



Red  
Internacional de  
Bosques Modelo

30 AÑOS DE  
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ALIANZAS Y  
SOSTENIBILIDAD

# Integrating Fire Science and Fire Management

Social Participation and Local Fire Governance  
through International Networks

Canada

W.J. (Bill) de Groot



# Integrating Fire Science and Fire Management

- Use science to support Local Fire Governance –  
i.e., *Community-Based Fire Management*
- Fire Management = Decision-making
  - Suppression tool have limits
  - Early decision-making prevents/mitigates wildfire disaster
- Develop simple, operationally useful decision-aid tools



# Integrating Fire Science and Fire Management



Five R's of Fire Management:

Review and analysis (identify fire issues)

Risk Reduction

Readiness

Response

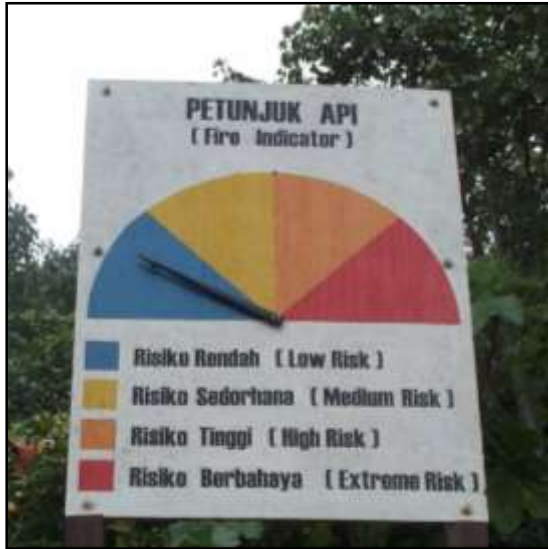
Recovery (building back better)

Key components: early warning, advanced planning, involvement, community







# Fire Danger, Early Warning and Fire Management

- **Fire Danger** is a measure of the potential for fire to start, spread, and do damage
- **Fire Early Warning** is advanced knowledge of future fire danger conditions
- **Fire Danger Rating** is the cornerstone of fire management decision-making





# Example of Prevention and Detection Planning Guides

| Potential Ignition Level |  | Prevention Activity          | Detection       |         |
|--------------------------|--|------------------------------|-----------------|---------|
|                          |  |                              | Activity        | Period  |
| Low                      |   | None                         | None            | None    |
| Moderate                 |   | Post local warning signs     | towers          | mid-day |
| High                     |   | Local media warnings         | towers          | all day |
|                          |  | Prescribed fire restrictions | vehicle patrol  | mid-day |
| Extreme                  |  | TV and radio warnings        | towers          | all day |
|                          |  | Prescribed fire exclusion    | vehicle patrol  | all day |
|                          |  | Local community meetings     | aircraft patrol | mid-day |



# Example of using Fire Danger to quantify a Detection Decision-Aid

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Probability  
Of Fire Start

Detection  
Activity

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<30%

No detection

30-60%

Towers 1-4pm

60-80%

Towers all day

80+%

Patrols 1-4pm

Towers all day

Patrols am, pm

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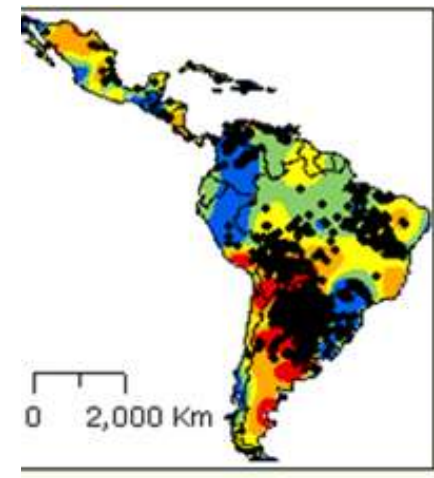
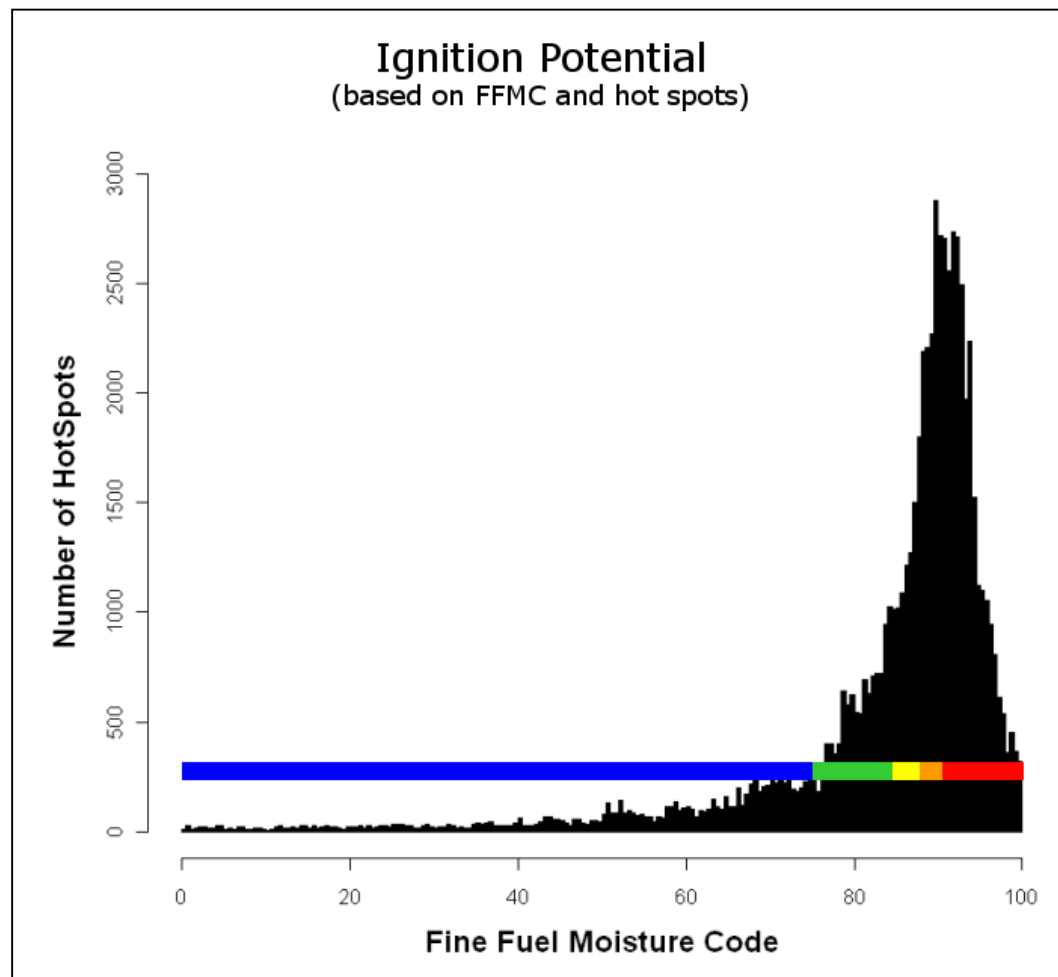


# Example of using Fire Danger to quantify a Detection Decision-Aid

| Probability Of Fire Start | FFMC  | Activity       | Detection      |
|---------------------------|-------|----------------|----------------|
| <30%                      | <70   | No detection   |                |
| 30-60%                    | 70-80 |                | Towers 1-4pm   |
| 60-80%                    | 80-86 |                | Towers all day |
|                           |       | Patrols 1-4pm  |                |
| 80+%                      | 87+   | Towers all day |                |
|                           |       | Patrols am, pm |                |







# Calibration example of Ignition Potential





# Example of a Suppression Planning Guide

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



# Head Fire Intensity Limits of Control

| Resource                                    | HFI Limit (kW/m) |
|---|------------------|
| Hand tools                                  | 0-250            |
| Power pumps                                 | 250-1250         |
| Mechanized equipment to build control lines | 1250-2500        |
| Aircraft                                    | 2500-5000        |
| Indirect attack (burning out)               | 5000+            |



# Example of Calibration for Suppression Planning

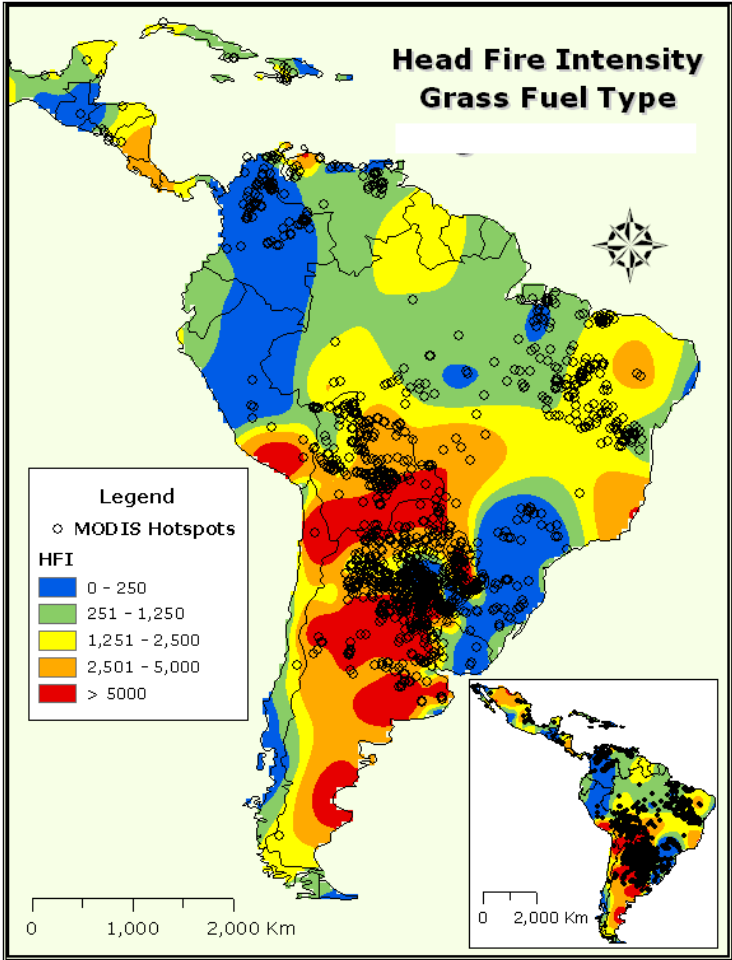
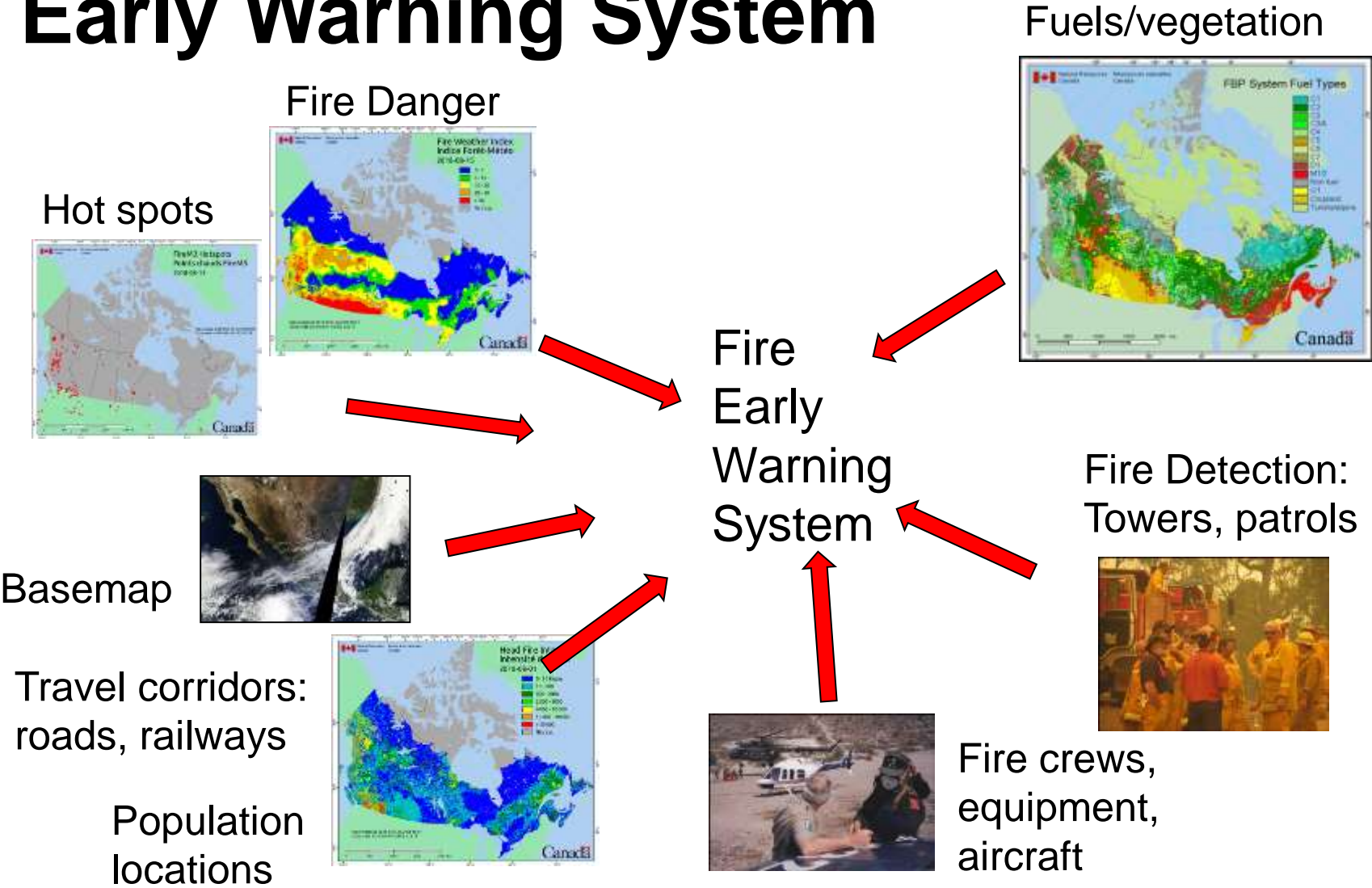


Photo: Working on Fire

# Components of a Fire Early Warning System



# Fire Early Warning

There are many possible components of a Fire Early Warning System:

- **Fire Danger – primary driver of early warning info!** (Early warning is provided by forecasted weather)
- Hot spots (new and on-going fires)
- Fuels/vegetation, and topography
- Travel corridors and people: roads, railways, waterways, buildings, population locations
- Fire mgt. info: detection towers, aircraft patrol routes, fire crew bases, equipment locations





# Integrating Fire Science and Fire Management

Obrigado!



# Somos la Red Internacional de Bosques Modelo

   : @bosquemodelo #SoyBosqueModelo



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