Conservation Shepherding in the French Alps: how traditional practices are used to deliver conservation objectives in the mountains.

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William Walters: shepherd and herdsman, Risoul
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Executive Summary:

The uplands across Europe are facing dramatic changes: demands for energy, habitat-specific ecosystem services, and biodiversity conflict with the current economic downturn and impending changes in farm subsidies. Adding to the uncertainty on upland management is the ever decreasing numbers of young farmers able to, or interested in managing traditional upland hill farms due to the isolation, the difficult nature of the work, and the poor income these harsh environments provide. Across the open mountains of Wales, the result has been the rapid disappearance of hefted sheep flocks and mountain cattle herds. In contrast, other mountainous European countries have succeeded in maintaining traditional skills and livestock presence by recognising their role in delivering ecological benefits, and ensuring that they are adequately supported (financially and socially).

This report focuses on examples from the French Alps where shepherding is employed to the benefit of both livestock and the environment. Shepherds in France are normally employed by a farmer or group of farmers who pool their flocks together, totalling between 200 and 1300 sheep, according to the terrain. The shepherd spends between three to five months in the mountains with the flock, and may utilize several shepherds' huts at increasing elevation to follow the seasons.

Shepherding in France is seen as a necessary tool for sustainable land use in the sensitive alpine habitats. Through active, daily management of the flock the shepherd ensures that the animals:

- Do not overgraze sensitive sites
- Make the best use of available forage, including grazing less palatable grasses by alternating grazing of sweet and tough swards throughout the day
- Reduce the cover of rank/problem grasses, often remnant from historic overgrazing or mismanagement of the land
- Avoid sensitive ground-nesting bird sites during their breeding season
- Minimize transmission of diseases between domestic and wild ungulates

Without these controls the condition of mountain habitats decreases: sensitive plant species get damaged or grazed out, less palatable species gain dominance, erosion and sheep-track scars develop on steep terrain, and wild animals can also be negatively affected. In contrast, the re-introduction of shepherding has become popular on many sites in the French Alps through agri-environment schemes because it is recognised as the best way to stem further habitat degradation while actively enabling habitat and species recovery. It is clear that the French model of shepherding is not just a historic tradition valued only in romantic museums, it is a living tradition which has adapted to deliver both agricultural and ecological demands on the mountains. It is a successful tool for conservation management which should be considered more widely in the United Kingdom.

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1. Introduction

The uplands across Europe are facing dramatic changes: demands for energy, habitat-specific ecosystem services, and biodiversity conflict with the current economic downturn and impending changes in farm subsidies. Adding to the uncertainty on upland management is the ever decreasing numbers of young farmers able to, or interested in managing traditional upland hill farms due to the isolation, the difficult nature of the work, and the poor income these harsh environments provide. Across the open mountains of Wales, the result has been the rapid disappearance of hefted sheep flocks and mountain cattle herds. In contrast, other mountainous European countries have succeeded in maintaining traditional skills and livestock presence by recognising their role in delivering ecological benefits, and ensuring that they are adequately supported (financially and socially).

In the French Alps for example, shepherding and herding of livestock has experienced a resurgence since the 1990s, with over 700 registered shepherds in France and up to 57 shepherds enrolling in shepherding colleges each year (Meuret 2014), and agri-environment agreements now funding specific objectives through active shepherding. This report focuses on the management of natural resources in regional and national parks of the French Alps. In particular, it will focus on successful examples of agri-environment schemes which have been developed in cooperation with farmers and their shepherds with the objective of restoring or protecting the alpine habitats of designated sites.

2. From Wales to France: an opportunity for cross-border exchange

Hafod y Llan is a 1000 ha farm on the flanks of the highest mountain in Wales, Snowdon. It is the largest farm in the UK which is owned and managed by the National Trust, a conservation charity, and its remit is to demonstrate sustainable management, environmentally, economically, and socially. Set within the Eryri Natura 2000 site, Special Area of Conservation and National Nature Reserve, its conservation objectives drive the management prescriptions applied. It is also at the heart of Welsh mountain culture, where farms continue to practice transhumance (*hafod a hendre* in Welsh), neighbouring farmers still rely on each other to help gather the mountains of the hefted flocks, and where Welsh is the language of choice.

Since 2000, Hafod y Llan has been managed with a reduced flock of 2000 Welsh Mountain sheep and a new herd of 90 Welsh Black cattle. Monitoring results suggest that despite significant improvements to habitat conditions, some key sites continue to suffer from over or undergrazing. There are also problems with the management of the flock, since it has been excluded from large areas of the mountain. This situation is appearing across the Welsh uplands (Silcock et al. 2012), and the need to review and ammend conservation agreements is high. One possible change, which is gaining popularity across the UK, is the adoption of full-time shepherding to control grazing patterns more effectively.

2.1. Shepherding and Herding in the Alps: the ecological benefits

In the mountains of France, there is no debate between ecologists, foresters, farmers that shepherding can be used as an effective way to maintain and improve the quality of key habitats. It is widely accepted that the degradation of upland habitats is not necessarily due to over or under grazing, rather to poor management of the flock or herd. To restore rank grasses, to maintain diverse alpine swards, to control invasive species, or to reduce erosion, the French approach depends on livestock and their shepherd or herder (Meuret 2014). In both national parks Ecrins and Vanoise, all agri-environment contracts within Natura 2000

sites specify the need for shepherds or herders to be present full-time. This is in stark contrast to the approach taken in the Welsh uplands, where habitat restoration and maintenance is controlled principally through the manipulation of grazing animal types, numbers, and periods, but without any active control of where, how, and when the animals graze particular areas.

Figure 1. The main French alpine study area is circled in blue, although a small visit to Jura was also made, circled in green.

3. Shepherding and Herding in the Alps: history and structure

3.1. History

The practice of transhumance between the alpine pastures and valleys has evolved significantly in the last century. Records from the 1800s refer to small, self-sufficient villages scattered across the mountains at elevations from roughly 1000 to 1800m, in what is referred to as the "intermediate zone" (Figure 2 and 4). These villages exploited the mountains to the fullest: even today, every open steep hill is patterned with eroded terraces where barley, oats, rye, potatoes, and hay were grown for centuries, often in association with elaborate hand-dug irrigation networks. Cattle and sheep were kept for meat, milk, and cheese, the latter often being sold to passing merchants en-route for markets in Provence. These animals were kept in barns during the snowy winters, but grazed increasingly higher pastures as the spring and summer seasons developed, under the care and attention of one or many shepherds from the village. Production of manure was an essential bi-product resulting from overnight penning-in, then possible due to low labour costs and high predator threats (Garde, Dimance, and Lasseur 2014).

Figure 2: A typical view of the alpine intermediate zone, where historic terraces are still visible amongst the encroaching forest.

By the end of the 19th century, many of the smaller villages had been abandoned, but the remaining ones continued to make use of their mountains as long as agricultural families remained. In Le Roux (1750m elevation, Parc Naturel Regional du Queyras), I learnt that local farms still sent their dairy cattle up onto the intermediate mountain under the care of one of the village boys until the 1980s. These animals came down every night for milking, thus exploiting difficult land which was not being cultivated or used otherwise with the added benefit of nightly deposits of manure to be used in the cultivated terraces and gardens around the village. Le Roux in 2014, like many of the high alpine villages, looks very different: most of the intermediate zone is treed over with mature European Larch and the remaining clearings are maintained by only one herd of 45 Gascogne cattle, a small flock of dairy sheep, and a few horses. The issues related to closing in pastures in the intermediate zone is addressed further in Appendix A of this report.

Figure 3: A melancholic view from the abandoned village of La Montette (1850m), looking down at the larch forest encroaching on the village's old terraces. Now, only a herd of 45 Gascogne cattle (circled) graze from May to October. Being only 1km up from the inhabited village of Le Roux, this site is still sufficiently accessible for cattle, which the farmer can check daily from the track across the valley.

3.2. Zonation

The mountains today continue to be exploited through a structure of zones, primarily based on elevation. Farmers and shepherds begin and end the alpine grazing season in the Intermediate zone (1000-1800m), with the peak elevation of grazing reaching the high alpine ridges in August.

Figure 4: Zonation enables the farmers to maximize grazing during the relatively short alpine summer.

Intermediate Zone

Steep, often terraced profiles
Permanent villages, many are still inhabited
Suitable for early/end of season grazing
Suitable for modern summer cattle grazing
Decreasing use in modern times
Encroaching forest and scrub
Wolf conflicts with remaining livestock

Alpine Zone

Steep but open landscape
Flock/herd managed by additional zones according to seasons and vegetation types
Summer shepherds' huts and mountain refuges only
Abandoned villages and terraces in lower alpine zone
Each grazing site might have 1-3 shepherd's huts at increasing elevation to cope with zoned grazing.
Upper alpine zone includes ecologically fragile habitats
Important breeding sites for large wild ungulates and birds (Black grouse, ptarmigan, bearded vultures, eagles)
Wolf conflicts with ovine flocks

3.3. Shepherding and Herding in the Alps: structure

The alpine pastures have always played a key part in long distance transhumance, with sheep and cattle from the south (primarily Provence-Alpes-Cote d'Azure) to the alpine pastures in the summer. The trip between winter and summer pastures now happens in trucks, carrying animals for up to 10 hours each way. Despite the recent decline in sheep and cattle farms in the Alps (Garde et al. 2014), demand for alpine pastures remains high as they offer a relatively inexpensive and healthy option for grazing animals. In general, these alpine pastures remain the property of the local council ("la commune" in French) or private landowners, and grazing is arranged through rental agreements, as described in the following diagram.

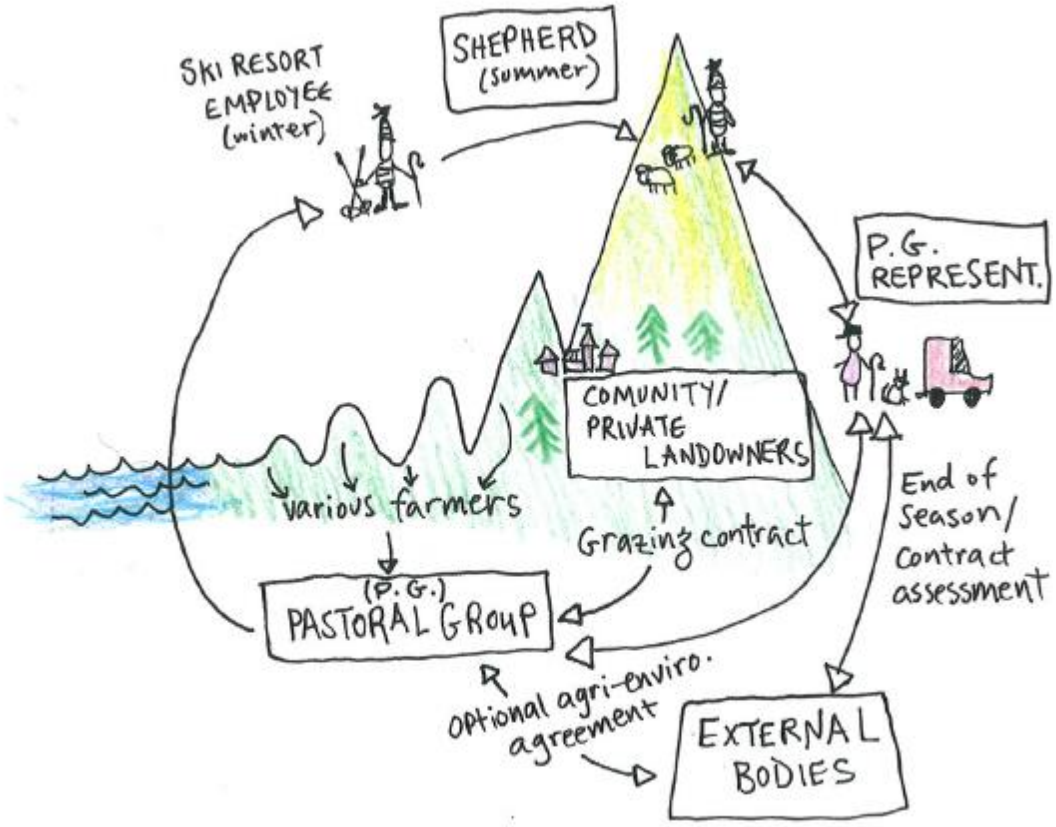

Figure 5: Such a modern grazing system is complex and varies from site to site, however it typically involves some or all of these characters.

Farmer/Pastoral Group (*groupement pastoral*): One farmer, or a group of farmers (about 3 to 40) send their sheep and/or cattle into the mountains for the summer. Each sub-flock is scanned and treated for diseases before being sent as an amalgamated flock, which will be managed by one or several full-time shepherds, or an elected member of the group who can visit the flock on a regular basis ("non-guarded flock"). Members of the Pastoral Group (PG) might be based locally in the valley bottoms, or remotely such as in Provence, the lower Alps, or even Switzerland. By pooling shepherding costs and responsibilities, farmers are then free to make hay, grow crops, and develop other agricultural ventures on their lowland farms in the summer. Some of them might never visit the alpine sites. The formalisation of PGs in France dates

from 1972, when they were given legal status. There is now approximately 500 PGs in the Alps (CERPAM 2014). PGs in the high Alps are organised by the federation of PGs named ALPAGE.

It is not uncommon for at least one member of the PG to have a local link with the alpine site; in such cases the farmer assists or coordinates shepherding, and might also be running a farm at the base of the mountain, for example in the associated village.

Community: The intermediate and alpine zones are owned by the local community and/or private landowners. These may each agree separate summer contracts with the farmer/pastoral group, which can become bureaucratic and inefficient, or they can form an association which manages the contract as one unit.

Shepherds (sheep): In France now, over 700 shepherds are registered on the national census (Meuret 2014). New shepherds (25-30 years old on average) now come predominantly from non-agricultural backgrounds and 30-50% of these are women (Meuret 2014). Most of these shepherds have trained through one of the four French agricultural colleges offering shepherding qualifications, L'Ecole du Merle in Provence, the CFPPAs (Centre de Formation Professionelle et de Promotion Agricole) in Annemezan and Ariège-Comminges both in the Pyrénées, and Savoie-Isere-Drome CFPPAs. Between the colleges, up to 57 shepherds can be trained annually (Meuret 2014). Shepherds make good use of internet-based services provided by shepherding organisations which offer an employment matching service with farmers and pastoral groups amongst other things. One shepherd normally keeps 1000-2500 sheep, depending on the terrain. The flock might be composed of one to several sub-flocks from different farms. The shepherd's responsibilities include:

- Managing the daily grazing regime of the flock
- Providing salt and water
- Caring and treating for animal diseases and injuries
- Basic first aid when necessary
- The shepherd is not responsible for sorting, marking, or transporting the sheep, this falls to the owners of each flock.

To summarise the work of the shepherd, let me quote an experienced and well-respected shepherd, André LeRoy:

> "After all these years, I think the one thing I would like to pass on is this: a shepherd is like a coach, or a facilitator. He has to ensure that the sheep graze the right things, at the right time. It's not just about making good sheep, but also about keeping good vegetation. If he doesn't do this well, either the sheep or the plants suffer. It's usually the plants which suffer, and that's not good for the sheep in the long run."

Herders (cattle):
Herders in France often come through similar training as shepherds, via agricultural colleges. Herding cattle requires less input, as these are generally kept in large compartments delineated either by temporary electric fences, or natural features in the landscape. The herder is therefore present to check animals every two to three days, provide first aid and minor animal husbandry care, and adjust or move fencing as the seasons develop. This process is described in Section 7.1. Those specialising in dairy herds will be involved in milking on the alpine pastures using mobile or fixed

parlours. Some summer farms on the mountains still transform the milk into cheese, while others now send all milk down to facilities in the valleys. Like with sheep, cattle graze increasingly high up the mountain as the summer develops, so there are commonly two or even three different herders' cabins, milking units, and processing sites along the mountain elevation.

Figure 6: A typical mid-elevation (2 300m) dairy cattle unit comprising a small house and processing barn, and the mobile milking parlour.

Shepherds and herders can choose to work for three to four months in the Alps only, but can also extend their season by shepherding on smaller mountains during the Spring and Autumn, as well as in the southern plateaux of France during the winter. If the shepherd lives in the Alps year-round, it is possible to complement their summer work with winter employment in ski resorts.

Shepherds and herders are paid between €1,300 - €2,300/month according to the size of the flock/herd, complexity of the site, level of management required, and the experience of the employee.

External Partners:

If the alpine site rests within a regional or national park, a Natura 2000 reserve, or includes any other protected habitats or species, the alpine graziers will have the opportunity to engage in different projects or agri-environment contracts. Until 2015, agri-environment contracts were only agreed in designated areas, however other key projects which I came across were:

- Territorial Pastoral Plans (organised and funded by the regional government, including all relevant alpine stakeholders)
- Sentinel Alpine Pastures Program (a research project coordinated by the national parks, see Section 6.1)
- Flower-rich prairie competition (a national competition held by the Ministry of Agriculture and Food)

The external bodies involved with such projects include:

- National park authorities:
    - coordinating between stakeholders and other parks
    - monitoring of key species
    - monitoring of agreements (vegetation surveys and livestock movements)
- Department of Agriculture/Chambre d'Agriculture:
    - monitoring agreements (as above)
- Regional grazing or shepherding associations:

    - coordinating and supporting pastoral groups (example: writing up management plans and applying for grants)
- CERPAM (Centre d'Etudes et de Realisations Pastorales Alpes Mediterranee)
    - Research projects
    - Drafting, monitoring, and reviewing grazing agreements.
- INRA (Institute Nationale de la Recherche Agronomique)
    - Research and control of agi-environment agreements on behalf of the government

3.4. Communication between the Pastoral Group and Shepherds

The pastoral group needs to maintain communication with the alpine community, the shepherd(s), and any other associations involved in agri-environment agreements. In some cases, the group president or leader has links to the alpine community: he/she is either based permanently, or can afford to live there in the summer. This is an important feature to successful summer grazing in my opinion, as this farmer provides an effective link between the salaried shepherd(s) and the rest of the farmers, who might never travel up to the summer pastures.

4. Shepherding in the French Alps: the economics

Distribution of subsidies and grants for grazing management in the French Alps is based on a complicated system of administration, which is even more difficult to understand due to the Common Agricultural Policy reforms in 2014/15. A summary of the envisioned structure resulting from these most recent changes, and how it will be adopted in one important region of the Alps, l'Isere, is shown below. A notable change to the structure from 2015 on will be the adoption of territorial offices, which will have authority to channel funds according to their local priorities and objectives.

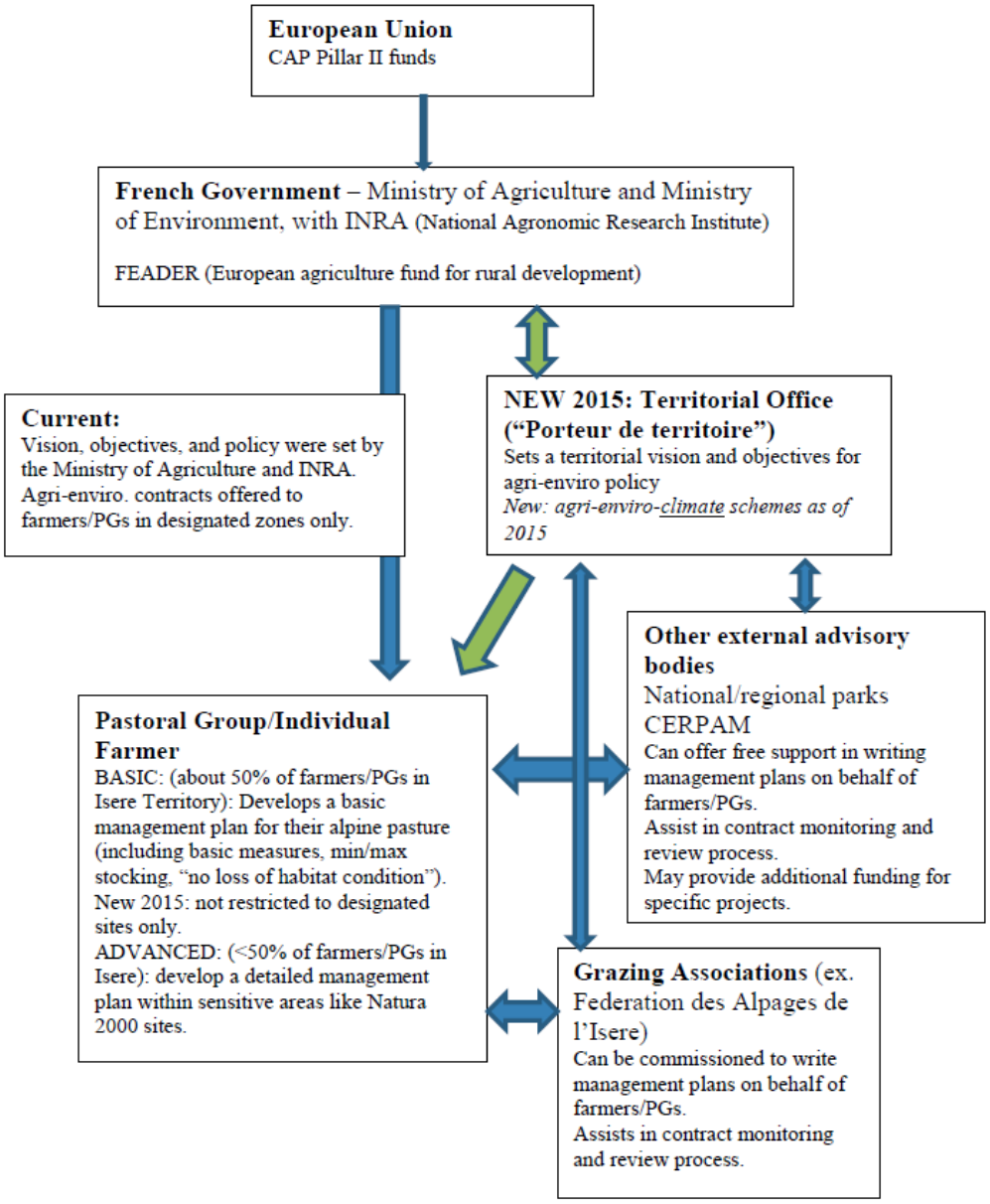

Figure 7: financial support for shepherding comes from the European Union and French Government, although other grants exist from national parks and other organisations as well.

Access to these grants and subsidies can be organised through individual farmers, pastoral groups, or communities according to relevance. Grants for shepherding are scarce and inconsistent, so the cost of shepherding continues to be factored into the normal agricultural budgets of each farm. In many cases, this has led to the decline of permanent shepherding in the Alps, associated with the complex changes of the 1900s

including farm agglomerations and mechanisation, increased regulatory constraints tied to the EU, and the opening of borders to imported lamb and beef since the 1980s.

However, the cost of hiring a shepherd for the summer remains relatively low:

- rental agreements are affordable
- a herder can be hired for a group of farms
- lower land can be turned to profitable crops or valuable hay
- the farmer gains time to diversify in business
- the mobility of the flock results in a more resilient system against fluctuating fodder prices and extreme weather events such as droughts, changing springtime arrival, or early winter storms.

From my understanding, financial support for permanent herders on the mountains are available in the following instances, though this might vary from region to region:

- Small flocks (<1200 sheep): grants available to pay for 100% of the shepherd's salary (*EU and French government funded*).
- Wolf subsidies: in areas at risk of wolf attacks, these grants will cover 80% of the shepherd's wages (for flocks <1200 sheep) or €21/day to a farmer who does not employ a shepherd; larger flocks (>1200 sheep) are eligible for 80% of the shepherd's assistant's wages. All flocks are eligible for electric fencing costs, and the purchase of Patous, or other guard dogs. Financial compensation is also given for every animal killed by a wolf (*French and regional government funded)*.
- Agri-environment contracts (ex.on Natura 2000 sites): grants for management work which requires a full-time herder by default (*EU and French government funded)*.
- Other grants: for construction, upgrade, and maintenance of shepherds' cabins and access tracks as well as for heli-lifts of supplies and materials (*EU, French, regional government funded)*.

The French government has also invested significantly in a program of certification for regional products of quality, under the title of "Protected designation of origin" (AOP). Although there is much debate over its effectiveness, the AOP designation can be used to strengthen and secure economic activity in pastoral systems by adding value to the associated products (alpine cheeses especially). Qualification of AOP products will often demand key features which are tied to the traditional use of the mountains. For example, Compté cheese from the region of Jura, can only be accredited AOP if at least 80% of the grass or hay fed to the dairy cows comes from local mountain pastures, most of which are forest pastures which require herding of the animals in unimproved habitats (*pers.comm.*Dominique Chauvin Comité Interprofessionnel du Gruyere de Compté). Another example is the AOP of Fin Gras du Mezenc beef, which requires that the cattle graze alpine grasses in the summer, and alpine hay or sileage in the winter (Chabrat et al. 2014).

5. <u>The use of electric fences</u>

Temporary electric fences are a useful tool for shepherds and herders: grazing of cattle in the intermediate and alpine zones can be compartmentalised using these fences (normally 50-150 ha), and can sometimes be managed directly by the farmer if it is close enough to the main farm. In more remote areas, shepherds often use portable electric fences to group sheep together overnight. This might be to protect the

flock from wolves, to concentrate faeces and trampling on certain vegetation, or simply to buy the shepherd more sleep during the early hours of the morning. Despite their rising popularity since their introduction in the 1980s, for several reasons fences have not replaced shepherds and herders entirely:

- The successful use of electric fences requires a certain level of skill and much time for setup and maintenance.
- The use of fences in popular recreational zones is limited.
- Permanent electric fences in the intermediate zones require added maintenance of the fence posts, removal of the wire for the winter, and sometimes removal of all posts before snowfall, if in a ski zone.
- Control of daily grazing patterns is not possible, so direct manipulation of vegetation is much more limited.

Figure 8: Holding sheep in portable electric pens on the mountain overnight has many benefits, however the pen needs changing every three days and takes between one and two hours.

6. Study visit, the actors:

Three objectives were formative to my selection of sites and organisations for this study trip:

- To visit wardens, ecologists, or technicians from various national parks and reserves in order to better understand their role and involvement with agri-environment schemes relating to the alpine pastures (Figure 9). *Parc National des Ecrins, Parc National de la Vanoise, Parc Naturel Regional du Queyras, Parc Naturel Regional du Jura*
- To meet with other bodies involved with the alpine shepherding community, in order to compliment my understanding founded in the parks. *Association Pastorale de L'Isere, Association Francaise du Pastoralisme, CERPAM*
- To visit farmers and shepherds in the alpine pastures in order to learn about shepherding and how it can be conducted within environmentally sensitive areas (what works and what needs improvement).

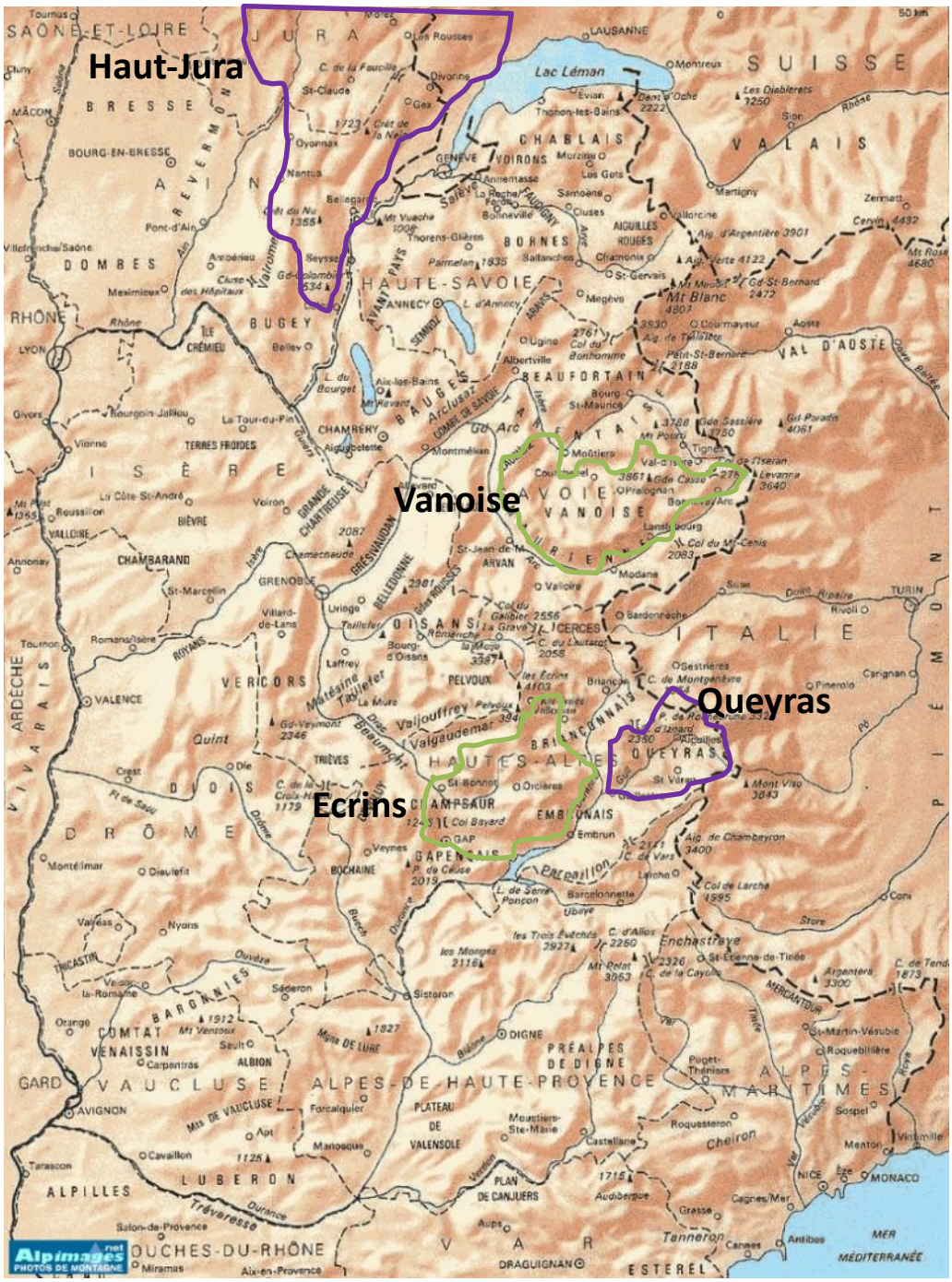

Figure 9: Main study areas visited, national parks are outlined in green, regional parks in purple.

6.1. Parc National des Ecrins

Parc National des Ecrins (PNE) has been working with alpine farmers for over 40 years by providing subsidies for agricultural buildings and machinery, participating in the monitoring and survey work of alpine pastures relating to ecosystem function and forage availability (and relationships with grazing animals), developing species and habitats management plans, and implementing agri-environment agreements since 1994. Of approximately 78 000ha (200 distinct sites) of alpine pastures, 31 600ha (57 sites) are involved in agri-environment agreements. The remaining sites tend to be small and often do not rely on shepherding or herding. Because of the strong shepherding presence in the PNE, it has been a leader in developing agri-environment agreements within the framework of this traditional system. In fact, the park's

encouragement of these schemes has actually resulted in the reintroduction of permanent shepherding for conservation in recent years.

6.1.1. Research in the PNE

The PNE has been involved with important research projects relating to alpine habitats and pastoralism. It was the first French park to create a "reserve intégrale" where access is only permitted on the grounds of scientific research: the valley of Lauvitel (698 ha) was abandoned by farmers in the 1950s, and since made into a nature reserve in 1995 with the sole purpose of studying ecological processes over time (http://www.ecrins-parcnational.fr/parc-action/connaitre-proteger/reserve-integrale-du-lauvitel.html). Another important project coordinated by the PNE was the long-term pastoral study of Saut-du-L'aire, which has been running since 1995. This study produced formative documentation on the grazing behaviour of sheep and shepherding techniques to improve the condition of alpine habitats (Meuret 2014).

Epitomizing the PNE's interests in supporting sustainable use of the alpine pastures is the Sentinel Alpine Pastures Program (SAPP), which was initiated in 2008/9 and has since been extended to include participants from the neighbouring national and regional parks of Vanoise, Vercors, and Chartreuse. This project was developed in response to rising concern over the future of alpine habitats and pastoralism following a series of devastating droughts in 2003-2005. Its objective is "to anticipate the impact of climate events and changes to pastoral practices in order to preserve (or restore) sustainable management of these areas." Founded on collaboration between stakeholders, it relies on the participation of farmers and herders, farming technicians, pastoral system specialists, researchers, and managers of the protected areas (Dobremez et al. 2014). Together, this team is documenting important information on:

- Climate: weather conditions over time, specific to each site
- Vegetation: biodiversity and plant dynamics (composition and biomass)
- Transect lines
- Pastoral resource and practices
    - End of summer grazing inspections including:
        - an interview with the shepherd/herder to determine links between that season's weather and pastoral decisions)
        - an assessment of vegetation consumption
    - Vegetation resource estimation throughout the summer, based on LECA protocol.
    - Herder's observations (grazing logbook: numbers, dates, and circuits, weather)

Beyond the obvious value of this data for improving future management plans, is the benefit of successful cooperation between ecologists, farmers, and shepherds.

6.2. Parc National de la Vanoise

The alpine grazing systems in le Parc National de la Vanoise (PNV) are dominated by cattle herds (dairy and meat), which require less attention than sheep. The parc covers 59000 ha, of which 17000 ha are within the core conservation zone. About 50% of the grazing pastures within the core zone are under agri-environment agreements. Where sheep are present, a permanent shepherd is often limited to large flocks (>1200 sheep) or sites at risk of wolf attacks. Unlike in le Parc National des Ecrins, there are some examples of agri-environment agreements in one region of the parc, Maurienne, where full-time shepherding is not always required from agri-environment contracts

(Ferbayre, *pers.comm.)*. In fact, out of the three regions I visited, it was only in this park that I felt uncertainty about the future of shepherding. One local technician mused to me: "shepherding in the Alps is going through an existential crisis." The debate appeared more poignant in this park than anywhere else, possibly because of the significant populations of large wild animals now threatening livestock systems (wolves and bearded vultures to a lesser extent), or competing with and replacing livestock (mountain sheep and goats) (Ferbaye, *pers.comm. 2014*).

6.3. Parc Naturel Regional du Queyras

This smaller regional park retains a very strong cultural identity, evident in the density of shepherded sites I saw, as well as the pride the shepherds had in traditions and craftsmanship. This park is relatively remote, and has less summer visitors in the mountains than the larger two national parks. During my visit I felt a clear sentiment of frustration about the abandonment of local farms and permanent inhabitants in the mountain villages. However, the shepherds and farmers with whom I spoke showed little apprehension about the future of pastoralism.

6.4. Parc Naturel Regional du Haut-Jura

Situated to the west of the high Alps, the mountains in the Jura region are smaller and more rounded. Except for relatively small alpine pastures on their peaks, they are characterised by dense forests (coniferous dominant) with species-rich open pastures scattered throughout. The park is dominated by bovine dairy farms, which have intensified their lowland pastures while often abandoning the intermediate zone due to its less productive and accessible nature. Thus, since the early 1900s, forest cover in the Jura has increased significantly. The closing-in of forest glades is a cause for concern amongst local inhabitants, ecologists, foresters and some farmers for several reasons:

- Loss of views and vistas
- Overgrown forests are less accessible for recreation, but also for timber and firewood extraction, a right which locals hold and depend on
- Loss of biodiversity: the forest pasture mosaic in this park is notified as a Natura 2000 site, and is associated with rare plant and animal species, notably the Black Grouse.
- Loss of seasonal forage sites for transhuman flocks and herds.

In this region, the ministry of Department of Forests (Organisation National de Forets ONF), works closely with communities to improve management of their community-owned forests. Examples of one agri-environment contract funded by the ONF, which uses ovine shepherding to maintain Natura 2000 habitats is described in Appendix A.

6.5. Federation des Alpages de l'Isere (Federation of mountain grazing for the region of Isere)

There are numerous regional grazing associations in France. Many of these are members of the Association Francaise du Pastoralisme, which lobbies government and provides a network for discussion across France (www.pastoralisme.org). Local organisations provide more direct services and assistance to the farmers, shepherds, and herders in their region. When I met Morganne Walters, a technician at the FA L'Isere, I learnt about the typical mandate and services:

- Emergency support for shepherds: following predator attacks or for emergency evacuations or help to shepherds or livestock in remote areas
- Insurance (livestock and employee)

- Helicopter lifts: coordinating several heli-lifts for different PGs
- Employment network: matching farmers and PGs to shepherds
- Advice on animal diseases and parasites: prevention, control, treatment
- Bulk purchasing of equipment for PGs
- Advice and development of management plans, grant applications, etc…

6.6. CERPAM (Pastoral Research and Management Centre for the Mediterranean Alps)

Like grazing associations, CERPAM offers expertise, organisational, and financial support to PGs, however its remit covers all of the southern Alps. In addition to these services, CERPAM also specialises in research and monitoring, and as such plays an important role in the development and review of agri-environment contracts. It often works in partnership with the Ministry of Agriculture, National or Regional Parks, and other research institutes on sites of high nature conservation value. I contacted a grazing specialist in CERPAM who is responsible for the design, monitoring, and evaluation of an agri-environment contract on a Natura 2000 site I visited in Le Queyras regional park (Section 7.2).

7. Case studies:

Shepherding and herding remains an integral part of livestock management in the Alps. These traditions have evolved over hundreds of years: shepherds and herders are sometimes funded by agri-environment schemes rather than the income made from livestock sales, because of the recognition that their work can maintain important habitats and even improve their biological condition following neglect and/or overgrazing. If not all shepherds are grazing for conservation, then how do those feel about these imposed "limits"? Furthermore, what role do the livestock keepers play in creating and amending conservation prescriptions? These questions and others are explored through the descriptions of five site visits to a variety of alpine pastures.

7.1. **Commune de Risoul:** (William Walters, cattle herder)

Figure 10: Herder William Walters explaining the extensive grazing system he manages to Caryl Hughes, visiting Welsh shepherdess.

7.1.1. Contract type:

There is no agri-environment contract on this mountain, although a management plan was commissioned by the Pastoral Group (PG) approximately 15 years ago. The

ensuing report recommended that the herd graze nine compartments as part of a rotation, benefitting both the animals and the vegetation. The higher zones were kept for August, while more sheltered zones were allocated for late summer grazing.

7.1.2. William Walters:

For the last ten years, William Walters has been employed by a Pastoral Group (PG) as the sole herder for approximately 210 head of cattle, belonging to six farmers. He has much authority over the implementation of the grazing plan; for example, he has removed a fence between an exposed compartment and its adjacent sheltered compartment in order for the cattle to find refuge during storms.

Figure 11: Arriving at Williams' "little foothill heaven."

The PG has been leasing this land from the community of Risoul for over 20 years. Between the PG and the community, many improvements have been made to William's cabin, sheds, and handling facilities. William feels well respected and cared for by his employers and the community, and intends on staying at this site for years.

Figure 12: Cowboy with a smartphone.

7.1.3. Cattle breeds:

A mixture of cattle was seen, including dairy heifers and cows in calf:
Holstein, Vaugene, Aubrac, Salers, Blanc-bleu, Limousin, Charolais, Normand

7.1.4. Grazing management:

The cattle graze a total of approximately 650ha, between 1,900-2,500m elevation. The mountains are covered with of a mixture of mature larch forest, forest glades, and some alpine pasture. Interestingly, the majority of the alpine zone on this mountain is grazed by a flock of 2000 sheep, which is shepherded permanently on behalf of a different PG. In 2014, the herd was separated into three groups, two with a bull each, and one smaller group of heifers. The cattle graze blocks of 20ha - 200ha at a time, these being enclosed by natural barriers or electric fences. Three handling facilities had been built across the site in order to facilitate William's work. Details of the compartments and grazing patterns are outlined in Appendix B.

7.1.5. Vegetation types:

The forest and its open glades appeared in good condition. Natural and planted larch regeneration was frequent and other species were growing as well. Browsing of these was negligible. The understory was composed of a mosaic of grassy, shrubby, and flower-rich areas. In general, the grassy areas in the forest and the alpine were species

rich, however a small proportion of these were dominated by two problem grasses, Queyrel (*Festuca paniculata*) or Matgrass (*Nardus stricta)*.

7.1.6. William's responsabilities:

William ensured that each herd was inspected every two or three days to ensure that each animal was fit and healthy. With some of the cows in calf, he also needed to check that the mothers and newborn calves were well, although he did not have the means to intervene with difficult births (sometimes at a loss of the calf and even the cow). When arriving in the vicinity of each herd, he would bellow and call the animals, then spread salt out at a strategic point so as to attract wider-ranging individuals. If an animal was injured or showing signs of illness, William was able to treat them at one of the handling facilities. Problems requiring further intervention required William to phone the respective owner and arrange for the animal to be transported down the farm. William also spent a significant amount of time erecting, maintaining, and dismantling the electric fences as part of the grazing rotation ("*remu"* in French).

7.1.7. Why cattle and not sheep?

It is rare to come across examples of sites grazed by both cattle and sheep. In general, sheep graze the highest areas of the mountains, while cattle graze the intermediate zone, which is often forested in parts, and the lower alpine zones. The reasons for this are numerous:

- Safety and health: sheep are better suited to the high elevations
- Grazing habits: cattle graze rough forest fodder better than sheep
- Management:
    - In the forest, individual sheep get lost more easily than individual cows.
    - Cattle do not need to be herded full-time, they can be left to graze large enclosed areas, requiring regular checks only.
- Access: it is easier for the farmer living in the village to check cattle in the intermediate zone. Access is also an important issue for dairy herds, although even these can graze relatively high up thanks to mobile milking parlours and secondary farm buildings at higher elevations.

7.1.8. Horses for the herder:

William was a strong advocate of herding with horses. Using horses conserves the herder's energy, while maintain access to difficult areas which quad bikes could not get to even if they were permitted. Because of their size and nature, horses are also dominant over cattle, so William demonstrated how he could safely and effectively navigate the herd and encourage cows to move while on horseback because of the hierarchy between the two animal groups.

7.2. **Commune de Le Roux: Pastoral Group du Bric Froid**

(sheep: interviews with René Roux, shepherd and farmer; Christelle Houïe, shepherdess and member of the PG as "bergere sans terre"; Sebastien, retired local shepherd for the PG).

7.2.1. A look into the structure of a Pastoral Group (PG):

The Bric Froid PG is composed of 12 farmers, most of whom live on farms in Provence, up to eight hours away from Le Roux, a small village in the regional park

of Le Queyras (Figure 9). Their elected president, René Roux, has been leading the group since it first got its lease on the community mountains of Le Roux (a coincidence in names), 30 years ago. The combined flock of the PG totals approximately 4000 sheep, and is divided into three sub-flocks, each with a permanent shepherd to manage it over the three main mountains of l'Alpet, le Bric Froid, and Le St Martin over approximately 2400ha (Figure 16). The PG has been leasing all of the communal and private land around Le Roux for 30 years now, which is managed as one unit by a local Pastoral and Forestry Association (PFA). The PFA holds responsibility for the maintenance of access tracks and shepherds' cabins, though it often works in partnership with the PG in grant applications for such work.

7.2.2. Sheep breeds:

Préalpes, Portuguese Mérino (black), Mérino, Mourerousse

7.2.3. René Roux, PG President, shepherd, and farmer:

Unlike the other PG members, who might not have any shepherding experience, René has been shepherding sheep in this region of the Alps since he began helping his father about 50 years ago. During the summer and autumn he lives in the village of Le Roux, from where he supports and provides cover for the three PG shepherds on the mountains. He also keeps a herd of 50 cattle in the intermediate zone, the forest-terrace pastures around the village itself. His sons and daughter run the farm in Provence, where the sheep and cattle return to when snow arrives in the mountains. When I remarked how interesting that René shepherded as well as owned and managed livestock, he said: "like the others (*the shepherds*), it's in my blood." He also keeps a small group of goats with the sheep; these have the main purpose of clearing paths for the sheep in the early autumn snow since it doesn't stick to their fur.

Figure 13: René accompanying a flock of heavily pregnant ewes down the mountain in September 2014.

Of the PG flock of 4000 sheep, 2000 Mérinos belong to René. Like most of the other PG members, half his flock lamb in September-October and the other half in March. The early autumn lambs are sold for export to Spain (with a large proportion of rams sold for Eid al-Adha in October), and René will sell for export until prices drop to below €50. At that point, René will sell all other lamb direct from his family farm in La Craux, Provence, along with the farm produce, poultry, and all of the beef. Livestock sales therefore contribute significantly to his income, however subsidies still make up approximately 50% of his income.

7.2.4. Christelle Houïe, PG member and salaried shepherdess:

Christelle Houïe owns 150 high quality Mérino sheep, which she shepherds intensively all year round thanks to her legal status of "bergere sans terre", or shepherdess without land. Without land of her own, she has the right to graze any fallow land. In the summer, Christelle keeps her sheep with the rest of the PG flock, and is thus paid as a salaried shepherdess during that season. For the rest of the year, she is based near Gap, in Provence, where she shepherds her flock on a range of pastures such as large private gardens, neglected village greens, or winter fields. Christelle says that she looks at grass in a very different way to other people, because she is always evaluating its potential fodder for her flock. Her work in Provence is one of "tidying up" and she is often requested to pass her sheep on private properties needing such a service. She claims no subsidies for her flock, and depends on direct marketing of her lamb and high grade Mérino wool the rest of the year.

Figure 14: Christelle inspecting her ewes at the end of the summer grazing season, below Le Roux. Notice the black Portuguese Mérino s, which she bought especially for the quality of their wool.

7.2.5. Grazing management:

The large flock is divided into three sub-flocks, each managed by a separate shepherd. When the snow melts in May or June, a portion of the sheep arrives in Le Roux and is kept by René alone in the intermediate zone, around the village. As the spring develops and grazing becomes available higher up, the shepherds and remaining sheep arrive in Le Roux to move up to their summer cabins. Two of the shepherds have two cabins (a lower one for July and September, and a higher one for August), while the third shepherd is based entirely from one central cabin.

René's cattle spend the entire summer in the open pastures of the intermediate zone, around and above the village. The terrain, like everywhere in the Alps is extremely steep, however this is eased by its faintly terraced profile, a relic of more intensive farming practices from the 1800s.

Figure 15: Gascogne white cattle, are easy to spot and easy to view from the track across the valley thanks to the steep terrain. This is a typical view of the "intermediate zone" slowly closing in with encroaching Larch forest.

7.2.6. Le Bric Froid agri-environment agreement:

There are two Natura 2000 sites within the PGs grazing range, which the 12 farmers have embraced through an agri-environment contract worth €12,000/year. This contract was drawn up by CERPAM, and is currently coming to the end of its third 5-year agreement (Figure 16).

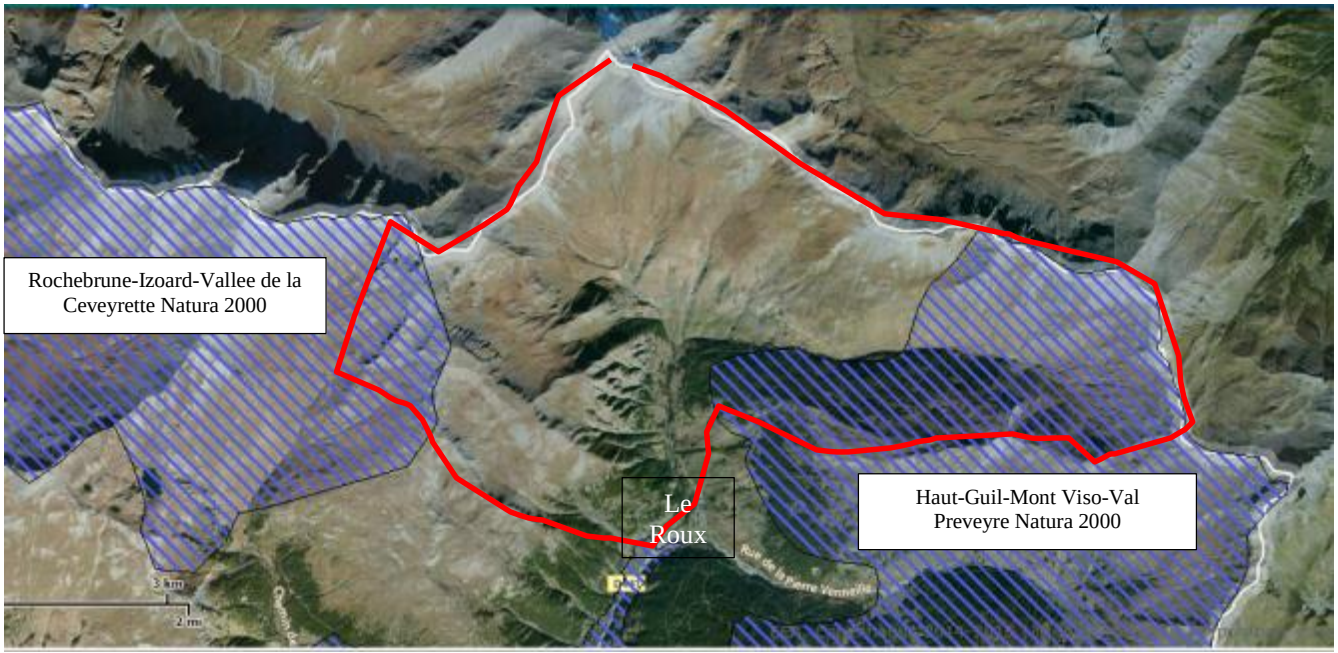

Figure 16: The Bric Froid Pastoral Group graze their 4000 sheep in three flocks over three peaks, which include two Natura 2000 sites (http://natura2000.eea.europa.eu/).

It addressed the following areas:

- Grazing zones, where the flock is kept on increasingly higher compartments as the summer progresses, culminating on the highest alpine zones in August, and then working back down the mountain. This ensures that each area is grazed more effectively, while also ensuring that plant species are given the chance to flower and set seeds.
    - Success: this is widely accepted as beneficial to the plants, and most shepherds acknowledge the benefit of reduced daily walking distances for their sheep.
- Management of Queyrel grass (*Festuca paniculata*), which has become dominant in old terraced meadows of the intermediate and lower alpine zones.
    - Targeted grazing: This can only be done under the direction of a shepherd, who times the passing of their flock through Queyrel when it is young and tender. Later in the season, the shepherd can bring sheep to tougher Queyrel when they are particularly eager to graze, such as in the hours before nightfall, or following a grazing session (lasting 30-90 minutes) on sweet and palatable forage.
    - Trampling and manure: Following trials onsite, 10 years ago, it was found that settling the flock on Queyrel for their afternoon rest produced the right effect. If sheep were penned in on the Queyrel overnight, too much manure would be added, resulting in more vigorous growth the following year. This is interestingly different to management of Matgrass (*Nardus stricta*), as described in Section 7.3.4.
    - Success: René is very proud of the effect the PG's shepherding has had on Queyrel in this area, and on the contribution to the understanding of Queyrel management they have made in Risoux. There is however, more Queyrel-dominant areas than available sheep and shepherds.
- Limited grazing in a Black Grouse nesting zone. No grazing until mid-August.
    - Success: there is no monitoring of Black Grouse populations on this mountain, so success is not measurable. The prescription has no significant impact on flock management.
- Limited grazing on exposed alpine sites, where snow is often blown off and the plants are subsequently more sensitive to damage and grazing.
    - Grazing allowed in passing, but the flock is not to spend any prolonged time on these sites.
    - There is no formal monitoring of these sites, however the prescription does not negatively impact flock management, and is supported by all parties.
- Grazing excluded from two alpine ridges notified for their rare and rich floral assemblages.

  This is a point of concern for René, who believes that there are not enough wild ungulates to control grasses in these areas. He believes that this prescription might lead to the eventual loss of species and diversity.
    - There is no formal monitoring of these sites, so success or risks cannot be quantified, however the CERPAM technician believes that wild herbivores are sufficiently numerous on those mountains to control any rank grasses, and will therefore not propose a change to the prescription in the new contract.

This is a typical description of control measures within an alpine grazing zone. Another common measure applied in areas where large wild ungulates are numerous is to exclude domestic flocks from wild ungulate summer territories (normally the highest alpine zone of a mountain). This is done to limit grazing impact on sensitive alpine plants, but also to control the spread of disease between both groups of animals.

7.2.7. Protecting sheep from the wolf:

Since the arrival of the wolf in 1994, René and his shepherds have had to employ predator control techniques which have altered the management of the flocks:

- Nightly pens close to the shepherd's cabin: sheep no longer sleep on the mountain ridges. Pens are created using temporary electric fences, and are moved as frequently as possible to protect vegetation, soil, and sheep health. This requires extra time, and the fact that the night pens need to be based close to the cabin also limits the options for daily grazing circuits.
- Additional shepherds' cabins need to be erected in order to address this problem. At a cost of €10,000-€20,000 (including helicopter delivery of materials), this is not always possible.
- The government offers 80% funding for a shepherd's assistant, in order to help with the additional work related to fencing, the longer walking days, and the stress of defending against or dealing with wolf attacks. In Le Roux, this option is rarely adopted by the PG because the shepherds' cabins are small and unsuitable for two shepherds, unless they are a couple.
- Patous, or other guard dogs: In theory, each flock needs at least two Patous, one inside and one outside of the pen. Larger flocks require more dogs. With three sub-flocks, the PG at Le Roux would require at least six dogs, and would need shepherds willing to work with these difficult animals. Conflicts with walkers are increasingly problematic. For these reasons, the PG has not bought any Patous.

Figure 17: Patous dog guarding a flock on the slopes of Le Mont Pouri, with the shepherd's hut and disused cattle shed in the background.

7.2.8. Qualified shepherds: the pros and cons:

In recent years, the practice of shepherding has become professionalised and as a result, the relationship between shepherds and farmers or PGs has become more formalised. Benefits to this include employment security and rights for the shepherds as well as the development of employment matching services. Despite the growing

popularity of shepherding amongst young adults, problems have arisen due to the apparent paradigm shift from the dedicated vocation to the calculated career path.

Shepherds in France today are dominated by young and educated men and women, of which almost 80% do not have any agricultural background prior to training as a shepherd (Meuret 2014). Shepherding offers a tangible way to connect to nature, and to contribute directly to the agricultural and conservation worlds. It is therefore not surprising to read that there are over 700 shepherds in France who describe that as their main profession (Meuret).

Despite its appeal, shepherding remains difficult because of its seasonal and isolated nature. During the exceptionally wet summer of 2014, some PGs had to replace their shepherds two or three times, each one giving up out of desperation due to the high level of footrot in the flock, and the depressing weather conditions. In fact, the average duration of a shepherding career now stands at five years (Meuret 2014), and there are problems with negligence and alcoholism amongst the profession.

Older shepherds and farmers are saddened that younger shepherds do not want to dedicate their entire lives to this work. Whether the formalisation of the relationship between shepherds and farmers has much to do with this trend, I cannot say, however I have noticed that the most successful examples of shepherding in the Alps always included a good relationship between the shepherd and their employer based on mutual respect and good communication.

7.2.9. Traditions, always good?

Not all traditions are good. Take the "traditional" practice of leaving sheep free for the night, as described by René Roux, an old shepherd in Le Queyras Regional Park: before the arrival of the wolf in 1994, René and his shepherds relied on the flock's natural instinct to sleep and take refuge on the mountain ridges. Hence, the shepherd in those days had to wake up very early each morning in order to reach the flock at daybreak and hold it until conditions were right for grazing. Not only was this tradition demanding on the shepherd, but it must have had an impact on the sheep who ended up walking unnecessary distances up to the ridges every night. Finally, this tradition led to the degradation of very sensitive alpine habitats on the ridges, which suffered from relentless grazing and trampling throughout the summer degrading the vegetation diversity and creating deep ruts which cut up the habitat.

Figure 18: Sheep ruts ("drailles" in French) are now recognised as a symptom of poor flock management and symptomatic of unkept flocks. They are the result of repeated passage by the flock across one area. Once established, drailles funnel sheep along the established lines, developing deep ruts. Studies of flock movements in Saut-du-L'Aire, Parc National des Ecrins, highlighted that sheep travelling along these ruts tend to run more than if they are forced to fan out over a larger area, thus further exacerbating the problem of erosion.

7.3. **Plâteau d'Emparis** (André LeRoy, shepherd)

7.3.1. Contract type:

Three separate flocks of 1200-1700 sheep graze this glacial plateau, which covers approximately 600 ha, and includes a boggy river basin designated as a Natura 2000 site. The shepherd I visited, André LeRoy was employed by a Pastoral Group (PG) to manage their combined flocks totalling 1700 heads, but no ecological or pastoral management prescriptions were in place. Although André has been a shepherd for over 30 years, this was his first year on this site. His employers have held the grazing rights over their section of the Plâteau for over 20 years, but members of the PG have changed frequently, and a large proportion of the sheep each year are new to the mountain site. This, combined with the apparent lack of interest in shepherding on the part of the PG members has resulted in an unsettled flock which André found difficult to manage especially in the early summer. From André's perspective, the single advantage to this contract was the freedom he had in choosing his daily grazing circuits and managing the flock during that season since the farmers did not come up onto the mountain.

7.3.2. André LeRoy, shepherd and grazing specialist:

Figure 19: André LeRoy spent 20 years as the shepherd for a grazing research project in Saut-du-l'Aire, a mountain in the Parc National des Ecrins (PNE). His work was fundamental to the scientific understanding of shepherding for conservation, and now forms a basis for the training of modern shepherds in agricultural colleges of France. An excellent summary of the research conducted on Saut-du-l'Aire is provided in several chapters of Meuret's book, *The Art of Shepherding* (2014).

7.3.3. Grazing management:

When André arrived on the Plâteau d'Emparis in June 2014, he quickly imposed changes to the flock and its management which he considered essential if good sheep and plants were to be produced over the season:

- Grazing zones: as described in Section 3.1. André identified four areas to graze over the summer, each one being targeted for three to four weeks (ex. the highest ridges were saved for August, and the lowest slopes saved for late September). This was done in conjunction with mobile sheep pens and ensured that the flock always had access to fresh vegetation, and that plants had a chance to recover.
- Mobile sheep pens: sheep were parked in a pen for their afternoon rest ("la chaume" in French) and for the night. The pen was made of portable electric mesh fencing, which André moved every three days in order to minimize the spread of diseases like footrot, and to reduce the cover of Matgrass (*Nardus stricta*). The pens were also located centrally to each grazing zone, thus minimizing the walking distance of the flock each day.
- Slowing the sheep down: without control from the shepherd, the flock would walk quickly and long distances every day. If the grass is heavy with dew in the morning for example, the flock will spend the first few hours walking without much interest in grazing. In his research, André has noticed that sheep will walk faster if they are kept tightly, and that fanning the flock out relieves the pressure resulting in calmer, slower animals (****Meuret, 2014). He therefore walked all morning in front of the flock to slow it down and to spread it out like a fan.

Figure 20: André LeRoy walking in front of the flock to slow it down and fan it out. Notice the green patches on the hill beyond, where mobile pens were placed earlier that year to park sheep overnight.

- Grazing circuits: grazing circuits are calculated to maximize grazing in as small an area as possible, thus reducing the walking required by the sheep. The development of a grazing circuit takes at least these four factors into account, further details can be found in Meuret's book (2014):
    - Sheep do not like to graze in the early morning (especially if the vegetation is wet or frosted), so it is not worth putting them onto a pasture which needs grazing at that time of the day.
    - Sheep will settle into "grazing mode" following the initial restless period in the morning. This can be encouraged by timing the arrival of the flock to a palatable or clean pasture.
    - Once their appetite has been wetted, sheep are more willing to graze rougher grass.
    - Sheep graze manically in the last hours of daylight, before returning to their night pen. Rough grasses which had been passed over by the flock earlier in the day can be tackled at this point.

7.3.4. Controlling Matgrass (*Nardus stricta*):

For almost eight years while working in the mountains of Wales, I have been struggling to find a way to reduce the cover of Matgrass, a tough little grass which tends to dominate drier areas following a period of overgrazing. I have asked every ecologist, grazing researcher, and farmer I met in Wales, but never heard a satisfactory answer. However, within a day of my arrival in the French Alps, the answer was given to me, and this thanks to the Saut-du-l'Aire grazing project for which André was the shepherd.

Figure 21: Sheep held in an electric pen. The size of the pen is roughly twice the area that the flock takes when packed tightly together.

According to that study, the cover of matgrass can be reduced simply by parking the sheep (in mobile pens) for approximately three nights and three afternoon rests at a density of about 1.5m/sheep. The pen is then moved to the next area, and given three years break until the same pulse of grazing, trampling, and manure is repeated. Although two or three rotations are required to have optimal effect, the impact of this treatment is visible within a year. The combined effect of trampling on existing matgrass, with a pulse of nitrogen results in an immediate increase of growth (of matgrass and any other species present). If followed by a series of grazing and rest rotations, this method results in the gradual increase in cover of other competitive species, which must then be managed through careful shepherding afterwards. A longer stay, or more rapid rotation will result in too much manure and disturbance, to the advantage of the matgrass.

Success of this method has been documented by the Parc National des Ecrins and is summarised in Meuret's shepherding book (2014). However, André is convinced that his observations suffice in explaining the effectiveness of his work: at the beginning of the first trials, André watched his flock walk right through areas of Matgrass without grazing. Twenty years later, the flock would stop and graze on the same areas for up to 45 minutes. The team also noted that marmots moved in to Matgrass dominant areas within the first year because of the lusher growth of plants (Dellavedova, *pers.comm).*

7.3.5. Four ways to move sheep:

André's insight into grazing management extended into the subtle art of manipulating the flock's movement. This skill was evident in several of the shepherds I encountered, and can be summarised in four notable lessons:

- Dogs: these can be commanded through whistles, spoken words, or body language.
- Whistles or calls, without dogs: some shepherds whistle sharply, or call abruptly to "frighten" the sheep. These calls are not directed at the dogs, but at the flock, which responds either by bolting or changing direction.
- Shepherd without dogs: when the shepherd wants to hold the flock somewhere, for example on a particular patch of vegetation, the presence of dogs or sharp calls might be counter-productive. So, the shepherd walks

without the dogs to the flock and around it, thus holding it almost subconsciously.

- The Leader ram ("Le Meneur" in French): le Meneur is a tame castrated ram (or ewe on occasion), whose sole purpose is to wear a large bell which resonates above all of the other smaller bells. Shepherds believe that the sound of bells holds a flock/herd together, and that the occasional large bells resonate further and therefore holds larger groups effectively. In addition, le Meneur has normally been bottle-fed and is very tame. He probably holds a special relationship with the shepherd who might feed him handfuls of grain from his pocket throughout the day. The shepherd can use this tame individual to lead the rest of the flock in a gentle way.

Figure 22: Le Meneur, a castrated ram wearing a particularly large bell. Notice the tufts of longer wool left on his back during shearing as a decoration.

8. Conservation shepherding: lessons for the United Kingdom:

Shepherding and herding is a useful and effective tool for habitat management and restoration in the French Alps. The adoption of full-time shepherding in the United Kingdom would be of tremendous value. From speaking with shepherds, grazing specialists, and ecologists in the Alps, it has become clear to me that managing upland habitats in Wales cannot be addressed solely through questions of over or under grazing by sheep. In order to effect change on the vegetation, it is essential to manage the sheep's daily and monthly grazing patterns.

When done properly, full-time shepherding can deliver key ecological services such as:

- Maintaining a diverse sward (height and species)
- Reinstating a balance in sward composition
- Restricting grazing in sensitive sites which cannot be fenced out
- Shepherding and herding can also provide other important services:
    - Maximising grazing potential of the mountain habitats for the sheep/cattle (especially within ecological parameters)

- Maintaining woodland clearings, valued for their biological diversity, accessibility, and aesthetic appeal.
- Ensure optimum grazing conditions for each flock, particularly valuable on commons where access and boundaries are difficult

Shepherds in France have the skills to deliver these services, and the profession is valued and supported through policy and funding programs like agri-environment schemes. It is appealing because of its direct link with agriculture and conservation, and because of the variety and abundance of jobs available.

8.1. Full-time shepherding in Wales: opportunities and obstacles

If shepherding is to become an effective tool for conservation management in the uplands of Wales, what will it take? Much of the art and science of shepherding, as described by Meuret and the contributors to his book (2014), has been lost in Wales. Since the early 1900s, hill farms in Wales have become reliant on well dispersed and trained flocks, "hefted" to their part of the mountain (their "cynefin" in Welsh) thanks to the efforts of shepherds in the past. Today, shepherds do not need to spend every day with the flock, as its cynefin is taught from ewe to ewe lamb, so the shepherds have lost much knowledge about grazing behaviour (ex. what plants are eaten, and how this changes throughout the day or season). The hefted flock has become the tradition in Wales, and is a unique form of management rather limited in its shepherding potential.

If shepherding potential on hefted flocks is limited, it doesn't mean it is not worth exploring. At Hafod y Llan, the National Trust farm on Snowdon (within the Eryri Natura 2000), a shepherd manipulates part of one hefted flock to reduce the amount of time they spend on the more sensitive upper ridges of the mountain. They cannot be controlled like a tight flock of Mérino sheep, but their daily grazing patterns might be altered with the end product being healthy sheep and a "healthier" mountain habitat. In Cwm Idwal, another Natura 2000 site in Snowdonia National Park, shepherding has been adopted to exclude all sheep from the site, thus re-adjusting the distribution of hefted flocks from neighbouring land.

Where hefted flocks have disappeared and mountain habitats are now rank with grasses or uniform swathes of mature heather, then habitat diversity could be improved by re-introducing grazing through shepherding. In these instances, perhaps even a different breed of sheep than the Welsh Mountain, one which is more gregarious, might be appropriate.

A return of shepherds employed on the mountains of Wales could deliver ecological objectives we have yet to attain in difficult areas. It would also add recognition to the skills shepherds and farmers already have, and would be a way to improve/rekindle their knowledge of mountain grazing. The benefits would touch both ecological and cultural ambitions held high in this part of the world.

8.2. What would success look like, and how do we get there?

Success is when the mountains habitats are rich in species, and grazed by healthy livestock. It is important to highlight the key points of success for conservation shepherding in the Alps, so that they can influence the development of shepherding programs in the UK:

- Good weather = happy and hardworking shepherds ("*the best shepherd is sunshine and fine weather*")
- Clear objectives must be agreed by the farmer, ecologist/manager, and shepherd.
- Communication between the shepherd, farmer, and ecologists is critical. Nobody has an easy job, particularly the shepherd, and it is important for everyone to work sympathetically and adaptively.
- Site visits, particularly end-of-season visits: these assist in adapting the management plan according to successes/failures highlighted by the shepherd and the ecological surveys. The end of season visit should be done by the whole team.
- Well-trained shepherds, who are confident that they can deliver good sheep and good habitats will be valued by their community.

9. References

Shepherding colleges:

VFPPA Ariege-Comminges (Pyrénées): 1 year training for shepherding or herding in the mountains (Pyrenees). http://www.pamiers.educagri.fr/cfppa/

Centre de formation du Merle: l'école du berger. Sup Agro, Montpellier (Provence): http://www.supagro.fr/web/pages/?idl=19&page=233&id_page=199

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Walters, William. Shepherd and herder. +33 (0)6 81 36 78 37

Shepherding Associations:

Association Francaise de patoralisme. www.pastoralisme.org

Federation des Alpages de l'Isere http://www.alpages38.org/-Federation-des-Alpages-de-l-Isere-.html

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