EFC WP MMW - Working Group II Workshop on Woody debris

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French contribution

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ONF RTM

- Creation of the RTM office for *Restoration law on mountainous lands* implementation (1882)
- Integration of RTM office within the French forestry service *ONF* (1972)

**Mission: natural hazards prevention in mountainous areas**

- Observation of the phenomena
- Studies and expertises
- Structures of protection (contracting authority support, project management, maintenance) and torrent management in state owned forests
- Involvement in management of crisis
Reasons and causes for woody debris

Level of awareness in France

Possibilities and legal aspect related to the reduction of woody debris

Technical structures to stop woody debris
Reasons and causes for woody debris

- More wood in watersheds - more wood in torrents and rivers
  - Agriculture modernization
  - Rural abandonment
  - Less firewood uses
  - Reforestation (RTM policy)

Development of forest due to socio economic mutations
Reasons and causes for woody debris

- Mountainous watersheds
  - Action of avalanches
Reasons and causes for woody debris

- Mountainous watersheds
  - Storage in gullies and channels > influence of duration between two floods

Difficulties of access
Reasons and causes for woody debris

- Mountainous watersheds
  - Storage in gullies

Storage behind sediments
Reasons and causes for woody debris

- Mountainous watersheds
  - Action of landslides / debris flow = sudden input
Reasons and causes for woody debris

- River beds - Riparian areas

Ex: the Bleone river

- Colonization of austrian pine and scots pine in the flood plain forest
- Competition between riparian species and pines
Reasons and causes for woody debris

- River beds - Riparian areas
  - Hydropower impact on river beds

Ex: Isere river

Debit regulation

less sand band mobility

Alluvial forest grow up
Reasons and causes for woody debris

- No bridges… less problems

Development of infrastructures → More traps → Increase of flood hazards
Reasons and causes for woody debris

Level of awareness in France

Possibilities and legal aspect related to the reduction of woody debris

Technical structures to stop woody debris
Level of awareness in France

- **What the law says (environmental and rural code)**
  - River management is the river bank owners responsibility
  - Recommendations: cleaning of vegetation and moving of woody debris
  - The authorities have no obligation if they are not the riverside owners

- **What’s the reality**
  No management by private riverside owners
  - Multiplicity of owners
  - Technical difficulties and cost to intervene

  Public forests
  - Not systematically taken into account in forest management plans
Level of awareness in France

• New regulations – after 2018

  • the municipalities will have to manage the river environment and the flood hazards
  • Aim to create intercommunal structures at the river catchment scale, for the river management
  • Possibilities to levy a tax (40 € per person) for river management
  • Doubts about law application and responsibilities between local authorities and private river bank owners
Level of awareness in France

- Environment vs flood hazards
  - Ecological aspects (diversification of physical environment, organic material traps…)
  - Landscape
  - Recreation aspects

Natural protected areas (EBC)
Restriction of intervention
Level of awareness in France

- Contribution of woody debris to morphological balance?

Remote areas away from human stakes

- Can reduce sediment transfer during floods?
- Can reduce hydraulic energy?
Level of awareness in France

• Research and development

• Lack of tools to model hydraulic wood debris impact

• ARTELIA and CNR private group are able to create reduced models

• Recent IRSTEA research aims to quantify wood production and to design structures (RTM collaboration)


Reasons and causes for woody debris

Level of awareness in France

Possibilities and legal aspect related to the reduction of woody debris

Technical structures to stop woody debris
Possibilities and legal aspects

- **Local authorities substitution**

  Possibilities of intervention by authorities using a regulatory process (general interest declaration)

- **vegetation management plan**
  (ex : Cordon/Combloux/Domancy)

  - Floods in 2004: authorities become aware of the lack of wood management

Remove debris if possibility of access

Wood cutting into logs of 1m/0,5m/0,3m

No intervention

| 40 km of torrent | 200 k€ / 5 years | 1000€/km/year |
Possibilities and legal aspects

- State benefit promote watershed management and local authorities grouping?

- « River Contracts »
  - Technical and financial tool since 1981
  - 5 year programs including plan of vegetation management

- Ex: Giffre River Contract

| 370 km of streams | 200 k€ / year | 9000€/km/year |
Reasons and causes for woody debris

Level of awareness in France

Possibilities and legal aspect related to the reduction of woody debris

Technical structures to stop woody debris
Technical structures

• Improving existing structures
  • Flow acceleration upstream bridges
  • Progressive « entrance » of bridges
  • No bridge pier
Technical structures

- In the French Alps, most structures have an initial objective to stop all materials (1970-2000): sediments, woody debris
- Nowadays: design structure more selective, allowing material transport in small events
Technical structures

Les Fraches (38)  Pontamafrey (73)  Torrent des Nantets (73)

Risoul (05)  Nant Bordon (74)  Versoyen (73)
Exemple of Arvan river

- **The watershed**
  - Area: 220 km²
  - Deep canyon
  - A lot of lateral streams
Exemple of Arvan river

- **Flood hazard**
  - Confluence Arc / Arvan create sediment deposit, the rise up of the river bed and the flood of the city
  - Debris flow generate the bridge obstruction
Exemple of Arvan river

- **Use of reduced model to design the constructions**

  **Without WD flow trap**
  - Bridge traps the debris flow involving the deposit of sediment upstream and river wandering

  **With WD flow trap**
  - No debris in the bridge and the river stays in its bed
  - The model shows the erosion in the bed downstream debris flow trap and the necessity of check dams
Exemple of Arvan river

- **Construction of woody debris and sediment trap:**
  - Floor of concrete riprap 3T – 5T, thickness from 2.5 m to 4 m,
  - 10 drilled-cased piles Ø1.5 m in steeled concrete with steeled protection.

- **Some figures:**
  - Earthwork: 22 000 m³
  - Riprap: 8 000 m³
  - Concrete: 2 000 m³
  - Steel: 106 T
Exemple of Arvan river
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Thanks for your attention

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