Determination of forest fire causes and harmonisation of methods for reporting them

Contract number: 384 340

Deliverable 2.2. Analysis of fire causes classification scheme adopted in Europe and elsewhere (Final Report)

Due date of report: Month 13   Actual submission date: 03/03/10

Start date of project: 4th December 2008   Duration: 24 months

Organisation name of lead contractor for this deliverable: ONF (P2)

Members of the Consortium: *Cemagref* (P1), ONF (P2), Fraunhofer-IAIS (P3), IBIMET CNR (P4), FRI/IBL (P5), NICIF (P6), SFI/GIS (P7), GMV (P8)

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BACKGROUND

The European Community, represented by the Commission of the European Communities, represented by the Director of the Institute for Environment and Sustainability (IES) of the Joint Research Centre (JRC), and Cemagref, a French public institution, in consortium with:
-         Office National des Forêts (ONF),
-         Fraunhofer Gesellschaft zur Förderung der angewandten Forschung-IAIS,
-         Consiglio Nazionale delle Ricerche, Istituto di biometeorologia (IBIMET CNR),
-         Forest Research Institute – Instytut Badawezy Lesnictwa (FRI/IBL),
-         Núcleo de Investigaçao Científica de Incêndios Florestais (NICIF),
-         Slovenian Forestry Institute - Gozdarski inštitut Slovenije (SFI/GIS),
-         GMV Aerospace and Defence SA,

following the call for tender N°IES/H/2008/01/153999/OC of 05/06/2008 and the contractor's tender, have entered a contract, the subject of which is a service on " Determination of forest fire causes and harmonization of methods for reporting them". The contract was signed on 04/12/2008.

Considering the heterogeneity of national classification schemes and the relatively limited scope of the EU classification scheme (limited to four categories), a pan-European approach on the analysis of forest fire causes was needed. In this context the Institute for Environment and Sustainability funded the project for the determination of forest fire causes and harmonization of methods for reporting them, with the aim of providing an analysis of the spatial and temporal distributions of causes and the identification of the main driving factors affecting fire occurrence in the different European regions. The project includes: (i) the review of studies on fire causes in the scientific literature in the field of forest fire causes, (ii) the analysis of fire causes classification schemes currently adopted in Europe and elsewhere, (iii) the proposal for a harmonized classification scheme for EU, (iv) the conversion of the data stored in EU fire database into the new scheme, (v) the analysis of geospatial and temporal distributions of the forest fire causes in Europe, and the identification of the main driving factors of fire occurrence and (vi) the delivery of resulting datasets and related metadata ready to be implemented in EFFIS.

The present deliverable (D2.2: analysis of fire causes classification scheme adopted in Europe and elsewhere – final report) due at month 12, concern the second part of the project (ii) mentioned above.

EXECUTIVE SUMMARY

For this project, an analysis has been made on classification schemes from 24 countries (the 5 southern european most affected countries, 12 other EU member states, 3 other european countries and 4 other countries. The data collection was carried out mainly by contacts with forest fire experts, but also through websites or literature. The quality of the information is quite unequal but is enough to give a good overview of the different ways of classifying forest fire causes.

In the first part the fire causes datasets as available in the countries analyzed are schematically described in dedicated "Country sheets". If possible, the sheets give information about the period of validity of the datasets (since the last change), how the fire causes information are collected, the level of knowledge requested, the records of other information, the architecture of the fire causes classification and the fire causes classes.

In the second part an analysis is done to understand the setting of the various classification schemes and see if their logic may be reproduced or widespread, or how it could be transposed in a different logic.

At first, we find that some bases are not hierarchical but just list juxtaposed categories without showing a strategy of organized subdivisions. However, other classifications have an approach that is both more hierarchical and more precise, detailed in different levels (2 to 5) and often dividing in an organized manner at least the causes of involuntary origin.

In the first level, it always happens to find at least the 4 classes identified in the current European classification : unknown, natural, accidental / negligence, voluntary.

When voluntary causes are detailed, it's always based on the motivation of the incendiary act.

For unintentional causes, 2 approaches seem existing : the distinction between causes related or not to the initial use of fire or hot objects, or the distinction between causes related or not to an active intervention of the man.

ACKNOWLEDGEMENTS

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1. LIST AND DESCRIPTION OF THE CLASSIFICATION SCHEMES RECORDED

1.1. Introduction

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In what follows the fire causes datasets as available in the countries analyzed are schematically described in dedicated "country sheets". If possible, the sheets give information about the period of validity of the datasets (since the last change), how the fire causes information are collected, the level of knowledge requested, the records of other informations, the architecture of the fire causes classification and the fire causes classes.

The currently available Country sheets are synthesized in the table in next page, in the following paragraphs the individual sheets are given.

In preamble, we have to point the fact that most classifications (except Spain) doesn't make the difference between "cause" and "motivation" which are two different concepts :
Shortly, **cause** reflects **how** a fire is generated (by natural events, by man for will, by man for negligence, by accident (fatality)) **motivation** refers to **why** : the deliberate lighting of a fire can be an action with multiple elements and purposes or impulses that prompt people to destroy their environment, i.e. the inner drives or impulses that are the cause, reason or incentive that induce or prompt a specific behaviour, the wilful motivation in our case (Jackson and Fisher 2001). For instance a member of a seasonal crew igniting a fire to obtain or maintain job makes a voluntary (cause) fire generated for monetary profit (motivation).
The analyzed causes classifications also include motivation categories, and the present study will be led on both concepts.

country	designation	period	knowledge	structure	nb of classes
Portugal	national forest fires database	since 2000	only certain	1 field – 3 levels	92
Spain	EGIF national forest fires database	since 1998	"type of cause" true/supposed	2 fields – 3 levels	64
France	Promethee S-E forest fires database	since 1997	"knowledge of cause" sure/likely/supposed/unknown	1 field – 3levels	51
	SIFORA S-W forest fires database	since 2006	certain and supposed	2 fields – 2 levels	20
	BDIFF national forest fires database	since 2006	certain and supposed	2 fields – 2 levels	22
Italy	AIB national forest fires database	since 1996	certain and supposed	1 field – 2levels	40
Greece	national forest fires database	since 2002	?	1 field – 1 level	19?
Bulgaria	national forest fires database	since 2000	certain and supposed	1 field – 1 level	17
Czech rp.	national all fires database	?	not stated	1 field – 2 levels	60
Cyprus	national forest fires database	since 2000	certain and supposed	1 field – 5 levels	73
Finland	national forest fires database	since 1996?	certain and supposed	1 field – 1 level	21
Latvia	national forest fires database	since 2008	certain and supposed	1 field – 2 levels	10
Lithuania	national forest fires database	since 2000	?	?	12?
Poland	national all fires database	since 1999	not stated	1 field – 1 level	37
	state forest and national parks database	since 1996	not stated	1 field – 2 levels	13
Romania	national forest fires database	since 2005	specific field certain/supposed/unknown	1 field – 4 levels	9
Slovakia	national forest fires database	since 1999	?	1 field – 1 level	20
Slovenia	NFS national forest fires database	2001 - 2004	not stated	1 field – 5 levels	31
	ISRIA national all fires database	since 2005	not stated	2 fields – 3 levels	53 x 16
Sweden	national forest fires database	since 2005	specific field probable/very probable/certain	1 field – 1 level	24
UK	UKVFS database	new project	not stated	1 field – 2 levels	47
Croatia	national forest fires database	?	?	1 field – 1 level	5
Turkey	national forest fires database	since 1992?	only certain?	1 field – 2 levels	12
Switzerland	swissfire national forest fires database	since 2008	"cause reliability" sure/supposed	1 field – 2 levels	15
Australia	Victoria state forest fire database	since 1976	not stated	1 field – 1 level	25
Canada	national forest fires database	since 1990	certain and supposed?	1 field – 2 levels	10
Chile	national forest fires database	since 2003	not stated	1 field – 2 levels	13
USA	national forest fires database	since 1995	certain and supposed?	4 fields – 4levels	9/10/30/10

1.2. Southern most affected member states

1.2.1. Portugal

Designation of database :
National Forest Fires Database, ruled by Nature and Environment Protection Service (SEPNA) and National Guard (GNR).

Source : partner's contribution (NICIF)

Period : The current classification exists since 2000.
The responsibility for filling it has changed in 2007 (see further)

Filling of database :
The Forest Services (National Forest Authority) were responsible for the forest fires causes investigation and statistical information until 2006. To better uniform the work made by the forest fires causes investigators in the field, during the 90s and later in 2000, the Forest Services made a codification of the forest fires causes in categories and the definition of each cause.

- In the past, until 1977, the information on forest fires were made only in the forest areas managed by the State Forest Services. The information for the rest of the country were made by estimation, with all the associated errors.

- Until 1989, each fire in Portugal was assigned with a probable cause determined by forest rangers, fire fighters or other credible bodies or persons. While the number of forest fires remained small (about 1,500 in the decade from 1959 to 69), the method was very satisfactory although it contained a wide range of subjectivity.

- The number of fires and the burnt areas increased strongly in the mid-1970s and it became impossible to reliably attribute a cause to each fire.
The physical evidence method was tested for the first time in 1989 by the Forest Services in cooperation with the Criminal Police, using the model commonly applied in the USA. The results inspired sufficient confidence for application to be broadened. Although the method does not give the cause of all fires, it is nonetheless possible to perform an exhaustive inquiry for each fire in a significant sample of all fires.
Seven investigation brigades with trained forest guards were formed in 1990 in the North and Central Portugal, using the physical evidence method for the criminal investigation of the causes of forest fires ignitions.
Later, in 1996, due to an institutional reorganization of the Forest Services, the investigation brigades were over and the forest rangers integrated in regular brigades. This measure resulted in a decay of the fire causes investigation capacity.
Between 1999 and 2003, a special program in the Forest Services to reinforce the National Forest Rangers Corps developed the fire investigation issue, promoting training and organizing the regional services. Also, in 2000 the fire causes classification scheme was revised and operation directives were established.

- In 2006, following the Government reform on the forest fire protection national system, the National Forest Rangers Corps was removed from the Forest Services and the personnel were

integrated in the National Guard, under the Nature and Environment Protection Service. These change resulted in a increase of the number of investigated fires, but the results quality decreased with a significant increase of the unknown causes (66% in 2006).

In 2007, the Forest Service with the collaboration of the Criminal Police and the National Guard, trained 120 agents of the National Guard - Nature and Environment Protection Service, on the Forest Fire investigation process.

Prosecution is the corollary of a good criminal investigation process. Bringing suspected arsonists to the courts with well-formulated charges and sufficient proof for fair sentencing will represent the expected goal for society and will play a preventive role through the example given.

Information about knowledge of cause : Only attested causes, with confirmed evidences, are recorded. That explains the high percentage of "unknown" causes. The "unknown" causes include fires that have a supposed cause, but have not 100% sure about it.

Other information about causes :
A technical sheet is filled in during the investigation process. It contains miscellaneous information concerning the fire location, the meteorological conditions, the area and the type of vegetation burned, description of fuels and all the indicators that facilitate the classification of the cause : statements by witnesses, sketches, etc.
A report is also sent to the public Prosecutor and/or the Criminal Investigation Department depending on the case.

Architecture of the classifications :
The former classification had only one level in a non-hierarchic list of causes.

The current classification of the forest fires causes is made under a three level structure, which lead to three digit code of each fire ignition cause:
   • higher level (first digit) – group the causes classification in six main categories:
      1 – Negligent usage of fire;
      2 – Accidental;
      3 – Structural causes;
      4 – Incendiary;
      5 – Natural;
      6 – Unknown
   • The second level (second digit) details the high categories in smaller groups of causes, identifying common behaviours/activities.
   • The third level (third digit) corresponds to each cause of forest fire ignition.

Observations :
One of the problems related to the forest fires causes investigation derives from the lack of representation of the investigated fires to the total amount of forest fires. In fact, due to the fire investigation activity being performed by trained forest rangers, there is a significant difference among the higher number of investigations in the most forested areas comparing to the other areas, specially the urban and peri-urban municipalities.
With the new organisation, the number of fires investigated has increased but with an uncertainty much larger so the problem of knowledge of causes is not yet solved.

Also, in a regional (district) analysis, there are significant differences among regions. Some have plenty of forest fires investigations with their cause identified, while other regions have only few useful results. This situation compromises the results of the causes analysis in some districts.

With the exception of the Alentejo region (hunting conflicts), "deliberate causes" still has an important lack of critical information on the motivation behind the fire ignition.

Classifications :

- Former classification (before 2000)

code	Cause in original language	Cause translated
PTf_1	Negligencia	negligence
PTf_2	Queimada	vegetation burning
PTf_3	Trabalhos Florestais	forest works
PTf_4	Fogueira	bonfires
PTf_5	Fumadores	smokers
PTf_6	Faísca	spark
PTf_7	Caminho de Ferro	railway
PTf_8	Linha Eléctica	electric line
PTf_9	Fogo Artifício	workfires
PTf_10	Intencional	intentional
PTf_11	Naturais	natural
PTf_12	Desconhecida	unknown
PTf_13	Outras	other
PTf_14	Trabalhos Agrícolas	agricultural works
PTf_15	Trabalhos Florestais	forest works
PTf_16	Actividades Industriais	industrial activities
PTf_17	Comunicações	communication
PTf_18	Publicas	public

- Current classification (from 2000)

code	Cause in original language	Cause translated
PT_1	**USO DO FOGO**	**negligent use of fire**
PT_11	Queima de lixo	garbage burning
PT_111	*Autárquica*	*in official garbage dump*
PT_112	*Indústria*	*industrial waste*
PT_113	*Comércio*	*commercial waste*
PT_114	*Actividades clandestinas*	*waste from clandestine activities / illegal garbage dump*
PT_115	*Núcleos habitacionais permanentes*	*waste from permanent private habitation*
PT_116	*Núcleos habitacionais temporários associados ao recreio*	*waste from temporary or leisure habitation*
PT_12	Queimadas	vegetation burning
PT_121	*Limpeza do solo agrícola*	*clearing of agricultural areas*
PT_122	*Limpeza do solo florestal*	*clearing of forest areas*
PT_123	*Limpeza de áreas urbanizadas*	*clearing of urban areas*
PT_124	*Borralheiras*	*burning remnants or agricultural waste*
PT_125	*Renovação de pastagens*	*renewing pastures*
PT_126	*Penetração em áreas de caça e margens dos rios*	*improving access to hunting and fishing areas*
PT_127	*Limpeza de caminhos, acessos e instalações*	*clearing paths or private areas*
PT_128	*Protecção contra incêndios*	*escaped preventive burning*
PT_129	*Outras*	*other vegetation burning*

PT_13	Lançamento de foguetes	fireworks
PT_131	*Com medidas preventivas*	*with prevention measures*
PT_132	*Clandestinos*	*clandestin*
PT_133	*Auto-ignição*	*self-ignition*
PT_14	Fogueiras	bonfires
PT_141	*Recreio e lazer*	*for leisure activities*
PT_142	*Confecção de comida*	*for cooking*
PT_143	*Aquecimento*	*for heating*
PT_144	*Reparação de estradas*	*for road works*
PT_145	*Outras*	*other bonfires*
PT_15	Fumar	smokers
PT_151	*Fumadores a pé*	*walking smokers*
PT_152	*Em circulação motorizada*	*cigarette butts or matches thrown from vehicles*
PT_16	Apicultura	apiculture
PT_161	*Fumigação*	*fumigation*
PT_162	*Desinfestação*	*disinfection*
PT_17	Chaminés	chimneys
PT_171	*Industriais*	*industrial chimneys*
PT_172	*De habitação*	*houses chimneys*
PT_173	*Outras*	*other chimneys*
PT_2	**ACIDENTAIS**	**accident**
PT_21	Transportes e comunicações	transport and communications
PT_211	*Linhas eléctricas*	*electric lines*
PT_212	*Caminhos de ferro*	*railway*
PT_213	*Tubos de escape*	*mufflers*
PT_214	*Acidentes de viação*	*road accident*
PT_215	*Outros acidentes*	*other accident*
PT_22	Maquinaria e equipamento	machinery
PT_221	*Alfaias agrícolas*	*impact of agricultural metallic tools against rocks*
PT_222	*Máquinas agrícolas*	*agricultural engines*
PT_223	*Equipamento florestal*	*forest equipment*
PT_224	*Motosserras*	*chainsaws*
PT_225	*Máquinas florestais*	*forest engines*
PT_226	*Máquinas industriais*	*industrial engines*
PT_227	*Outra maquinaria e equipamento*	*other machinery*
PT_23	Outras causas acidentais	other accidental cause
PT_231	*Explosivos*	*explosives*
PT_232	*Soldaduras*	*soldering*
PT_233	*Disparos de caçadores*	*hunter firing*
PT_234	*Exercícios militares*	*military exercise*
PT_235	*Vidros*	*glass*
PT_236	*Outras*	*other accidental cause*
PT_3	**ESTRUTURAIS**	**structural**
PT_31	Caça e vida selvagem	hunting and wildlife
PT_311	*Conflitos de caça*	*hunting conflict*
PT_312	*Danos provocados pela vida selvagem*	*preventing from damages caused by wildlife*
PT_33	Uso do solo	land use
PT_333	*Alterações no uso do solo*	*changing land use*
PT_334	*Pressão para venda de material lenhoso*	*pressure on wood market*
PT_335	*Limitação ao uso e gestão do solo*	*limiting use or management of land*
PT_336	*Contradições no uso e fruição dos baldios*	*conflict in use of fallow lands*
PT_37	Defesa contra incêndios	forest fires prevention
PT_337	*Instabilidade laboral nas actividades de DFCI*	*problem during fire prevention or firefighting activities*

PT_38	Outras causas estruturais	other structural causes
PT_4	**INCENDIARISMO**	**incendiary**
PT_41	Inimputáveis	irresponsible
PT_412	*Brincadeiras de crianças*	*children games*
PT_413	*Irresponsabilidade de menores*	*irresponsibility of minors*
PT_417	*Piromania*	*pyromania*
PT_419	*Outras situações inimputáveis*	*other irresponsible*
PT_44	Imputáveis	responsible
PT_441	*Manobras de diversão*	*diversionary maneuver*
PT_444	*Provocação aos meios de combate*	*fire lit in order to admire the firefighting means*
PT_445	*Conflitos entre vizinhos*	*conflicts between neighbors*
PT_446	*Vinganças*	*revenge*
PT_448	*Vandalismo*	*vandalism*
PT_449	*Outras situações dolosas*	*other deliberate*
PT_5	**NATURAIS**	**natural**
PT_51	Raio	lightning
PT_6	**INDETERMINADAS**	**unknown**
PT_60	Indeterminadas	unknown
PT_610	*Prova material*	*material evidence missing*
PT_620	*Prova pessoal*	*personal evidence missing*
PT_630	*Outras informações*	*other information missing*

1.2.2. Spain

Designation of database : EGIF (General Forest Fire Statistics) ruled by the General Secretariat for the Territory and Biodiversity, of the Ministry of the Environment and Rural and Marine Affairs.
The regions can have their own database a bit more detailed according to the local needs but with the same common core of data.

Source : partner's contribution (GMV)

Period : 1998-2008 (cause "restart of fire" and field "type of cause" added to the database existing since 1989)

Filling of database :
- The Fire Officer of each fire is the person responsible for completing the Wild Fire Report form and submitting it to the office in charge of its coding and recording. It is necessary to complete a form for all fires that affect a forest area, even if the fire covers only a few square meters. The data that the Fire Officer is unable to fill out is completed in the office with his/her own data and that provided by organizations and administrations that have intervened in the incident.
- In the office, there is a program designed for processing Forest Fire Reports.
- Once the Central Administration has received the files, they are subject to a change in format and a review to correct possible logical errors, incorporating new information if necessary and possible. The final databases are returned to the Autonomous Centre so that both administrations have identical data available to them.
- The final data of the annual national total is submitted to the European Commission to incorporate the data into the EU Databases..

Information about knowledge of cause : specific field called "type of cause" with 2 values : "true" and "supposed" ; "unknown" is not a value of this field but a value of the field "cause".

Other information about causes :
- for fires due to lightning, the number of days after thunderstorm is registered
- field « author » with 2 values : "known" or "unknown". In case of fires due to known causes (i.e. reproduction a previous fire, railway, lightning, etc.) author is ever reported as known. In case of fire started by an identified person, his/her name shall be reported
- field "type of day" with 4 values : "holiday", "Saturday", "day before a holiday", "workday".

Architecture of the classification : One field called "fire cause", detailed in three levels for fires due to negligence or accidental causes. For the intentional causes, the second level is detailed in an other field called "motivation"

Observations : The first level doesn't exactly correspond to the current EU classification scheme, due to the cause "restart of fire" which is not a part of the accidental fires but is a separate value in the first level.

Classification :

code	Cause in original language	Cause translated
ES_100	**Rayo**	**Lightning**
	Negligencias y causas accidentales	**Negligence/accidental**
ES_210	Quema agrícola	Agricultural burning
ES_211		*Stubs burning*
ES_212		*Burning of pruning derbies*
ES_213		*Fires on the boundaries of farms or plots*
ES_214		*Fires in the edges of irrigation ditches*
ES_215		*Other fires set for agricultural purposes*
ES_220	Quema para pastos	Pasture regeneration burning
ES_221		*Bush Burning*
ES_222		*Burning of herbaceous*
ES_223		*Other fires set for pasture regeneration*
ES_230	Trabajos forestales	Forest works
ES_240	Hogueras	Campfires
ES_250	Fumadores	Smokers
ES_260	Quema de basuras	Rubbish burning
ES_270	Escape de vertedero	Escape from a garbage dump
ES_280	Quema de matorral	Bush Burning
ES_281		*Bush burning near to buildings*
ES_282		*Bush burning with the purpose of clearing tracks and paths*
ES_283		*Bush burning to eliminate refuges of harmful fauna*
ES_284		*Bush burning with other purposes*
ES_290		Other negligence
ES_291		*apiculture*
ES_292		*fire works*
ES_293		*hot air balloon*
ES_294		*kid games*
ES_295		*burning of pruning rests from gardens*
ES_296		*Fires due other negligence cause*
ES_310	Ferrocarril	railway
ES_320	Líneas eléctricas	electric lines
ES_330	Motores y máquinas	engines and machinery
ES_331		*Harvesters*
ES_332		*Light or heavy weight vehicles*
ES_333		*Vehicle accident*
ES_334		*Fixed machinery*
ES_335		*Other type of machinery*
ES_340	Maniobras militares	army manœuvres
ES_400	**Intencionado**	**intentional**
ES_500	**Causa desconocida**	**unknown**
ES_600	**Incendio reproducido**	**restart of fire**

For the intentional cause, the second level is detailed in an other field called "motivation" :

code	Motivación (in original language)	Motivation (translated)
ES_401	Incendios provocados por agricultores para eliminar matorral y residuos agrícolas que se dejan arder incontroladamente y pasan al monte	Uncontrolled agricultural fires, started by farmers to eliminate bushes and agricultural derbies, spreaded into the forest.
ES_402	Incendios provocados por pastores y ganaderos para regenerar y favorecer el nacimiento del pasto	Fires started by shepherds and livestock farmers to facilitate pasture regeneration and/or pasture growth.
ES_403	Incendios provocados por venganzas	Fires set for revenge purposes.
ES_404	Incendios provocados por animales (lobos, jabalíes, etc.) que causan daños en los cultivos o ganados	Fires started to frighten away animals (wolfs, wild boars, etc) harmful to crops or livestock.
ES_405	Incendios provocados por cazadores para facilitar la caza	Fires caused by hunters to make hunting easier.
ES_406	Incendios provocados como protesta contra el acotamiento de la caza	Fires started against hunting limitation.
ES_407	Incendios provocados por disensiones o disputas en cuanto a la titularidad de los montes públicos o privados	Fires started due to dissents or contestations on the public or private ownership of forests.
ES_408	Incendios provocados por represalia al reducirse las inversiones públicas en los montes	Fires started in retaliation for the reduction of public investment in forests.
ES_409	Incendios provocados para obtener salarios en su extinción o en la restauración posterior de las superficies incendiadas	Fires set to get a job in the fire fighting brigades or in the post-fire restoration works of damaged areas.
ES_410	Incendios provocados por pirómanos (enfermos mentales)	Fires started due to pyromaniacs (mentally ill people).
ES_411	Incendios provocados para hacer bajar el precio de la madera	Fires started to reduce the price of wood.
ES_412	Incendios provocados para obtener la modificación del uso del suelo	Fires started to force land-use changes.
ES_413	Incendios provocados por grupos políticos para crear malestar y alarma socia	Fires started by political groups to create social unrest.
ES_414	Incendios provocados por animadversión contra repoblaciones forestales	Fires started due to the rejection towards reforestation works.
ES_415	Incendios provocados por delincuentes, manifestantes para distraer a la Guardia Civil o la Policía	Fires started by delinquents or demonstrators to distract the security forces, Civil Guard or Police.
ES_416	Incendios provocados por rechazo a la creación o existencia de Espacios Naturales Protegidos	Fires started due to the rejection of the creation of new Natural Protected Areas or against the existing ones.
ES_417	Incendios provocados en ritos pseudoreligiosos o satánicos	Fires started during pseudo-religious or satanic rites.
ES_418	Incendios provocados para contemplar las labores de extinción	Fires started with the aim of contemplating the fire fighting tasks.
ES_419	Incendios provocados por vandalismo	Fires due to acts of vandalism.
ES_420	Incendios provocados para favorecer la producción de productos del monte	Fires started to facilitate the production of forest products.
ES_421	Incendios provocados para forzar la resolución de Consorcios o Convenios	Fires started with the will to force the resolution of Consortiums or Agreements.
ES_422	Incendios provocados por resentimiento contra expropiaciones	Fires started due to resentment against expropriations or compulsory purchases.
ES_423	Incendios provocados como venganza por multas impuestas	Fires started as revenge for imposed fines.
ES_499	Otras motivaciones	Other purposes.

1.2.3. France

Designation of database :
3 databases are coexisting :
* one for the south-east of France , called "Promethee", existing since 1973.
* one for the south-west of France, called "SIFORA" (Système d'Information sur les FORêts d'Aquitaine) existing since 1996.
* one for the whole country, called "BDIFF" (Banque de Données sur les Incendies de Forêts en France) existing since 2006. This database as been designed in order to integrate automatically the data from the 2 others.

Source : ONF / Ministry of Agriculture

Period : Promethee's classification of causes has changed in 1997. SIFORA's classification of causes has changed in 2006. BDIFF exists since 2006.

Filling of database : the 3 databases are running on the same principle : for each fire, a sheet is initiated by firefighters and supplemented by other partners (foresters, police...). All the partners can fill the "cause" field.

Information about knowledge of cause :
For promethee database, there is no nature of cause "unknown", this information is mentioned in the field "knowledge of cause" which contains 4 classes : 1-"sure", 2-"likely", 3-"supposed", 4-"unknown". For unknown causes, the field "nature of cause" is empty.

For the 2 other databases, "unknown" is a value of the classification. The nature of cause is filled even if it is only supposed.

Other information about causes :
Only promethee database provides diverses informations about causes :

field	values possible
knowledge of cause	4 classes : 1-"sure", 2-"likely", 3-"supposed", 4-"unknown"
nature of cause	cf classification further
investigation	5 classes : SP= firefighters, F = foresters, G = gendarmes, P = police, C = coordinator
sexe of author	2 classes : H = man, F= woman
age of author	in years
main home of author	INSEE code of community
home of author when fire occured	7 classes : 1=main home, 2= holiday home, 3= occasional rent, 4 = vacation centre, 5 = hostel, 6= camp site, 7= other
profession of author	10 classes : 1= farmer or agricultural employee, 2= logging contractor or forestry employee, 3= industrial or craftsman, 4= senior executive or liberal profession, 5= middle manager or foreman, 6= employee, 7= worker, 8= staff of service, 9= inactive, 0 = other
fire occured during professional activity of author	2 classes : O=yes, N= no

Architecture of the classifications :

Former Promethee database (1973-1996) had two levels detailed in two fields : the first one was called "category of cause" with only 3 classes : 1-"accidental (no human involved)", 2-"arson", 3-"unvoluntary (human origin)". The second one was called "nature of cause". The category "unvoluntary" was even detailed in a second and a third level in this field. The fires caused by garbage dump were not clearly reattached to accidental fires but seemed to be treated apart. We can notice the originality of the fire caused by "lightning" which were considered as a part of accidental fires, without identifying a category "natural".

Current Promethee database has just one field called "nature of cause", detailed in three levels wich can all be used (i.e if you can't find a cause precise enough to be classified in the third level, you can classify it in the second or the first level). The first level has now 5 classes : "natural" has been separated from accidental causes ; the difference between "accidental" (no human involved) and "unvoluntary" (human origin) is still made but "unvoluntary" is now separated according to the activity of the author ("professionnal" / "private").

SIFORA and BDIFF have the same structure with 2 levels recorded in 2 fields. The first level is a field called "nature of cause" and the second level is a field called "origin of fire". The first level is the same and corresponds with the current EU classification. The second level details more accidental and deliberate causes.

SIFORA's classification has changed in 2006. The new classification scheme details more the "deliberate" cause which was not detailed in different origins, and bring some more origins to the "accidental" cause. The particular origin code "other" can be used anyway for accidental or deliberate cause.

The BDIFF classification scheme has been created in order to be coherent with the south-west classification scheme and the second level of the south-east classification scheme, so that the general French database can be automatically filled from these two regional databases.

Observations :
We have to notice the particular distinction which is made by promethee between "accidental" and "unvoluntary", based on the direct involvment of man.
In this sense, the approach of the case "restart of fire" seems to have changed : it was classified as accidental in the former classification, but it is now considered as "unvoluntary due to professional" (implying that it is the responsibility of the firefighters).

Classifications :

- south-east (Promethee database)

  * former classification scheme (1973-1996)

category	code	Cause in original language	Cause translated
	FR_SEf_01	foudre	lightning
accidentelle (sans participation humaine) - accidental (no human involved)	FR_SEf_11	lignes électriques 1ère catégorie (Basse Tension < 1000V)	electric lines 1st category (Low Voltage < 1000V)
	FR_SEf_12	lignes électriques 2ème catégorie (Moyenne Tension de 1000 à 50000V)	electric lines 2nd category (Medium Voltage from 1000V to 50000V)
	FR_SEf_13	lignes électriques 3ème catégorie (Haute Tension > 50000V)	electric lines 3rd category (High Voltage > 50000V)
	FR_SEf_14	chemin de fer	rail
	FR_SEf_15	échappement de véhicule	vehicle's muffler
	FR_SEf_19	autres installations	other installation
	FR_SEf_21	reprise d'incendie	restart of fire
?	FR_SEf_16	dépôt d'ordure officiel	official garbage dump
	FR_SEf_17	dépôt d'ordure clandestin	illegal garbage dump
arson	FR_SEf_31	mise à feu immédiate	arson - immediate firing
	FR_SEf_32	mise à feu par tous dispositifs à retardement	arson - firing by any devices with delay
involontaire (origine humaine) - unvoluntary (human origin)	FR_SEf_41	travaux en forêt - incinéation de végétaux sur pied	forest works - burning of standing bush
	FR_SEf_42	travaux en forêt - incinéation de végétaux coupés	forest works - burning of cut bush
	FR_SEf_43	travaux en forêt - carbonisation	forest works - charcoal manufacturing
	FR_SEf_49	travaux en forêt - autres	forest works - others
	FR_SEf_51	travaux agricoles - incinéation de végétaux sur pied	agricultural works - burning of standing bush
	FR_SEf_52	travaux agricoles - incinéation de végétaux coupés	agricultural works - burning of cut bush
	FR_SEf_59	travaux agricoles - autres	agricultural works - others
	FR_SEf_61	imprudences - jeux d'enfants	carelessness - children's games
	FR_SEf_62	imprudences - emploi d'un réchaud	carelessness - use of a stove
	FR_SEf_63	imprudences - feu de bois en forêt (loisirs)	carelessness - campfire in forest (leisure activities)
	FR_SEf_64	imprudences - jets de mégôts par véhicule	carelessness - throwing butts from vehicles
	FR_SEf_65	imprudences - fumeur à pied	carelessness - walking smoker
	FR_SEf_69	imprudences - autres	carelessness - others
?	FR_SEf_99	autres causes connues	other known causes

* current classification scheme (since 1997)

code	Cause in original language	Cause translated
FR_SEc_1	**naturelle**	**natural**
FR_SEc_11	foudre	lightning
FR_SEc_2	**accidentelle liée aux installations**	**accidental due to installations**
FR_SEc_21	ligne électrique	electric line
FR_SEc_211	*rupture*	*break*
FR_SEc_212	*amorçage*	*electric arc*
FR_SEc_22	chemin de fer	rail
FR_SEc_23	véhicule	vehicle
FR_SEc_231	*échappement, freins, …*	*muffler, brakes, …*
FR_SEc_232	*incendie*	*fire*
FR_SEc_24	dépôt d'ordure	garbage dump
FR_SEc_241	*officiel*	*official*
FR_SEc_242	*clandestin*	*illegal*
FR_SEc_3	**malveillance - origine humaine intentionelle**	**arson - intentionnal human origin**
FR_SEc_31	conflit	conflict
FR_SEc_311	*occupation du sol*	*land use*
FR_SEc_312	*chasse*	*hunting*
FR_SEc_32	intérêt	interest
FR_SEc_321	*occupation du sol*	*land use*
FR_SEc_322	*cynégétique*	*hunting*
FR_SEc_323	*pastoralisme*	*pastoralism*
FR_SEc_33	pyromanie	pyromania
FR_SEc_4	**involontaire liée aux travaux professionnels**	**unvoluntary due to professionnal works**
FR_SEc_41	travaux forestiers	forest works
FR_SEc_411	*machine-outil*	*machinery*
FR_SEc_412	*feu végétaux sur pied*	*burning of standing bush*
FR_SEc_413	*feu végétaux coupés*	*burning of cut bush*
FR_SEc_42	travaux agricoles	agricultural works
FR_SEc_421	*machine-outil*	*machinery*
FR_SEc_422	*feu végétaux sur pied*	*burning of standing bush*
FR_SEc_423	*feu végétaux coupés*	*burning of cut bush*
FR_SEc_424	*feu pastoral*	*pastoral fire*
FR_SEc_43	travaux industriels, publics, artisanaux, …	industrial, public or crafts works
FR_SEc_431	*machine-outil*	*machinery*
FR_SEc_432	*feu végétaux sur pied*	*burning of standing bush*
FR_SEc_433	*feu végétaux coupés*	*burning of cut bush*
FR_SEc_44	reprise	restart of fire
FR_SEc_5	**involontaire liée aux particuliers**	**unvoluntary due to private**
FR_SEc_51	travaux	private works
FR_SEc_511	*machine-outil*	*machinery*
FR_SEc_512	*feu végétaux sur pied*	*burning of standing bush*
FR_SEc_513	*feu végétaux coupés*	*burning of cut bush*
FR_SEc_52	loisirs	leisure activities
FR_SEc_521	*jeu d'enfants, pétard, …*	*children's games, firecrackers, …*
FR_SEc_522	*feu d'artifice*	*fireworks*
FR_SEc_523	*barbecue, réchaud, feu loisir*	*barbecue, stove, campfire*

FR_SEc_53   jet d'objets incandescents   throwing of incandescent objects
FR_SEc_531   mégot de promeneur   butt from walking smoker
FR_SEc_532   mégot par véhicule   butt from vehicle
FR_SEc_533   fusée de détresse   distress rocket
FR_SEc_534   déversement cendres chaudes   warm ashes

- south-west (SIFORA database)

  * former classification scheme (before 2006)

code	Cause in original language	Cause translated
FR_SWf_1	**foudre**	**lightning**
FR_SWf_2	**accident**	**accidental**
FR_SWf_2.1	activités de loisirs	leisure activities
FR_SWf_2.2	dépôts d'ordures	garbage dump
FR_SWf_2.3	feux et travaux agricoles	agricultural fire and works
FR_SWf_2.4	installations électriques	electric installations or lines
FR_SWf_2.5	reprise de feux	restart of fire
FR_SWf_2.6	trains et véhicules routiers	rail and vehicle
FR_SWf_2.7	incinérations et travaux forestiers	forest works
FR_SWf_2.8	autres accidents	other accidental
FR_SWf_3	**malveillance**	**deliberate**
FR_SWf_4	**inconnue**	**unknown**

  * current classification scheme (since 2006)

code	Cause in original language	Cause translated
FR_SWc_1	**foudre**	**lightning**
FR_SWc_2	**accident**	**accidental**
FR_SWc_2.1	activités de loisir	leisure activities
FR_SWc_2.2	dépôts d'ordures	garbage dump
FR_SWc_2.3	feux et travaux agricoles	agricultural fire and works
FR_SWc_2.4	installations électriques	electric installations or lines
FR_SWc_2.5	reprises de feux	restart of fire
FR_SWc_2.6	trains	rail
FR_SWc_2.7	véhicules routiers	vehicle
FR_SWc_2.8	travaux des particuliers	private works
FR_SWc_2.9	travaux forestiers	forest works
FR_SWc_2.10	travaux industriels	industrial works
FR_SWc_2.11	jets d'objets incandescents	throwing of incandescent objects
FR_SWc_2.15	autres accidents	other accidental
FR_SWc_3	**malveillance**	**deliberate**
FR_SWc_3.12	conflit	conflict
FR_SWc_3.13	intérêt	interest
FR_SWc_3.14	pyromanie	pyromania
FR_SWc_3.15	autre malveillance	other deliberate
FR_SWc_4	**inconnue**	**unknown**

- general database (BDIFF database) (since 2006)

code	Cause in original language	Cause translated
FR_1	**inconnue**	**unknown**
FR_2	**naturelle**	**natural**
FR_2.1	foudre	lightning
FR_2.2	autre	other natural
FR_3	**accidentelle**	**accidental**
FR_3.1	ligne électrique (rupture, amorçage)	electric line (break, electric arc)
FR_3.2	chemin de fer	rail
FR_3.3	véhicule (échappement, frein, incendie)	vehicle (muffler, brakes, fire)
FR_3.4	dépôt d'ordure (officiel, clandestin)	garbage dump (official, illegal)
FR_3.5	travaux forestiers (machine-outil, feu de végétaux sur pied ou coupés)	forest works (machinery, burning of standing or cut bush)
FR_3.6	travaux agricoles (machine-outil, feu de végétaux sur pied ou coupés, feu pastoral)	agricultural works (machinery, burning of standing or cut bush, pastoral fire)
FR_3.7	travaux industriels ou artisanaux (machine-outil, feu de végétaux sur pied ou coupés)	industrial or crafts works (machinery, burning of standing or cut bush)
FR_3.8	travaux des particuliers (machine-outil, feu de végétaux sur pied ou coupés)	private works (machinery, burning of standing or cut bush)
FR_3.9	loisirs (jeux d'enfants, pétards, feu d'artifice, barbecue, réchaud…)	leisure activities (children's games, firecrackers, fireworks, barbecue, stove...)
FR_3.10	jet d'objets incandescents (mégot, déversement de cendres chaudes, fusée de détresse)	throwing of incandescent objects (butt, warm ashes, distress rocket)
FR_3.11	reprise de feu	restart of fire
FR_3.12	autre	other accidental
FR_4	**volontaire**	**deliberate**
FR_4.1	conflit (occupation du sol, chasse)	conflict (land use, hunting)
FR_4.2	intérêt (occupation du sol, chasse, pastoralisme)	interest (land use, hunting, pastoralism)
FR_4.3	pyromanie	pyromania
FR_4.4	autre	other deliberate

1.2.4. Italy

Designation of database : National AIB (Anti Incendi Boschivi) Database ruled by the CFS : Corpo Forestale dello Stato (National Forest Corps - Ministry of Agriculture)
Collects only forest fires. Some regions collect also fires in agricultural and pastures areas in a separate database.

Source : Fire Expert M Milazzo

Period : since 1996.
From 1984 to 1995 the AIB database existed but recorded all fires including agricultural an pasture fires.

Filling of database : Corpo Forestale dello Stato (National Forest Corps)
Following the enforcment of the "Framework law on forest fires" n°353 of novembre 21, 2000, , which has introduced in the penal code the specific crime of "forest fire", the Italian National ForestCorps gave new impulse to the prevention and repression of arson at both central and local levels. Set up on august 2000, at the General Inspectorate (Ispettorato Generale), the Anti-Forest Fire Investigation Unit (Nucleo Investigativo Antincendio Boschivi – NIAB) operates throughout the national territory, except in the special statute regions and in the autonomous provinces, and has the task of coordinating information gathering and investigation activities concerning forest fires. NIAB provides operative, investigative and logistical support to the territorial offices of the Italian National Forest Corps, also by conducting research on the findings at the scene of the fire on whatever remains of the devices and primers are discovered.this activity is backed by the scientific department of the state police in Rome and by the national research institute of Padua.
From 2000 to 2008, more than 3500 people were brought before the judicial authorities for the crime of forest fire, 92% charged for having negligently caused a fire and only 8% charged for having deliberately and maliciously caused a fire, while the proportion of fire causes in the database are around 65% for arson and around 20% for negligence. That illustrate the fact that arson-related investigations are much more complex and difficult.
On january 2008, the procedure for data gathering was changed completely : the AIB/FN paper form used until 2007 was replaced by a new fully digital procedure applied within the framework of SIM (Sistema Informativo della Montagna – Mountain Information System), a broader project aimed at digitalising all available territorial data linked to natural "events" and "objects". For a "fire" event, the GPS coordinates of the place where it has occurred are recorded, and also all pertinent statistical data, all information concerning the investigation. It even allows operators to attach multimedia files.

Information about knowledge of cause : the database tries to have a cause for each fire, even if it is an hypothesis.

Other information about causes : knowledge of author (known/unknown), occupation of author (17 values), residence of author (from the province/from another province), age of author (<=20, 21-30, 31-40, 41-50, 51-60, 61-70, >=71)

Architecture of the classification : 1 field detailed in 2 levels

Observations : The intentional causes are much detailed compared to other classification (as in Spain). That is linked to the fact that in Italy the purpose of fire cause investigation is to identify responsible people in regard of the law. Nevertheless, the category "other intentional due to uncertain motivation" is much used considering the difficulty in attributing a specific motivation even when elements clearly indicate the malicious intent of starting a fire.

"accidental" is defined by an article of the penal code as unguilty.

We have to notice that the cause "restart of fire" doesn't exist in this classification because when it happens it is still considered as the same fire in the database, even if it's many days after.

Classification :

code	Cause in original language	Cause translated
		natural
IT_1001	Incendi causati da fulmini	lightning
IT_1002	Incendi causati da eruzioni vulcaniche	volcanic eruption
		accidental
IT_2001	Incendi causati da scintille provocate dall' attrito delle ruote dei treni con i binari	sparks from train
IT_2002	Incendi accidentali senza attribuzione	accidental diverse
		cigarette butt or matches
IT_3001	Incendi causati da mozziconi di sigaretta o fiammiferi originati lungo le reti viarie	thrown along road
IT_3002	Incendi causati da mozziconi di sigaretta o fiammiferi originati in aree di campagna	thrown in countryside
IT_3003	Incendi causati da mozziconi di sigaretta o fiammiferi originati in aree boschive	thrown in forested area
IT_3004	Incendi causati da mozziconi di sigaretta o fiammiferi originati lungo le linee ferroviarie	thrown along railway
		agricultural and forest activities
IT_3101	Incendi causati da attivita' agricole e forestali per la ripulitura di incolti	burning of fallow land
IT_3102	Incendi causati da attivita' agricole e forestali per eliminare i residui vegetali (lavorazioni for	burning of vegetation waste
IT_3103	Incendi causati da attivita' agricole e forestali per la rinnovazione del pascolo	escaped pastoral burning
IT_3104	Incendi causati da attivita' agricole e forestali per la bruciatura delle stoppie	Thatches/stubble burning
IT_3105	Incendi causati da attivita' agricole e forestali per la ripulitura di scarpate stradali o ferrovia	burning of road or railway shoulders
		carelessness
IT_3201	Incendi causati da attivita' ricreative e turistiche	leisure or tourist activities
IT_3202	Incendi causati da fuochi pirotecnici, lanci di petardi o razzi, brillamento di mine o esplosivi	fireworks, firecrackers, explosives
IT_3203	Incendi causati dall'uso di apparecchi a motore, a fiamma, elettrici o meccanici	machinery
IT_3204	Incendi causati da manovre militari o esercitazioni di tiro	military or firing exercises
IT_3205	Incendi causati da bruciature di rifiuti in discariche abusive	illegal garbage dump
IT_3206	Incendi causati da cattiva manutenzione di elettrodotti o dalla rottura e caduta a terra di condutto	electric lines
IT_3207	Incendi determinati da cause colpose non ben definite	other carelessness

		intentional
IT_4001	Incendi causati da apertura o rinnovazione del pascolo a mezzo del fuoco	opening or renovating pastures
IT_4002	Incendi causati con l'intento di guadagnare dalla scomparsa della vegetazione ai fini di coltivazione agricola	vegetation burning to earn agricultural land
IT_4003	Incendi causati con l'intento di guadagnare dalla scomparsa della vegetazione ai fini di speculazione edilizia	vegetation burning for speculation
IT_4004	Incendi causati con l'intento di guadagnare o comunque di avere vantaggi dall'attivazione degli stessi incendi	fire lit in order to take advantage of the situation
IT_4005	Incendi causati da questioni occupazionali	fire lit for land use issue
IT_4006	Incendi causati con l'intento di distruggere a mezzo del fuoco opere forestali non ben eseguite	fire lit to destruct badly-executed forest operations
IT_4007	Incendi causati da fatti riconducibili a questioni di caccia e bracconaggio	hunting conflict
IT_4008	Incendi causati da fatti riconducibili alla raccolta di prodotti conseguenti al passaggio del fuoco	fire lit to harvest products after burning
IT_4009	Incendi causati da fattori connessi a criminalita' organizzata	fire due to organized crime connex factors
IT_4101	Incendi causati da vendette o ritorsioni nei confronti della pubblica amministrazione	revenge against administration
IT_4102	Incendi causati da conflitti o vendette personali	personal conflict or revenge
IT_4103	Incendi causati da proteste contro l'attivazione di aree protette o la loro gestione	protesting against land protection
IT_4104	Incendi causati per gioco o divertimento	fire lit for game or divertissement
IT_4105	Incendi causati con l'intento di deprezzare aree turistiche	fire lit to depreciate tourist area
IT_4106	Incendi causati da fatti riconducibili a questioni di contrapposizioni politiche	political conflict
IT_4107	Incendi causati da atti terroristici	terrorism
IT_4108	Incendi causati da insoddisfazioni e dissenso sociale	social conflict
IT_4109	Incendi causati da turbe psicologico comportamentali o piromania	psycho or pyromania
IT_4201	Incendi determinati da cause dolose non ben definite	other intentional due to uncertain motivation
IT_5001	Cause in cui non e' individuabile la motivazione che ha dato origine all'incendio	**unknown**

1.2.5.Greece

<u>Designation of database</u> : national forest fires database ruled by the General Directorate for the Development and Protection of Forests and Natural Environment (GDDPFNE), Athens Greece. (until October 2010 this General Directorate belonged to the Ministry of Rural Development and Food but has now been moved to the Ministry for the Environment, Energy and Climate Change).

<u>Source</u> : fire expert Mr Theodoros Pallas / Mr Gavriil Xanthopoulos

<u>Period</u> : 2002-2009 (data available in JRC from 1985)

<u>Filling of database</u> : Greek Fire Corps (firefighters) & GDDPFNE

<u>Information about knowledge of cause</u> : "unknown" is a value of the classification

<u>Other information about causes</u> : not stated

<u>Architecture of the classification</u> : One level in a non-hierarchic but detailed list of causes ?

<u>Observations</u> : Reliable data were being collected by the Greek Forest Service at its GDDPFNE (headquarters) until 1997. Following transfer of firefighting responsibility to the Greek Fire Corps (urban firefighters until then) in 1998, data reliability decreased, particularly in the 1998-2002 period. Currently, the Greek Fire Corps maintains a general database, however, burned areas in it are only quick estimates. The firefighters, locally, give notice about each fire to the local Forest Service office. The final measurement and input in the official database is done by the GDDPFNE based on reports filed by the local Forest Service offices following on-site mapping. As some (relatively few) offices do not submit reports for all fires, the resulting total burned area is believed to be an underestimation of the true one.
The task of fire investigation lies with the Firefighters. Compared to the past the percent of fires for which the cause is determined has decreased sharply in recent years.

<u>Classification</u> :

GR1_1	Lightning
GR1_2	Military Exercise
GR1_3	Use of explosives (for opening roads etc..)
GR1_4	Spark from engines
GR1_5	electric lines and installations
GR1_6	smokers
GR1_7	burning of waste
GR1_8	burning of agricultural fields
GR1_9	burning of pasture
GR1_10	Arson (voluntary, on purpose)
GR1_11	Tourist / recreation
GR1_12	hunters
GR1_13	people working in the country side (e.g. forest workers)
GR1_14	pyromaniac
GR1_15	children
GR1_16	psycho
GR1_17	mental ill (mentally disabled)
GR1_18	other known
GR1_19	unknown

1.3. Other Member States

1.3.1. Bulgaria

Designation of database : national forest fires database

Source : State Forestry Agency

Period : 2000 - 2009

Filling of database : State Forestry Agency registers in a unique electronic database. The database must register all the fires in forest areas.

Information about knowledge of cause : the database tries to have a cause for each forest fire

Other information about causes : the author of fire can be "known" or "unknown"

Architecture of the classification : One level in a non-hierarchic list of causes

Observations : this classification doesn't consider the activity of the person responsible of the fire. For example "burned stubble/thatches" can be used for fire lit during agricultural activity, public work, or private. Thta's why there is not a category "private". It can be recorded in the category corresponding to the way of lighting the fire or in "other known cause"

Classification :

code	Cause in original language	Cause translated
BG_2	Мълния	Lightning
BG_3	Военна стрелба	Military shooting
BG_4	Взривни работи	Explosion works
BG_5	Транспортно-технологични (искри)	Transport-technological sparks (*ie sparks from the trains, agriculture machineries, vehicles and other transport means*)
BG_6	Късо съединение	Electric Shock (*ie the fires created by sparks from electric power lines or by rupture of the cables*)
BG_7	Цигара	Cigarette
BG_8	Сметище	Dunghill
BG_9	Опожаряване на стърнища	Burned stubble/thatches
BG_10	Опожаряване на пасбища	Burned Pastures
BG_11	Умишлен палеж	Deliberate or Arson
BG_12	Туристи	Tourists
BG_13	Ловци	Hunters
BG_14	Работници на открито	Workers at Open Air
BG_15	Пироман/психопат	Pyroman/Psychopath
BG_16	Деца	Children
BG_17	Друга известна причина	Other Known Reason
BG_18	Неизвестна	Unknown

1.3.2.Czech republic

Designation of database : national all fires database

Source : JRC

Period : ?

Filling of database : firefighters ?

Information about knowledge of cause : "unknown" is represented by 2 values of the classification (unsolved, still under investigation / no further investigation)

Other information about causes : the information about the knowledge of author for intentional cause or about the investigation for unknown cause are included in the classification (CZ_10/CZ_13, CZ_0/CZ_5)

Architecture of the classification : one field detailed in 2 levels

Observations : This database must register all type of fires, including forest fires, building fires, industrial fires…

Classification :

code	Cause in original language	Cause translated
		Unsolved, without further investigation, arson, children
CZ_0	neobjasněná příčina, dosud v šetření	Unsolved, still under investigation
CZ_5	dále nešetřená příčina a činnost při vzniku	No further investigation
CZ_10	úmyslné zapálení - pachatel zjištěn	Arson - offender identified
CZ_11	sebevražedný úmysl, choromyslnost, nemoc	Suicidal intentions
CZ_12	děti do l5 let	Children up to 15 years
CZ_13	úmyslné zapálení - pachatel nezjištěn	Arson - offender unidentified
		Negligence
CZ_20	kouření	Smoking
CZ_21	zakládání ohňů v přírodě a na skládkách, vypalování trávy	Setting fires, grass burning
CZ_22	nesprávná obsluha topidla	Incorrect manipulation with heaters
CZ_23	sušení hořlavých materiálů a hořlaviny u topidla	Flammable matterial near heaters
CZ_24	nesprávné používání hořlavých kapalin a plynů	Use of flammable liquids, gases
CZ_25	používání otevřeného ohně k osvětlování, rozehřívání ap.	Use of naked flame
CZ_26	manipulace se žhavým popelem	Glowing ashes handling
CZ_27	sváření a řezání, rozehřívání, rozmrazování včetně zpětného šlehnutí plamene	Welding, cutting, defrosting
CZ_28	zanedbání bezpečnostních předpisů, použití předmětů či zařízení k jiným funkčním účelům, nesprávná o	Neglect of safety regulations
CZ_29	nespecifikovaná nedbalost (nelze jednoznačně určit jednou verzí)	Negligence, error, incorrect control

Chimneys

CZ_30	nevhodná konstrukce komínu a odvod spalin/větrací šachta jako komín, trouby/	Improper construction of chimney
CZ_31	zazděný nebo přizděný trám v komíně	Walled-up timber in chimney
CZ_32	spáry v komíně, nezajištěná komínová dvířka, nezajištěné sopouchy	Gaps in chimney
CZ_33	jiskry z komína a zažehnutí sazí v komíně	Sparks from chimney, soot ignition

Heaters

CZ_40	technická závada topidla /i v dopravním prostředku/	Technical failure of heaters
CZ_41	špatný stav topidla nebo kouřovodu	Bad conditions of heater/smoke-flue
CZ_42	nesprávné umístění a instalace topidel a kouřovodů/v nevhodném prostředí, nedodržení návodu výrobce	Incorrect place/installation of heater
CZ_43	jiná závada	Other failures of heaters

Technical failures

CZ_50	technické závady - vada materiálu, konstrukce, opotřebení a stárnutí, stavební řešení, porušení těsn	Technical failures
CZ_51	nesprávná instalace - krytí neodpovídá prostředí ap.	Incorrect installation
CZ_52	nesprávná údržba - není prováděná, závady jsou odstraňovány neodborně, neprováděná revize, nekvalitn	Incorrect maintenance
CZ_53	žhavé materiály a výrobky /i při kalení/	Glowing materials, products
CZ_54	cizí předmět ve stroji	Foreign material in machine
CZ_55	výboje statické elektřiny	Discharge of static electricity
CZ_56	úlet jisker z výfuku a parního stroje event.brzdného systému	Sparks from exhaust A372/ brakes
CZ_57	tření a přehřátí	Friction, overheating
CZ_59	ostatní nepředpokládané změny provozních parametrů včetněnásledků poruch jiných zařízení, přetížení	Other changes of operational parameters

Self-ignition

CZ_60	zemědělských plodin	Self-ignition of agricultural products
CZ_61	uhlí, uhelného prachu a briket	Coal self-ignition
CZ_62	olejů a tuků	Oil and grease self-ignition
CZ_63	chemických látek	Self-ignition of chemicals
CZ_64	chemické výrobky /barvy,fermeže ap./	Self-ignition of chemical products
CZ_69	jiné	Other self-ignition (e.g. waste)

Explosions

CZ_70	plynů	Gas explosion
CZ_71	par hořlavých kapalin	Flammable liquids explosion
CZ_72	prachů	Dust explosion
CZ_73	výbušnin	Explosion of explosives
CZ_74	tlakových nádob a kotlů včetně potrubí	Explosions of pressure vessels, boilers

Flammable substances handling

CZ_80	u stříkacích zařízení	near Spraying machines
CZ_81	u čerpacích zařízení pohonných hmot včetně dopravy PHM	near Pumping devices
CZ_82	u namáčecích zařízení /lázně, vany/	near Steeping bowles
CZ_83	u dálkové dopravy potrubím a zásobníků	near Long-distance piping and reservoirs
CZ_84	při lepení podlahových krytin, kladení a lití podlah	during Cementing of flooring materials
CZ_85	při výrobě hořlavých a výbušných látek	during Production of flammable and explosive

		materials
CZ_86	při manipulaci s hořlavými a výbušnými látkami ,chemickém čištění včetně pálení lihu	during Handling of flammable and explosive materials, chemical cleaning and producing alcohol
CZ_87	při technologii skladování a ochrany hořlavých a výbušných látek	during Storing and preservation of flammable and explosive materials
CZ_89	jiné	Other (flammable substances)
		Exceptional causes
CZ_90	blesk - objekty chráněné hromosvodem	Lightning/buildings with lightning conductors
CZ_91	blesk - objekty nechráněné hromosvodem	Lightning/buildings without lightning conductors
CZ_92	blesk - ostatní případy zapálení	Lightning - other
CZ_93	živelná pohroma /mimo blesku/	Natural disasters
CZ_94	dopravní nehoda	Traffic accidents
CZ_95	vojenské cvičení, ohňostroje	Military exercise, fireworks
CZ_99	jiné příčiny	Other causes (exceptional)

1.3.3. Cyprus

Designation of database :
There are 2 National Databases in Cyprus, both registering all the fires of the country within the Government controlled area :
- Specific to forest fires (for state forest and 1km outside), ruled by the Department of Forests
- For fires in rural areas as well as building fires, industrial fires, etc…, ruled by Fire Service
The database studied in this document is the forest fires database.

Source :
Fire Expert Mr PAPAGEORGIOU, Fire Protection Section of the Department of Forests

Period : since 2000
The National Forest Fires Database was built during 1990. The first update of the database took place in the year 2000 in order to meet the directions of the E.U. 804/94 regulation. The second and most recent update of the database took place in the year 2007 in order to meet the directions of the E.U. 2152/2003 regulation. During the last update emphasis was given to the causes of forest fires. Each general (main) fire cause category broke into fire cause subcategories (i.e Agricultural activities : a. burn of grass, b. garbage burning, c. burning cigarette ends or matches, d. use of electrical equipment etc)

Filling of database : Department of forest for state forest and 1km outside – fire service for other fires
After each fire incident, a forest fire form is filled by the forest officer in charge of the area of the fire outbreak. The form is then submitted to the regional authorities, which are the headquarters of each Forest Division, where all data are checked, confirmed and captured on the local fire database. Every month, each Forest Division sends the data on fire incidents of the referring period, to the Fire Protection Section of the Department of Forests, where all data about forest fires are gathered and storaged in the central database.
The investigation of fire causes is a responsibility of the Police. It is not a responsibility of the Department of Forests. In the National Forest Fires Database the fire causes are based on supposed (presumed) causes as estimated by Forest Officers. Usually investigation is carried out by the Police in case of big fires or fires that there is a big possibility that are set deliberately.
NB : The Cyprus Forest Law prohibits the lighting of any fire or the throwing of burning cigarette ends and matches in the forest or within a distance of 1 km from the boundaries of the forests.

Information about knowledge of cause :
All causes registered are supposed (presumed) causes but very close to certainty. There is no specific field giving the level of knowledge.

Other information about causes : nothing

Architecture of the classification : one field – 5 levels : first one is known/unknown, second correspond to the EU categories, third to fifth detail the accidental causes. Deliberate causes are not detailed.

Observations : nothing

Classification :

CY_1	*Unknown*
CY_2	*Known*
CY_2.1	**Natural (Lightning)**
CY_2.2	**Anthropogenic (Arson)**
CY_2.3	**Anthropogenic (Accident or negligence)**
CY_2.3.1	Agricultural activities
CY_2.3.1.a	Burning of grass-gorse or stubble
CY_2.3.1.b	Burning of weedpiles or branches
CY_2.3.1.c	Burning of manure
CY_2.3.1.d	Burning of rubbish
CY_2.3.1.e	Cigarettes or matches
CY_2.3.1.f	Use of electrical tools or machinery
CY_2.3.1.g	Other
CY_2.3.2	Burning of rubbish (in rubbish dumps)
CY_2.3.3	Hunting activities
CY_2.3.3.a	Cigarettes or matches
CY_2.3.3.b	Lighting of fire
CY_2.3.3.c	Other
CY_2.3.4.	Works in forest or forested areas
CY_2.3.4.1	By the Department of Forests
CY_2.3.4.1.a	Cigarettes or matches
CY_2.3.4.1.b	Lighting of fire
CY_2.3.4.1.c	Use of electrical tools or machinery
CY_2.3.4.1.d	Other
CY_2.3.4.2	By Others
CY_2.3.4.2.a	Cigarettes or matches
CY_2.3.4.2.b	Lighting of fire
CY_2.3.4.2.c	Use of electrical tools or machinery
CY_2.3.4.2.d	Other
CY_2.3.5.	Military activities
CY_2.3.5.a	Gunshots /Artillery
CY_2.3.5.b	Cigarettes or matches
CY_2.3.5.c	Lighting of fire
CY_2.3.5.d	Use of electrical tools or machinery
CY_2.3.5.e	Other
CY_2.3.6	Residential activities
CY_2.3.6.1	Country house
CY_2.3.6.1.a	Burning of weedspiles or branches
CY_2.3.6.1.b	Burning of rubbish
CY_2.3.6.1.c	Cigarettes or matches
CY_2.3.6.1.d	Use of electrical tools or machinery
CY_2.3.6.1.e	Lighting of fire for food preparation
CY_2.3.6.1.f	Children
CY_2.3.6.1.g	Short-circuit of electric wires
CY_2.3.6.1.h	Other

CY_2.3.6.2		Permanent residence
CY_2.3.6.2.a		Burning of weedspiles or branches
CY_2.3.6.2.b		Burning of rubbish
CY_2.3.6.2.c		Cigarettes or matches
CY_2.3.6.2.d		Use of electrical tools or machinery
CY_2.3.6.2.e		Lighting of fire for food preparation
CY_2.3.6.2.f		Children
CY_2.3.6.2.g		Short-circuit of electric wires
CY_2.3.6.2.h		Other
CY_2.3.7		Recreation activities within forested areas
CY_2.3.7.a		Lighting of fire for food preparation (picnicking) outside picnic sites
CY_2.3.7.b		Lighting of fire for food preparation (picnicking) in picnic / camping sites
CY_2.3.7.c		Cigarettes or matches
CY_2.3.7.d		Use of electrical tools or machinery
CY_2.3.7.e		Children
CY_2.3.7.f		Other
CY_2.3.8		Travelling through forest or forested areas
CY_2.3.8.a		Cigarettes or matches
CY_2.3.8.b		Car accidents (car explosion)
CY_2.3.8.c		Other
CY_2.3.9		Short-circuit of high voltage electric power lines
CY_2.3.10		Car / Motorcycle racing
CY_2.3.10.a		Car accidents (car explosion)
CY_2.3.10.b		Cigarettes or matches
CY_2.3.10.c		Lighting of fire
CY_2.3.10.d		Use of electrical tools or machinery
CY_2.3.10.e		Other
CY_2.3.11		Other

1.3.4.Finland

Designation of database : national forest fires database

Source : fire expert Mr Alpo NIKULA, Department for Rescue Services, Ministry of Interior

Period : from 1996

Filling of database : ?

Information about knowledge of cause : "unknown" is a value of the classification. The name of the field make us suppose that all certain and supposed causes are registered.

Other information about causes :

Architecture of the classification : one field called "estimated cause of ignition"– one level – non hierarchic list

Observations :
It is not clear how is made the difference between deliberate and accidentaland where are registered arson fires.
It is also not clear what is behind the causes "sun", "electricity (not spark)", "friction energy".

Classifications :
Two different classifications have been found : one extracted from tables sent by the fire expert and another which is the one used to provide data to the JRC.

Classification extracted from tables sent by fire expert :
FI1_1	Lightning
FI1_2	Sun
FI1_3	Another natural cause
FI1_4	Prescribed burning for tree regeneration
FI1_5	Another form of prescribed burning
FI1_6	Burning of trash/litter
FI1_7	Camp-fire or another form of open flame
FI1_8	Candle
FI1_9	Cigarette or another form of tobacco
FI1_10	Matchstick or another igniter
FI1_11	Electricity (not spark)
FI1_12	Spark
FI1_13	Explosion energy
FI1_14	Firework
FI1_15	A hot object
FI1_16	Friction energy
FI1_17	thermal reaction of the chemical (self ignition)
FI1_18	Welding
FI1_19	Ignition after an inefficient extinction
FI1_20	Another known reason
FI1_21	Not known

Classification provided to JRC :

code	Cause in original language	Cause translated
FI2_01	Ihmisen toiminta	Human activities
FI2_11	Eläin	Animal
FI2_12	Luonnontapahtuma tai ilmiö	Natural event
FI2_13	Koneen tai laitteen vika	Caused by machine or some apparatus
FI2_14	Palovaarallinen aine	Inflammable material (liquid)
FI2_19	Muu tunnettu syy	Other known causes
FI2_99	Aiheuttaja tuntematon	Unknown

1.3.5. Latvia

<u>Designation of database</u> : national forest fires database ruled by State Forest Service

<u>Source</u> : fire expert Agris Šūmanis, Forest Fire Control Unit, State Forest Service

<u>Period</u> : since 2008.
From 1995 to 2007, railway influence, motorized vehicles influence, and short circuit of electric lines were grouped in an unique cause "communication lines influence"

<u>Filling of database</u> : the unique national database is based on intranet network. State Forest Service central administration Forest Fire Control Unit provide supervision and coordination of gathering of information. Any forester can add necessary data of forest fires which had occurred in those areas.

<u>Information about knowledge of cause</u> : "unknown" doesn't exist in the classification. All certain and supposed causes are registered in the database. There is quite always a cause at least supposed. If there is no other cause believable, the cause "negligence" is used.

<u>Other information about causes</u> : nothing

<u>Architecture of the classification</u> : one field detailed in 2 levels : 1st level corresponding to EU current classification, and 2nd level detailing the accidental causes. Deliberate causes are not detailed.

<u>Observations</u> : the category "old grass burning" concerns only fires coming from pastures and other agricultural lands, as this technique is prohibited at all as method of land cleanup by Fire Safety Rules and therefore prescribed fires are not used as tool for land cleanup as well.
The classification of causes connected with man influence must determinate types (groups) of wrong actions which cause a fires, and there is no difference in forest belonging : If the fire escapes from a bonfire then it will be classified as "Negligance of forest visitor" even in your own private forest.

<u>Classification</u> :

LV_1	Arson
LV_2	Causes connected with man influence, which includes:
LV_2.1	Old grass, straw burning
LV_2.2	Forest logging residues burning
LV_2.3	Railway influence
LV_2.4	Motorized vehicles influence
LV_2.5	Short circuit of electrical power lines
LV_2.6	Negligence of forest visitors (e.g. smokers, bonfires etc.)
LV_2.7	Other causes (forest fires started from peat production areas, fires started after traffic accidents, shooting in forest, structural fires, etc..)
LV_3	Natural cause - Lightning

1.3.6. Lithuania

Designation of database : national forest fires database

Source : fire expert Mr Zbignev GLAZKO, Forests Department.

Period : since 2000

Filling of database : The Directorate General of State Forests under the Ministry of Environment is responsible for the recording and gathering data on forests fires in Lithuania.

Information about knowledge of cause : "unknown" is a value of the classification (it's even the first level)

Other information about causes : nothing.

Architecture of the classification : 4 levels (first and second one corresponding to first level of other classifications, and only negligence is detailed in the fourth level

Observations : there is no fire cause due to pasture burning or prescribed burning because these activities don't exist in Lithuania.

Classification :
(codes invented for the purposes of the study)

LT_1	**Known causes**
LT_11	Man-made activities
LT_111	Deliberate *(only if author is caught)*
LT_112	Negligent action in :
LT_1121	agriculture, burning of grass *(including in private gardens)*
LT_1122	Forest practices
LT_1123	Other industrial activities
LT_1124	Means of communication *(telephone lines for example)*
LT_1125	Railway
LT_1126	Motor transport
LT_1127	Power lines (electric lines, gas pipes…
LT_1128	Campfires *(including all fires linked to leisure in forest or children games)*
LT_1129	Other *(including military exercises, garbage burning)*
LT_12	Natural
LT_13	Other known causes *(accidental with no active intervention of man)*
LT_2	**Unknown causes**

1.3.7. Poland

Designation of database : 2 different databases are used :
* State Fire Service database

This database registers in the computer program EWID-99 all fires happening in Poland, so its classification scheme is not especially oriented towards forest fires, but is also adapted to other fires like building fires or industrial fires.
* State Forests and National Parks database

This database registers only forest fires happening in state forest and national parks and its classification scheme was more adapted to the subject.

Until 2006 JRC received data concerning fires that occurred in forests and cultivated land based on data registered in the SFS database. Since 2007 JRC has been receiving data concerning fires registered by the State Fire Service, and additionally from State Forests and national parks, which were not registered in the EWID-99 program. The cause codes given in reports are enlisted in the tables describing the classifications.

Source : Fire Expert Joseph PIWNICKI, Forest Research Institute

Period :
SFS database : since 1999
SFNP database : since 1996. the database exists since 1976 but a different classification of causes (more detailed) was used from 1976 to 1995.

Filling of database : SFS database by firefighters, SFNP by forest divisions and national parks managers

Information about knowledge of cause : not stated.

Other information about causes : not stated

Architecture of the classifications :
- SFS database : one field with a classification presented as a non-hierarchic list of categories, even if it seems possible to regroup logically some categories.
- Former SFNP database : one field with a classification detailed in 2 levels (1st one with 14 values, including other and unidentified, detailed in the second one in none to 6 values). Both deliberate and accidental causes are detailed in the second level.
- Current SFNP database : one field with a classification detailed in 2 levels (1st one with 8 values, including other and unidentified, detailed in the second one in none to 3 values). This classification is much less detailed than the precedent. Only accidental causes are detailed in the second level.

Observations : nothing.

Classifications :

- State Fire Service database

Code for that study	description	Code given to JRC(until 2006)	Code given to JRC (since 2007)
PL_sfs_1	Careless of adults with use of open fire, incl. cigarettes, matches	1	PSP-1
PL_sfs_2	Careless of adults firing of vegetation's' remnants	2	PSP-2
PL_sfs_3	Careless of adults with use of combustible substances and explosives	3	PSP-3
PL_sfs_4	Careless of adults with fire hazardous works	4	PSP-4
PL_sfs_5	Careless of adults with other case	5	PSP-5
PL_sfs_6	Careless of adolescents *(aged under 16)* with use of open fire, incl. cigarettes, matches	6	PSP-6
PL_sfs_7	Careless of adolescents *(aged under 16)* firing of vegetation's' remnants	7	PSP-7
PL_sfs_8	Careless of adolescents *(aged under 16)* with use of combustible substances and explosives	8	PSP-8
PL_sfs_9	Careless of adolescents *(aged under 16)* with fire hazardous works	9	PSP-9
PL_sfs_10	Careless of adolescents *(aged under 16)* with other case	10	PSP-10
PL_sfs_11	Defects of electric devices and installations (exc. heating devices)	11	PSP-11
PL_sfs_12	Incorrect exploitation of electric devices and installations	12	PSP-12
PL_sfs_13	Defects of electric heating devices (furnaces, heaters etc.)	13	PSP-13
PL_sfs_14	Incorrect exploitation of electric heating devices	14	PSP-14
PL_sfs_15	Defects of heating devices for solid fuel	15	PSP-15
PL_sfs_16	Incorrect exploitation of heating devices for solid fuel	16	PSP-16
PL_sfs_17	Defects of heating devices for liquid fuel	17	PSP-17
PL_sfs_18	Incorrect exploitation of heating devices for liquid fuel	18	PSP-18
PL_sfs_19	Defects of heating devices for gas fuel	19	PSP-19
PL_sfs_20	Incorrect exploitation of heating devices for gas fuel	20	PSP-20
PL_sfs_21	Defects of machineries	21	PSP-21
PL_sfs_22	Incorrect exploitation of machineries	22	PSP-22
PL_sfs_23	Defects of manufacturing processes	23	PSP-23
PL_sfs_24	Incompliance of technological regimes	24	PSP-24
PL_sfs_25	Incorrect storing of hazardous substances	25	PSP-25
PL_sfs_26	Defects of means of transport	26	PSP-26
PL_sfs_27	Incorrect exploitation of means of transport	27	PSP-27
PL_sfs_28	Biological self-ignition	28	PSP-28
PL_sfs_29	Chemical self-ignition	29	PSP-29
PL_sfs_30	Thunderbolts	30	PSP-30
PL_sfs_31	Defects of building constructions	31	PSP-31
PL_sfs_32	Incorrect exploitation of building constructions	32	PSP-32
PL_sfs_33	Static electricity	33	PSP-33
PL_sfs_34	Arson (purposely) incl. acts of terror	34	PSP-34
PL_sfs_35	Fires as effects of local threats	35	PSP-35
PL_sfs_36	Other causes	36	PSP-36
PL_sfs_37	Unsettled	37	PSP-37

- Former State Forests and National Parks database (1976-1995)

PL_sfnpf_1	**Arson**
PL_sfnpf_11	arson for profit or for obtaining PZU compensation
PL_sfnpf_12	arson for revenge (family dissentions), etc.
PL_sfnpf_13	arson by mentally ill persons (pyromaniacs), etc.
PL_sfnpf_14	arson for belying abuse, covering up of another offence, etc.
PL_sfnpf_15	other arson
PL_sfnpf_2	**Carelessness of children at the age of up to 14 years inclusively**
PL_sfnpf_21	children's carelessness in handling cigarettes, matches, lighters, etc.
PL_sfnpf_22	burning of bonfires
PL_sfnpf_23	other carelessness of children
PL_sfnpf_3	**Carelessness of adults**
PL_sfnpf_31	carelessness in handling cigarettes, matches
PL_sfnpf_32	carelessness in handling of portable power sources
PL_sfnpf_33	carelessness in handling of non-electric lighting
PL_sfnpf_34	inappropriate usage of flammable fluids
PL_sfnpf_35	other carelessness of adults
PL_sfnpf_4	**Welding, cutting, soldering, etc.**
PL_sfnpf_5	**Spontaneous combustion**
PL_sfnpf_51	spontaneous combustion of vegetable products
PL_sfnpf_52	spontaneous combustion of chemical agents
PL_sfnpf_6	**Faults of a technological process**
PL_sfnpf_7	**Atmospheric discharges**
PL_sfnpf_71	lightning striking structures with no lightning arresters
PL_sfnpf_72	lightning striking structures with lightning arresters
PL_sfnpf_8	**Poor condition and inappropriate usage of heating and chimney installations**
PL_sfnpf_81	defects of heating installations (stoves, cookers), etc.
PL_sfnpf_82	defects of chimney pipes
PL_sfnpf_83	chimney sparks
PL_sfnpf_9	**Poor condition and inappropriate usage of electric devices**
PL_sfnpf_91	short-circuit of electrical system
PL_sfnpf_92	engines
PL_sfnpf_10	**Poor condition and inappropriate usage of mechanical equipment**
PL_sfnpf_11	**Sparks produced by tractors, locomobiles**
PL_sfnpf_12	**Sparks produced by steam locomotives**
PL_sfnpf_13	**Miscellaneous** (not classified in groups 1-12)
PL_sfnpf_14	**Unidentified in the course of investigation**

- Current State Forests and National Parks database (since 1997)

Code for that study	description	Code given to JRC (since 2007)
	Carelessness of adults	
PL_sfnpc_11	tourism and picking fruits of the forest (including smokers, bonfires…)	LP-1
PL_sfnpc_12	economic activity of State Forests (including post-exploitation burning and bonfires lit by forest workers)	LP-2
PL_sfnpc_13	other carelessness of adults (including work on structures located inside the forest, fireworks…)	LP-3
	Carelessness of minors (at the age of up to 15)	
PL_sfnpc_21	carelessness of minors (playing with matches, cigarettes, torches, fireworks…)	LP-4
PL_sfnpc_22	burning of bonfires by minors	LP-5
	Machines and equipments	
PL_sfnpc_30	failure of power line	LP-6
PL_sfnpc_41	road transport	LP-7
PL_sfnpc_42	rail transport (including fires started by passengers)	LP-8
PL_sfnpc_50	**Atmospheric discharges**	LP-9
PL_sfnpc_60	**Breakovers from non-forest land** including agricultural (straw) burning, pasture burning, tidying of escarpments and gardens, work on structures located outside the forest.	LP-10
PL_sfnpc_70	**Arson** including mental illness	LP-11
PL_sfnpc_80	**Other** including military exercises	LP-12
PL_sfnpc_90	**Unidentified**	LP-13

1.3.8.Romania

<u>Designation of database</u> : specific just for forest fires, ruled by the National Forests Administration ROMSILVA.

<u>Source</u> : Fire Expert Mr Septimius MARA, Ministry of Environment / professor Marian PROOROCU

<u>Period</u> : since 2005
The database exists since 1986 and the last changes was about the content and was made since 2005, when it was made suitable for reporting at EFFIS data base;

<u>Filling of database</u> :
Forestry Inspection Units from ROMSILVA are responsible for filling and analyzing the database. They collaborate also with fire fighters and police if the extend of the fire is very large and can't be extinguished just by the forestry personnel.

<u>Information about knowledge of cause</u> :
There is a specific field telling if the cause is certain, supposed or unknown. All the fires investigated are registered. If there is evidence of the cause of fire it is recorded as certain and if there are only clues leading to a cause that is registered as supposed.

<u>Other information about causes</u> :
It's a mention under "observations" chapter of the cause category, if there are any pertinent information ; The value of eventual fines is also registered.

<u>Architecture of the classification</u> :
One field detailed in 4 levels. The 3 first are dichotomous. Accidental causes are a bit more detailed than other ones but in only 3 sub-categories.

<u>Observations</u> :
In Romania, currently there is no classification by codes of presumed forest fire causes. The Fire Department uses nominal lists for presumed fire causes, but those are not most relevant in forestry. We emphasize that a detailed classification of forest fire presumed causes and codes is under work.

<u>Classification</u> : (codes invented for the purposes of the study)

RO_1	unknown
RO_2	known
RO_21	natural
RO_22	human
RO_221	criminal
RO_222	negligence
RO_2221	agricultural practices
RO_2222	pathways *(including all problems happening along roads crossing forests, like throwing cigarettes, or problems with brakes or motors…)*
RO_2223	public (tourists, children,etc.)
RO_2224	electric lines
RO_2225	railway

1.3.9. Slovakia

<u>Designation of database</u> : national forest fire database, ruled by ministry of interior – Presidium of fire and rescue corps

<u>Source</u> : bibliography (EFFIS report 2003)

<u>Period</u> : 1999-2003

<u>Filling of database</u> : ?

<u>Information about knowledge of cause</u> : "not determined" is a value in the classification, suggesting that an investigation has been done. But it's not stated where the fire are registered if there is no investigation.

<u>Other information about causes</u> : "arson" is separated in 2 values giving an information about the knowledge of author.

<u>Architecture of the classification</u> : one field – one level

<u>Observations</u> : for fires lit by children a difference is made according to the age but it's not stated why. It's not clear where fires caused by trains are registered (6 or 7)

<u>Classification</u> :

SK_1	Lightning – structure protected
SK_2	Lightning – structure not protected
SK_3	Arson by unknown person
SK_4	Arson by convicted person
SK_5	Electrical short connection
SK_6	Malfunction of motor vehicle exhaust or breaking system
SK_7	Other technical malfunction
SK_8	Withered grass and bush covers firing
SK_9	Camp fires
SK_10	Waste and garbage burning
SK_11	Escape from waste dump
SK_12	Smoking
SK_13	Open fire handling
SK_14	Military training
SK_15	Other adult's carelessness
SK_16	Children 6-15 years
SK_17	Children under 6 years
SK_18	Re-ignition of fire
SK_19	Other monitored reasons
SK_20	Not determined

1.3.10. Slovenia

Designation of database :
2 different databases are co-existing and are in the phase of reform to be standardized.

- **N**ational **F**orest **S**ervice (NFS) database

This database was drafted within the framework of forestry profession and refers exclusively to forest fires.

- **I**nformation **S**ystem for **R**eporting **I**nterventions and **A**ccidents (ISRIA) database

This database is ruled by the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief. In this database forest fires are not specially classified, and neither are the causes of forest fires. In this classification, forest fires are placed among "fires in the natural environment or in the open air" (section : group of events) and among "fires in tree and shrub areas" (section : subgroup of events). But as fire can spread into forests from elsewhere, other categories in this subgroup should not be neglected either, i.e.: "fires on cultivated grounds", "grassland fires", "fires on rubbish dumps and landfills", and "other fires in nature (in the open air)". The causes of fires are not stipulated per separate types of fires; the list is uniform for all types of fires.

At the moment, both classification schemes are in the phase of reform, in which the NFS and the Administration are participating side by side. Namely, these two institutions have made an agreement to standardise the two classifications, but at the same time consented that these changes should be made in such a way that the possibility of temporal series of data processing would be in no way lost.

Source : contribution from project partner Andreja FERREIRA, Slovenian Forestry Institute.

Period :
NFS : 2001-2004
ISRIA : since 2005
ISRIA was introduced in 2005; since then, all the data on natural and other disasters and interventions are gathered in a single place. Since 2005, the Slovenia Forest Service, too, has been entering detailed information on forest fires into this system, and does not keep its own forest fire database. Here it adjusts its forest fire classification to ISRIA. In internal reports on forest in Slovenia, however, it still uses its own classification of the causes of forest fires. Prior to 2005, the Slovenia Forest Service had been entering the data on forest fires (as well as on their causes) into its own database, which is available for the 1995-2004 period, while during the 2001-2004 period the Forest Service developed it within the Forest Focus project.

Filling of database :
the first registration of an event is made by operator in the regional information centre and is subsequently supplemented by the intervention coordinator, the participating units and other participating organisations interested in this information.

Information about knowledge of cause :
"unknown" is a category existing in both databases. ISRIA even makes the difference between "unknown" and "no data".

Other information about causes : not stated.

Architecture of the classification :
- NFS : Fire causes are described in one field detailed in 5 levels (the 3 first are dichotomous : known/unknown ; man/natural ; arson/negligence). Only the cause "negligence" is detailed in a 4th and a 5th level.
- ISRIA : Classification of fire causes is two-stage; with 2 different fields : "fire cause" which is more describing the ignition factor, and "fire outbreak manner", which is more describing the context and the type of activity done when the fire occurred. The field "fire cause" is detailed in 2 levels. The difference between accidental causes and deliberate causes is made in the field "fire outbreak manner", while the natural causes are identified in both fields.

Observations :
We have to notice that "Self-ignition of garbage at landfill" is considered as a natural cause in NFS database but not in ISRIA database. The NFS database is the only one in this study to consider that cause as natural, while classifications in other countries consider it as accidental.

Classifications :

- National Forest Service database

SI_nfs_1.0	**Known cause**	
SI_nfs_1.1	Man	
SI_nfs_1.11	Arson	
SI_nfs_1.12	Negligence	
SI_nfs_1.121	Agricultural operations	
SI_nfs_1.1211		*Open fire, making fires in the open air*
SI_nfs_1.1212		*Hay self-ignition*
SI_nfs_1.122	Forestry operations	
SI_nfs_1.1221		*Open fire, making fires in the open air*
SI_nfs_1.123	Industrial activities	
SI_nfs_1.1231		*Ignition of inflammables and vapors*
SI_nfs_1.1232		*Explosion*
SI_nfs_1.1233		*Grinding, welding, friction, overheating*
SI_nfs_1.124	Communications (trains, electric lines, etc.)	
SI_nfs_1.1241		*Traffic accident*
SI_nfs_1.1242		*Fire on vehicles*
SI_nfs_1.1243		*Train sparks*
SI_nfs_1.1244		*Short circuit, electricity distribution*
SI_nfs_1.125	Forest visitors (tourists, children, etc.)	
SI_nfs_1.1251		*Careless smoking, thrown away butts*
SI_nfs_1.1252		*Open fire, making fires in the open air*
SI_nfs_1.1253		*Mass manifestations in natural environment*
SI_nfs_1.1254		*Children's play*
SI_nfs_1.126	Other (army, etc.)	
SI_nfs_1.1261		*Military activities*
SI_nfs_1.1262		*Construction facility fire*
SI_nfs_1.1263		*Depositing of hot ashes or burning materials*
SI_nfs_1.2	Natural causes	
SI_nfs_1.21	Lightning	
SI_nfs_1.22	Self-ignition of garbage at landfill	
SI_nfs_2.0	**Unknown cause**	

- **I**nformation **S**ystem for **R**eporting **I**nterventions and **A**ccidents database

SI_isria_1	**Open fire**
SI_isria_1.1	Open fire during agricultural activities
SI_isria_1.2	Open fire during forest activities
SI_isria_1.3	Open fire, fires made by nature visitors in the open air
SI_isria_1.4	Other use of fire
SI_isria_1.5	(Makeshift) fireplaces
SI_isria_1.6	Careless smoking, thrown away butts
SI_isria_1.7	Depositing of hot ashes or inflammables
SI_isria_1.8	Locomotive sparks
SI_isria_1.9	Sparks caused by braking train
SI_isria_1.10	Cooking
SI_isria_1.11	Grinding, welding
SI_isria_1.12	Ignition of inflammables near fire or heating appliance
SI_isria_1.13	Ignition of inflammables, gases, vapors
SI_isria_2	**Explosion**
SI_isria_2.1	Explosion of household gas
SI_isria_2.2	Explosion of other gases
SI_isria_2.3	Explosion due to increased pressure
SI_isria_2.4	Explosion or open fire as a result of military activities
SI_isria_2.5	Explosion of ordnance
SI_isria_2.6	Explosion of old unexploded ordnance
SI_isria_2.7	Petard or other pyrotechnic means
SI_isria_2.8	Other explosions
SI_isria_3	**Electricity**
SI_isria_3.1	Short circuit, electricity distribution
SI_isria_3.2	Static electricity
SI_isria_3.3	Breakdowns and irregular functioning of electric heating appliances and implements
SI_isria_4	**Chemical energy**
SI_isria_4.1	Self-ignition of hay, mown grass in the open air
SI_isria_4.2	Self-ignition of garbage at landfill
SI_isria_4.3	Ignition and sparks in chimneys
SI_isria_4.4	Self-ignition of hay, straw in agricultural facilities
SI_isria_4.5	Other self-ignitions
SI_isria_4.6	Exothermic reaction
SI_isria_5	**Mechanical work**
SI_isria_5.1	Friction, overheating
SI_isria_5.2	Shock, pressure burst
SI_isria_5.3	Breakdown and damages of appliances, equipment, machines, engines
SI_isria_6	**Natural phenomena**
SI_isria_6.1	Lightning
SI_isria_6.2	Earthquake
SI_isria_6.3	Wind
SI_isria_6.4	Other natural phenomena
SI_isria_7	**Other**
SI_isria_7.1	Unsuitable technical state of chimneys
SI_isria_7.2	Unsuitable technical state of facilities
SI_isria_7.3	Fire in nature
SI_isria_7.4	Fire in building

SI_isria_7.5   Fire in vehicles
SI_isria_7.6   Traffic accident
SI_isria_7.7   Other
SI_isria_7.8   Unknown
SI_isria_7.9   No data

ISRIA outbreak manner :
SI_isriaom_1   Negligence as a result of traffic activities
SI_isriaom_2   Negligence as a result of agricultural activities
SI_isriaom_3   Negligence as a result of forest activities
SI_isriaom_4   Negligence as a result of industrial activities
SI_isriaom_5   Negligence as a result of military activities
SI_isriaom_6   Negligence as a result of other activities
SI_isriaom_7   Arson
SI_isriaom_8   Children's play
SI_isriaom_9   Person has fallen asleep
SI_isriaom_10   Influence of alcohol and drugs
SI_isriaom_11   Unknown person
SI_isriaom_12   Psychically disturbed person
SI_isriaom_13   Natural phenomena
SI_isriaom_14   Caused by animals
SI_isriaom_15   Other
SI_isriaom_16   Unknown

1.3.11. Sweden

Designation of database :
National forest fires database (actually a dataset taken from the national incident report database covering all incidents attended by the municipal fire brigades)

Source :
Fire Expert Mr Leif Sandahl / Mr Colin McIntyre, Swedish Civil Contingencies Agency

Period : since 2005
The database exists since 1996 and minor changes in classifications were implemented in 2005 (SE_10 was replaced by SE_21 and SE_17 by SE_23)

Filling of database :
Every month fire brigades generate a data file containing information from all new or altered incident reports. The national database is then updated with the new data file and quality checks are carried out. Any suspected errors are notified to the brigade. In February every year the previous year's data is checked again and if necessary corrected by the brigade or in certain circumstances the Agency. In March statistical tables are produced and after that the previous year's data is usually left unchanged even if a brigade should decide to update a particular report in the local system.
There is no direct link between the fire cause identified in a police investigation and the fire cause recorded in the incident report by the fire brigade.

Information about knowledge of cause :
"unknown" and "not specified" are values of the classification. The local fire brigade is obliged to identify the cause of the fire. Occasionally there are problems with datafiles from a brigade and in exceptional circumstances the Agency must accept fires without a recorded cause. Such fires are then classified by the agency as "not specified". When the fire officer cannot identify a probable cause (30% of the cases) he records the cause as "unknown".
There is a separate data field in the national database for the fire officer to record how certain he is on the recorded cause ("Probable"/"Very probable"/"Certain") but the Agency question the validity of this field and consider it more of a reflection on the fire officer's personality than an estimate of reliability of the fire cause.

Other information about causes : nothing.

Architecture of the classification :
one field – one level – non hierarchic

Observations :
Quite detailed classification even if it's not hierarchic (all causes placed on the same level)
Fires due to leisure activities are registered as "Other" unless the leisure activity caused the fire by one of the causes in the classification (campfire, smoking…). This classification is more oriented towards the ignition factor than towards the context.

Classification :

code	Cause in original language	Cause translated
SE_0	Orsak ej angiven	Not specified
SE_1	Återantändning	Re-ignition
SE_2	Anlagd med uppsåt	Arson
SE_3	Barns lek med eld	Child playing with fire
SE_4	Tågbromsning	Sparks from train brakes
SE_5	Rökning	Smoking
SE_7	Tekniskt fel	Technical fault (i.e. problem with a machine or a technical system, including electric lines)
SE_8	Blixtnedslag	Lightning
SE_9	Fyrverkerier	Fireworks
SE_10	Hantverkare	Careless handyman (no more used, replaced by SE_21 since 2005)
SE_12	Explosion	Explosion
SE_14	Värmeöverföring	Heat transfer
SE_16	Självantändning	Spontaneous combustion
SE_17	Lägereld	Camp fire (no more used, replaced by SE_23 since 2005)
SE_18	Trafikolycka	Transport accident
SE_19	Övriga gnistor	Other sparks (from vehicles)
SE_20	Eldning av gräs	Fire spread when burning grass
SE_21	Heta arbeten	Hot work (with tools that give off heat or sparks, like cutting, grinding, welding, LPG blowlamp etc…)
SE_22	Eldning annat	Fire spread when burning other things than grass (including prescribed fire, garbage burning, residues from agricultural or forest activities)
SE_23	Grillning/lägereld	Camp fire/grill
SE_24	Friktion	Friction (generates heat and can ignite materials)
SE_30	Okänd	Unknown
SE_91	Annan	Other

1.3.12. United Kingdom

Designation of database : UKVFS
There is no existing national database for forest fires in UK. Different services produce reports about forest fires but in very various and uncoordinated ways.
The Forestry commission is currently conducting the « United Kingdom Vegetation Fire Standard (UKVFS) » project which is a multi-government agency and organisation approach to delivering vegetation fire (Outdoor fires) reporting.
UKVFS Data Fields is designed to provide a framework of data field as part of an evidence-based approach to reporting wildfire incidents and prescribed fires.
UKVFS provides a comprehensive range of data fields to be used in vegetation reporting systems (i.e. wildfires or prescribed fire reporting). This provides the United Kingdom with a standard for the reporting of vegetation fires that will ensure correspondence between different organisations, sectors and professions across fire, governance and land management.
It is a non-mandatory framework of data fields that provides a flexible approach to developing fire reporting for organisations. This includes United Kingdom's Fire and Rescue Service's, public and private land management organisations, wildfire groups and researchers. UKVFS's data fields can however be used in the development of vegetation fire systems and processes such as; fire investigation, prevention, training, risk assessment and identification, land management and policy.
UKVFS Data Fields is formed from twelve data sections of over one hundred data fields. One of these sections is "Fire Cause".

Source : fire expert Jonathan Taylor – Rob Gazzard – Forestry Commision.

Period : this project is being conducted. A draft has been produced in 2009 which is presented in this sheet.

Filling of database : not filled yet

Information about knowledge of cause : not stated.

Other information about causes : this database has four complementary fields :
- "caused by" with 8 categories, recording whom caused the incident (other, animal or person with different ages for person).
- "contributing factors" with 17 categories, recording the contributing activity or number of the individuals involved (work or leisure activities, one or more people, use of drugs or alcohol, mental or physical health issues, smoking, activities with no man directly involved like powerlines or vehicles…).
- "place where fire started" with 9 categories, recording the place where the fire was ignited (like paths, open area next housing, access land, military places, railway…)
- "item first ignited" with 17 categories, recording the ignition source (different elements of vegetation, different fuels, different categories of refuse, building, vehicle…)

Architecture of the classification :
One field called "fire cause" defined by 2 levels : "motive category" (deliberate, accidental and not known) and "cause type"

Observations :
All reported deliberate fires in UKVFS are assumed to be on the owner property. All cause types are relevant to wildfire incidents, but only deliberate fires are relevant to 'prescribed burning operations'. Where a prescribed burning or suppression fire goes 'out of control' a deliberate, accidental or unknown category can be recorded.

We have to notice that a fire restarted from a previous fire will be classified in the initial "motive category"

Classification :

UK_1	**Deliberate**
UK_1a	Incendiary device
UK_1b	Prescribed burning operation
UK_1c	Prescribed burning operation out of control
UK_1d	Suppression fire out of control
UK_1e	Heat sources and combustibles brought together deliberately
UK_1h	Later found as arson
UK_1i	Restart from previous fire
UK_1j	Other
UK_2	**Accidental**
UK_2a	Faulty leads to equipment or appliance
UK_2b	Fault in equipment or appliance
UK_2c	Prescribed burning out of control
UK_2d	Suppression fire out of control
UK_2f	Burning out of control (i.e. Bonfire)
UK_2g	Careless handling – due to sleep or unconsciousness
UK_2h	Careless handling – due to careless disposal
UK_2i	Careless handling – due to knocking over
UK_2j	Combustible articles too close to heat source
UK_2k	Person too close to heat source (or fire)
UK_2l	Vehicle crash or collision
UK_2m	laying with fire (or heat source)
UK_2n	Accumulation of flammable material
UK_2o	Military training
UK_2p	Natural Occurrences
UK_2q	Restart for previous fire
UK_2r	Overheating, unknown cause
UK_2s	Other
UK_3	**Not known**
UK_3a	Faulty leads to equipment or appliance
UK_3b	Fault in equipment or appliance
UK_3c	Prescribed burning out of control
UK_3d	Suppression fire out of control
UK_3f	Burning out of control (i.e. Bonfire)
UK_3g	Careless handling – due to sleep or unconsciousness
UK_3h	Careless handling – due to careless disposal
UK_3i	Careless handling – due to knocking over
UK_3j	Combustible articles too close to heat source
UK_3k	Person too close to heat source (or fire)
UK_3l	Vehicle crash or collision
UK_3m	laying with fire (or heat source)
UK_3n	Accumulation of flammable material
UK_3o	Military training
UK_3p	Natural Occurrences
UK_3q	Restart for previous fire
UK_3r	Overheating, unknown cause
UK_3s	Other

1.4. EU Candidate Countries

1.4.1. Croatia

Designation of database : national forest fires database
Source : JRC
Period :
Filling of database :
Information about knowledge of cause : "unknown" is a value of the classification
Other information about causes :
Architecture of the classification : one field – one level – non hierarchic
Observations : Very simple classification scheme with only one more value than the EU classification ("by child").
Classification :

code	Cause in original language	Cause translated
HR_1	namjera	Deliberate or Arson
HR_2	nehat-nepažnja	Accidental or Negligence
HR_3	dječja igra	by child
HR_4	prirodna pojava	Natural
HR_8	nepoznato	Unknown

1.4.2. Turkey

Designation of database : national forest fires database ruled by the Directorate General of Forestry (OGM)
Source : bibliography / fire expert Mr Muammer KOL
Period : 1992 - 2001
Filling of database : foresters
Information about knowledge of cause : only certain causes seem to be registered. If there is no proof, it is registered as "unknown" which is a value of the classification
Other information about causes :
Architecture of the classification : one field with 2 levels. Only fires due to negligence are detailed in the second level.
Observations :
Classification :

TR_1	negligence
TR_11	agricultural residues
TR_12	cigarette
TR_13	hunting
TR_14	rail traffic
TR_15	road traffic
TR_16	shepherds
TR_17	picnic
TR_18	tourism
TR_19	power lines
TR_110	other negligence
TR_2	intentional
TR_3	unknown
TR_4	lightning

1.5. Other European Countries

1.5.1. Switzerland

Designation of database :
name : swissfire: Swiss forest fire database.
domain : national level since 2008.
fire types : forest fires and pasture fires. There is field "definition" with the options "Forest fire" and "open-land fire". A fire is considered "forest fire" when at least a part of forest has burnt (can be 5% forest and 95% pasture). In "Open-land fires" no forest is affected by the fire. At the moment the database contains only forest fires.

Source : fire expert Mr Boris Pezzatti

Period : the database was initially developed only for canton Ticino. In 2005 it was extended to canton Grisons, Uri and Valais. Since 2008 it is at national level. Please consider following date ranges:
cantons Ticino, Valais, Uri: 1900-(detailed archive search has been performed)
canton Grisons: 1980-
other: 2008-

Filling of database :
data gathering : depend from each canton, according to their administrative organization. There is a responsible in each Canton, usually someone of the forest service. In Ticino also the fire-fighters reports are considered, in order to identify fires not registered by the forest service. Also historic researches (archives) have been performed.
Procedure : usually the forester fill up a form after a forest fire
penal procedures: no link to penal procedures for the moment. In Canton Ticino fire-fighters get refunded for forest fires only if the event have been registered.

Information about knowledge of cause :
unknown : "unknown" is a value of the classification
reliability : there is a field "cause_reliability" with 2 options (sure, supposed)
investigation : nothing

Other information about causes :
"Remark_cause" field with textual information.

Architecture of the classification :
One field detailed in 2 levels. In a second field is possible to enter an "other known cause", if the cause cannot be assigned to the mentioned categories.

Observations :
"cross-border" is an original value which is not found in other classification schemes. It could be considered as a sub-category of "unknown"

Classification :

code	causes in official languages			causes translated
	IT	GE	FR	
CH_1	**non identificabile**	**unbekannte Ursache**	**pas connu**	**unknown**
CH_2	**fulmine**	**Blitzschlag**	**foudre**	**lightning**
CH_3	**dolo/piromania**	**Brandstiftung**	**dol/pyromanie**	**arson**
				carelessness
CH_4	fuochi all' aperto non spenti	ungenùgend gelàschte Feuerstellen	feu de camping pas éteint	not extinguished campfires
CH_5	privati (turisti, escursionisti, mozziconi, altro)	privat(Touristen, Wanderer, weggeworfene Raucherwaren, sonstiges)	privée (touristes, excursionnistes, mégots, autre)	private (tourists, hickers, thrown cigarettes, other)
CH_6	bambini	Kinder	enfants	children
CH_7	attività forestali	Forstwirtschaft	activitées forestières	forestry
CH_8	attività agricole	Landwirtschaft	activitées agricoles	agriculture
CH_9	militare	MilitÃ¤r	militaires	army
				technic installation
CH_10	ferrovia	Eisenbahn	chemin de fer	rail
CH_11	elettrodotto	elektrische Leitung	conduite électrique	electric line
CH_12	altra installazione tecnica	technische Anlage, sonstiges	autre installation tecnique	other technical systems
CH_13	**innescato oltre confine**	**grenzùberschreitend**	**transfrontalier**	**cross-border**
CH_14	**ripresa di incendio**	**wiederentfachen alter Brandherd**	**reprise de feu**	**fire restarting**
CH_15	**altra causa conosciuta**	**andere bekannte Ursache**	**autre cause connue**	**other known cause**

1.6. Other Countries

1.6.1. Australia

Each state is managing forest fires on its way and it seems that there is no national policy so there is neither national database. The state of New South Wales seems to have specific fire investigation brigade, but no data on the results of these investigations has been found. The State of Victoria seems to have a precise procedure to register fire causes. This is what is described further.

Designation of database : State of Victoria Forest Fire Dtabase

Source : Department of Sustainability and Environment (DSE) of Victoria website

Period : at least since 1976

Filling of database : this database is filled by forester of the DSE

Information about knowledge of cause : most fires are investigated. The difference is made between cause "unknown" corresponding to fires investigated without finding a cause and "not reported" corresponding to fires not investigated.

Other information about causes : not stated.

Architecture of the classification : one level in a non hierarchic list of causes

Observations : nothing.

Classification :

AUv_1	lightning
AUv_2	exhaust, chainsaw
AUv_3	exhaust, other
AUv_4	snigging, hauling *(ie forest exploitation)*
AUv_5	burning vehicle, machine
AUv_6	pipe, cigarette, match
AUv_7	campfire, barbecue
AUv_8	prescribed burning *(escaped)*
AUv_9	burning off, railway
AUv_10	burning off, stubble, grass, scrub
AUv_11	burning off, windrow, heap
AUv_12	train
AUv_13	deliberate lighting (malicious)
AUv_14	waste disposal, domestic
AUv_15	waste disposal, industrial, sawmill, tip *(dump)*
AUv_16	power transmission
AUv_17	house, stove, flue
AUv_18	burning building
AUv_19	fireworks
AUv_20	relight, wildfire
AUv_21	relight, prescribed fire
AUv_22	relight, burning off
AUv_23	other
AUv_24	unknown *(ie investigated but without conclusive evidence)*
AUv_25	not reported *(ie not investigated)*

1.6.2. Canada

<u>Designation of database</u> : national forest fires database

<u>Source</u> : Canadian Council of Forest Ministers website

<u>Period</u> : at least since 1990

<u>Filling of database</u> : Each state and also "Parks Canada" is responsible for filling a database for fires happened in its juridiction. All the databases are then gathered in the national database.

<u>Information about knowledge of cause</u> : most fires are investigated. "Undetermined" includes both fires non-investigated and fires investigated without result.

<u>Other information about causes</u> : not stated.

<u>Architecture of the classification</u> : 2 levels distinguished by the involvment of man. Only human activities are detailed in the second level. "Incendiary" is placed at the same level as other human-linked causes.

<u>Observations</u> : some states can have a more detailed classification as Alberta which distinguishes 3 sub-classes in "other industry" : "oil and gas industry", "power lines industry", and "other industry", and 2 sub-classes in "other known causes" : "re-start of fire" and "prescribed burning".

<u>Classification</u> :

CA_1	**Human activities**
CA_11	recreation
CA_12	residents
CA_13	forest industry
CA_14	railroad
CA_15	other industry
CA_16	incendiary
CA_17	other known causes
CA_2	**Lightning**
CA_3	**Undetermined**

1.6.3. Chile

Designation of database : national forest fires database

Source : National Forest Service website

Period : since 2003 (former classification has been used from 1993 to 2002)

Filling of database : National Forest Service

Information about knowledge of cause : not stated

Other information about causes : not stated

Architecture of the classification : 2 levels, the first one corresponding to UE current classification scheme. Only the accidental fires are detailed in the second level.
Former classification had only one level in a non-hierarchic list of causes.

Observations : nothing.

Classifications :

- Former classification scheme (1993-2002)

CL_old_1   forest works
CL_old_2   agricultural works
CL_old_3   sport and recreation
CL_old_4   games
CL_old_5   transit and transports
CL_old_6   other activities
CL_old_7   deliberate
CL_old_8   others causes
CL_old_9   unknown

- current classification scheme (since 2003)

The former value "transit and transport" has been more detailed in this new classification.

	accidental
CL_1.1	forest works
CL_1.2	agricultural or pastoral works
CL_1.3	manufacturing or harvesting of forest secundary products
CL_1.4	leisure activities
CL_1.5	rail
CL_1.6	fire extinction activities, structural fires, others
CL_1.7	people, vehicles or planes transit
CL_1.8	garbage burning
CL_1.9	electric accidents
CL_1.10	other accident from activities
CL_2.1	**deliberate**
CL_3.1	**natural**
CL_4.1	**unknown**

1.6.4. USA

Designation of database :
National Fire Occurrence Database, ruled by National Forest Service.
This database registers either wildfires and prescribed planned or natural fires.

Source : National Forest Service website / partner's contribution (NICIF)

Period : since 1995.

Filling of database :
* Regional Foresters are responsible for establishing appropriate local reporting and ensuring that the Regional fire record is complete and accurate in the national fire occurrence data base.
* Forest Supervisors are responsible for ensuring that fire reports for the calendar year are entered into the national fire occurrence data base within the time standards and ensuring that the forest fire record is complete and accurate in the national fire occurrence data base.
* District Rangers are responsible for preparing a complete and accurate report on each statistical wildfire on Form FS-5100-29, Individual Fire Report, within the time standards.
* The manager of the reporting unit is responsible for providing a report to all affected Forest Service units included in the Form FS-5100-29, Individual Fire Report, within the time standards.
The form is registered in a national application called FIRESTAT.

Information about knowledge of cause : no specific fiel telling it. Even supposed causes seem to be registered.

Other information about causes : Regional Services have a field called "special code" where they can register additional information for specific purposes.

Architecture of the classification : 4 fields describing the cause :
a. Statistical Cause.
b. General Cause. Used to further identify the human activity related to the fire ignition.
c. Specific Cause. Used to further refine and identify the cause.
d. Class of People. Used to identify the person or group involved with a human-caused fire.

Observations : this particular architecture allows to make analysis in different logical approaches.

Classification :

a. Statistical Cause.
US_st_1	Lightning
US_st_2	Equipment Use
US_st_3	Smoking *(except the fires started by smoking children or railroad employees)*
US_st_4	Campfire *(except the fires started by children or railroad employees)*
US_st_5	Debris Burning *(including vegetation burning)*
US_st_6	Railroad *(regardless of the specific fire-starting agent)*
US_st_7	Arson *(excluding negligent debris burning fires)*
US_st_8	Children (less than 12 years-old) *(regardless of the specific fire-starting agent)*
US_st_9	Miscellaneous *(including unknown causes, power lines, blasting, fireworks other than children, structure fires...)*

b. General Cause.

Code	Description
US_ge_1	Timber harvest
US_ge_2	Harvest other products
US_ge_3	Forest/Range management activities
US_ge_4	Highway
US_ge_5	Power, Reclamation
US_ge_6	Hunting
US_ge_7	Fishing
US_ge_8	Other recreation
US_ge_9	Resident
US_ge_0	Other *(including unknown activities and lightning fires)*

c. Specific Cause.

Code	Description
US_sp_1	Lightning
US_sp_2	Aircraft
US_sp_3	Burning vehicle
US_sp_4	Exhaust-Powersaw
US_sp_5	Exhaust-Other
US_sp_6	Logging line
US_sp_7	Brakeshoe
US_sp_8	Cooking fire
US_sp_9	Warming fire
US_sp_10	Smoking
US_sp_11	Trash burning
US_sp_12	Burning dump
US_sp_13	Field burning
US_sp_14	Land clearing
US_sp_15	Slash burning
US_sp_16	Right-of-way burning
US_sp_17	Resource management burning
US_sp_18	Grudge fire
US_sp_19	Pyromania
US_sp_20	Smoking out bees or game
US_sp_21	Insect/snake control
US_sp_22	Job fire
US_sp_23	Blasting
US_sp_24	Burning building
US_sp_25	Powerline
US_sp_26	Fireworks
US_sp_27	Playing with matches
US_sp_28	Repel predatory animals
US_sp_29	Stove fuel sparks
US_sp_30	Other *(includes unknown causes)*

d. Class of People.

US_pe_1	Owner
US_pe_2	Permittee
US_pe_3	Contractor
US_pe_4	Public employee
US_pe_5	Local permanent
US_pe_6	Seasonal
US_pe_7	Transient
US_pe_8	Other *(persons whose status cannot be determined)*
US_pe_9	Visitor
US_pe_0	Not person-caused *(includes lightning fires)*

2. ANALYSIS

Introduction

This analysis is done to understand the setting of the various classification schemes and see if their logic may be reproduced or widespread, or how it could be transposed in a different logic.

At first, we find that some bases are not hierarchical but just list juxtaposed categories without showing a strategy of organized subdivisions (Greece, Bulgaria, Finland, Slovakia, Sweden, Croatia). However, other classifications of other countries (mainly the most affected by forest fires, except Greece) seem to have an approach that is both more hierarchical and more precise, detailed in different levels (2 to 5) and often dividing in an organized manner at least the causes of involuntary origin.

We can notice that some databases register all fires even building fires or industrial fires, so the classification scheme are not completely adapted to forest fires : Poland state fire service, Czech Republic, Slovenia ISRIA.

If we try to analyse further the detailed classification schemes, we can see that for voluntary causes, there is always the same strategy based on the motivation of the incendiary act. For unintentional causes, strategies may be more varied.

The following note attempts to describe the various possible approaches. For each hypothesis, the cases difficult to classify or which interpretation seemed delicate are reported.

In the first level, it always happens to find at least the 4 classes identified in the current European classification :

1 - unknown
2 - natural
3 - accidental / negligence
4 - voluntary

It is therefore to analyze how these broad classes have been detailed in a second or a third level in the main bases examined, and to deduce what would be the various possibilities for harmonization.

1 - Unknown

UK, Latvia and France SE are the only classifications where this value doesn't exist. In the France SE classification, "unknown" is not a class of the field "cause". There is another field "knowledge of the cause" which distinguishes 4 classes : "sure", "probable", "supposed", "unknown". The field "cause" remains empty for the fires of knowledge "unknown"

In the USA database, unknown causes are registered amongst "other causes" or "miscellaneous causes"

Only Portugal details this class, depending on the reasons why the investigation failed.

Switzerland identifies a class "cross-border fire" wich would be a sub-category of this class "unknown".

Unknown is very often a class of the first level. The distinction known / unknown is even the first level for classifications from Cyprus, Romania and Slovenia National Forest Service

It might be interesting to differentiate 2 cases :
- no investigation
- investigation done but nothing found
Some bases are able to infer whether an investigation was conducted or not :
  - in the south-eastern France when the survey was conducted but failed the field "knowledge of the cause" is completed as "unknown" then that if there was no investigation this field is not filled.
  - Czech republic database distinguishes 2 values : "unsolved, still under investigation" and "no further investigation" but doesn't seem to consider the case with no investigation at all.
  - Slovenia ISRIA database distinguishes the 2 cases "no data" and "unknown", this second one suggesting that an investigation has been done.
  - Sweden database distinguishes "not specified" (when it has not been filled by the local service) and "unknown".

2 - Natural
Most of the classifications identify only one natural cause : lightning.

Italy also identifies another cause which is the volcanic activity. Slovenia ISRIA database identifies 4 different values for natural phenomena but as it is a database registering all fires it is not certain that forest fires are recorded in other values than "lightning"

In former Promethee classification "natural" didn't existed and "lightning" was a part of "accidental causes"?

The Slovenia national forest service classification considers "self-ignition of garbage at landfill" as natural but in the same time considers hay self-ignition as accidental.When it is identified in other databases, self-ignition of piles of waste (plants - sawdust) due to fermentation appears to be more considered as an accidental cause (Poland, Czech Republic, Sweden, Finland?)

3 - Accidental / negligence
This class includes all cases not linked to a deliberate attempt to burn the landscape in order to destroy it.
Some cases are being treated differently depending on the countries :
- Fires caused by children's games are considered as accidental (France, Spain, Slovenia, Poland, Switzerland) or voluntary irresponsible (Portugal, Italy). In Croatia, it's even an other category placed on the same level as "accidental or negligence" and "deliberate or arson". In Czech Republic, it is placed in the second level and regrouped in the same first level as "unknown" and "arson". For the non hierarchic classification, this cause can be identified (Greece, Sweden, Bulgaria) or not (Lithuania, Latvia, Finland). In Chile, the category "game" was distinguished from "sport and recreation" until 2002 but these 2 categories seem to have been regrouped in "leisure activities" in the current classification.

There is also a variety in the definition of children : the approach can be by the difference between minor and major, legally responsible or not, or according to the age : less than 6, 12, 15, 18 years…
- The fires caused by smokers are sometimes identified separately (Portugal, Italy, Spain, France south-east, Cyprus, Bulgaria, Finland, Slovenia, Sweden), or included in leisure activities or in the activity of the smoker. When it is identified, it regroups either cigarettes and matches, except in Finland where cigarettes are in one category and matches in an other one.
- The fires caused by <u>agricultural and pastoral burning</u> are all considered as accidental in France, Portugal, Slovenia, Poland, Czech Republic, Switzerland and Chile. However, Spain, Italy and UK distinguish the case of an escaped fire which is considered as accidental from the case of a fire lit in order to destroy natural vegetation which is considered as deliberate.

Two approaches seem existing to cut this class in a 2nd level : the distinction between causes related or not to the initial use of fire or hot objects, or the distinction between causes related or not to an active intervention of the man.

A - approach based on the initial use of fire

This is the case mainly for Portugal's classification which uses this approach in its first level, but also for the former classification of Poland NFS and the Czech republic classification. The third level of the France SE classification uses also this approach. Spain, Italy, Greece and Cyprus classifications are not basically oriented towards this approach but are enough detailed to find some links with this approach.

A31: cases with initial use of fire
a 3rd level can be found by detailing the purpose of the use of fire : works related to vegetation management, waste management, recreation.

A311: use of fire for work related to vegetation management
It may be burning living plants (prescribed burning, pastoral fires, stubble burning, burning shoulders ...) or cut plants (in a pile or in windrows). The France SE, Portugal and Spain classifications make that distinction between living and cut plants.
This can be achieved by farmers, ranchers, foresters, other professionals or private.
Most bases distinguish at least agricultural, forestry and pastoral fires. The France south-east base classifies pastoral fires as a sub-category of agricultural fires and adds 2 categories : Industrial/craft, and private. Other French bases make this distinction between the different socio-professional categories, but they mix for each one the use of fire with other accidents caused by machinery.
Case of prescribed burning : this category doesn't exist in some countries as this acivity is not practiced in the country. Usually this category is used to record only prescribed fire that escaped, but some countries (like USA or UK) register all prescribed fires.

A312: use of fire for waste management
These are the burning of household or industrial waste (distinction made in Portugal), deposits in official or illegal garbage dump (distinction made in Portugal, Spain, France. In Italy, only the illegal garbage dumps are mentioned, it is unclear how the fires escaped from an official garbage dump are classified). In Cyprus, the distinction is made between the activity during which the rubbish is burned (agricultural aactivities, in rubbish dump, private in country

house or in permanent residence). In Slovakia and USA the difference is made between waste burning (implying outside a garbage dump) and fire escpaed from a garbage dump.

A313: use of fire or glowing objects in the context of leisure activities

It includes the use of stoves, bonfires, campfires, barbecues, firecrackers, fireworks.

We can also find the throwing of cigarette butts, class identified in many classifications, detailed in south-east France, Portugal and Italy with the mode of locomotion or the whereabouts of the smoker. In France outside the south-east, this class is merged with the throwing of other objects such as incandescent flares or hot ashes. In Switzerland it is grouped with fires caused by tourists and walkers.

Children's games are often in this class.

In Portugal, in the "burning of waste", there is a sub-category "waste burning in areas of temporary visitors such as parks, campgrounds ...". The question arises about the logic to link this cause to "burning of waste" or "leisure activities".

Problematic Cases :

The discharge of hot ash, class existing in France SE, Czech Republic, Slovenia ISRIA and NFS, that could be linked either to the waste management or recreational activities (actually linked to this last one in the France south-east classification).

In Spain, Portugal and USA we find the cause "apiculture", which seems to be for other countries placed in "various agricultural work". In this case there is use of fire by farmers (broadly defined) but not to manage vegetation since fire is used to produce smoke to manipulate beehives.

In Portugal we also identifies fires lit by outdoor workers, and fires related to construction or repair of roads, which do not fall under any of the 3 categories outlined above.

For the treatment of these cases in an harmonization, we have to see if it is necessary to expand the categories previously identified, or create new ones but which can not be met by all countries, or create a A314 last category "other uses of fire "

A32: causes without initial use of fire

It includes everything that can be caused by accidental spark or accidental burning machinery related to infrastructure or to human activities without the use of fire.

A321: lines and electrical

Class clearly identified in almost all classifications except Romania (negligence), Czech Rp. (technical failure?). In Sweden it is included in "technical fault"

sparks caused by break of power lines, electric arcs or by malfunction in electrical installation.

A322: Railways

Class clearly identified in almost all classifications except Turkey (other negligence), Slovakia (malfunction of motor vehicle exhaust or breaking system?), Romania (negligence), Cyprus (?), Czech Rp. (sparks from exhaust or brakes?), Bulgaria (transport/technological

sparks), Greece (included in a general category "Machinery Sparks"), Canada (other industry).
It can be caused by sparks caused by problems on the brakes or the wheels of trains.
Slovenia ISRIA classification makes the difference between sparks from locomotive and from brakes.

A323: vehicles
sparks emitted by mufflers, accidental burning of a vehicle caused by a road crash or engine failure, burning of dry grass next to the catalytic converter of a vehicle.

We must notice that in Poland SFS, Greece, Finland, Latvia and Bulgaria these 2 last categories are grouped in the same category "transports"

A324: causes related to the work without the use of fire
sparks caused by machines (brush cutter, chainsaw, welding, industrial machinery ...) or tools. heating caused by a machine. Accidental burning of a machine.
These may include agricultural, forestry, other professionals or private works.
We can also find there the use of explosives, but in Italy is grouped with firecrackers and fireworks.
In France outside the south-east, the fires related to agricultural, foresters, other professionals or private are not distinguished between those related to the use of fire and accidents described in this category.

A325 fires related to military activities or use of firearms
sparks caused by incidents on military equipment, explosive shells or grenades, firing weapons by military or hunters. Heating associated with military gear. Accidental burning of a military vehicle.
The question can raise of a smoking soldier setting fire with his cigarette : depending on the definitions it could be registered as "smoker" or as "military activity"

This category does not exist in Poland (registered in "other" in all classifications), France (these fires may be classified either in the "throwing of glowing objects" cause for shells, either in the "various installations" the range and military camp being considered an installation, either in the "recreational activities" for firearms hunters), Latvia, Finland, Romania, Sweden, Croatia, Turkey, Chile, Canada, USA.

In Czech Rp. It is grouped with fireworks.
In Cyprus fire due to military activities are detailed in a 4th level according to the source of ignition (guns, cigarettes, campfire, tools, other).

A326: restart of fire
New start on the edge of a previous fire badly extinguished.
Cause often identified but difficult to classify. It might be a class apart?
In France SE it is a subcategory of fires related to the activities of professionals
In France SW and general, it is a part of accidental causes (in Promethee it was formerly considered as accidental without involvment of man but it it now considered as involuntary due to professionnal work).
In Spain, Slovakia, Switzerland and Sweden, it is an apart category in the first level.
In UK and Australia, it is identified and classified according to the cause of the initial fire.

In Portugal, Slovenia, Poland, Czech Republic, Lithuania, Bulgaria, Cyprus, Latvia, Romania, USA, Canada, Turkey, Chile, Greece and Italy it's not clear where it is registered (maybe it is a part of "problem during fire prevention or firefighting activities" in Portugal and a part of "other" in the other classifications?)

Portugal, Slovenia, Poland, Czech Republic, (and the USA) identify a cause related to sparks escaped from industrial or house chimneys, which should logically be included in this category A32. As this cause is not clear in other bases, see if we can create a specific category in the 3rd level or whether it should be grouped in a category "other accidents without the use of the initial fire"

B - approach based on active intervention of man

This approach corresponds mainly to the second levels of France's classifications (even to the first level of Promethee), to Italy, Spain and Slovenia, but is also adapted to all the not much detailed classifications

B31: accident without active intervention of man
It includes everything that can be caused by accidental sparks emission or accidental lighting related to infrastructure.

B311: electrical lines and installations
Class clearly identified in all classifications
sparks caused by the rupture or ignition power lines or by malfunction in electrical transformers types

B312: Railways
Class clearly identified in all classifications
sparks caused by problems on the brakes or the wheels of trains
Some countries (Spain?, Latvia, Lithuania, Poland, Canada, Chile, USA) can register in "railway" all the fires linked to the trains regardless of the specific ignition factor) so that it can be fire started by smoking travellers or campfires lit by railroad workers. In this case it doesnt fit really well with this approach.
Portugal, France, Italy, well identify "butts thrown from vehicles" or "from train" so it avoids this misunderstanding.

B313: vehicles
sparks emitted by mufflers, accidental burning of a vehicle caused by a road crash or engine failure, burning of dry grass next to the catalytic converter of a vehicle.

B314: restart of fire
new start on the edge of a previous fire badly extinguished.

Fires caused by sparks escaped from chimneys should be classified in this category B31.

B32: accident linked to the active intervention of man

B321: accidental fires occurred during the work
It can be all types of work, whether they occur in nature or not, whether carried out by farmers, foresters, other professionals or private, whether the accident is related to the use of fire or to the use of equipment or machinery. This can sometimes be detailed in a 4th level according to one of these criteria.

B322: accidental fires occurred during recreational activities
In general, you can find everything related to private activities excepting private work which is more classified in the previous category.
It includes the use of stoves, campfires, barbecues, firecrackers, fireworks, throwing of cigarette butts or incandescent objects, children's games, the discharge of hot ash.

B323 fires related to military activities or use of firearms

Sparks caused by incidents on military equipment, explosive shells or grenades, firing weapons by military or hunters. Heating associated with military gear. Accidental burning of a military vehicle.

B324: accidental fires associated with waste disposal or burning of waste

These are the burning of household waste and industrial deposits in official or illegal garbage dump.

4 - Volunteer
It includes all the fires lit in order to destroy the forest or natural area without supervision.
It is much detailed in Italy and Spain.
In France, Portugal, Poland former SFNP (not current) and USA (in the fields "general cause" and "specific cause" a detail is made according to the motivation.
Bulgaria and Slovenia ISRIA (in the field "outbreak manner") make only the difference between arson and pyromania (i.e. responsible/irresponsible)
We must notice that an important part of the fires registered in Portugal in the category "structural" (which is however distinguished in the first level from "incendiary") should be classified in the sub-categories interest or conflict.

The classification of fires lit on a voluntary basis by children could also be classified in this category rather than accidental fires which could more contain accidents due to children's games, but often the distinction is not made and everything is grouped in "Fires caused by children" which are classified as" "accidental", except in Portugal where all fires caused by children appear in the category "voluntary irresponsible".

The bases which detail this category do so according to the motivation and we often find as a common denominator the 3 following categories which may be the 2nd level :

41: Interest
It includes mainly the ignition to obtain a change of land use (agricultural, pastoral, building speculation ...).
we can also find ignitions in order to destroy vegetation in a non-controlled way to improve conditions for grazing or hunting, or burns to fight against some wild animals.
the ignitions to facilitate the harvesting of some forest products, or influence the market of some products can also be found in this category.
Finally, one can classify ignitions by people who can find an interest in the firefighting or recovery operations.
The causes identified in the bases of Portugal, Italy and Spain related to ignitions to divert the attention of law enforcement agencies also fall into this category.
Fires lit by terrorists are mentioned by Italy and Poland and could fit in "interest" category.

It seems possible in the databases that detail precisely that type of causes to identify 2 sub-categories : direct or indirect interests.

42: Ignition linked to conflict
We find in this category fires ignited by revenge or related to a conflict between neighbors, between landowners, among hunters, with a public authority or the government.

43: Ignition by sick or irresponsible people
It concerns the mythic "pyromaniac" but also all the other forms of irresponsibility.

The term pyromaniac is often largely misused as a synonym of arsonist; such misuse is perceivable in some of the classifications analyzed in the deliverable, where "deliberate irresponsible" is also called in a reducing way "pyromania". That is the case for Spain, France, Italy, Bulgaria or Poland, while Portugal and Greece identify it like a sub-category of "irresponsible"

Pyromania is defined as a pattern of deliberate setting of fires for pleasure or satisfaction derived from the relief of tension experienced before the fire-setting. The well known clinician's handbook, the Diagnostic and Statistical Manual of Mental Disorders, also known as the DSM, clearly classifies pyromania as a <u>disorder of impulse control</u>, meaning that a person diagnosed with pyromania fails to resist the impulsive desire to set fires—as opposed to the organized planning of an arsonist or terrorist.

Psychologists agree that pyromaniacs– people with a mental illness resulting in an uncontrollable urge to start fires – account for only a small minority of arson. Despite this, and despite its existence as a psychiatric diagnosis, it seems likely that there are few true pyromaniacs or even that the diagnostic category is really a valid one.

About voluntary fires, we have to consider the interesting classification by Douglas et al. (1992) working at the National Center for the Analysis of Violent Crime (NCAVC) of FBI Academy in Quantico, Virginia.

They produced a motive classification which proves very effective :

1• <u>Vandalism</u>: Malicious or mischievous fire setting that results in damage to property: willful and malicious mischief or peer group pressure.

2• <u>Excitement</u>: Seeking of thrill, attention, recognition, sexual gratification (rare), relieve of boredom. Fires are set to gain attention and to meet the needs of being important (author is sometimes the "hero" type).

3• <u>Revenge</u>: Fires set in retaliation for real or perceived injustice or wrong. Revenge can be further classified under sub-groups as:

> 3.1-Personal revenge: use of fire to retaliate for a one-to one or personal grievance, argument, fight, personal affront or any of infinite arrays of events perceived by the offender to warrant retaliation.
>
> 3.2– Societal retaliation: use of fire in revenge against the society that the author perceives has wronged him.
>
> 3.3– Institutional: fire against institutions or use of fire to settle grievances with the institution and to intimidate those associated with the institution.
>
> 3.4– Group retaliation: fire as expression of anger towards the group or its members rather than anger at a specific individual within the group.
>
> 3.5– Intimidation.

4• <u>Crime concealment</u>: fire set to hide or conceal the primary crime activity: murder, suicide, breaking and entering, embezzlement, larceny, destroying records.

5• <u>Profit</u>: profit from fire setting, either directly for <u>monetary gain</u> or from a goal <u>other than money</u>: fraud, insurance, liquidate property, dissolve business, inventory, employment, parcel clearance, competition.

6• <u>Extremist</u>: fire set to further social, political or religious causes: terrorism, discrimination, riots/civil disturbance.

Douglas classification, with minor modifications, seems applicable to forest fires in different countries and covers a wide spectre of motivations , to which it gives a plausible interpretation.

National classifications which, in some way, are coherent with Douglas are certainly the hierarchical ones of Spain and Italy.

Remarks on semantic aspects :

The differences in definitions encountered are given along the analysis, but it seem important to highlight in this part some problems in terms used : we find in the classifications analyzed different terms who seem to have the same signification but sometimes with little difference. Over a problem of definition, it can also be a problem of translation. Anyway, it will be necessary to choose one of these words and give a precise definition in the final proposition.

* Arson / deliberate / voluntary / malicious / intentional / incendiary
All this terms are used for fire lit intentionally to destroy the forest.
Depending on the countries, "arson" could be used either as "deliberate" in general or "deliberate responsible" by opposition to "deliberate irresponsible" which is also called in a reducing way "pyromania" in some classifications.
For the term "arson" which is the most encountered one, we can refer to 2 official definitions :
FAO forest fire terminology: "The act of willfully igniting a wildfire which burns or spreads to vegetation or property without consent of the owner or his/her agent"
US forest fire glossary : "At common law, the malicious and willful burning of another's dwelling, outhouse or parcel; by most modern statutes, the intentional and wrongful burning of someone else's, or one's own, property. Frequently requires proof of malicious or wrongful intent."

* Accidental / Unvoluntary / Unintentional / Negligence
All these terms can be used for fires lit without the intention of destroying the forest, by opposition to the fires described in the previous paragraph. It can cover either fires lit by accident (man directly involved or not) or fires lit deliberately in a specific purpose like vegetation management or waste management which escaped from their initial purpose.
In some case, « accidental » can be used only for causes where man is not involved by opposition to « negligence » where man is involved.
There is no official definition for one of these terms. We can notice that the UNECE classification use the term "negligence"
Accidental and negligent can be considered as very different categories. Accidental could be used only when a fire, although connected to man activity, is caused by an action behind the usual and/or ordinary care and accuracy; for instance, an airplane crash causing a wildfire is usually clearly connected neither to will nor to negligence but to a fatality (e.g. ice on wings, turbulence, wind shears etc.). On the contrary a fire from a sawdust pile is not accidental since it is a common knowledge that in such context fire can be provoked by thermal raise of fermentation and that to avoid it it is necessary to keep it wet with sprinklers. Not wetting the pile is but a negligent behaviour which could provoke a fire which must be classified not as an accidental but a negligent one. We could therefore mentally use the concept of fatality to identify the divide between categories.

* restart / reignition / relight
these 3 terms are used for the same signification.
In the FAO terminology as in the US glossary, we find the term "rekindle" which has the same definition in these 2 sources : "reignition due to latent heat, sparks, or embers"

* other / miscellanous
even if these 2 words have a difference in their signification, they are both used to the same purpose which is to record all the causes not corresponding to an other category of the classification.

Quantitative analysis :

After reporting all the classifications in the annexed Excel table *GLOBAL_ANALYSIS_D2.2_annexe*, a test has been realized to make correspond each national cause to a category of the previous analysis. This has been made in order to see how each classification would match in the two different hypothesis and in which level.

The synthesis results are given in the following tables. These tables show how many cause typesof a classification fit in each category of the hypothesis of analysis. The last columns show how many countries have at least a cause which fit in a category, to highlight the interest given to this category and help to evaluate the opportunity and the facility of identifying it in the common classification.

hyp A	PT	ES	FR_SE	FR_SW	FR	IT	BG	CY	FI	LV	LT	PL_sfnp	PL_sfs	RO	SI_nfs	SE	UK	CH	Total	nb of countries 18	
1	5	1		1	1	1	1	1	1		1	1	1	1	1	2		2	21	15	83%
2	2	1	2	1	3	2	1	1	3	1	1	1		1	2	1	2	1	26	17	94%
3	2	2	6	6	6	1	2	16	1	2	3	1	2	3	3	1	12	4	73	18	100%
31	9	1											2			1	6		19	5	28%
311	10	17	9			5	2	7	2	2	2	2	2		3	1	7		71	14	78%
312	7	2	4	1	1	1		4	1						1				22	9	50%
313	9	3	5	2	2	2	1	14	4	1	1	2	2	1	3	2	2	1	57	18	100%
children	2	1	1				1	3				2			1	1		1	13	9	50%
smokers	3	1	2			4	1	10	1						1	1			24	9	50%
32	5	2	1			2	2		5				14		3	5	4	1	44	11	61%
321	1	1	3	1	1	1		3	1	1	1	1		1	1			1	18	14	78%
322	1	1	1	1	1	1				1	1	1		1	1	1		1	13	13	72%
323	2	2	3	1	1			2		1	1	1	2		2	2	2		22	13	72%
324	11	2	4				2	5	1		1		9		4	1			40	10	56%
325	2	1					1	1	5						1		2	1	14	8	44%
326		1	1	1	1				1							1	3	1	10	8	44%
4	4	3	1	2	2	1	1	1		1	1	1	1	1	1	1	4	1	27	17	94%
41	7	11	4	1	1	10													34	6	33%
42	4	8	3	1	1	6													23	6	33%
43	4	3	1	1	1	2	1												13	7	39%
?	2						1	1					2	2	3				11	6	33%
Total	92	64	51	20	22	40	17	73	21	10	13	13	37	11	31	21	44	15	595		

hyp B	PT	ES	FR_SE	FR_SW	FR	IT	BG	CY	FI	LV	LT	PL_sfnp	PL_sfs	RO	SI_nfs	SE	UK	CH	Total	nb of countries 18	
1	5	1		1	1	1	1	1	1		1	1	1	1	1	2		2	21	15	83%
2	2	1	2	1	3	2	1	1	3	1	1	1		1	2	1	2	1	26	17	94%
3	2	1		2	2	1	3	6	4	2	3	1	1	1	2	3	10	1	45	17	94%
31	3		1			1			2				8	1	3	3	4	1	27	10	56%
311	1	1	3	1	1	1		3	1	1	1	1		1	1			1	18	14	78%
312	1	1	1	1	1	1				1	1	1		1	1	1		1	13	13	72%
313	2	2	3	1	1			2		1	1	1	2		2	2	2		22	13	72%
314		1	1	1	1				1							1	3	1	10	8	44%
32	3	2							4			1	5			1	8		24	7	39%
321	29	21	19	4	4	6	5	18	3	2	3	2	15	1	9	2	7	2	152	18	100%
322	10	3	5	2	2	2	1	14	4	1	1	1	2	1	3	2	2	2	58	18	100%
323	2	1					1	1	5						1		2	1	14	8	44%
324	7	2	4	1	1	1		4	1						1				22	9	50%
children	2	1	1				1	3				2			1	1		1	13	9	50%
smokers	3	1	2			4	1	10	1						1	1			24	9	50%
4	4	3	1	2	2	1	1	1		1	1	1	1	1	1	1	4	1	27	17	94%
41	7	11	4	1	1	10													34	6	33%
42	4	8	3	1	1	6													23	6	33%
43	4	3	1	1	1	2	1												13	7	39%
?	1						1	1					2	2	2				9	6	33%
Total	92	64	51	20	22	40	17	73	21	10	13	13	37	11	31	21	44	15	595		

Conclusion :

The principal choice to make for a new proposition of EU classification is the choice between the 2 approaches for accidental causes. Except the fact that it fits more with one or another existing classification, there is also a difference of philosophy :
- the approach based on the use of fire (approach A) is more oriented towards an idea of identifying precisely the cause and the ignition factor through an accurate investigation trying to end to an author and the prosecution of the responsible.
- the approach based on the activity (approach B) is more oriented towards prevention, by identifying socio-professionnal categories which could be the cible of specific preventing actions.

The approach based on activity seem to fit less bad with not much detailed classifications.

Much detailed classifications can fit with either one or the other depending on the level considered.

country	designation	best approach
portugal	national forest fires database	A eventually B
spain	EGIF national forest fires database	A or B
france	promethee S-E forest fires database	B (2nd level) or A (3rd level)
	SIFORA S-W forest fires database	B
	BDIFF national forest fires database	B
italy	AIB national forest fires database	A
greece	national forest fires database	B
bulgaria	national forest fires database	eventually B
czech rp.	national all fires database	A
cyprus	national forest fires database	B (2nd and 3rd level) or A (3rd and 4th level)
finland	national forest fires database	A
latvia	national forest fires database	eventually B
lithuania	national forest fires database	B
poland	national all fires database	A
	state forest and national parks database	B
romania	national forest fires database	eventually B
slovakia	national forest fires database	eventually A
slovenia	NFS national forest fires database	B
	ISRIA national all fires database	A (fire cause) or B (outbreak manner)
sweden	national forest fires database	A
UK	UKVFS	A or B (with the other fields)
croatia	national forest fires database	not enough detailed
turkey	national forest fires database	eventually B
switzerland	swissfire national forest fires database	B
australia	Victoria state forest fires database	A or B
canada	national forest fires database	eventually B
chile	national forest fires database	B
USA	national forest fires database	A (specific cause) or B (general cause)