a way that prioritizes the safety of people and property while minimizing the impact of such light on protected outdoor spaces, viewsheds and wildlife.

Therefore, all instances using artificial light at night in the IDSR project will adhere to the following principles, which are inspired by the IDA's Values-Centered Outdoor Lighting :

Outdoor light should be :

1. **Useful and appropriate** : before repairing, replacing a light, determine if it's really required. It's also recommended to limit the extend of lighted areas and the addition of new outdoor light;

2. **Targeted :** outdoor lighting shall limit the emissions of light outside the intended lighting area ;

3. **Low power level** : use the lowest light level required ;

4. **Controlled** : the temporal management of the lighting shall be considered, in particular the extinction and/or the modulation ;

5. **Warm** : use as much as possible the lowest temperature for lighting and limit the amount of shorter wavelength (blue-violet-white).

In the rest of this document, we will refer to two different zones within the IDSR project as shown in the adjacent map below : the **"core zone"** of the IDSR project and the **"buffer zone"**. Different rules may apply to these two different zones. These rules, which go beyond the ones defined for the buffer zone, have the objective to apply stronger constraints on artificial light emissions to better protect the nighttime environment and be more respectful of the exceptional natural resources of this region.

Enforcing the rules presented in this document is the responsibility of the Vercors natural regional Park public authority for the **core zone**. For the **buffer zone**, responsibility goes to the municipalities, consolidated city-counties, or energy associations from the departments of Drôme and Isère depending on the authority distribution for the street lighting work.

Daytime test of new light installed in Beaufort-sur-Gervanne

French legislation

Basically, all the following rules apply beyond the French legislation which is considered as the minimum rules of acceptance inside the IDSR project. Especially a French National Decree from the 27th of December 2018 specifies a certain number of rules regarding the lighting of non-residential buildings. The key aspects of this regulation are the following :

• Indoor office lighting must be turned off no later than one hour after closing of the office ;

• Lighting of building facade must be switched off no later than 1: 00 am ;

• Lighting of indoor commercial stores must be switched off no later than 1:00 am and cannot be turned on before 7: 00 am (except when the store opens earlier) ;

• The maximum color temperature in core of National Parks is limited to 2700 K in urban area and 2400 K outside ;

• The maximum ULR is 4% (flux code CIE n°3 i.e., 95% flux within 75° half solid angle) ;

• Surface density of illumination is at maximum 35 lumen/m^2 (25 lumen/m^2 outside urban areas);

• Ponds, lakes, and watercourses cannot be exposed directly to artificial lighting.

Light Fixture Shielding

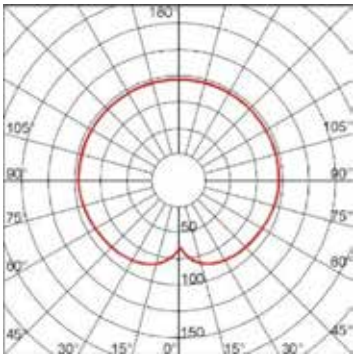
Within the International Dark Sky Reserve, all outdoor lighting fixtures shall be fully shielded and shall have a ULOR (Upward Light Output Ratio) or ULR lower than 1%, irrespective of the number of lumens emitted by the lamps. Lighting fixtures must have a base plane.

Practically speaking, it is very rarely possible to reach a perfect 0% ULOR or ULR even if the fixture is fully shielded.

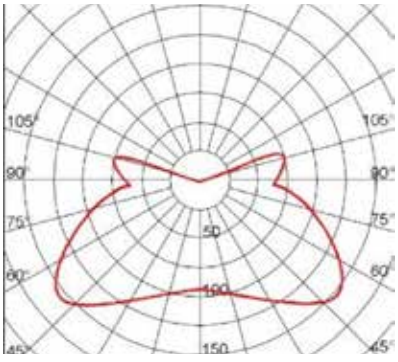
This is due to unwanted reflections on various parts of the lighting fixture including the closing base plane. Therefore, we use here a 1% limit value for the ULOR / ULR. In any case, the IDSR project does not intend to allow any lighting to be installed that, by virtue of its design alone, results in the direct emission of light into the night sky.

All outdoor lighting fixtures shall not be exempt from the other requirements of the LMP and must be designed in such a way to minimize impact to the nighttime environment. The following photometric polar diagrams depict the situations that are permitted and those which are forbidden.

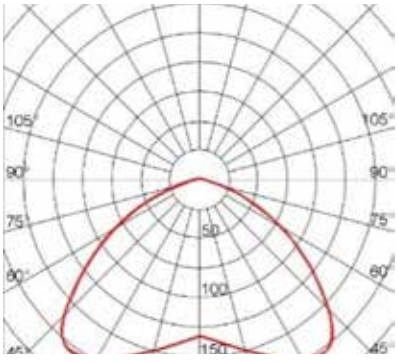
Not permitted



Not permitted

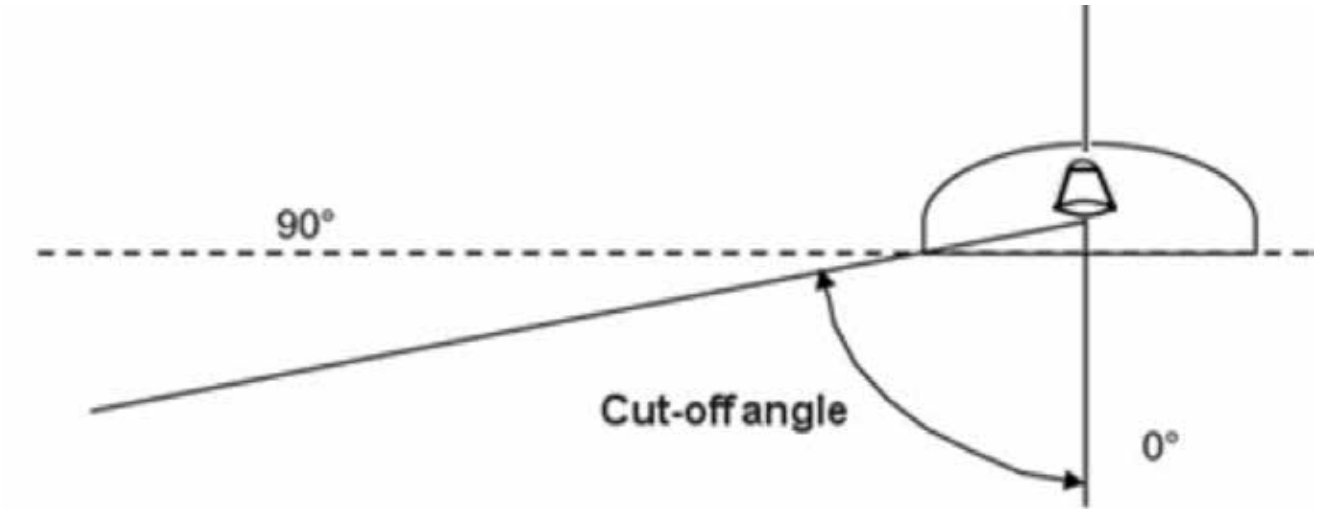


Permitted



Further, to the greatest possible extent, the PNRV IDSR project will endeavor to limit the inadvertent or incidental emission of light from indoor spaces to the outdoors using window coverings, indoor lighting timers/switches, and other appropriate measures.

In the case LED-based lighting systems are used, it is strictly required that the actual light sources be totally enclosed into the lighting system case. The figures below depict which configuration of light fixtures are permitted and which are not.



Caution: One must make sure that, in all circumstances, there is no direct upward light emitted above the horizontal. The following configurations are permitted as long as they comply with this constraint.

If for any reason the plane of the lighting fixture has a tilt compared to the horizontal, it must be checked in situ that there is no direct emission of light into the upward hemisphere.

Lighting Spectral Performance

Core Zone		Buffer Zone
Ratio of emission shorter than 500 nm	0 %	15 %
Light Fixture Color Temperature*	⩽ **1800 K** (e.g., high-pressure sodium or PC Amber LED…)	⩽ **2700 K** recommended inside agglomeration (e.g., high-pressure sodium or PC Amber LED…) ⩽ **2400 K** recommended outside agglomeration (e.g., high-pressure sodium or PC Amber LED…)

* There will be no obligation regarding the exact type of lamp to be used

Outdoor lighting fixtures in the IDSR project shall be chosen to minimize the amount of short-wavelength light emitted into the nighttime environment. IDSR project will prefer amber and similar colors for lighting and avoid white light wherever practically possible unless a demonstrated need for color rendition exists.
In no case shall the correlated color temperature of any lamp exceed 3000 kelvins.

New Lighting Sources management

Within the core zone of the PNRV IDSR project, the installation of additional street lighting is permitted only in instances where the IDSR project/IDSR project manager determines that a public or traffic safety hazard exists which can only be mitigated using outdoor light at night.

In the buffer zone, the installation of additional lighting is permitted but it is recommended to limit as much as possible the addition of new light sources in particular within the residential area. Public or traffic safety issues should be the only reasons to add public lighting where issues are clearly identified.

Bivouac night on high plateaus

Adaptation Control (Extinction and automation)

New outdoor lighting is not allowed in the IDSR project/ IDSR project core zone. In the future in case specific needs for installing light sources for public or traffic safety reasons arise, all outdoor lighting will be extinguished or must be equipped with adaptation controls to limit the duration and intensity of outdoor lighting to the maximum possible extent allowed by the equipment. For the extinction we highly recommended at seven (7) hours (i.e., 11pm to 6am) per night.

For the buffer zone, all outdoor lighting must be equipped with adaptive controls to limit the duration and intensity of outdoor lighting or is to be extinguished. For the extinction we recommended seven (7) hours (i.e., 11pm to 6am) per night.

The table below summarizes the directives regarding the installation of new lighting sources and lighting adaptive control :

Core Zone		Buffer Zone
Installation of New Lighting Sources	Forbidden. Requires the approval of the IDSR project/IDSR project Manager only for safety hazard	National regulations Recommendations to limit the addition of new light sources in particular within the residential areas Recommended adaptive controls to limit the duration and intensity of outdoor lighting Extinction during seven (7) hours recommended
Lighting Adaptation Control	Extinction during seven (7) hours highly recommended Mandatory adaptive controls to limit the duration and intensity of outdoor lighting	

This temporal control of the lightning will obviously have a huge impact on the energy consumption of the communities.

Photo : Joseph Mondelet

Beautiful starry night above the Trièves and its villages

Lighting Values per Type of Location

In all applications, outdoor lighting deployed throughout the PNRV IDSR project will use the most energy-efficient lamp technology that minimizes the emission of short-wavelength light into the nighttime environment.

The following table gives the maximum illuminances which are recommended throughout the core and buffer zones of the PNRV IDSR project unless a demonstrated need for larger values exists.

Core Zone		Buffer Zone
Functional lighting of town and village centers	8 lux	10 lux maximum in the recommended
Lighting of hamlet	6 lux	8 lux maximum recommended
Roads inside towns and villages	0 lux	For towns and villages centers10 lux maximum recommended For hamlets 8 lux maximum recommended
Roads outside towns and villages	0 lux	12 lux maximum recommended and only on necessary portions
Public building entry and surroundings	0,5 lux (1) (3)	10 lux (2) (3) (4)
Private building entry and surroundings	0 lux	8 lux (3) (4)
Parking	5 lux	In agglomerations 10 lux maximum recommended (4) Outside agglomeration 8 lux maximum recommended (4)

(1) Lighting of public buildings within the core zone must be limited as much as possible while maintaining the relevant security levels.

(2) Public building lighting must be turned off during the night per the national regulation.

(3) Outdoor lighting controlled with motion-activated switches limiting the duration of illumination to less than five minutes after activation.

(4) With the exception of the situations where national regulations in favor of accessibility for people with disabilities must be applied (20 lux)

Watts/lux correspondence

Illuminance targets are in lux in the LMP. These objectives are systematically requested from the companies that carry out lighting renovations (the two energy syndicates that manage renovations in most municipalities have committed to respect the LMP).

A level of illuminance at ground level in lux results from the implementation of lamps of a certain power and color temperature, at a certain height with a certain type of fixture. These 4 factors influence the illuminance. This is why it is difficult to guarantee an illuminance level given the variety of situations.
Nevertheless, some general rules can be established to keep the illuminance level below a certain level :

- **LED renovation projects are carried out with a maximum power of 45W,**
- **when you want to lower the color temperature, the power necessarily increases by a few watts, to ensure the right level of illumination,**
- **the level of illumination very rarely exceeds 10 lux. 12 lux can be reached on the main roads crossing the villages** (remember that the regulation in France is < 35 lux in built-up areas and < 25 lux outside built-up areas, so we go well beyond with the IDSR project).

Event and temporary lighting

The table below summarizes the rules regarding temporary lighting :

Core Zone		Buffer Zone
Event Lighting	Requires the approval of the IDSR project/IDSR project Manager	National regulations
Construction or Survey Lighting	Allowed with the permission of the IDSR project/ IDSR project Manager for the safe execution of the task	National regulations

Unshielded, low intensity 'holiday' lighting whose use is specific to events or time periods is forbidden within the core zone unless a specific agreement is given by the IDSR project/IDSR project manager. In the buffer zone it must be limited in extent and duration while complying with the extinction policy as expressed in the national regulation.

Within the core zone, lighting installations required temporarily for the safe performance of nighttime tasks, such as construction or species inventory for survey, requires an approval at the discretion of the IDSR project/IDSR project manager.

It is forbidden to use light for sport or cultural event in the core zone except if a specific agreement is given by the IDSR project/ IDSR project manager.

As much as possible, temporary lighting in the core zone should not exceed 2400 kelvins, in accordance with the provision of the 2018 French national decree for natural reserves and regional natural parks.

Shop Illuminated Signs

Shop must conform to the national regulation: Illuminated signs, except for public information display, should be switched off at the latest from 1 am to 6 am.

In municipalities having a population under 10 000 inhabitants, illuminated signs should not exceed 8 square meters, with specific limitations to 2 and 4 square meters depending on the circumstances.

Shop signs should be non-flashing except for pharmacies and emergency services.

Internally illuminated signs, and signs illuminated by electronic means such as LEDs and similar lighting, are prohibited in the core zone of the PNRV IDSR project.

Core Zone		Buffer Zone
Construction or Survey Lighting	Not allowed	Not recommended Minimal usage, extinction strongly recomended from one hour after closing time to one hour before opening time (1) in addition to the national regulation. All new illuminated information billboards, single color use on a black background, max 100 cd/m^2

(1) Unless strictly required for way finding or public information

Artisanal, Commercial and Industrial Zones

Such zones are not allowed in the core part of the IDSR project.

Within the buffer zone, these zones should at least respect the national regulation. In addition, it is recommended to switch off as much as possible these areas when there is no activity.

Built Heritage Highlighting

Lighting of monuments and historical building is not allowed in the core zone.

In the buffer zone, it is recommended to limit the lighting to special days as national fest. The highlighting of historical and patrimonial buildings must be done with a moderate usage of light to reveal its architecture without affecting their environment.

If lighting of historical and patrimonial buildings is desired, it is recommended to use fixtures with a top-down lighting design such as light strips which are directed downwards.

If used, spotlights embedded in the ground must be designed in such a way that their resulting lighting cones are contained within the monuments they are aimed at highlighting, i.e., there should be no significant fraction of the flux that escapes to the sky.

Core Zone		Buffer Zone
Built Heritage Lighting	Not allowed	Minimal usage with contained flux and avoid bottom-up lighting. Respect the national regulation on lighting hours. Luminous flux of the individual devices must be below 500 Lumens in case of top-down lighting

Milky Way on high plateaus

Public building lighting

The table below summarizes the rules that apply to the outdoor lighting of the public buildings to comply with the accessibility regulatory obligations :

Core Zone		Buffer Zone
Public Building Outdoor Lighting	Mandatory controlled by switches	Controlled by switches or motion detectors (recommended)

Outdoor sport lighting

Lighting of outdoor sport equipment (e.g., soccer field) must be designed to minimize obtrusive light spill and glare into surrounding neighborhoods and natural areas, to meet sustainability and climate friendly goals, and to reduce sky glow to the greatest extent practicable.

Lumen density must be at the lowest possible level while complying with the lighting requirements for the corresponding sport.

As an example, most of the soccer competitions within the PNRV IDSR project only require an illuminance of 100 lux with a uniformity factor greater than 0.4. The illuminance and uniformity factors can be adjusted based on the requirements of higher-level leagues if applicable.

The following requirements must be respected by outdoor sport lighting installations within the core zone of the
PNRV IDSR project and are recommended within the buffer zone :

Core Zone		Buffer Zone
Extinction time	No later than 11:00pm and as soon as the activity end.	No later than 11:00 pm (recommended) and as soon as the activity end.
Ration of lumen outside the field perimeter with a 10 m margin	10%	10% (recommended)

In addition, all lighting fixtures must be designed such as to not to emit direct light above the horizon, unless required for the activity.
It is recommended to use lighting technologies that can provide variable illumination levels for different task lighting needs on field, e.g., official game, practice periods, other types of events, etc.

Ski resort lighting

Some ski resort might want to light some of their tracks to allow night practice. These practices are forbidden in the core zone and strongly not recommended in the buffer zone.

In the case of a tracks lighting decision, it must be short in time and respect the basic requirement about light temperature, ULOR and illuminance. Lighting should be a oneoff event.

Core Zone		Buffer Zone
Ski resort lighting	Not allowed	Strongly not recommended

Residential Lighting

In the core zone, the only case where lighting may exist is isolated habitations. Lighting is not recommended if unnecessary.

In the buffer zone, residential lighting includes private allotment lighting and private habitation.

The maximum recommended color temperature is 2700 K, for interior and exterior lighting.

Core Zone		Buffer Zone
Private Building Outdoor Lighting	Mandatory controlled by switches or timers	Controlled by switches or timers (recommended) or motion detectors
Habitation Outdoor Lighting	Controlled by switches or timers (recommended) or motion detectors	Controlled by switches or timers (recommended) or motion detectors
Private Allotment Lighting	Not applicable	Same rules than hamlets.

Visitor lighting in the core zone of the PNRV IDSR project

Lighting produced by the IDSR project visitors within the core zone shall be limited in such a way as to provide for reasonable use while maintaining the natural character of the park and avoiding the creation of nuisance for other visitors. All lighting shall be restricted in intensity and extent to provide for the legitimate needs of visitors.

Inappropriate, high-intensity light painting of the IDSR project/ IDSR project landscapes, the use of searchlights, and similar uses of outdoor lighting by visitors is prohibited.
In the core zone, the power of the portable headlamps is limited, and the usage of red light is recommended.

These rules do not apply to emergency situation.

11.3. Comparative Analysis against the National legislation

The table below summarizes some key rules detailed in this document both for the **core** and the **buffer** zones and compare them against national regulations when they exist.

		National Legislation	PNRV IDSR project Core Zone	PNRV IDSR project Buffer Zone
Lighting Spectral Performance	Color temperature	⩽ 3000 K	⩽ 1800 K	⩽ 2700 K
	Ratio of emission shorter than 500 nm	No regulation	0%	15%
ULOR / ULR		⩽ 4%	⩽ 1% (1)	⩽ 1% (1)
Lighting adaptive control		No regulation	Mandatory adaptive control or extinction	Adaptive control and/or extinction recommended
Illuminated signs		Turned off between 1am and 6 am)	Not allowed	Turned off from 1h after closing time to 1h before opening time + size recommendation + conformance with LMP spectral performance
Built Heritage Highlighting		Turned off after 1am	Not allowed	National regulation + minimal usage with contained flux + 500 lumen max for top-down lighting
Offices		Turned off between 1am and 7am	Not allowed	National regulation

(1) See Section where this 1% value for the ULOR / ULR is explained.

11.4. Approval of the LMP by the Vercors municipalities

The Park of Vercors PNR has taken resolutions ("délibérations" in French) stating his commitment to submit the application to the IDA to be recognized as an International Dark-Sky Reserve.

A resolution taken the 02-24-2021 has recognized the implication of the Vercors Park in the IDSR application process since 2018 (see appendixes)

It emphasizes the sky-quality measures and the lighting inventory that have been undertaken and give a description of the buffer and core zone of theVercors IDSR project.

Finally, it is clearly stated that : "the organization and his partners make a commitment to manage the public lighting with the aim of protecting the night sky and thus jointly formulate recommendations recorded in a light management plan."
All the municipalities within the Vercors PNR sit on his board. **Thus, all of the 39 municipalities included in the Vercors IDSR project, representing 100% of the population and 100% of its total area took part in those debates and approved the proposed resolution**

In addition to the resolution, all the 39 municipalities were asked to support the IDSR by signing a commitment charter (see appendix). Today this charter has been signed by 32 municipalities of the 39.
This charter sets out the territory's roadmap for renovation, extinction and municipalities involvement, meaning that the signatory municipalities are commited to meeting these deadlines :

Extract of the Charter of commitment (see the full text in appendixes) :

« Roadmap of the territory
Based on the expectations of the IDA and the technical recommendations of the Vercors Regional Natural Park, we have set the following objectives :

- **Bringing 90% of the light points in the core area of the Vercors IDSR into compliance with the Lighting Management Plan within 5 years and 100% within 10 years**
- **The compliance with the Lighting Management Plan of 75% of the light points in the peripheral zone of the Vercors IDSR within 10 years and 100% by 2038.**
- **All IDSR communes have implemented night-time extinction or modulation within 10 years, an objective extended to the entire Vercors Park by 2038.**
- **Progressive enlargement of the IDSR perimeter to cover the entire territory of the Park by 2038. »**

With a view to expanding the IDSR, the Park also circulated the charter to all the other municipalities, which could, by signing it, demonstrate their voluntary adhesion and thus show that they were ready to join the project later on.

11.5. Partnership with urban surrounding area

The urban areas surrounding the territory of the Vercors have been progressively associated with our work for 4 years. They all support our IDSR project application, often with street lighting policies in line with IDA criteria for the buffer zone (T ⩽3000 °K / ULOR-ULR⩽1%) or better.

Urban community	Pop. (inhab.)	Closest distance to the IDSR project core zone	Colour temperature (°K)	ULOR/ ULR	Temporal management
Grenoble-Alpes metropole	432.916	10-15 km	⩽3000 °K	⩽1%	Switch off and/or power reduction in many municipalities
Valence-Romans Agglomeration	223.349	15-20 km	⩽3000 °K	⩽1%	Switch off and/or power reduction in many municipalities

Some municipalities member of the Park of Vercors but located outside the peripherical area of the IDSR project have already approved the IDSR Charter :

- Autrans-Méaudre en Vercors (3068 inhabitants),
- Fontaine (municipality of Grenoble metropolitan area, 23049 inhabitants),
- Lans-en-Vercors (2673 inhabitants),
- Rencurel (331 inhabitants),
- Seyssinet-Pariset (municipality of Grenoble metropolitan area, 11792 inhabitants).

All of these municipalities have switched off their public lighting and have started to renovate their public lighting systems. **These commitments prefigure the expansion of the peripherical area.**

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Parc naturel régional du Vercors

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