

## → The chain of actions to prepare a PPR

### Study of phenomenon by risk catchment

Historical data available, studies, field observation

### Identification of stakes

### Statutory documents

### Informative map of natural processes

### Assessment of stakes

### Risk Prevention Map

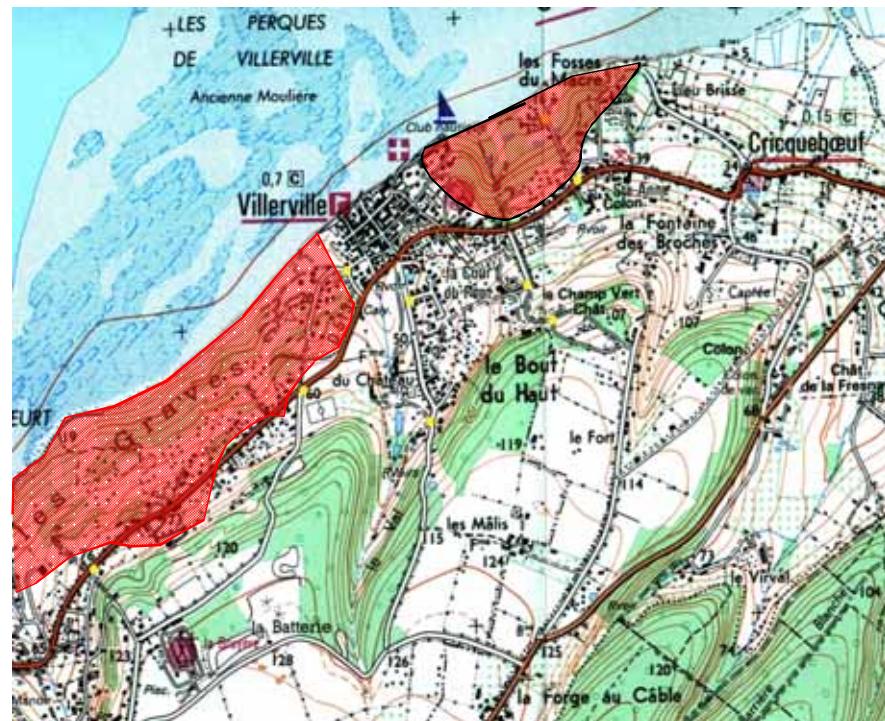
### Hazard map

Information and consensus building →  
Consultation of municipality council  
Public Enquiry

Risk management  
Annex to PLU

## The PPR of Villerville - Cricqueboeuf

**Hazard mapping:** the **Villerville municipality** is limited by two very active areas, with an extension mainly at the East (Fosses du Macre).



**Questions:** Why is the Villerville town still (or always!) stable?

**What is the future of the Villerville town ?** Is the stability permanent or is there a possibility, in the future, that the town could be partially or totally destroyed by the extension of the active landslides.

## The PPR of Villerville - Cricqueboeuf

### Hazard assessment

#### Predisposing factors:

- Lithology (marl, sand, chalk –aquifer layers-),
- Weak mechanical characteristics of marls,
- Tectonic (weak dip ( $< 1^\circ$ ) to the NE),
- Slope (DTM): steep slope to moderate steep slope,
- Geomorphololy: scarps, open & active cracks, ...
- Land cover: forest, bush, pond, ...

➔ Susceptibility of landslide

#### Triggering factors (see previously):

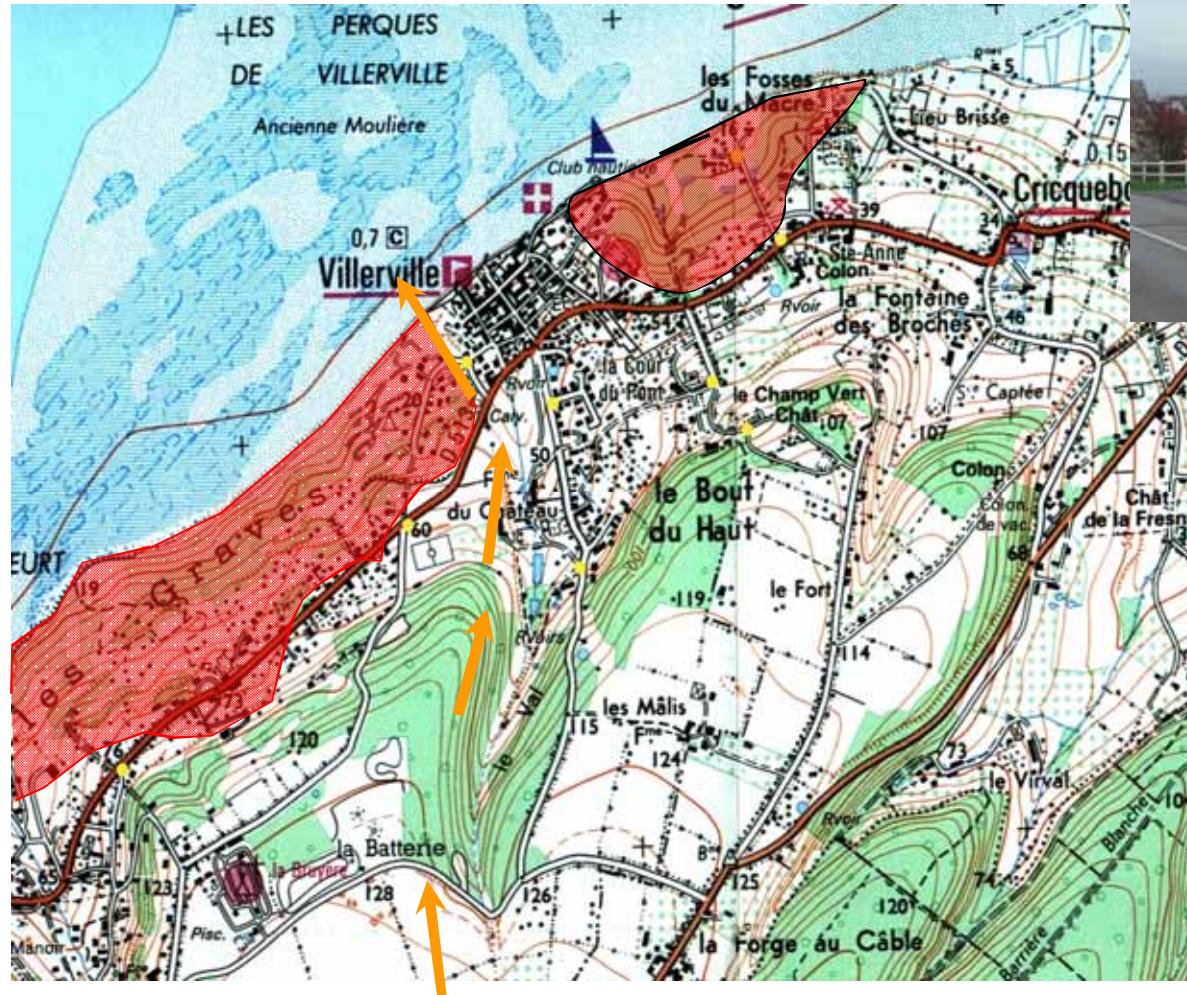
Main influence of:

- GWT variations,
- sea erosion at the base of the hillslope (toe unloading).

➔ Acceleration triggered by GWT above a certain threshold.

## The PPR of Villerville - Cricqueboeuf

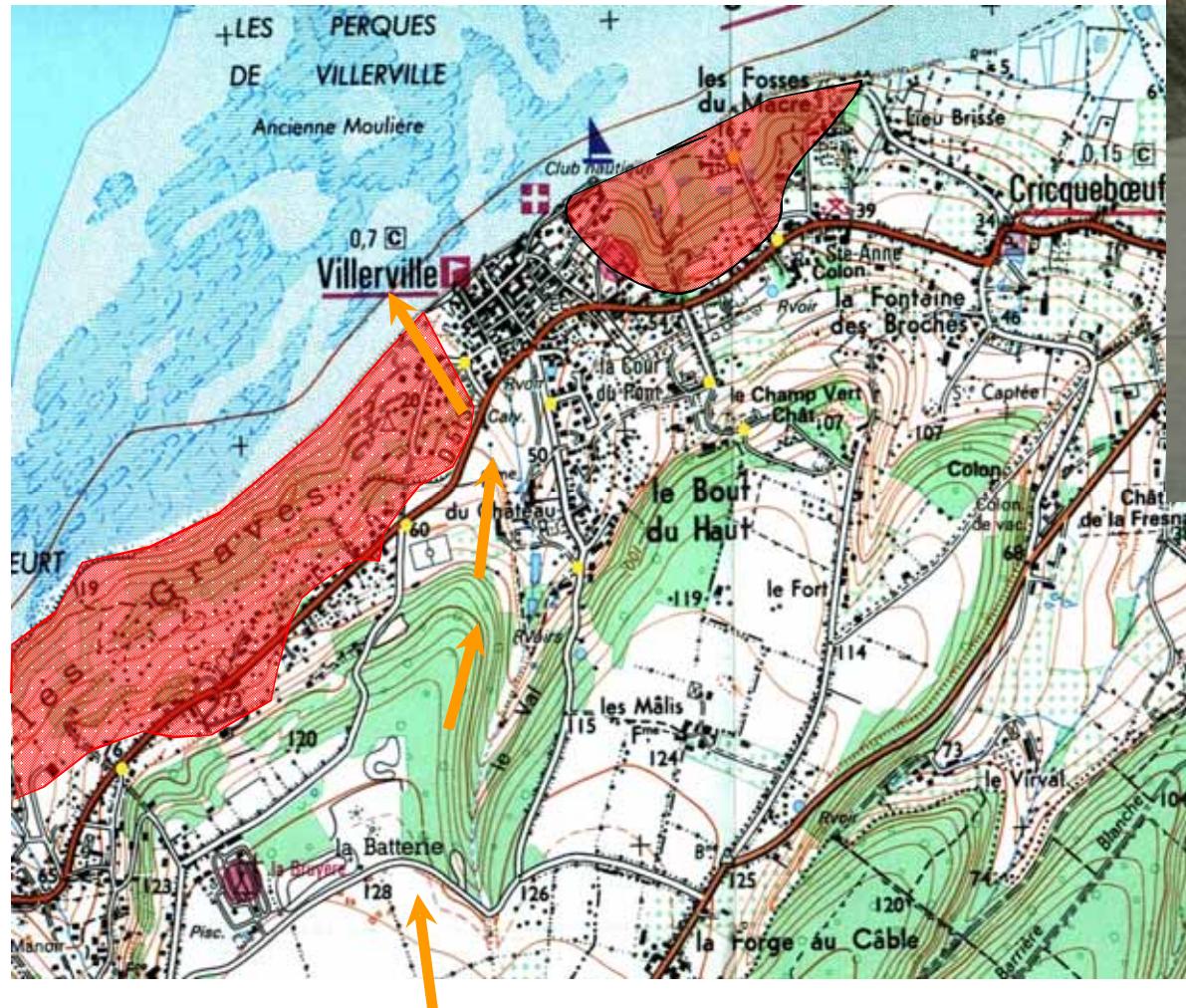
### Hazard assessment: case of Villerville town



1. The town is located in the axis of a small valley at 20m a.s.l.

## The PPR of Villerville - Cricqueboeuf

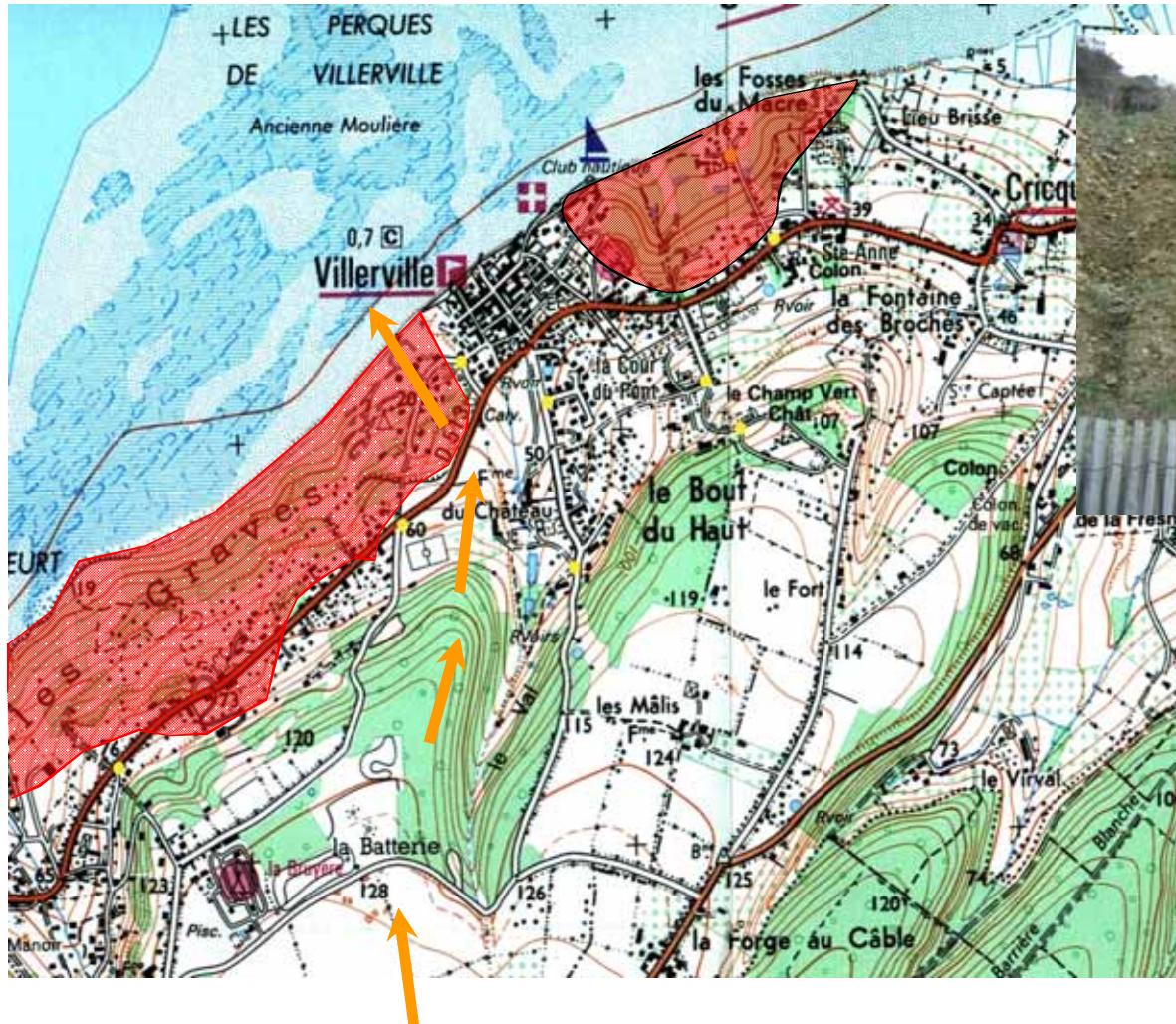
### Hazard assessment: case of Villerville town



1. The town is located in the axis of a small valley at 20m a.s.l.
2. The coastal slope is protected by a seawall

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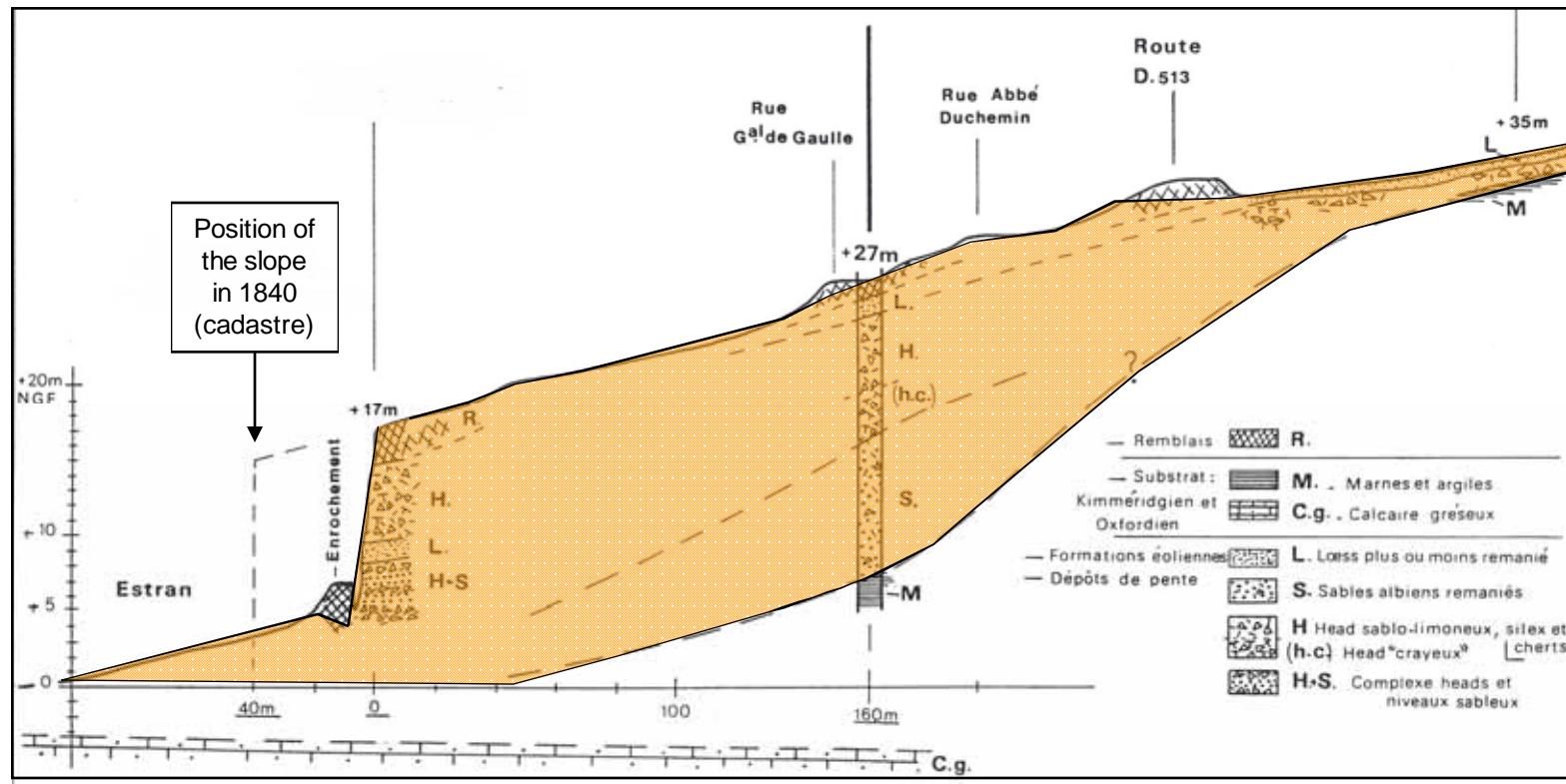
### Hazard assessment: case of Villerville town



1. The town is located in the axis of the small valley at 20m a.s.l.
2. The coastal slope is protected by a seawall
3. The slope material are mainly eolian loam, sand and gravels (head)

## The PPR of Villerville - Cricqueboeuf

### Hazard assessment: case of Villerville town

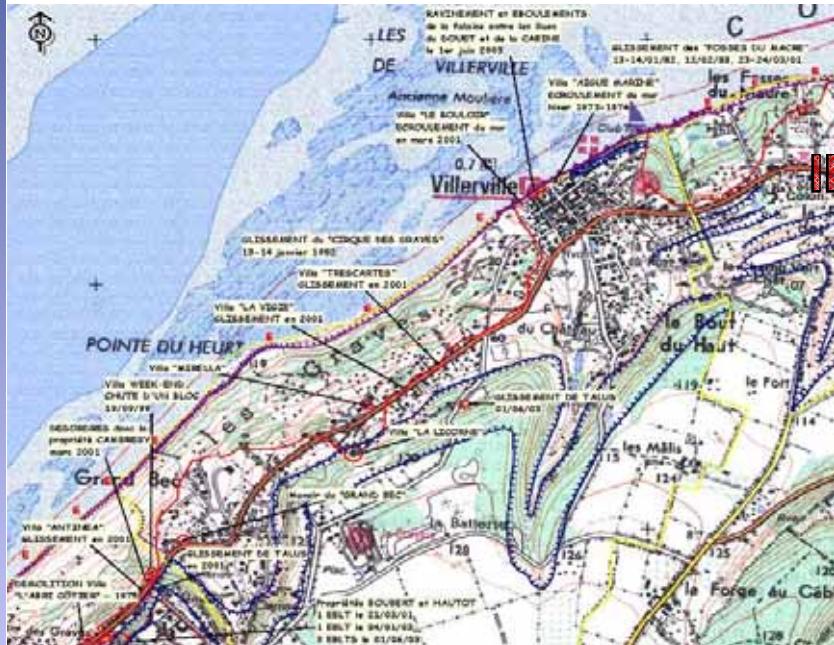


- Paleo-valley fulfilled by colluvial-alluvial materials (flints, eolian loamy sands & gravels). These formations have been placed during the **Upper Pleistocene** period when the see level was low (max -100m).
- Materials are very permeable without watertable, → **Low hazard !!**

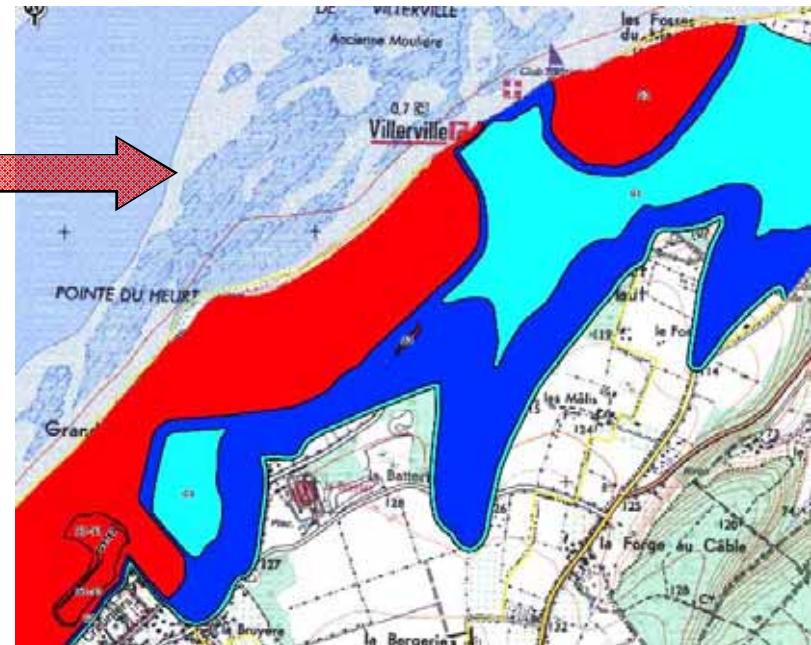
## The PPR of Villerville - Cricqueboeuf

### Hazard assessment and mapping

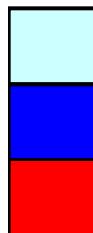
In progress, draft version



Landslide inventory map



Hazard zoning map



G1: Low hazard

G2: Moderate hazard

G3: High hazard

## The PPR of Villerville - Cricqueboeuf

### Hazard assessment and mapping

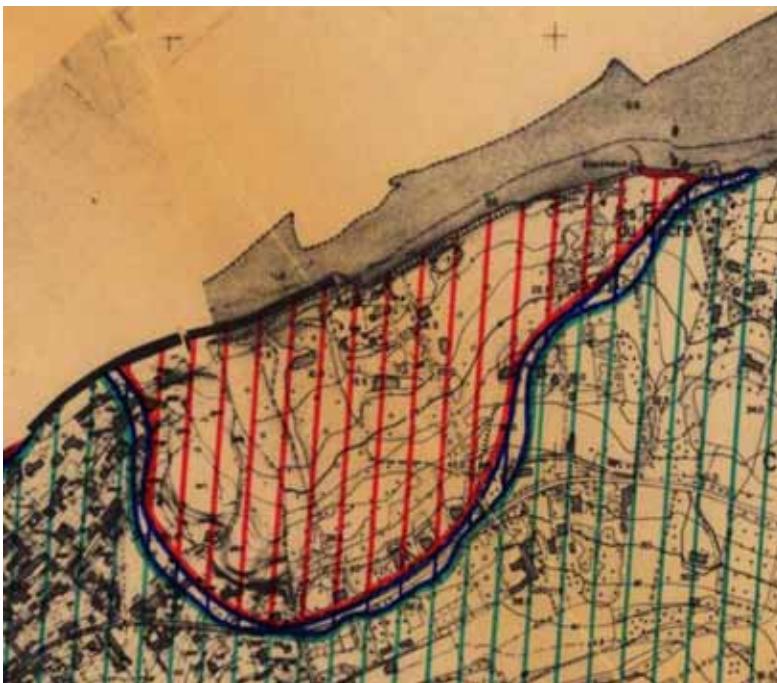
Hazard	Criteria
<b>High G3</b>	<ul style="list-style-type: none"> <li>- Active landslide: open cracks, scarps, counter slopes with ponds, ...</li> <li>- steep slope (<math>&gt; 30^\circ</math>),</li> <li>- geology: blocks of chalk, glauconic sands &amp; marls, IV deposits,</li> <li>- buffer zone of security around active landsilde.</li> </ul>
<b>Moderate G2</b>	<ul style="list-style-type: none"> <li>- No activity. Smooth topography +- hummocky,</li> <li>- same geologic conditions of G3,</li> <li>- steep to gentle slope.</li> </ul>
<b>Low G1</b>	<ul style="list-style-type: none"> <li>- No activity. No indices.</li> <li>- same geologic conditions of G2 or colluvial/alluvial permeable materials,</li> <li>- gentle to low slope.</li> </ul>
<b>Null G0</b>	<ul style="list-style-type: none"> <li>- Flat topography (plateau)</li> </ul>

## The PPR of Villerville - Cricqueboeuf

Comparison of PER (1988) and revised PPR (2007)

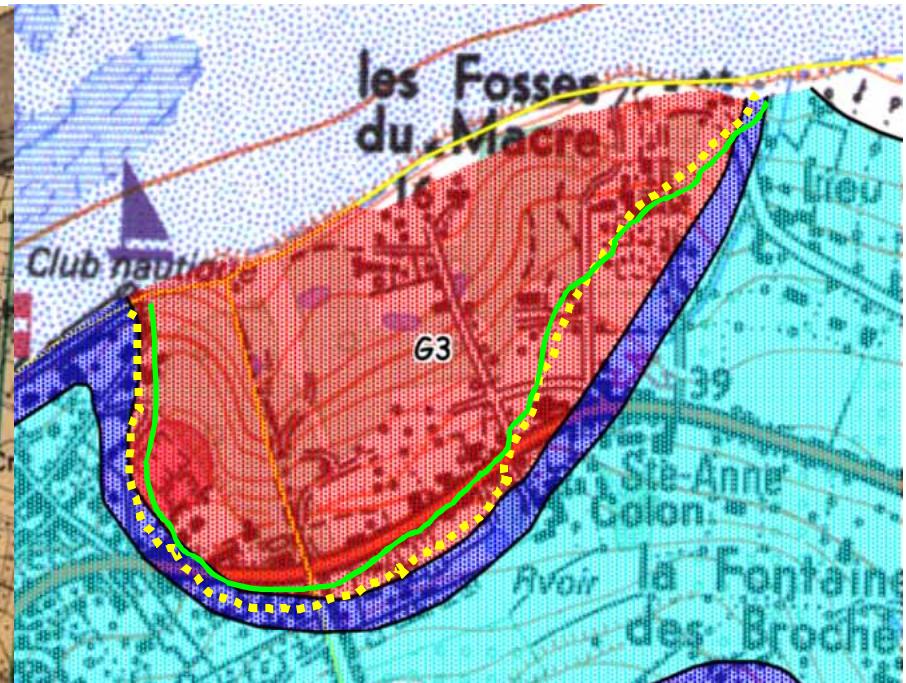
Hazard maps

In progress, draft version



Hazard zoning map PER 1988

- Main scarp in 2007 (limit of active zone)
- .... Limit G3 of the PER hazard map



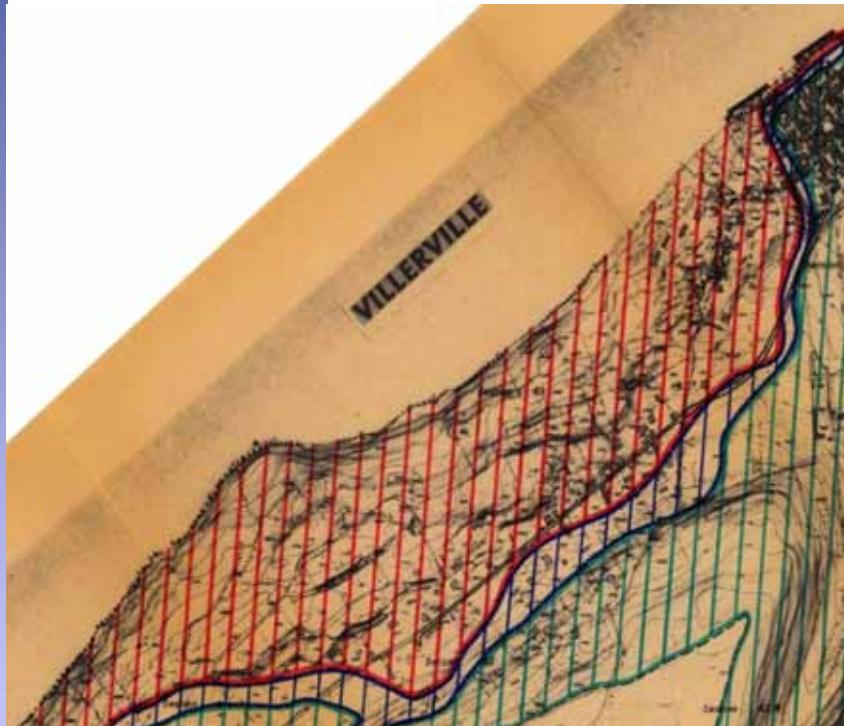
Hazard zoning map PPR 2007

- G1: Low hazard
- G2: Medium hazard
- G3: High hazard

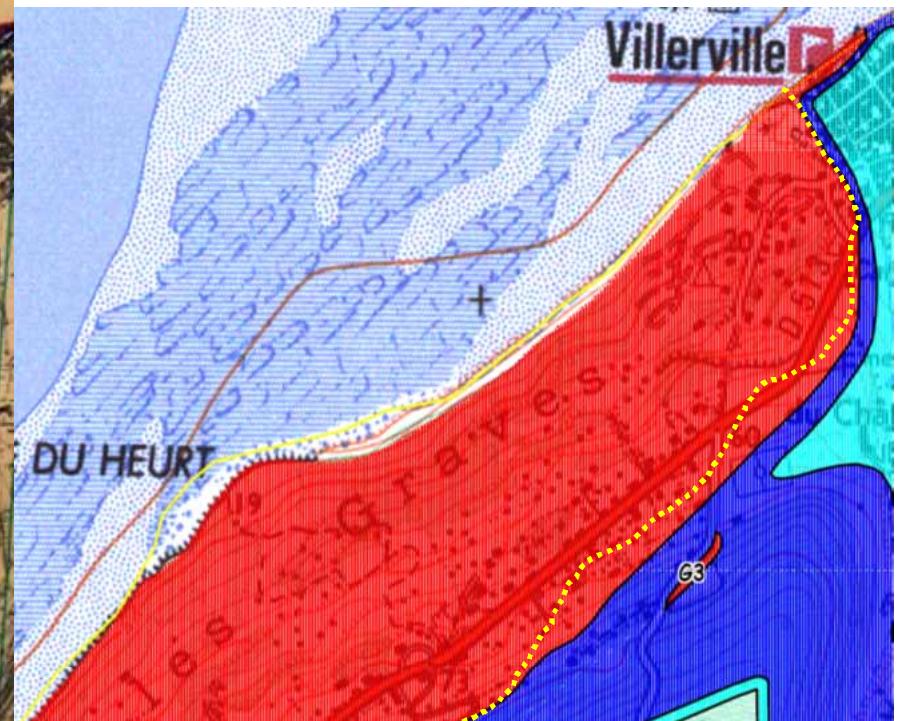
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Hazard zoning map PER 1988



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G1: Low hazard

G2: Medium hazard

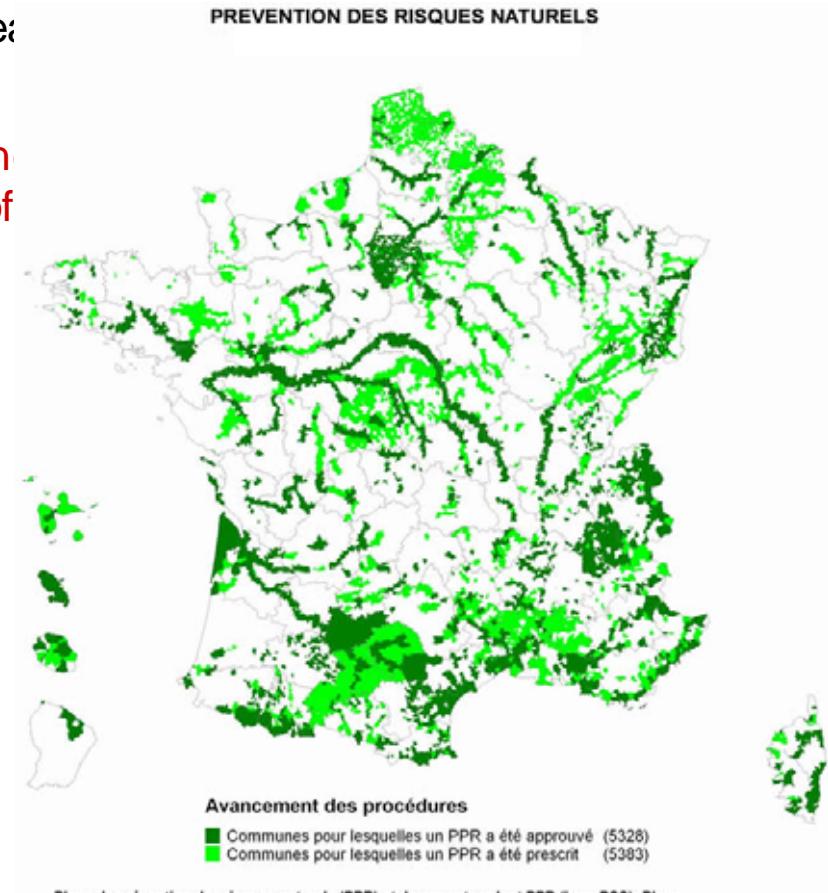
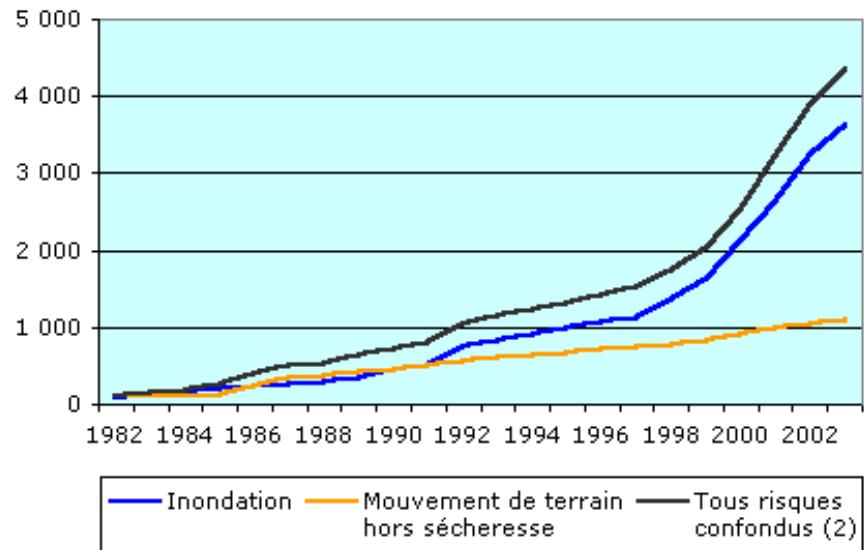
G3: High hazard

## 2.2. Efficiency and difficulties of PPR

In France, over 36000 local communities, more than 18000 are at risk.

In 2010, about 6000 PPR are available (including the previous PER, PSS and “R.111.3 - risks area”) and 2000 other PPR are in progress.

→ the mapping procedure is a slow process and the number of available PPR concerns 1/3 of communes at risk



Despite simplification of the procedure (from PER to PPR), the number of approved PPR is still weak and several problems exist. Also, it is essential to advance in researches to fill the gap between scientists and decision-makers.

So, Mountain-Risks may be able to give some answers to the Society.

## What should we do to improve land-use planning?

The main reason to the difficulty to ‘approve’ a PPR is the little attention paid in local town/municipalities regarding **the restrictive aspects of the cartography**, which can prohibit building or block building projects in high risk zones (red zones).

Cartography remains a **delicate exercise** and **realism** is of paramount importance:

- **over-estimation of the risk zone**: → socio-economical consequences,
- **under-estimation of the risk zone**: → responsibility.

**How to determine and map the hazard?** With a sufficient accuracy, without a long data collection, and a complex process of calculation.

**How to assess the consequences?** With appropriate method nor too simple (inventory of EE & major stakes of PPR procedure is not always appropriate) & nor to complex.

**How to create a quantitative risk assessment?**

## Do we need to identify & describe each EE?

How do we do to transfer from regional scale to local scale ? Or the contrary!

The delay between the prescription and the agreement (by the state) of PPR is generally of **18 to 24 months**.

But in many cases, the delay is **increased**, if the project of PPR is rejected by the municipality council, by the population during the '**Public inquiry**' or others inquiries (project not well understood, not well prepared or not well presented!), or if major modification are necessary.

Sometimes, if **no consensus** is find among the 'parties', the Prefet could engage a '**contradictory study**' by another organism (or expert) to solve the problem.

In other case, some people ('defence association' on the basis of scientific arguments) try to slow down the procedure by an '**juridical request**', or in last case, by a request to a 'State Council'.

In this case, the delay could be very long or the PPR could never be approved.

**How to communicate information?**

**How to educate the practitioners & population?**

**How to involve all stakeholders in the decision-making process?**

## 2.3. Practical hazard criteria used by ONF - RTM

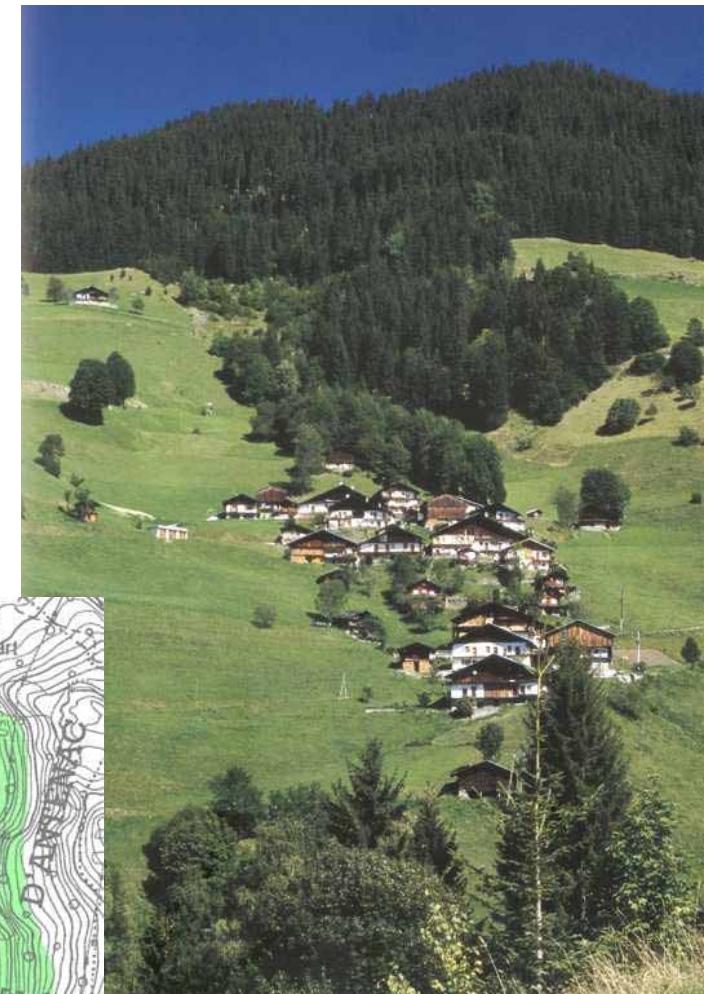
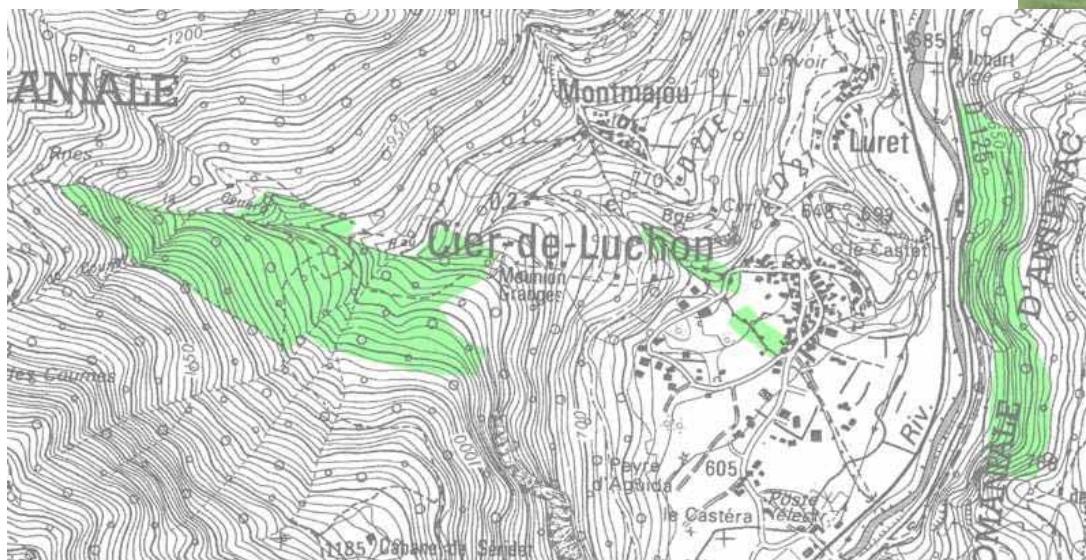


The criteria used by ONF – RTM are to propose a ranking of ‘hazard’ and ‘stake’ levels



## Example:

- \* **Scale: 1/25.000**
  - \* **Tool: ONF-RTM GIS Platform (ArcView)**
  - \* **Data: use of existing databases**



## Basic principles

\* Combine:

- forest map

- ① Forest,
- ② Other vegetation
- ③ Bare soil

- hazard map

- stake map

Criteria for hazard characterization:

→ A map per process

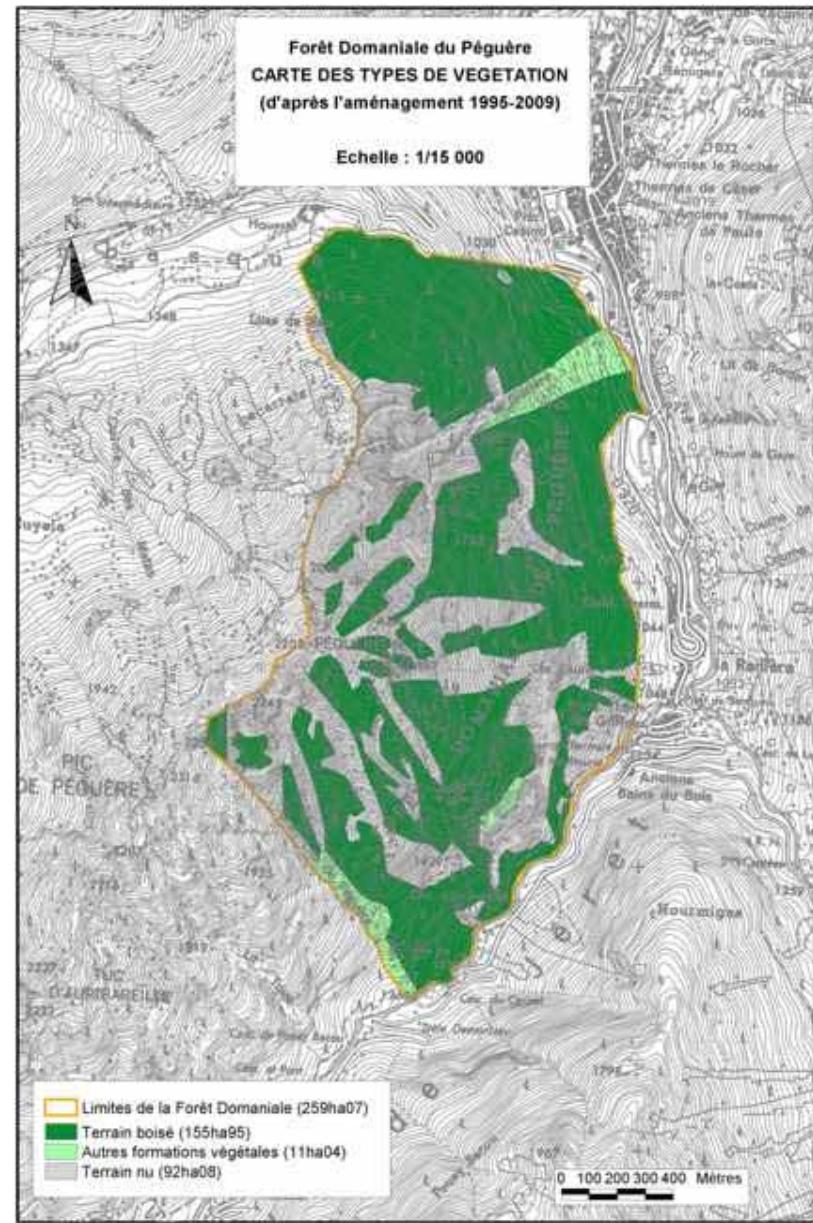
*Snow avalanche / Landslide / Debris Flow / Rockfall / Gullying*

*Flooding and Forest Fires are not taken into account*

→ Simple approach with single criteria

→ A relative index based on intensity not on spatial / temporal frequency

Note d'alea				
Avalanches	Ravinement	Crue torrentielle	Glissement de terrain	Chute de blocs
1	1	2	2	2
3	2	3	3	3



## ⌚ Overlapping of hazards

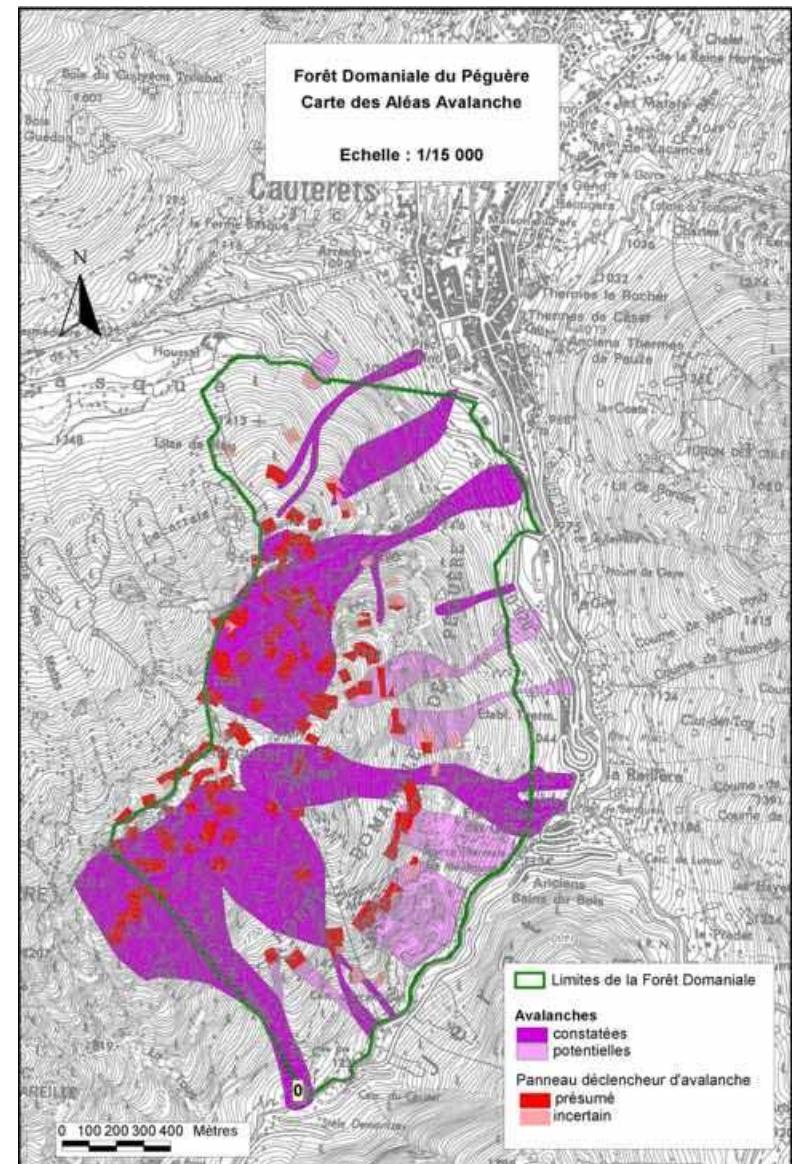
- ◆ Each hazard is analysed independently

## ⌚ Quotation of risk level

		Niveau d'enjeu résultant		
		Faible	Moyen	Fort
Note d'aléa	1	Risque faible	Risque faible	Risque moyen
	2	Risque faible	Risque moyen	Risque fort
	3	Risque moyen	Risque fort	Risque fort

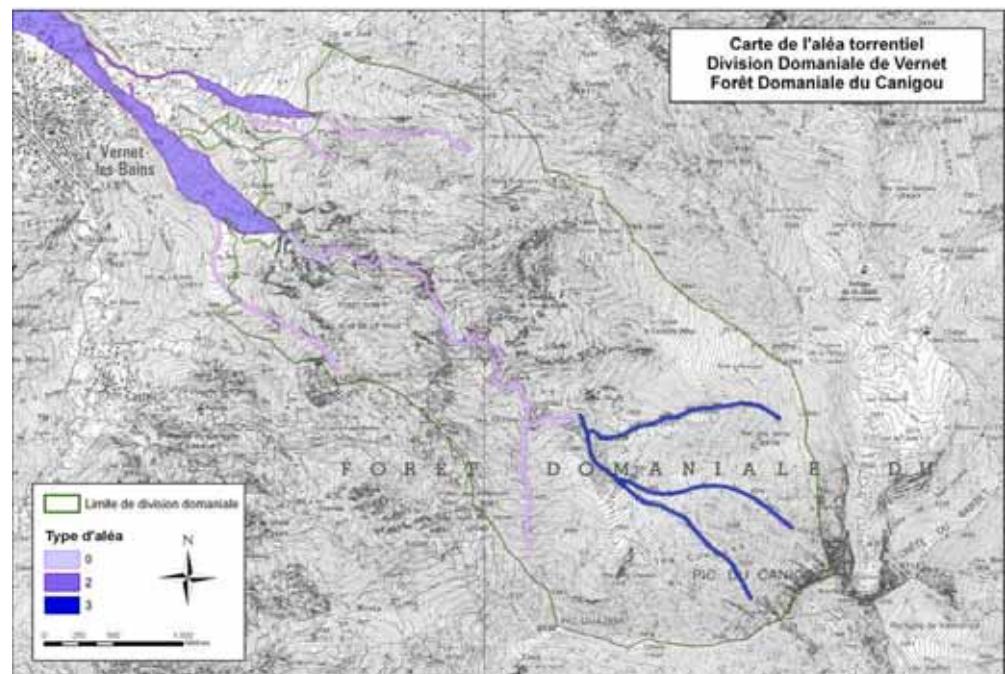
## ⌚ Avalanche

- ◆ no distinction between the source zone and the accumulation zone....
- ◆ avalanche which has occurred: **quotation 3** [the CLPA, Carte Localisation des Couloirs d'Avalanches) is used]
- ◆ potential avalanche: **quotation 1**
- ◆ If no historical data is available:  
The map is prepared by 'expert method' and by photo-interpretation



## ⌚ Torrential flood

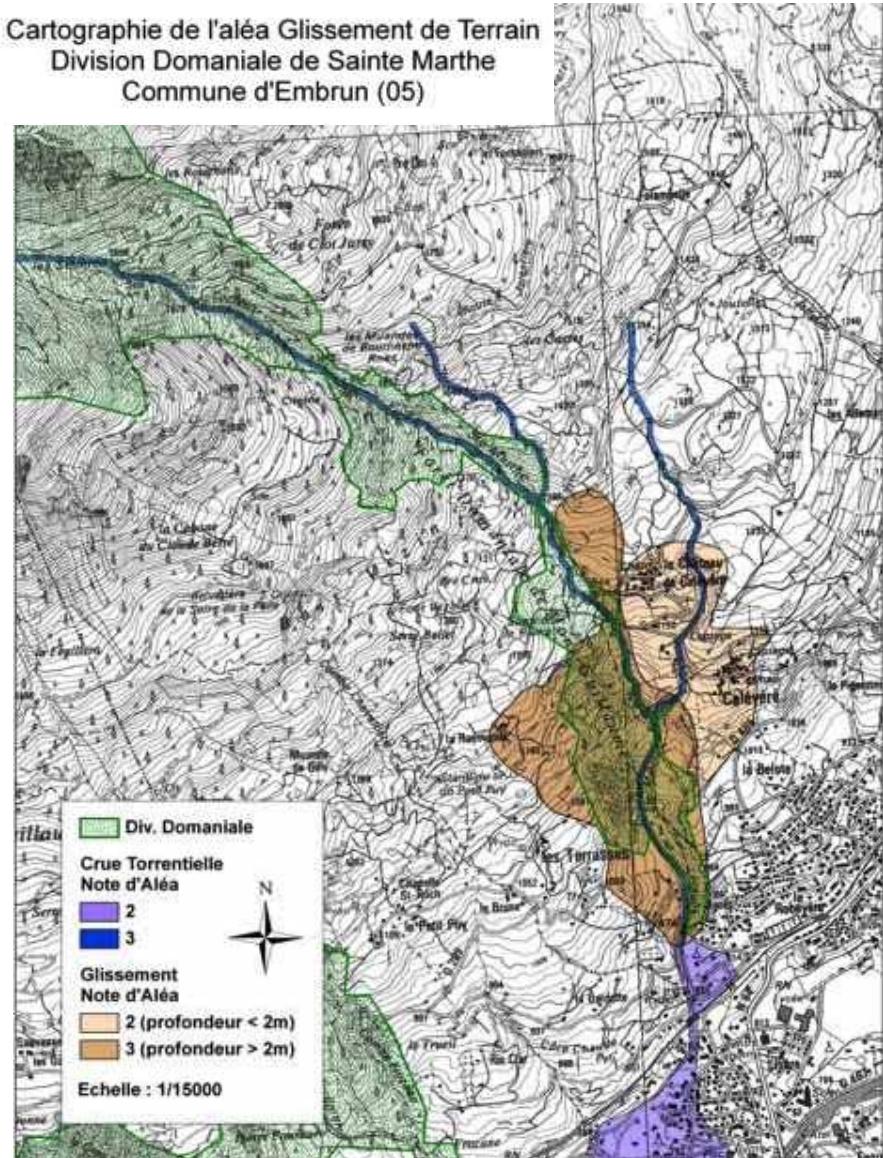
- ◆ The limits are the flooding areas; not the catchment:
  - linear aspect
  - mapping unit: < 1 drained hectare
  - all the alluvial fan is potentially flooded
  
- ◆ Subdivision of the torrent in homogeneous segments according to their role in solid transport
  - steep and non erosive segment: **quotation 0**
  - regulation zone (deposition / scouring) : **quotation 2**
  - steep and erosive segment: **quotation 3**
  - minimal size of segement: 250 m
  
- ◆ assess the possibility of debris flow (yes / no)



## ⇒ Landslide

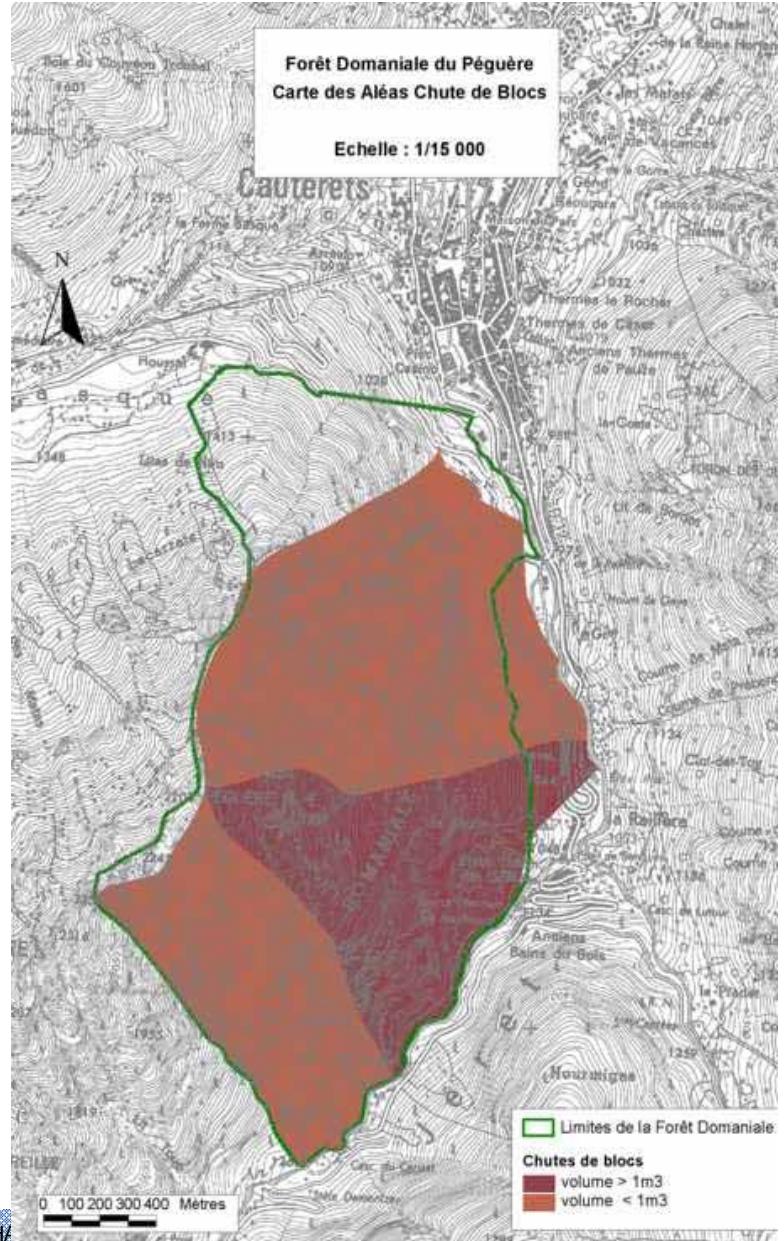
- ◆ the zoning include active and potential, ablation and accumulation zones
- ◆ differentiation according to the estimated depth of landslide:
  - < 2 m : quotation 2
  - > 2 m : quotation 3

Cartographie de l'aléa Glissement de Terrain  
Division Domaniale de Sainte Marthe  
Commune d'Embrun (05)



## ⌚ Falls

- ◆ the zoning takes into account the source and accumulation zones
- ◆ differentiation according to the size of block for a standard event:
  - < 1 m<sup>3</sup> : [quotation 2](#)
  - > 1 m<sup>3</sup> : [quotation 3](#)

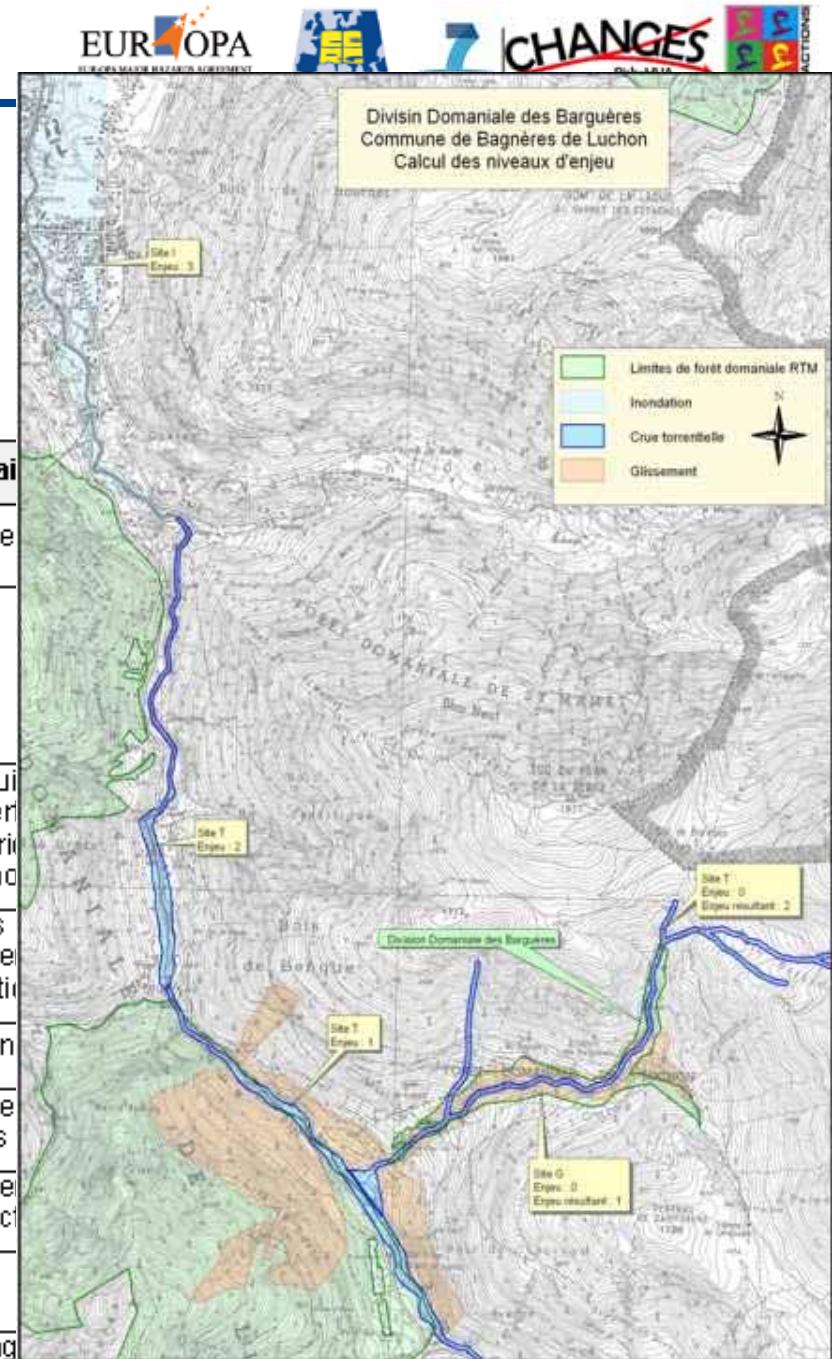


## → Delimitation and quotation of the stakes

### ⌚ Homogeneous units of stakes

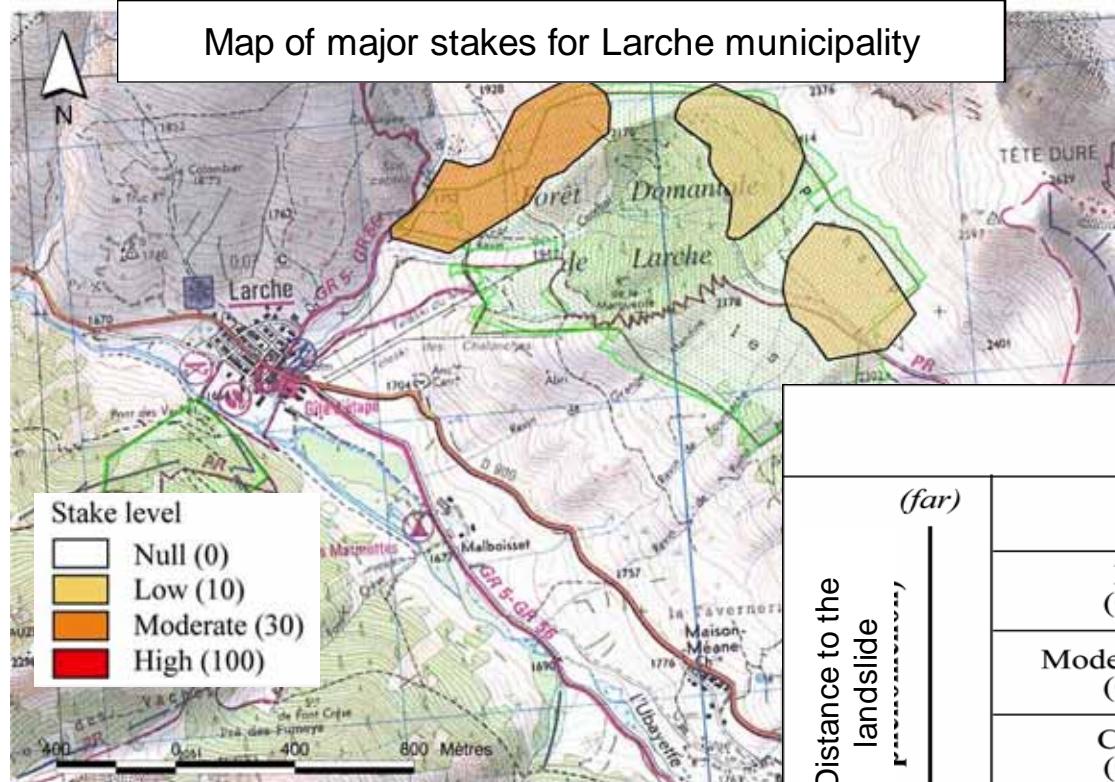
- ◆ the stakes are not located spatially
- ◆ quotation of local stake and of resulting stake

Type d'enjeu	Fort (3)	Moyen (2)	Faible (1)
Habitat	Dense, plus de 10 logements	Dispersé, 2 à 10 logements	Bâtime
Voie de communication (route, rail)	Voies structurantes d'intérêt national	Voies d'intérêt départemental, ou accès unique d'un pôle important d'activités	Voies local
Réseaux		Ligne HT	Conduits desservant (électricité, téléphone)
Tourisme	Camping, Centre d'accueil, Colonie de vacances		Pistes Equipe touristique
Industries et commerces	Centre industriel	Commerces	Artisan
Agriculture			Bâtime Terres
Forêt			Peuplement productif
Patrimonial		Bâtiment historique	
Autres enjeux publics	Ecole, hôpital, centre de secours	Autres bâtiments publics	Capteurs, station d'épuration, protection



## → Risk zoning – Identification of the major stakes

→ Identification of major stakes (4 classes: null, low, moderate, high)



		Stake	el of st:	
		(-) -	(+)	
Distance to the landslide	(far)	Null (0)	Low (10)	Moderate (30)
	Moderately far (0.5)	0	2	6
	Close (0.9)	0	5	15
	Very close (1)	0	9	27
		0	10	30

Final stake

Null	Moderate
Low	High

→ Matrix approach (RTM):  
Matrix associating the type of stakes  
and the distance to the landslides

## Conclusion: Access to Risk Information



bouquet prévention risques majeurs

Prim.net favorise la mise à disposition, le partage et l'actualisation d'informations relatives aux risques naturels et technologiques pour renforcer notre résilience individuelle et collective.

- 1 [risquesmajeurs.fr](http://risquesmajeurs.fr)
- 2 [ma commune face aux risques](http://ma-commune-face-aux-risques)
- 3 [catalogue numérique](#)
- 4 [jurisprudence et textes fondateurs](#)
- 5 [photothèque](#)
- 6 [aleas.tv](http://aleas.tv)
- 7 [bd dicrim.fr](http://bd dicrim.fr)
- 8 [cartorisque](#)
- 9 [mémoire](#)
- 10 [pprim.fr](http://pprim.fr)

## Conclusion: Access to Risk Information



**ÉCOLOGIE, DU DÉVELOPPEMENT DURABLE ET DE L'ÉNERGIE**

**CARTORISQUE**

**Qu'est ce que Cartorisque ?**

Cartorisque est la publication sur l'internet de l'ensemble des cartes des risques naturels et technologiques majeurs. Les informations publiées proviennent des services déconcentrés de l'Etat, sous l'autorité des préfets concernés. Celles destinées à la **prise de conscience des populations** sont accessibles dans l'onglet « Information préventive ». D'autres sont destinées à faciliter la mise en oeuvre de l'**obligation d'information de l'acheteur ou du locataire** de tout bien immobilier situé en zone de sismicité ou dans un plan de prévention des risques prescrit ou approuvé : c'est l'onglet « information acquéreur locataire ». Enfin, d'autres sont des représentations de servitudes d'utilité publique, les **plans de prévention des risques**, qui imposent des interdictions et des prescriptions dans certaines zones du territoire.

**Pour en savoir plus.**

Présentation de l'action Cartorisque.

En attendant que toutes les cartes des risques soient disponibles ici, Prim.net recense les **principaux moyens complémentaires de diffusion**.

Pour ceux qui veulent en savoir plus sur la cartographie des risques, les actes des séminaires "cartographie et prévention des risques majeurs" restent d'actualité.

**Pour plus d'informations sur les risques :**  
**prim.net | Portail de la prévention des risques majeurs**

Site d'information et de connaissance du Ministère de l'Écologie, du Développement Durable et de l'Énergie sur tous les aspects de la gestion du risque majeur.

- **Carte de France** des inondations (partielles), des zones de sismicité, des phénomènes avalancheux et des arrêtés de catastrophe naturelle
- **Téléchargement** des données publiées sur Cartorisque
- **Accéder** aux données Cartorisque grâce aux spécifications WMS et WFS

## Conclusion: Access to Risk Information



Aa<sup>+</sup> Aa<sup>-</sup>

### RUBRIQUES

Rechercher une commune à risques

Consultation de la base de données Gaspar

### Rechercher une commune à risques

Entrez le nom de la commune recherchée

ou

ou

Envoyer

### Prévention des risques

#### Documentation générale

#### Informations acquéreur locataire

- ▶ Communes de Aigur à Castelnau
- ▶ Communes de Castelnaud à Dignes-les-Bains
- ▶ Communes d'Enchevrettes à la Javie
- ▶ Communes du Chaffaut-Saint-Jurson à Oraison
- ▶ Communes de Pépin à Saint-Martin-de-Brennes
- ▶ Communes de Saint-Pons à Vida

#### Financement travaux

#### Plans de prévention des risques naturels

- ▶ Feu de forêt
- ▶ Glissements de terrains
- ▶ Inondations
- ▶ RGA

#### Plans de prévention des risques technologiques

#### Prévention des incendies