

Fire history data dictionary



PROCEDURAL

GUIDELINE

Version 1.0

5 May 2022

Doctrine ID: 3094

Copyright © 2022 Australasian Fire and Emergency Service Authorities Council Limited

All rights reserved. Copyright in this publication is subject to the operation of the Copyright Act 1968 and its subsequent amendments. Any material contained in this document can be reproduced, providing the source is acknowledged and it is not used for any commercialisation purpose whatsoever without the permission of the copyright owner.

Australasian Fire and Emergency Service Authorities Council Limited (ABN 52 060 049 327)

Level 1, 340 Albert Street
East Melbourne Victoria 3002

Telephone: 03 9419 2388

Facsimile: 03 9419 2389

afac@afac.com.au

afac.com.au

Disclaimer

This document has been developed from consultation and research between the Australasian Fire and Emergency Service Authorities Council Limited (AFAC), its members and stakeholders. It is intended to address matters relevant to fire, land management and emergency services across Australia, New Zealand and the Pacific region.

The information in this document is for general purposes only and is not intended to be used by the general public or untrained persons. Use of this document by AFAC Member agencies, organisations and public bodies does not derogate from their statutory obligations. It is important that individuals, agencies, organisations and public bodies make their own enquiries as to the currency of this document and its suitability to their own particular circumstances prior to its use.

AFAC does not accept any responsibility for the accuracy, completeness or relevance of this document or the information contained in it, or any liability caused directly or indirectly by any error or omission or actions taken by any person in reliance upon it.

You should seek advice from the appropriate fire or emergency services agencies and obtain independent legal advice before using this document of the information contained herein.

Citation

Australasian Fire and Emergency Service Authorities Council. (2022) *Fire History Data Dictionary* (AFAC Publication No. 3094). AFAC, Melbourne, Australia.

Review period

This AFAC guideline should be reviewed by the doctrine owner come 5 May, 2027.

Contents

About AFAC and AFAC Doctrine.....	iv
AFAC	iv
AFAC Doctrine.....	iv
Types of AFAC Doctrine	iv
About this document.....	1
Source of authority.....	1
Purpose.....	1
Scope	1
Statement of engagement.....	1
Audience.....	1
Definitions, acronyms and key terms	1
Introduction.....	1
AFAC's Fire history data dictionary	2
Attributes.....	2
Spatial Data Standards	3
Metadata standards	3
Appendix 1: Translating between existing fire history datasets	5

About AFAC and AFAC Doctrine

AFAC

The Australasian Fire and Emergency Service Authorities Council (AFAC) is the Australian and New Zealand National Council for fire, emergency services and land management. It is a collaborative network of fire, emergency services and land management agencies that supports the sector to make communities safer and more resilient.

AFAC Doctrine

AFAC develops doctrine to support the practice of emergency management. The information in doctrine publications is evidence based and drawn from academic research and the collective expert knowledge of member agencies. Doctrine is regularly reviewed and represents the official AFAC view on a range of topics.

Doctrine does not mandate action; rather, it sets aspirational measures. Publishing nationally agreed views, shared approaches and common terminology enhances cooperation and collaboration within and between agencies and jurisdictions.

Types of AFAC Doctrine

AFAC Doctrine is classified as follows:

Capstone doctrine – includes publications, such as 'strategic intents', that are high-level accounts of the concepts of emergency management operations and service delivery. They describe the principles of what is practical, realistic and possible in terms of protecting life, property and the environment.

Fundamental doctrine – includes 'positions', which AFAC members are expected to support, as well as 'approaches' and some 'frameworks'. Fundamental doctrine may become agency or jurisdictional policy on a matter if adopted by individual services or jurisdictions.

Procedural doctrine – includes 'guidelines', some 'frameworks', and 'specifications'. AFAC members are expected to be aware of procedural doctrine. A guideline is an advisable course of action; a framework provides a linking of elements to create a supporting structure to a system, and specifications are a detailed description of a precise requirement to do something or build something.

Technical doctrine – includes 'technical notes', 'training material' and the *Australasian Inter-Service Incident Management System* (AIIMS). Technical doctrine provides guidance of a technical nature: the how to do something, or the technical meaning relative to a situation.

About this document

This publication is a guideline (procedural doctrine).

Source of authority

AFAC National Council endorsed *Fire history data dictionary* on 5 May 2022.

Purpose

This guideline provides national data standards for fire history datasets to promote consistency in datasets throughout Australia and New Zealand. These data standards are to be used for the compilation of fire history datasets for the secure instance of Geoscience Australia's sentinel hotspots. AFAC member agencies may choose to incorporate these data standards into their internal processes.

Developers of bushfire management support tools are encouraged to use the fire history data standards presented in this guideline to facilitate cross jurisdictional application of these tools.

These standards are in accordance with ISO 19115-1:2014 Geographic information – Metadata.

Scope

This guideline includes a description spatial data standard, data definitions for three fire history attributes, metadata standards and an appendix which allows for translation between existing fire history datasets.

Statement of engagement

This guideline was prepared for members by the AFAC Predictive Services Group Data Working Group who report to the AFAC Predictive Services Group. Geoscience Australia have provided technical input.

Audience

This data standard is intended for use by custodians of fire history datasets to promote consistency in defining datasets. Furthermore, this guideline is intended for bushfire management support tool service providers to promote the use of common standards in fire history input requirements. Researcher and other users of fire history data may also be interested in this guideline.

Definitions, acronyms and key terms

See all terms in following data dictionary.

Acknowledgements

This guideline was prepared by the data working group of the AFAC Predictive Services Group. Thank you to Geoscience Australia for their contribution.

Introduction

Fire history information supports a diversity of bushfire management applications including prescribed burn planning, prediction of current fuel characteristics in the landscape through fuel dynamics modelling and bushfire simulation.

There are many providers of fire history information, including fire and land management agencies that maintain spatial databases with records of the spatial extent of bushfires and prescribed burns throughout the landscape. Fire history information is captured through satellite imagery, aerial photography and field observation methods.

In order to support cross-jurisdictional application of bushfire management support tools, it is necessary to define data standards for storing fire history information.

AFAC's Fire history data dictionary

Attributes

Table 1 provides nine fire history attributes for which national consistency is being sought. These nine key variables are intended to support a diverse bushfire management application.

Table 1: Fire history attributes

Attribute	Data type	Example	Description and business rules
fire_id	string	12345	ID attached to fire (e.g. incident ID, Event ID, Burn ID).
fire_name	String	Incident name	Incident name. If available.
ignition_date	Date	28/01/1990	The date of the ignition of a fire event.
capture_date	Date	29/01/1990	The date of the boundary captured or updated.
extinguish_date	Date	31/01/1990	The date a fire is declared safe (contained and under control). If available.
fire_type	string	Bushfire or prescribed burn	Binary variable to describe whether a fire was a bushfire or prescribed burn. <i>Refer to Table 2 for fire type definition.</i>
ignition_cause	string	Accidental	Cause of fire. <i>Refer to Table 3 for ignition causes.</i>
capt_method	string	MODIS satellite imagery 250m	Categorical variable to describe the source of data used for defining the spatial extent of the fire. <i>Refer to Table 4 for capture methods.</i>
area_ha	double	2 Ha	Burnt area in hectares.
perim_km	double	2 Km	Burnt perimeter in kilometres.
state	string	ACT (Australian Capital Territory)	Custodian of data.
agency	string	Rural Fire Services	Agency mapped the fire history data.

Table 2: Fire type

Data source category	Definition
Bushfire	Unplanned vegetation fire. A generic term which includes grass fires, forest fires and scrub fires both with and without a suppression objective. <i>Also known as wildfire, accident, arson, lightning.</i>
Prescribed burn	The controlled application of fire under specified environmental conditions to a predetermined area and at the time, intensity, and rate of spread required to attain planned resource management objectives. <i>Also known as planned burning, fuel reduction, traditional owner, ecological, hazard reduction.</i>
Unknown	Fire type is undetermined.

Table 3: Ignition cause

Data source category	Definition
Accidental	Fires that are not the result of a deliberate (intentional) act.
Natural	Fires that ignite without human intervention.
Incendiary	Fires result from deliberate acts, intentional actions, or circumstances for the fire to occur in areas where it should not have occurred.
Undetermined	Fires that have not yet been investigated, under investigation or fires that have been investigated and the cause is not proven to an acceptable level of certainty.

Table 4: Capture method

Capture method	Definition
Aerial photography	Derived from Aerial photography including manual interpretation as well as partially automated and fully automated methods.
Linescanner	Mapped against airborne sensor systems.
Ground intelligence	Mud map from ground observation.
Ground intelligence GPS	Fire boundary derived from ground (e.g. GPS tracker, Avenza).
Air intelligence	Mud map from air observation.
Air intelligence GPS	Fire boundary derived from air (e.g. helicopter, spotter).
Himawari	Derived from geostationary satellite Himawari and includes manual interpretation as well as partially automated and fully automated methods (spatial accuracy ± 2 kilometres).
NOAA AVHRR	Derived from <i>Low Resolution</i> - NOAA AVHRR satellite including manual interpretation, partially automated and fully automated methods (spatial accuracy ± 1 kilometres).
MODIS	Derived from <i>Low Resolution</i> - MODIS satellite imagery including manual interpretation as well as partially automated and fully automated methods (spatial accuracy ± 250 metres).
VIIRS	Derived from <i>Low Resolution</i> - VIIRS satellite imagery including manual interpretation as well as partially automated and fully automated methods (spatial accuracy ± 375 metres).
Landsat	Derived from <i>Medium Resolution</i> - Landsat satellite imagery including manual interpretation as well as partially automated and fully automated methods (spatial accuracy ± 30 metres).
Sentinel	Derived from <i>Medium Resolution</i> - Sentinel satellite imagery including manual interpretation as well as partially automated and fully automated methods (spatial accuracy ± 10 - 20 metres).
Multiple	Derived from multiple sources e.g. combination of ground intel and linescanner. <i>For detailed information contact agency or state responsible.</i>
Unknown	Data Source is unknown.

Spatial Data Standards

Table 4: Spatial data standards

Element	Standard
Datum	GDA 1994
Datatype	Vector- Polygon

Metadata standards

Title

National fire history

Abstract

The National fire history dataset consists of mapped fire boundaries from bushfire or prescribed burn events, Australia-wide. The data is captured by various government and non-government agencies (New South Wales Rural Fire Service; Australian Capital Territory Rural Fire Service; Victorian Department of Environment, Land, Water and Planning; Country Fire Authority (Victoria), Queensland Fire and Emergency Services, South Australian Country Fire Service, South Australian Department for Environment and Water; Bushfires NT; Northern Australian Fire Information; Tasmanian Department of Primary Industries, Parks, Water and Environment; Western Australian Department of Fire

and Emergency Services; Western Australian Department of Biodiversity, Conservation and Attractions; and Landgate) using several means including field observations and remote sensing capture methods. The update frequency of this dataset ranges from incident based only, weekly to yearly intervals.

Purpose

To provide collection and consistent burnt area data on a national scale.

Metadata contact organisation

AFAC Predictive Services Group- Data Working Group

Geographic location – coordinates

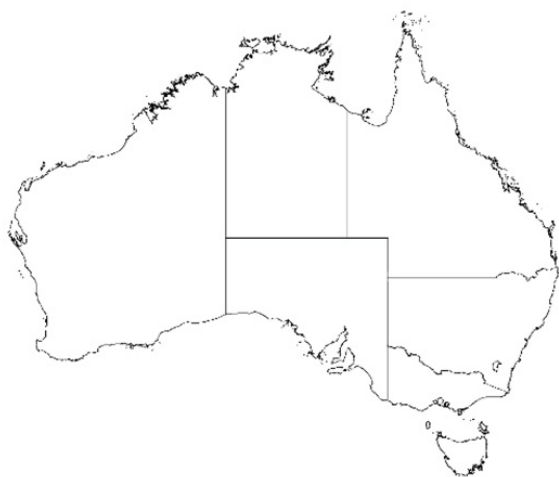
Geographical Bounding Box:

west longitude: 96.00

south latitude: -44.00

east longitude: 168.00

north latitude: -9.00



Lineage

The National fire history dataset is captured manually, partially automated and fully automated from various sources, including ground intelligence (e.g. Avenza, GPS Tracking), air intel, aerial photography, line-scan imagery as well as earth observation satellites (Himawari, NOAA AVHRR, MODIS, VIIRS, Landsat and Sentinel satellites).

Temporal extent:

The earliest records available are from 1937 and ongoing.

Distribution format

Shapefile, WMS, WFS, ESRI REST API, Shapefile Endpoint .

Keywords

Fire history, Time of last burnt, NSW-RFS, ACT-RFS, DELWP, VIC-CFA, QFES, SA-CFS, SA-DEW, BFNT, NAFI, Tasmania Fire Service, NRE, DFES, DBCA, Landgate.

Maintenance and update frequency

National fire history dataset update frequency is as follows:

Jurisdiction / agency	Update frequency
NSW – RFS	As required
ACT- RFS	Incident based
Victoria – CFA / DELWP / EMSINA	Half yearly to quarterly
QFES	Half yearly to yearly
SA – CFS / SA- DEW	Bi-monthly
BFNT / NAFI	Every week or two depending on fire activity
DFES / DBCA / Landgate	Monthly
Tasmania Fire Service / NRE	Yearly (financial year)

Use limitation

The National fire history dataset is a consolidated interpretation of data from various datasets collated by different jurisdictions and agencies. Discrepancies in actual versus mapped fire boundary and/or missing data may occur due (but not limited) to different capture methods, cloud cover, vegetation structure, fire intensity, resolution of imagery, remoteness of fire and update frequency. In no event shall relevant parties be liable for any incident or consequential damages resulting from use of the material.

Legal restrictions

Jurisdictional license:

QFES – Open / CC by 3.0 AU.

ACT – CC 4.0 International.

SA – CC 4.0 International.

Tasmania – Restricted Use.

NSW – Open CC by 4.0 International.

Victoria – CC By 4.0.

WA – CC By 4.0.

NT – Disclaimer <https://firenorth.org.au/nafi3/views/about/Disclaimer.htm>

National fire history dataset is available through EM-LINK <https://emlink.net.au/user/login?destination=home> and accessible to anyone who registers, including government, industry, education, and private sector.

Appendix 1: Translating between existing fire history datasets

Fire ID (fire_id)										
STATE	VICTORIA	WESTERN AUSTRALIA	QUEENSLAND	TASMANIA	AUSTRALIAN CAPITAL TERRITORY	SOUTH AUSTRALIA	NORTHERN TERRITORY	NEW SOUTH WALES	DRAFT Common field details	Common field notes
Is this attribute collected (y/n and comments)	Y	Y	N	Y	Y	Y	Y	Y		
Field name	DSE_ID	INCID_NAME or NUMBER or COMMENTS		INCD_NO and FIRE_NAME	Comment	Unique burn id for DEW prescribed burns or the CFS incident number.	FSID, FID, ID	RFS Fire Number.		
Data format	Long integer	string					String, String, String	Text		
Potential values/ categories							0-100,000, 0-100,000, 00000-99999			
Example entry	624451						32, 502, 16282			
Comments	Another field called CFA_ID same structure.		Incidents are not connected to fire history within the fire history dataset.				A unique identifier for each mapping event. This matches the attribute called "GRIDCODE" in the shapefile.			

Ignition date (start_date)										
STATE	VICTORIA	WESTERN AUSTRALIA	QUEENSLAND	TASMANIA	AUSTRALIAN CAPITAL TERRITORY	SOUTH AUSTRALIA	NORTHERN TERRITORY	NEW SOUTH WALES	DRAFT Common field details	Common field notes
Is this attribute collected (y/n and comments)	Y	Y	Y	Y	Y	Y	Y	Y		Y
Field name	Start_Date	Date	burn date	IGN_DATE	DATE	FIREDATE* domain values – see attached table	Acquired_date	Burn_Date		
Data format	Integer/date format	Integer/date format	Integer/date format	Date	DATE_	Date	Date/time format	Date	Alternate option to format for Phoenix (Integer YYYYMMDD).	Need format for TSF calculation.
Potential values/ categories	DD/MM/YYYY	DD/MM/YYYY	D(D)/MM/YYYY	DD/MM/YYYY	DD/MM/YYYY	DD/MM/YYYY	DD/MM/YYYY	DD/MM/YYYY	If no start date = end date; If only month DD=01; If only year MMDD = 0101; If only season use rules to select MM, let DD=01; if blank ??	
Example entry	27/01/2001	28/02/2017	4/01/2019	29/06/2016	17/05/2016	31/01/2011	19/11/2021			
Comments	Fire or planned burn ignition date/ start date.	The date of which fire boundary was captured.	The date of which it was sensed.	Incident start date & Incident end date is also captured.	Ignition date in two formats one for phoenix. BURN_DATE 20160517.	Date reliability is available as an integer. It provides a qualification attribute. *domain values – see attached table	Date hotspot was acquired.			Rules for nil data conversion to TSF.

Capture date (date of creation of the record) (start_date)										
STATE	VICTORIA	WESTERN AUSTRALIA	QUEENSLAND	TASMANIA	AUSTRALIAN CAPITAL TERRITORY	SOUTH AUSTRALIA	NORTHERN TERRITORY	NEW SOUTH WALES	DRAFT Common field details	Common field notes
Is this attribute collected (y/n and comments)	Y	Y	Y	y	Y	N	Y	captured in Live Incident file; not kept in WildFireHistory	Y	
Field name	create date	Date	Date	B_CAP_DATE	CREATED_DATE		Upload date	AddedDateTime	Capture_Date	
Data format	Date	Date	Date	Date	DATE		DATE	date	Date	
Potential values/categories	dd/mm/yyyy	DD/MM/YYYY	D(D)/MM/YYYY	dd/mm/yyyy	DD/MM/YYYY HH:MM:SS		YYMMDD		DD/MM/YYYY	
Example entry	28/01/2002	28/02/2017	4/01/2019	11/11/1111	18/04/2016 11:57:46 PM		2021119			
Comments	The date of the first capture of this incident.				Auto		The date the fire scars were uploaded.			

Fire type (fire_type)										
STATE	VICTORIA	WESTERN AUSTRALIA	QUEENSLAND	TASMANIA	AUSTRALIAN CAPITAL TERRITORY	SOUTH AUSTRALIA	NORTHERN TERRITORY	NEW SOUTH WALES	DRAFT Common field details	Common field notes
Is this attribute collected (y/n and comments)	Y	Y	N	Y	N	Y	N	Y	Y	
Field name	Firetype	Burn_Type		Fire_Type		Incident type		Class	Fire_Type	
Data format	String	String		String		String		geodatabase domain	String	
Potential values/categories	Bushfire, planned burn (or Fuel Reduction, Traditional owner, ecological).	Bushfire or planned burn.		Bushfire, planned burn, unknown		Bushfire, prescribed Burn		Class 1-3	WF=Wildfire/ Bushfire, PB=Prescribed burn, OM=Other management burn, UN=Unknown	Where HR/WF in separate files, add and auto fill field.
Example entry	Bushfire	WF		Bushfire				Class 1		
Comments			Data is partially available, but not connected to fire history.	Additional field named Coupe which indicates whether unit was a Coupe values are: No; Yes; Coupe (high intensity); Coupe (low intensity).						

Ignition Cause (ignition_cause)												
STATE	VICTORIA	WESTERN AUSTRALIA	QUEENSLAND	TASMANIA	AUSTRALIAN CAPITAL TERRITORY	SOUTH AUSTRALIA	NORTHERN TERRITORY	NEW SOUTH WALES	DRAFT Common field details	Common field notes		
Is this attribute collected (y/n and comments)	Y	N	N	Y	Y	N	N	Y	Optional			
Field name	cause	Not collected	Not collected	IGN_CAUSE1 and IGN_CAUSE2	IGNITION	Not collected		Cause	Cause			
Data format	text			String	String			Geodatabase domain	String?			
Potential values/ categories	BURNING OFF, STUBBLE, GRASS, SCRUB; BURNING OFF, WINDROW, HEAP; RELIGHT - PRESCRIBED FIRE; RELIGHT - BURNING OFF; DELIBERATE LIGHTING (MALICIOUS); UNKNOWN; PIPE, CIGARETTE, MATCH;			IGN	Prescribed burn, lightning, accident, arson, unknown.			See metadata.		Need common values & translation rules.		
				Cause 1							IGN Cause 2	Description
				Accidental							ACC	Accident
				Accidental							ESC	Escaped
				Accidental							PBR	Planned burn re-ignition
				Accidental							PBS	Planned burn spotting
				Accidental							REC	Unattended/ abandoned campfire
				Accidental							WRI	Wildfire re-ignition
				Accidental							WSP	Wildfire spotting
				Deliberate							ARS	Arson
				Natural							LIT	Lightning
				Planned Burn							PLA	Planned burn
				Undetermined							OTH	Other
				Undetermined							UDC	Undetermined cause
				Undetermined							UNK	Unknown

Ignition Cause (ignition_cause)										
STATE	VICTORIA	WESTERN AUSTRALIA	QUEENSLAND	TASMANIA	AUSTRALIAN CAPITAL TERRITORY	SOUTH AUSTRALIA	NORTHERN TERRITORY	NEW SOUTH WALES	DRAFT Common field details	Common field notes
example entry	BURNING OFF, STUBBLE, GRASS, SCRUB			ARS (Arson)	Arson			Lightning		
Comments	Collected but it is in another table, a table join would be needed to add to a fire history dataset.			Additional field IGN_Cause2 = equals categorisation of IGN_Cause1 values eg Deliberate	Same field used for Prescribed burns.	Collected in database maintained by CFS, but not available for use in other systems or joining to spatial data.				

Capture Method (capt_method)										
STATE	VICTORIA	WESTERN AUSTRALIA	QUEENSLAND	TASMANIA	AUSTRALIAN CAPITAL TERRITORY	SOUTH AUSTRALIA	NORTHERN TERRITORY	NEW SOUTH WALES	DRAFT Common field details	Common field notes
Is this attribute collected (y/n and comments)	y	Y	Y	y	Y	Y	Y	y	Y	
Field name	Method	CAPT_METH	Collection	B_CAP_TYPE	SOURCE	capture method, capture source, featuresource, image information *domain values – see attached table	SOURCE, SATELLITE	CaptureSource; CaptureMethod	Capture_Method	
Data format	String	String	Text	String	String	String	String, String	Text	String	
Potential values/ categories	Firescan; GPS, ground observer, fire operations plan; satellite image interpretation – unknown; satellite image interpretation – automated; aerial photo interpretation; unknown.	AN, anecdotal, FWGPS,GGPS, GPS-non-differential, GPSND, HCGPS, helicopter, MM, MODIS satellite imagery 250m, NOAA satellite imagery 1000m, reference map\ photo, RFM, RS25, RS30, RS500, SENT25, unknown.	6 MODIS QPWS GCCC AirOps Linescans OBM.	Air GPS; air Drawn; ground drawn; ground GPS; historical; landsat; RapidEye; unknown; sentinel; Google Earth.			See metadata.	See metadata.		Need common values & translation rules.
example entry	Aerial photograph interpretation.	MODIS satellite imagery 250m.	6 MODIS.	Air GPS.			Landgate.			
Comments	Additional field shows details of method of capture.	Text description using one of 13 categories defined in metadata statement, including three remote sensing methods.	Some quality issues exist when using operational mapping and planned burn mapping – so they are not always included.		Also capture in other fields how and who captured the data.			Source=Agency		

Area size burnt (area_ha)										
STATE	VICTORIA	WESTERN AUSTRALIA	QUEENSLAND	TASMANIA	AUSTRALIAN CAPITAL TERRITORY	SOUTH AUSTRALIA	NORTHERN TERRITORY	NEW SOUTH WALES	DRAFT Common field details	Common field notes
Is this attribute collected (y/n and comments)	Y	Y	Y	y	Y	Y	N	y	Y	
Field name	Shape_Area	Shape.Area	Shape_Area	Shape_Area	SHAPE.AREA	SHAPE.AREA		ShapeArea	Shape.Area	
Data format	Double	Double	Double	Double	Double	Double		Number	Double	
Potential values/categories										
example entry										
Comments	Auto				Auto			Auto generated field	Auto	

Perimeter of area burnt (perim_km)										
STATE	VICTORIA	WESTERN AUSTRALIA	QUEENSLAND	TASMANIA	AUSTRALIAN CAPITAL TERRITORY	SOUTH AUSTRALIA	NORTHERN TERRITORY	NEW SOUTH WALES	DRAFT Common field details	Common field naotes
Is this attribute collected (y/n and comments)	Y	Y	Y	y	Y	Y	N	y	Y	
Field name	SHAPE_LEN	Shape_Leng or ApproxPeri	Shape_Length (can vary)	SHAPE_LEN	SHAPE.LEN	SHAPE.LEN		ShapeLength	Shape.Len	
Data format	Double	Double or String	Double	Double	Double	Double		Number	Double	
Potential values/categories		Continuous, in units of km								
example entry		24.26		##						
Comments	Auto				Auto			Auto generated	Auto	

