

The Global Early Warning System for Wildland Fire





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Presentation Outline

- 1. Fire danger and early warning
- 2. Overview of the Global EWS
- 3. Recent advances
- 4. Next steps





Global Fire Problems

- 1. Increasing fire activity
 - Climate change (fire weather severity)
 - Changing fuel conditions
 - Fuel buildup (fire suppression)
 - Land use change tropical deforestation, agricultural land abandonment, peatland burning and drainage/fire susceptibility
 - Shifting populations (WUI, ignitions, fuels)
- 2. Increasing negative impacts on people (health, safety, livelihoods)





Examples of Recent (Documented) Wildfire Disasters







Global Fire Solutions

Greater international collaboration:

- Resource-sharing during wildfire disaster
- Exchanging expertise
- Sharing science and technology
- Collaborative research
- Integrated training
- Free and open access of fire intelligence





What is Fire Danger Rating?

Wildland Fire Danger – a measure of the potential for fire to start, spread, and have significant impact.

Fire danger is a primary fire management decisionaid tool, and important research tool.









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Why do we need fire danger rating?

- Justify annual operations budgets, and emergency funding
- Annual carbon emissions reporting (UNFCCC)
- •Simulate current and future impacts of climate change, and implications of various fire management scenarios
- Prepare air quality hazard reports
- Informing public of extreme burning conditions
- Planning prescribed burns
- Determine fire suppression resource requirements and strategic positioning
- Modeling post-fire biodiversity (mortality, regeneration, and post-fire succession models)





What is Fire Early Warning?

Early warning is advanced knowledge of future fire danger conditions

Fire early warning provides:

- 1. Guidance in the planning and appropriate use of prescribed fire
- 2. Time to implement fire management actions that mitigate or prevent wildland fire disaster



Photo: Working on Fire













Global EWS for Wildland Fire

Purpose is to reduce global wildland fire disaster through early warning, and promotion of information and resource-sharing





Africa Example



Vegetation Classification

Fuel Types

Head Fire Intensity August 1, 2008 **Grass Areas Only**

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Pre-Suppression Planning Guide

Wildfire Threat Level	Resources on Standby	Alert Period	Dispatch Time
Low	crews, hand tools	mid-day	60-min
Moderate	crews, hand tools	all day	30 min
	pumps, water tanks	mid-day	60 min
High	crews, hand tools	all day	15 min
	pumps, water tanks	all day	30 min
	control line-building equipment	mid-day	60 min
Extreme	crews, hand tools	all day	15 min
	pumps, water tanks	all day	15 min
	control line-building equipment	all day	30 min
	aircraft, burnout equipment	mid-day	60 min







Regional EWS Prototype: Central and South America





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Global EWS



- Provides 1-7 day forecast fire danger coarse scale
- Indicates regional fire 'hot spots' and global trends in fire danger
- Designed for making large-scale decisions
- Provides early warning to national and international agencies for fire management and disaster management (including UN/ISDR, FAO, WHO, UNEP)





Regional EWS

- Provides regionally-calibrated fire danger at a fine scale
- Used with fire management decision-aids to make strategic (regional) or tactical (national) decisions









National and Local Levels

- Provide rapid updates of fire danger from local weather network
- Used to determine daily fire prevention, detection, and suppression activities at local level
 - Based on locally-derived guidelines for prescribed fire and fire control







Photo: Working on Fire





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- Global Fire Information System to build on the work in EFFIS in collaboration with national and International organizations under the GOFC Fire IT umbrella.
- The European Forest Fire Information System (EFFIS) has been established by the Joint • Research Centre (JRC) and the Directorate General for Environment (DG ENV) of the European Commission (EC, CFS and the GOFC Fire IT community in close collaboration with the Member States and neighbor countries, and national/regional networks.
- It supports the services in charge of the protection of forests against fires in EU and neighbor countries, and provides the EC services and the European Parliament with harmonized information on forest fires in Europe/Globally.
- Aims at providing up-to-date, reliable information on forest fires at the European level, • providing European/Global level assessments during both pre-fire and post-fire phases, thus supporting fire prevention, preparedness, fire fighting and post-fire evaluations.
- EFFIS is intended as <u>complementary system to national and regional systems</u> in the • countries, which provides harmonized information required for international collaboration on forest fire prevention and fighting and in cases of trans-boundary fire events.



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European Forest Fire Information System (EFFIS) Forest fire events Fire Danger Detection Forecast Burnt area Vegetation maps regeneration Land cover Potential soil erosion damage estimates Emission assessment assessmen Canada Natural Resources Ressources naturelles Canada Canada

EFFIS current status

EFFIS Network & European Forest Fire Database

- Joint effort of national and EC services
- Network of 33 Countries, over 2 million records
- On-going extension to MENA countries in collaboration with FAO



Forest Fires

Global Fire Information System



- Provision of 50 ensamble forecasts, plus one deterministic forecast
- Computation of Canadian, USA, Australian fire danger indices
- Computation of 1 to 15 day fire danger forecast
- Area coverage on fire season global areas (threshold temp, prec)
- Calibration of fire danger classess 2012
- Global Web Service development 2012



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Next Steps

Items to include in future that influence fire behaviour and EWS Products:

- fuel data type and load (biomass), affecting as fire behaviour as well as emissions
- spatial rainfall
- seasonal vegetation greenup and curing
- live vegetation moisture content
- fire radiative energy, indicating fuel consumption and emissions





Next Steps

- Include ECMWF forecasts as second realization
- Burned area, hot spots, emissions
- Extend forecasts to 2 weeks
- Incorporate improved early warning accuracy (RS data: spatial weather, fuel classification, seasonal green-up and curing, live vegetation moisture)
- Incorporate RS biomass for improved fire intensity and fire emissions prediction
- utilize Fire Radiative Power to calibrate fuel consumption and emission rates
- Calibrate predictive ignition models with hot spot data
- Develop regionally calibrated EWS products
- Support national and local technology transfer of EWS through workshops via Regional Networks







Next Steps

Technology transfer and capacity building:

- 1. Establish Regional EWS in key areas
- 2. Training in EWS and fire management
- 3. Training and more training (technology transfer to national and community level)









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Thank You

GOFC-GOLD GLOBAL OBSERVATION OF FOREST AND LAND COVER DYNAMICS

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Global EWS website at FIRE GLOBE Global Fire Monitoring Center:

http://www.fire.uni-freiburg.de/gwfews/index.html



