



### General information

<b>Description</b>	Wind damage risk maps for forests in France incorporated in the QGIS software
<b>Geographical area</b>	Nouvelle-Aquitaine but can also be completed for whole of France
<b>Group of tree species</b>	<i>Pinus sylvestris</i> (données espagnoles) <i>Pinus laricio</i> (données espagnoles) <i>Pinus contorta</i> (données du Royaume-Uni) <i>Larix decidua</i> (données du Royaume-Uni) <i>Larix kaempferi</i> (données espagnoles) <i>Larix maschlinsii</i> (données du Royaume-Uni) <i>Pseudotsuga menziesii</i> (données espagnoles) <i>Picea abies</i> (données espagnoles) <i>Picea sitchensis</i> (données du Royaume-Uni) <i>Abies procera</i> (données du Royaume-Uni) <i>Abies grandis</i> (données du Royaume-Uni) <i>Tsuga heterophylla</i> (données du Royaume-Uni) <i>Betula spp.</i> (données finlandais) <i>Fagus spp.</i> (données françaises) <i>Quercus spp.</i> (données françaises) <i>Pinus pinaster</i> (données françaises) <i>Pinus radiata</i> (données espagnoles) <i>Eucalyptus globulus</i> (données espagnoles) <i>Eucalyptus nitens</i> (données espagnoles) <i>Chamaecyparis lawsoniana</i> (données espagnoles)
<b>Date</b>	May 2017
<b>Authors (affiliation)</b>	Barry Gardiner (EFI), Tommaso Locatelli (Forest Research), Celine Meredieu (INRA)
<b>Contact e-mail</b>	<a href="mailto:barry.gardiner@efi.int">barry.gardiner@efi.int</a>
<b>Tool type</b>	Model
<b>Tool format</b>	Cartography layers (SIG)
<b>Language</b>	English
<b>Risk management plans to which the tools can be added</b>	Plan national de gestion de crise tempête pour la filière forêt-bois
<b>Risk management plans link</b>	<a href="https://plurifor.efi.int/wp-content/uploads/WP2/plans/Storm-plan_FR.pdf">https://plurifor.efi.int/wp-content/uploads/WP2/plans/Storm-plan_FR.pdf</a>
<b>This tool is...</b>	<input checked="" type="checkbox"/> an improved tool
<b>Original tool of which this one is an improvement</b>	Hale, S., Nicoll, B., Gardiner, B., (2015) ForestGALES - A wind risk decision support tool for forest management in Britain: User Manual, Version 2.5. Forestry Commission, Edinburgh, UK <a href="https://www.forestry.gov.uk/forestgales">https://www.forestry.gov.uk/forestgales</a>

### Topic

<b>Risk</b>	Storm		
<b>Risk component</b>	<input type="checkbox"/> hazard	<input type="checkbox"/> impact	<input checked="" type="checkbox"/> vulnerability
<b>Risk area</b>	Risk assessment		
<b>Risk phase</b>	Prevention		



<b>Risk phase (alternative terms)</b>	Preparedness
<b>Level</b>	Regional
<b>Sendai priorities</b>	<input checked="" type="checkbox"/> Priority 1: Understanding disaster risk <input type="checkbox"/> Priority 2: Strengthening disaster risk governance to manage disaster risk <input type="checkbox"/> Priority 3: Investing in disaster risk reduction for resilience <input type="checkbox"/> Priority 4: Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction
<b>Contribution to Sendai targets</b>	<input type="checkbox"/> Reduce global disaster mortality <input type="checkbox"/> Reduce the number of affected people <input checked="" type="checkbox"/> Reduce the direct disaster economic loss <input type="checkbox"/> Reduce disaster damage to critical infrastructure <input type="checkbox"/> Increase the number of national and local disaster risk reduction strategies <input type="checkbox"/> Enhance international cooperation to developing countries <input checked="" type="checkbox"/> Increase availability of and access to multi-hazard early warning systems and disaster risk information and assessment

### Description and analysis

#### Summary

This tool is a set of maps of the risk of wind damage to key forest species incorporated in GIS across France. It incorporates data layers of soil, wind climate, and stand characteristics, together with predictions from the ForêtTempête model to calculate current and future levels of risk. The system works for all species in the ForêtTempête model (see list above).

#### Place in national/regional policy

At present it is not integrated in regional policy. The purpose was to develop an easy to understand and use mapping system and one that could be easily incorporated within existing forest data exchange systems in Nouvelle-Aquitaine (GIP ATeGERI [Aménagement Du Territoire et Gestion des Risques] and PIGMA [Plateforme d'échange de données en Nouvelle-Aquitaine]).

#### Goals and achievements

This is an extension of ForêtTempête that adds soil, wind climate and forest stand data within a GIS. It works for all species included in the stand-alone version of ForêtTempête.

#### Stakeholders involved

A seminar was given to forest representatives from the regional body responsible for forestry (DRAAF), representatives of forestry owners and managers (CRPF), and representatives responsible for forest health (CAISSE PHYTO FORÊT) to introduce the tool.

#### Implementation stage

Tool is being revised based on feedback from the seminar and further experience. It will then be made available to any interested parties. The plan is to incorporate maps from the tool in the required format to install in PIGMA.

#### State of technical knowledge

The tool represents our best current understanding of calculating wind risk to forests and is state-of-the-art for forest risk calculation in France.

#### Regulatory and/or socio-economic contexts

At present little regulatory context but potentially important socio-economic benefits by helping forest planners to identify areas of the forest most at risk of wind damage and to evaluate the overall level of risk of forests in the region.



### Impacts of the tool

To date very little impact because the tool has not been widely adopted. Efforts will be made to increase the impact by discussing how the maps can be incorporated in PIGMA with GIP ATeGERI.

### Implementation requirements and durability

#### Description of the implementation steps

1. Underlying model development (ForêtTempête)
2. Critical wind speed predictions based on forest information from NFI.
3. Incorporation of model predictions with wind climate and soil maps in QGIS to calculate risk
4. Workshop with key stakeholders
5. Revision of maps to incorporate more detailed tree height information for whole Les Landes Departement (in progress)
6. Maps incorporated in PIGMA (not yet completed)
7. Maps shared online (not yet completed)

#### Governance

- EFI PFF will be responsible for continued development, improvement and availability
- EFI PFF will be responsible for incorporation of maps in PIGMA

#### Regulatory framework

The tool is advisory only to assist regional planners and all parties involved in risk management in Nouvelle-Aquitaine. There is no regulatory framework at present.

#### Human resources requirements

Good collaboration between EFI and the main stakeholder groups will allow long-term implementation beyond the end of the project. For successful implementation it will require collaborative work between EFI PFF and GIP ATeGERI. This work should be carried out in the summer of 2018. In addition some form of short description of the maps and how they have been created in French is required.

#### Financial requirements

Low level of financial requirement for installation because the maps have been created and additional maps will be created by EFI PFF. However, for a fully effective implementation it will be necessary to incorporate the maps in PIGMA.

#### Technical requirements

Maps can be viewed in the free-software QGIS (<https://qgis.org/en/site/>)

#### Priorities identified for successful implementation of the tool (political, technical, human, financial...)

The priorities are making the maps available within the PIGMA data sharing platform available in Nouvelle-Aquitaine. In addition further workshops dedicated to using and interpreting the maps need to be organised for different potential end-users in Aquitaine (DRAAF, ONF, CRPF, CAISSE PHYTO FORÊT, Insurance Companies, et.)

#### Challenges or risk factors (legal, financial, safety...) expected during the implementation and solutions proposed

The main challenge is to incorporate the maps in the decision making process. For a rare (but important) hazard like storms it is difficult to ensure that such rare events are taken into account. The role of government and regional bodies (e.g. DRAAF) and forestry associations (e.g. CRPF) in promoting the use of the maps is very important.

#### Additional and non-formal experiences to help the implementation of good practice

This maps can be used as stand alone, within GIS or as part of PIGMA. Little experience is required in assessing the maps. The main challenge is to ensure end-users understand the origins of the maps and their limitations.



### SWOT analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Scientifically based and tested tool for evaluating storm risk</li> <li>Easy to integrate into map based management systems or any GIS</li> </ul>	<ul style="list-style-type: none"> <li>Depends on NFI data currently, which has low spatial resolution (5x5 km)</li> <li>Currently only incorporates <i>Pinus pinaster</i> growth tables for looking into the future. Other species growth tables need to be incorporated.</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>Possible to reduce the financial impact of storms on forestry in Nouvelle-Aquitaine.</li> <li>Allows foresters to evaluate the impact of different species choice and management options</li> <li>Allow assessment of the overall level of risk from wind damage in the Nouvell-Aquitaine region</li> </ul>	<ul style="list-style-type: none"> <li>Maps are not yet integrated in the current management systems used in the region</li> <li>Difficulties in persuading people to use the tool because of inherent reluctance to add additional work to busy jobs.</li> </ul>

### Lessons learnt

#### Evaluation process, if exists (internal or external)

Verbal feedback from participants at the first seminar demonstrating the maps. Ongoing evaluation by developer to improve maps with more precise example data on the size of trees in the forest in Les Landes Departement. The plan is that by illustrating the value of higher precision input data the value of obtaining such data will be illustrated.

#### Assessment of results (quantitative and qualitative) and comparison with main goals

Tool meets the original goals but needs updating with new input data

#### Negative aspects identified

Short Help Manual in French is required.

#### Unexpected consequences (short- / mid- / long-term) and corrective measures implemented

None so far

### Access to complete tool

Files	Risk_Damage_France_NFI.tif
Web links	<a href="https://www.dropbox.com/s/inxsuxl43ggktva/Risk_Damage_France_NFI.tif?dl=0">https://www.dropbox.com/s/inxsuxl43ggktva/Risk_Damage_France_NFI.tif?dl=0</a>