Portugal Wildfire Management in a New Era

Assessing Fire Risks, Resources and Reforms

Has Portugal Entered a New Era of Wildfire?

I. Assessing Wildfire Risk-- Will Tomorrow Resemble Yesterday?

II. Wildfire Defense Planning and Institutions-- Are Reforms Working?

III. Fuel Management, Firefighting and Wildfire Prevention– Towards A Balanced Strategy?

Photo Credit: Ângelo Cardoso

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2018 Report

Report Basis: Why Listen to Us? Because You're Listening to Them

2009 Report: ***Systemic Risk and Portugal's Forest Fire Defense Strategy—Assessment of Wildfire Management & Response Capability***

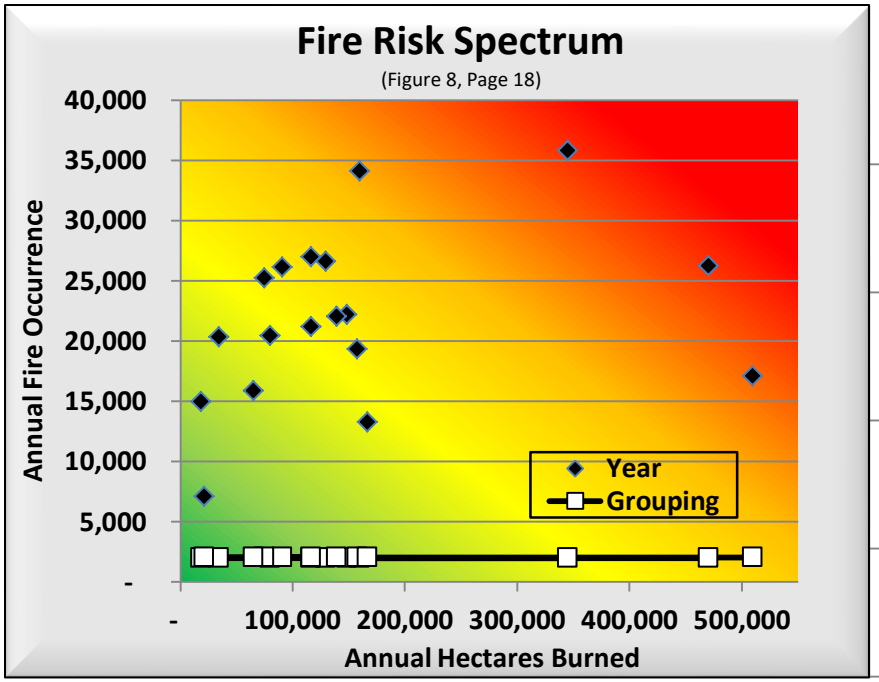
- Interviews with 59 Portuguese experts: forestry, civil protection, emergency management, meteorology, and forest fire research.
- Discussions with representatives from Government agencies, universities, pulp and paper industry, forest owner associations and municipalities.
- Field observations of fire responses over 4 weeks in July and August.
- Report warned of a 500,000 ha fire year.
  - Warning materialized in 2017

2018 Report*: Portugal Wildfire Management in a New Era*

- Proposed May 2017 to update information and data, review actions since 2009. (Postponed due to catastrophic fires in June).
- Project scope expanded after October fires and initiated in November.
- Interviews with 29 Portuguese experts and agency/organization representatives.
- Fire data analysis confirms new level of fire activity. Portugal decadal average increased:
  - Under 75,000 ha during the 1980s'.
  - 100,000 ha in the 1990s'.
  - 150,000 ha since 2000.
- Warns of a 600,000-750,000 ha fire year over the next decade.

ANNUAL FIRE BURNED AREA PORTUGAL 1980-2017

(FIGURE 1, PAGE 9)



600,000
500,000
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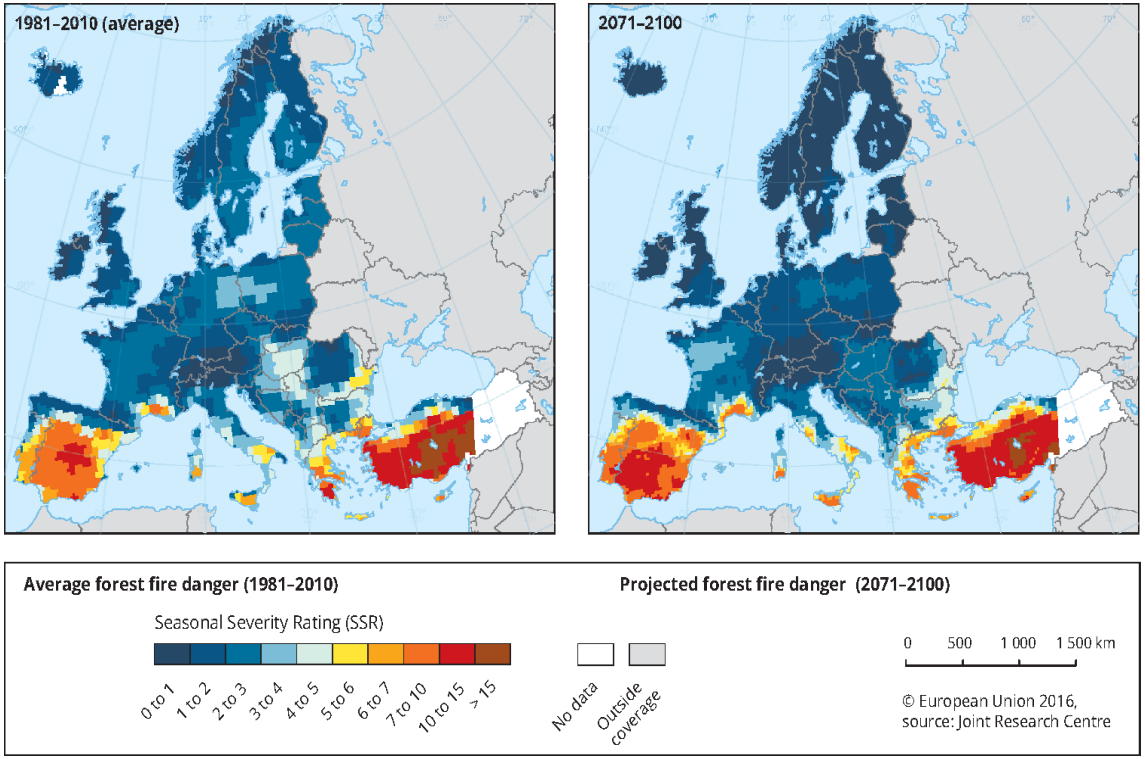
I. Assessing Portugal's Wildfire Risk

EU's Seasonal Fire Severity Rating

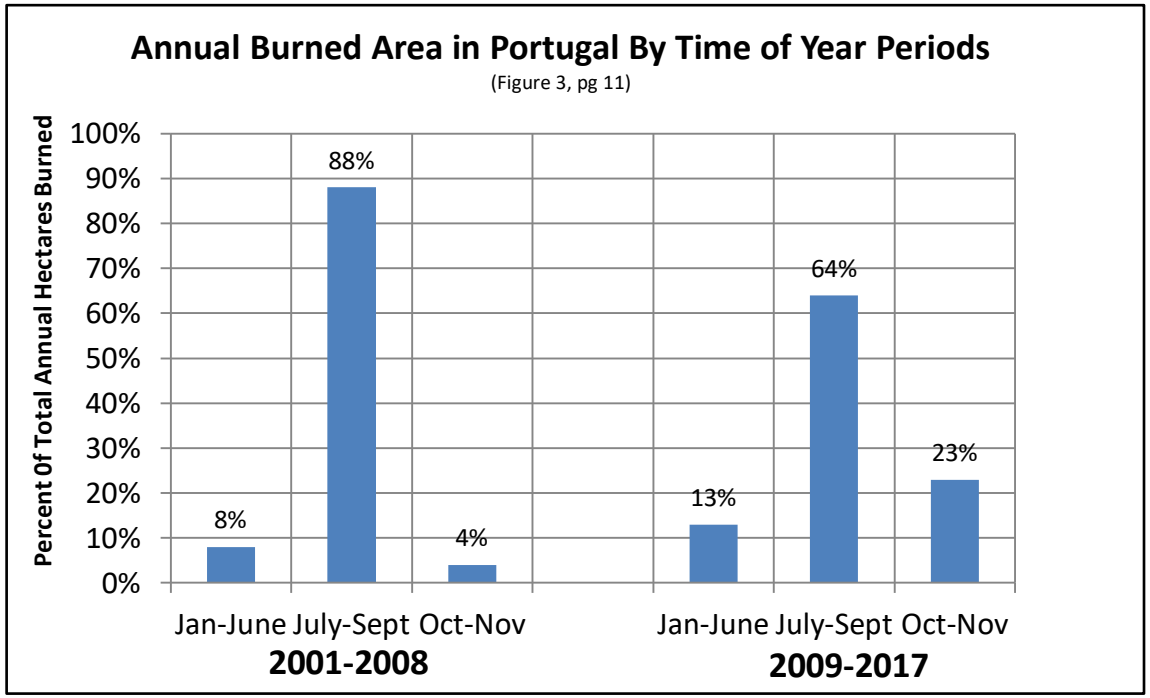


(Figure 4, page 12)

- Rising temperature, decreasing precipitation are the "new normal" for Iberian Peninsula.
- Contributing factors: increasing fuel load and continuity across large landscapes and abundant human-caused ignitions.
- Added environmental stress on vegetation increases the likelihood of larger wildfires.
- In next decade, without long-term and sustainable intervention, risk of another "extreme fire year" approaching 500,000 ha is now above 20%.

I. Assessing Wildfire Risk

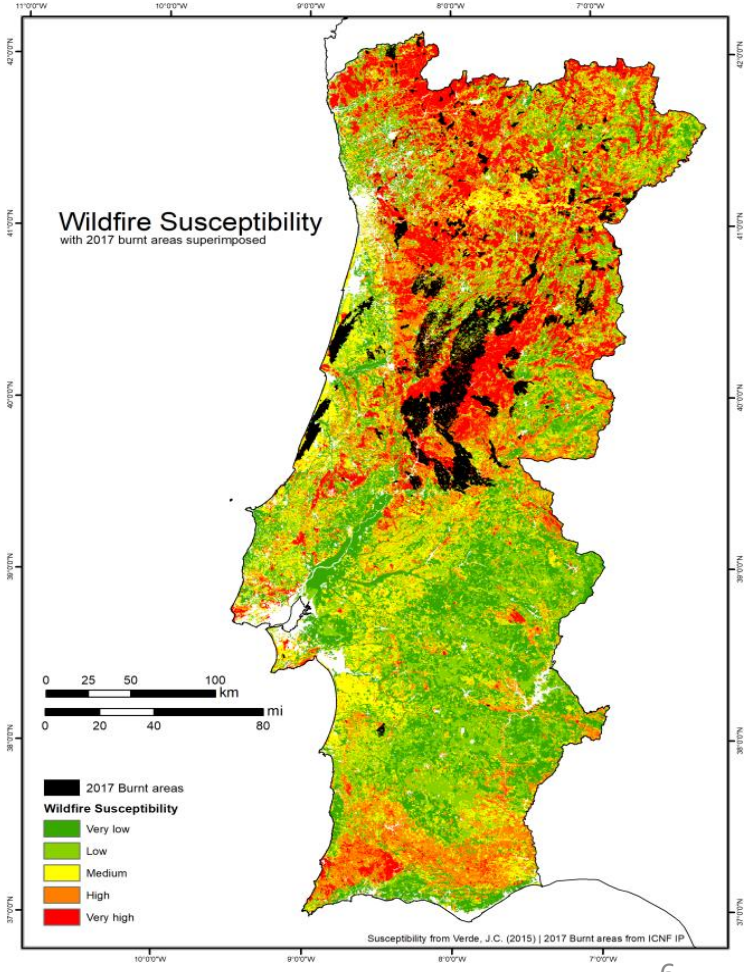
Large Inter-Annual Variability



- Extended periods of higher severity burning conditions may add weeks to the July through September peak fire season.
- 2001-2008: 12% of the total area burned was outside of the July through September period.
- 2009-2017, this tripled to 36%.
- Dates of peak firefighter numbers will need flexibility.
- Occasional years of lower fire activity may occur—should be seen as an opportunity to accelerate fuel reduction.

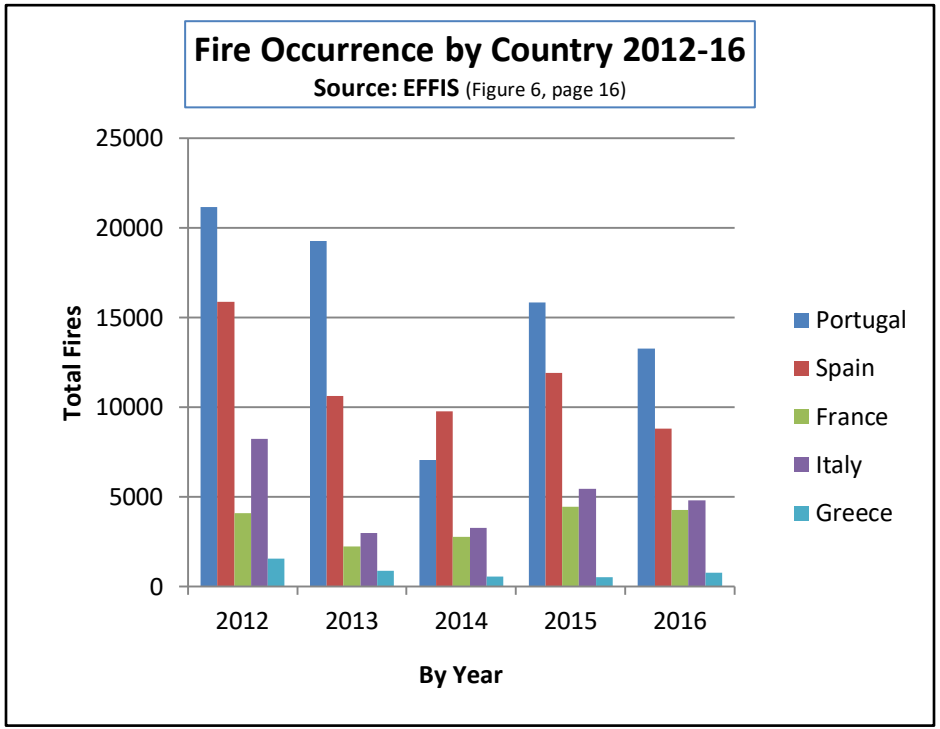
I. Assessing Wildfire Risk
Structural Risk Factors

- Unique mix of vegetation and topography has made Portugal very prone to wildfires.
- Many rural community farm lands that once mitigated fire spread are now abandoned due to rural depopulation.
- Marginally productive lands converted to forest plantations are increasingly left unmanaged, too costly to maintain (**80% of forests are unmanaged**).
- Abandoned rural areas and unmanaged forests are then invaded by dense shrubs and trees making vast landscapes prone to large fires.
- Recently burned areas are quickly invaded by highly flammable trees and shrubs making much of Portugal very susceptible to wildfire.



(Figure 5, page 15)

I. Assessing Wildfire Risk
Human Risk Factors



- 98% of all Portugal ignitions are human caused.
- Not only does Portugal have most total fire occurrences among Southern European Countries but per capita—it is six times worse
  - France 55 fires per/million people
  - Greece 77 fires per/million people
  - Italy 83 fires per/million people
  - Spain 246 fires per/million people
  - **Portugal 1488** fires per/million people
- Good news: fire occurrence in Portugal is trending down.
- Bad news: far too many fires occur during moderate to severe periods of fire weather.
- Fire cause data is still a major problem. From 2001-2017:
  - 59% of fires listed are not investigated.
  - Cause is unknown for an additional 14%.
  - In summary—Only 27% of fire occurrences in Portugal have an identified cause.

Fire Risk Scenarios	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Descriptor	Low Fire Year	Moderate Fire Year	High Fire Year	Extreme Fire Year	Black Skies
Annual hectares burned in thousands	0-50	50-100	100-200	200-500	Approaches 750
Number of times occurred in 18 years (2000-2017)	3 in 18	4 in 18	8 in 18	3 in 18	0 in 18
Historical Risk Factor, (percent of actual occurrence)	17%	22%	44%	17%	0%
Weather/Climate adjustment factor	Reduced chance	Reduced Chance	Increased chance	Increased chance	Increased chance
Future Risk Factor	12%	18%	45%	20%	5%

Scenarios for Portugal Next Decade of Fire Risk

(Figure 9, page 19)

Scenario 1: Increasingly rare, low fire year resulting from mild, wet summers.

Scenario 2: Few severe weather events occur resulting in a high rate of successful first intervention.

Scenario 3: Numerous severe weather events occur, fire fighting forces are often insufficient to meet the demand; the "new normal".

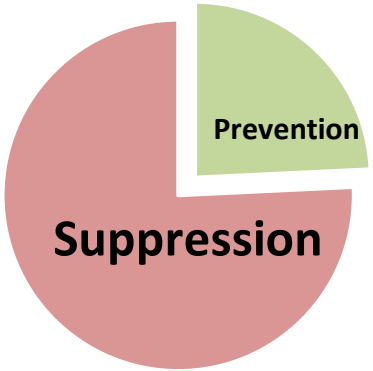
Scenario 4: Lengthy periods when fire fighting forces are overwhelmed, as was the case in 2003, 2005 and 2017.

Scenario 5: Multiple concurrent, very large fires in several regions of the country. National firefighting capabilities are pushed past the breaking point requiring massive international assistance. This presents a ***New Worst Case Scenario.***

II. Assessing Portugal's Wildfire Management Reforms

Previous Actions Prove Insufficient

Portugal National Prevention/Suppression Costs



*Source: 2017 ITC Report estimates

- Previous reforms (2006 PNDFCI) increased aerial firefighting means while minimizing prevention efforts that reduce fuel and fire occurrence.
- From 2000-2016: 213.5* million euros spent on suppression compared to 72.6* million invested in prevention. Yet, annual trend in area burned in Portugal has continued on a steady increase.
- "Successive restructuring" of government agencies has not adequately addressed growing and more destructive fire problem in rural areas.
  - AON Benfield listed the economic loss for just the October 15-16 wildfires at $875 million USD.
- When fires become more intense, and faster spreading, civil protection firefighting forces become less effective.

II. Assessing Portugal's Wildfire Management Reforms
Improving Government Effectiveness

Improve Rural Fire Management

- Establish an Agency for the Integrated Management of Rural Fire (AGIF) that specializes in rural fire protection.
- New approaches and policies must receive equal consideration.
- Authority must exist at the same levels of government as existing fire response agencies:
  - National Authority for Civil Protection **(**ANPC)
  - National Republican Guard (GNR)
  - Institute for Nature Conservation and Forests (*ICNF)*
- Include Intermunicipality Community (CIM) level field offices for supervision of Technical Forest Offices (*GTF),* forest sapper program and forest management plans.

Revise Directive for Forest Fire Fighting (DECIF) priorities:

1. Life
2. Buildings and other infrastructure
3. National parks and conservation areas
4. Managed forests and agriculture land
5. Unmanaged forests and agriculture land

III. Towards A More Balanced Strategy
Renewing Fuel Management Efforts

Photo Credit: Vasco Campos

However, fuel break construction, prescribed fire, commercial harvesting and livestock grazing combined won't result in sufficient fuel removal.

- Complete the primary fuelbreak system
- Increase forest sapper teams and supplement with dozer/tractor units.
- Increase efforts to remove annual growth on fuelbreaks and strategic fuel reduction zones (include livestock grazing).
- Increase prescribed burning to reduce fuels and provide firefighter live-fire training.
- Apply a post harvest residue tax that can be reimbursed upon satisfactory removal and disposal of forest fuels to a certifiable standard (CLF).
- Use harvesting, fuel treatment and vegetation type conversion to create mosaic patterns of species and age class diversity across landscapes.

III. Towards A More Balanced Strategy

Fire Planning & Prevention

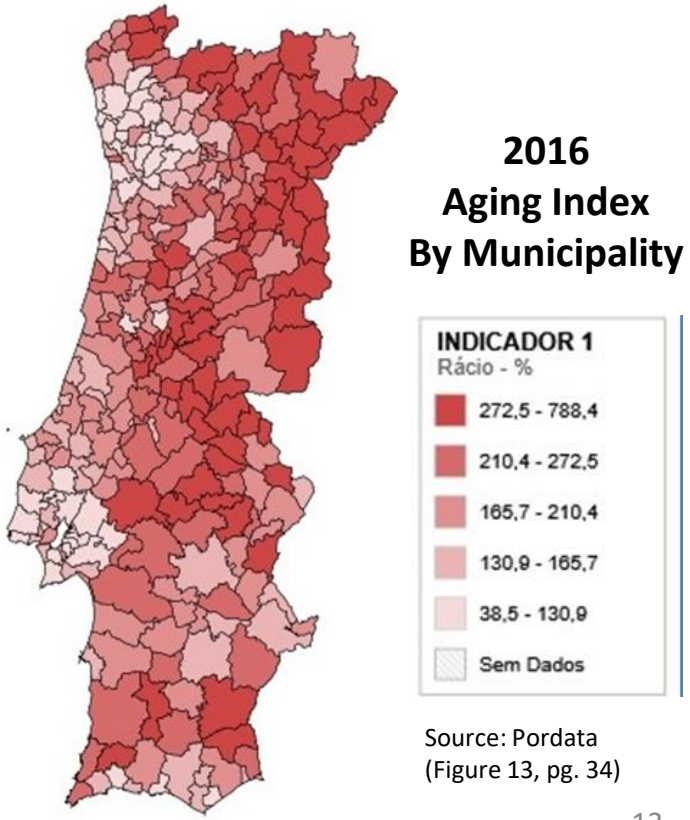
- Thousands of small plot forests have been consolidated into Forest Intervention Zones (currently there are 189 ZIFs) but…
  - Little improvement in fuel and forest conditions has resulted.
- Many things are **still lacking** for the ZIF program to be an effective contributor to better forest management, including:
  - **Landowner desire** to do work on their land that's in the best interest of the collective.
  - **Landowner trust** that the entity managing the ZIF will act in their benefit.
  - **Economic attractiveness** of forest products and services.
  - **Effective, progressive leadership** at community, municipal, and district levels.
  - **Additional financial incentives** (reduced taxes or increased subsidies) that recognize the public benefit of reducing future harvest income by removing trees to create fuel breaks or a mosaic of less flammable vegetation.

(Figure 10, pg. 29)

III. Towards A More Balanced Strategy
Improving Firefighter Performance, Pay and Career Opportunities

The Aging Index (Portugal)

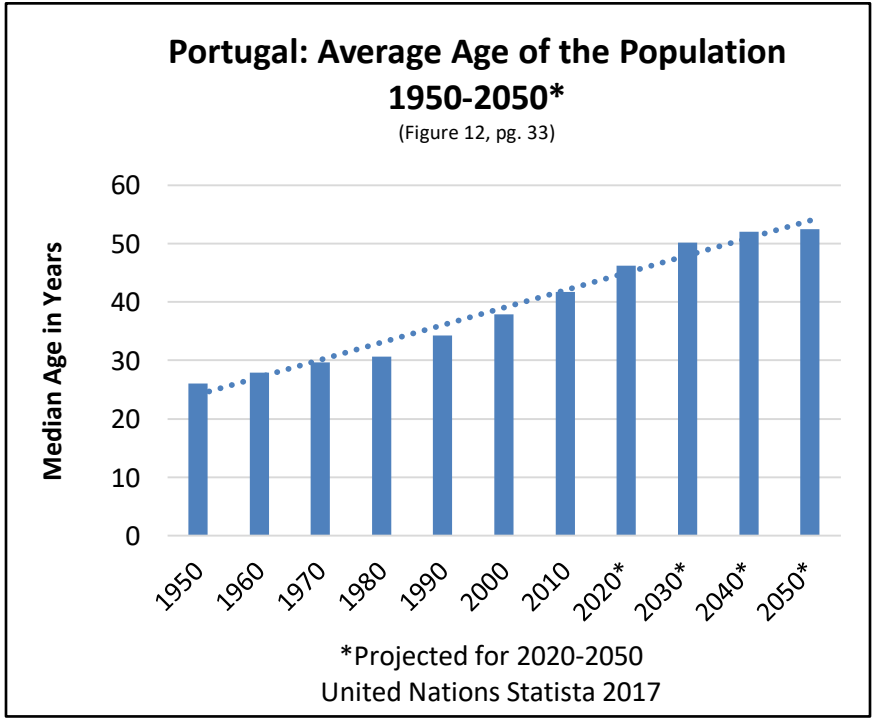
- Number of older people (65+) for every 100 younger people (14-)
  - In 2000, there were 99 older people for every 100 younger people—about equal.
  - By 2016, there were 149 older people for every 100 younger people—an increase of 50%.
- The darkest two colors are where older outnumber younger by a ratio from 2/1 up to almost 8/1.
- Many of these areas have the highest wildfire susceptibility.
- These are areas where younger firefighters are needed most!



Source: Pordata
(Figure 13, pg. 34)

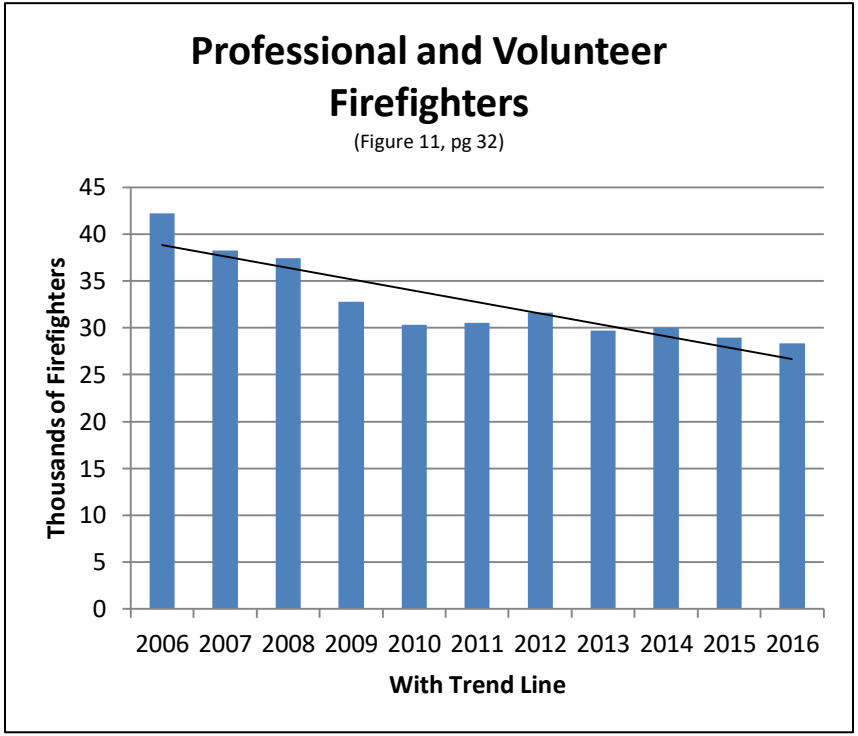
III. Towards A More Balanced Strategy
Improving Firefighter Performance, Pay and Career Opportunities

- Firefighting is a physically demanding job for which a healthy, younger workforce is required. But the trend in Portugal is not helping…
  - 1950 average age in Portugal was 26.
  - 2050 forecast average age will be 52!
- Firefighters are mirroring this trend.
- Fire Commanders are plagued by two issues.
  1. Most firefighters are older.
  2. Young people are not interested.
- And the Army?… *"the Army is also finding it difficult to keep young people in the ranks…due to greater involvement in forest fires."* Jornal de Noticias (6 March 2018)

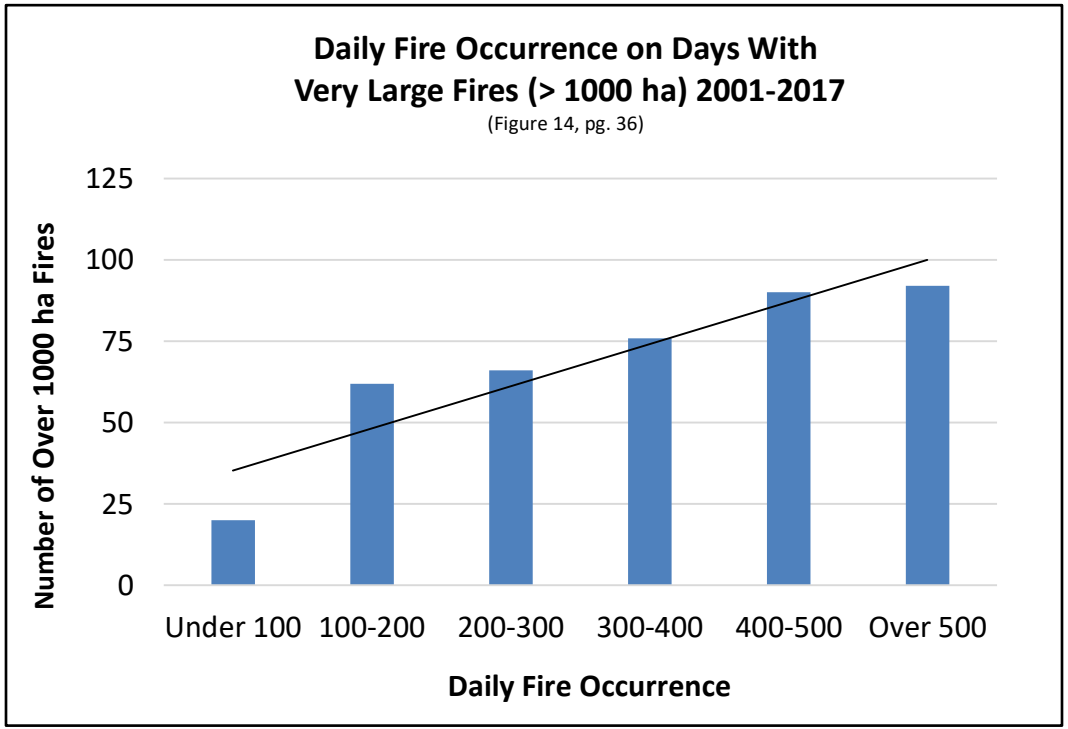


III. Towards A More Balanced Strategy
Improving Firefighter Performance, Pay and Career Opportunities

- Professional and volunteer firefighters in Portugal have declined 33% in just 11 years.
- Backbone of any fire protection system is the firefighters (not the aircraft or vehicles).
- Higher wages are needed to attract younger people to the profession.
- Career ladders need to retain experienced firefighters in training and supervision positions.
- Firefighters should be required to pass basic level mental and physical fitness requirements.
- **GNR/GIPS** has the most attractive program for both recruitment and retention of firefighters.



III. Towards A More Balanced Strategy
Limits to Firefighting Capability



- Only 1% of fires account for 80% of the total burned area.
- When conditions promote large fires, more occurrences = more very large fires (>1,000 ha).
- As fire growth and intensity increases, civil protection firefighting forces become less effective.
- *"…extremely large fires… overwhelmed the fire-control capacity, regardless of the available resources."* (Fernandes *et al.*, 2016).
- Possibly the most important reason to reduce occurrences.

III. Towards A More Balanced Strategy

Adjusting the Fire Suppression Skill Set

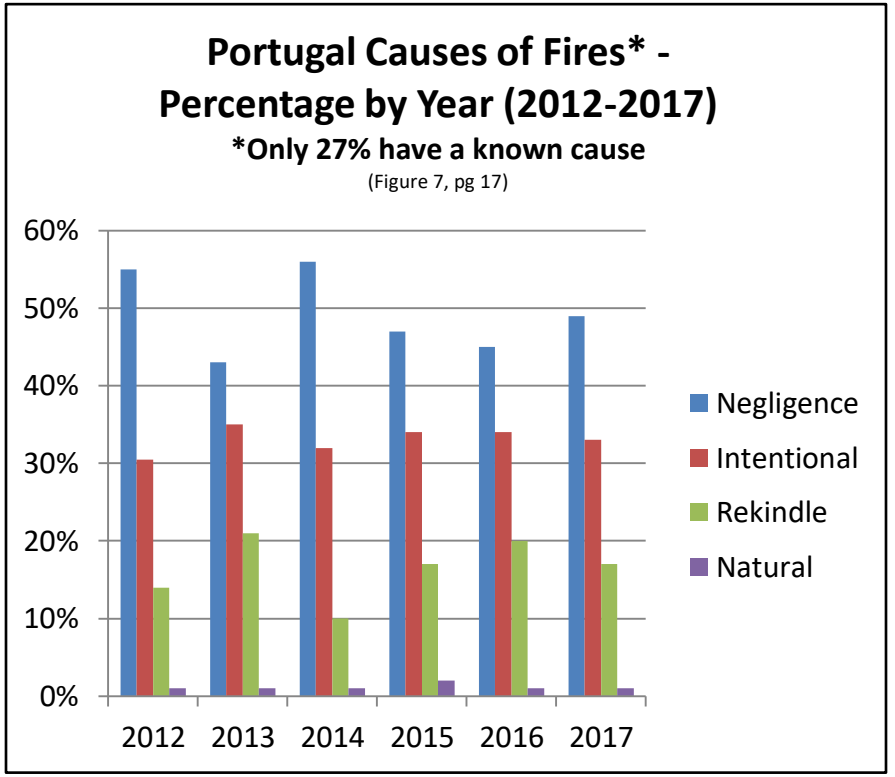
Photo Credit: Marciano Galguinho

- *Because of fire suppression limits under an increased frequency of severe conditions*, future investment must promote a more strategic approach, including:
- Technical fire specialists and meteorologists equipped with remote weather monitoring and fire behavior prediction support tools.
- Rural firefighters and commanders experienced in perimeter control strategy and tactics and proficient in the use of land cover and topographic mapping tools and technology.
- Increased fireline construction means including dozers, tractors and hand crews trained in rural fire operations.
- Airborne tactical aviation coordination on larger fires and when helicopters and air tankers are sharing airspace.

III. Towards A More Balanced Strategy

Reducing Ignitions and Rethinking Cultural Attitudes

- Rekindles average 16% of known fire causes. Firefighters are the problem! How can this be?
- First, a volunteer firefighter culture that avoids physically demanding work using only hoses and water, staying on roads, not using hand tools. Why?
- Second, too many daily fires force brigades to move prematurely to new fires and not return to insure all fires are completely extinguished.
- Another workforce, such as the Army, may need to be used to check fires for extinguishment.



III. Towards A More Balanced Strategy

Reducing Ignitions and Rethinking Cultural Attitudes

Photo credit: Mark Beighley

"See Something, Say Something"

- Enforcement officers can't be everywhere.
- The public must become a major component of the fire surveillance system.
- Neighbors are reluctant (afraid) to report suspicious activity, even when they know it's prohibited and could cause a fire.
  - "It's not my job to enforce the law."
  - But if you don't report it, who will?
- An anonymous fire hotline telephone number is needed for reporting negligent or illegal fire activity with total immunity.
- The public needs accurate information about what's causing fires and how they can help. *"It's not terrorists and it's not firefighting aircraft, it's your neighbor!"*

Photo Credit: Artur Costa

Closing Thoughts

- Solution demands dozens of strategic improvements in the next several years and possibly over the next decade.
- Changes must be sustainable with collaboration and participation from all levels of government and the public.
- When Portugal has mild, moist summers, it may appear the problem is solved. It's not. Get even more aggressive on fuel reduction.
- During heat and drought plagued years, firefighting forces will occasionally be overwhelmed. Contingency plans and agreements for international assistance must be prepared.
- A balanced strategy melds fire fighting with fire prevention. It requires improving the underlying conditions that put Portugal at higher risk—expansive landscapes of highly flammable fuel and thousands of potential ignition sources.