

“MANAGE THE FUEL - REDUCE THE RISK.”
EWWF WILDFIRE CONFERENCE 2019 - NOVEMBER 20, 2019.

WHAT WE MEAN WHEN WE SAY FUELS

WEAVING SOLUTION STORIES
FROM FUELS AND FIRE
IN OUR MEDIA AND WORK

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SO MANY WAYS TO KNOW FUEL

TALKING FUELS

1. Fuels as home.
2. Speaking of Fire vs. Fuels (counting words in our work and science).

WORKING FUELS

3. Managed Wildfire - Wyoming lodgepole (tall crowns).
4. Prescribed burning - reduced risk, regenerate aspen (green crowns).
5. Suppression, protection of values at risk - Wyoming sagebrush (short crowns).
6. Fuels of the Congo - a risk ... too much fire ... and a refreshed strategy.

THE NEW FUELS

7. Fuels of Wyoming, Congo, Australia, California, England and Wales and Europe - our risks are shared - too little fire and too much.
8. Finding a home within the fuels paradox - when we fight fire, fuels win. Your strategies? Climate change is global; the way to burn is local.

1. FUELS AS HOME

- In our natural areas and our communities, we live with vegetation first, fire next.
- Wildland fuels are also home.
- To manage our fuels — as landscape and intermix — how can our language of fuels help us adapt and adopt what others have piloted in similar situations?



THE FUELS I CALL HOME - GRAND TETON NATIONAL PARK



2. FIRE VS FUEL - COUNTING WORDS IN OUR WORK & SCIENCE

IN AN INFORMAL REVIEW OF WORD FREQUENCY ... IN PROFESSIONAL AND PUBLIC-FACING DOCUMENTS, WHAT IS THE RATIO?

FIRE VS.
FUEL/FUELS & WORDS THAT MEAN
“FUEL”



2. FIRE VS FUEL - COUNTING WORDS IN OUR WORK & SCIENCE

Type of Publication	Description	Fire	Fuel	Ratio of Fire to Fuel	Average Fire to Fuel - by Type	Fuel + phrase (prescribed fire, burn, vegetation)	Ratio of Fire to all Fuel-type words
▼ Field Guide							
Field Guide	Incident Response Pocket Guide (IRPG - US)	282	95	3.0		154	1.8
Field Guide	GB - Muirburn Code	478	78	6.1	4.5	406	1.2
▼ Professional Media							
Professional Media	Wildfire Magazine - recent years (online Google search)	264	158	1.7		302	0.9
Professional Media	Wildfire Magazine — 28.5 (current)	525	22	23.9		119	4.4
Professional Media	Wildfire Magazine - https://www.iawfonline.org/article/prescribed-fire-a-tool-for-our-time/	58	21	2.8			
Professional Media	Wildfire Magazine - https://www.iawfonline.org/article/learning-together-burning-together/	77	8	9.6			
Professional Media	Stephen Pyne, Intro, State Foresters (US), Prescribed Fire Use Report 2018.	6	0	6.0	8.8	6	1.0
▼ Science Journal							
Science Journal	Abstract, "Drivers of wildland fire behaviour variation across the Earth"	5	3	1.7		9	0.6
Science Journal	IJWF	1597	672	2.4	2.0		
▼ Terminology/Report							
Terminology/Report	TetonFires.Com (Teton Interagency Dispatch Center, WY)	407	370	1.1			
Terminology/Report	Terminology (US Forest Service)	292	74	3.9			
Terminology/Report	Comparative Risk Assessment (Cohesive Strategy)	714	176	4.1			
Terminology/Report	Fire Glossary (Wooten)	698	169	4.1	3.3		
▼ Averages							
Averages				AVERAGE	4.7	AVERAGE	1.6

2. FIRE VS FUEL - COUNTING WORDS IN OUR WORK & SCIENCE

> IN A SIMPLE COMPARISON — FIRE VS. FUELS — WE FLY TO THE FLAMES.

5 TIMES WE SPEAK OF FIRE FOR
EVERY REFERENCE TO FUEL

> YET TO COMPARE “FIRE” TO THE MANY LABELS AND ELEMENTS OF FUEL — TYPE OF VEGETATION, MOISTURE, ETC — WE CRAFT A BALANCED STORY.

1.6 TIMES WE SPEAK OF FIRE FOR
EVERY REFERENCE TO THE SYMPHONY OF FUEL

> ASSUMPTION: WE DESCRIBE “FUELS” (THE ROOT CAUSE) MORE SPECIFICALLY THAN WE DO THE EFFECT OF “FIRE,” WHICH IS A PROCESS TO MOVES FUELS FROM UNBURNED TO BURNED.

FIRES ARE AN INSTANCE, AN EMERGENCY WE “FIGHT.”
FUELS ARE AN ENVIRONMENT
WE CHOOSE TO MANAGE (OR OVERLOOK).

3. Fuels of home - Wyoming lodgepole (tall crowns)... and strategies

Done properly, the managed wildfire is a hybrid - part suppression, part prescribed burn. Suppression concentrates on sites of major assets at risk such as communities or municipal watersheds. The burning out can be imagined as a prescribed fire conducted under urgent, but not emergency, conditions....

I believe such fires are the future of prescribed burning in the West. There is no reason why the practice shouldn't expand to suitable sites elsewhere.

- Steven Pyne

3. Fuels of home - Wyoming lodgepole (tall crowns)



THE BERRY FIRE (2016)

4. Fuels of home - Wyoming mixed conifer/aspen - strategies

Prescribed burn, Wind River Mountains, WY (May 2019)



4. Fuels of home - Wyoming mixed conifer ... and aspen regeneration strategies



5. Fuels of home - suppression/protection -Wyoming sagebrush (low crowns)

THE SADDLE FIRE (2019)



5. Fuels of America - Wyoming sagebrush (low crowns)

THE SADDLE FIRE (2019)



EXTREME RATE OF SPREAD — FUELS ALIGNED WITH SLOPE AND WIND,
THEN A SLOPE REVERSAL.

THE SADDLE FIRE
(2019)

0 Minutes



+ 7 Minutes

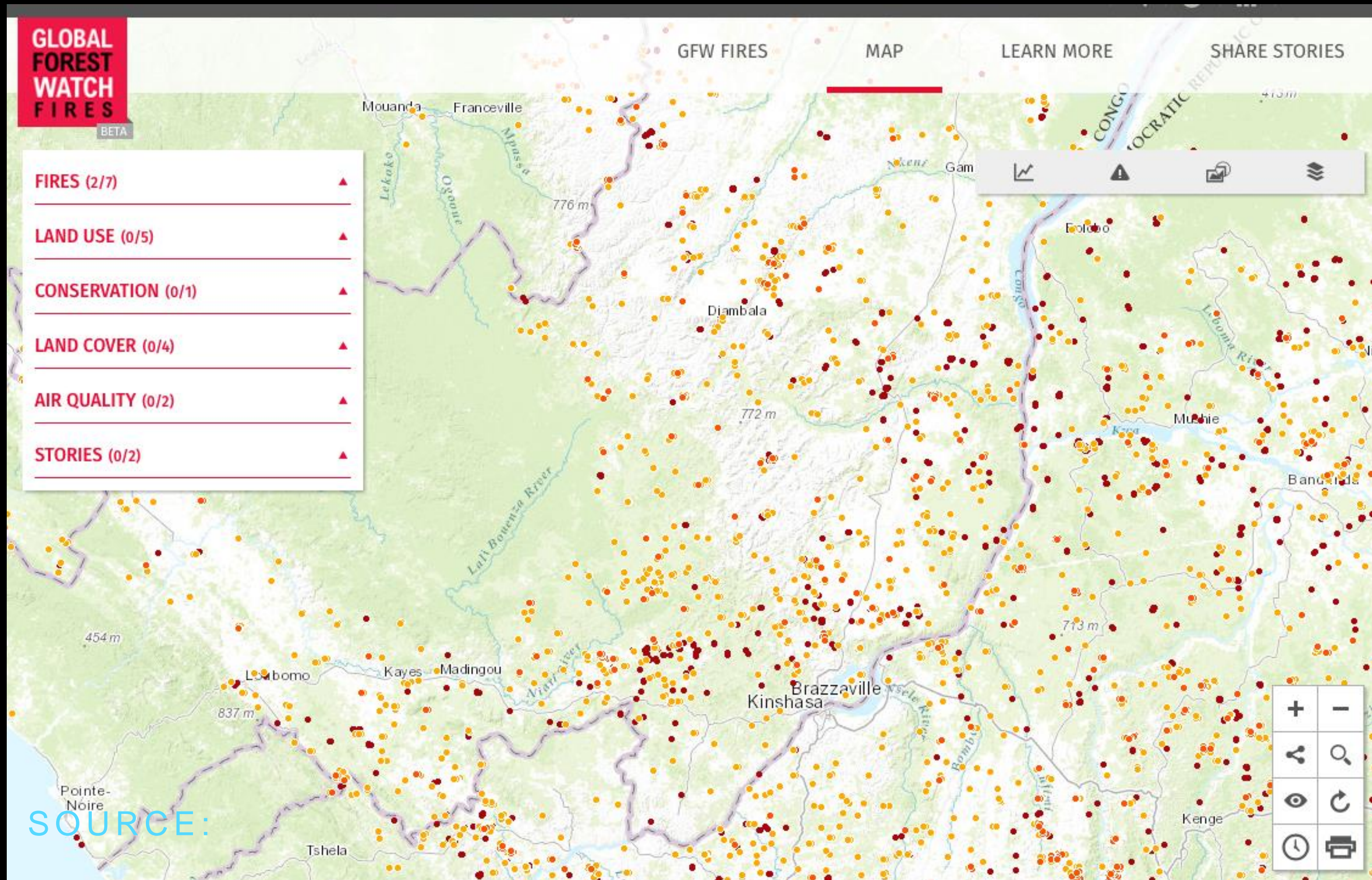


+ 35 Minutes



= fire around our safe zone and houses

6. FUELS OF THE CONGO ... THE OPPOSITE CHALLENGE? TOO MUCH FIRE ...OR NOT THE RIGHT TYPE.



DEVELOPING A STRATEGY

FROM 2014-2016, TREE COVER LOSS INCREASES DUE TO FIRES.

WHERE? SAVANNAH FIRES BURN INTO GALLERY FOREST.

WHEN? LATE DRY SEASON. NEXT ... ASK WHO IS BURNING & WHY?



Map: Forest Loss (red) between 2014-2016 & Woody Biomass (yellow). Focus: Mpo, Léfini Wildlife Reserve.

ATLAS FORESTIER DE LA RÉPUBLIQUE DU CONGO. CARPE analyses. WRI.

Source: <http://cog.forest-atlas.org/map/?appid=ab48869caa78429fb08f57748426ffeb&x=15.47&y=-2.50&z=13&l=en>

STRATEGY SCENARIOS

When planning to solve a fire challenge, some typical scenarios for managing bushfires include ...

STATUS QUO (NO CHANGE IN RESPONSE)

PROTECTION (OF KEY VALUES)

COMMUNITY ENGAGEMENT (TO REDUCE IGNITIONS)

+ PROTECTION OF VALUES AT RISK
(FORESTS, VILLAGES)

- Which scenario works best for your challenge, for your landscape, resources and communities?
- How can we adapt and adopt what others have piloted in similar situations?

STRATEGY OPTIONS - LEARNED FROM SIMILAR PROBLEMS &
SOLUTIONS
DEMOCRATIC REPUBLIC OF CONGO



TO SOLVE COMPLEX PROBLEMS
- AND CREATE SUSTAINABLE
SOLUTIONS -

WE MUST TAKE
SPECIFIC ACTS
THAT LEAD TO
TARGETED CHANGE.

A “systems thinking” approach may suggest these 4 stages:

1. BUILD A FOUNDATION FOR CHANGE
2. FACE REALITY
3. MAKE A CHOICE
4. BRIDGE THE GAP

"Systems Thinking For Social Change: A Practical Guide to Solving Complex Problems, Avoiding Unintended Consequences, and Achieving Lasting Results." Peter David Peter Stroh. Chelsea Green, 2015.

<https://www.chelseagreen.com/systems-thinking-for-social-change>.



1. BUILD A FOUNDATION
2. FACE REALITY



LESSONS LEARNED - DEMOCRATIC REPUBLIC OF CONGO:

Plan a process and follow the plan

Bring stakeholders together to solve shared problems together

Build toward common goals

3. MAKE A CHOICE
4. BRIDGE THE G

FOUNDATION FOR CHANGE

Gain support from local leaders





STAGE 1. BUILD A FOUNDATION FOR CHANGE

Offer training and “train the trainer” sessions by global experts — so local trainees can become regional trainers

STAGE 1. BUILD A FOUNDATION FOR CHANGE

LEADS INTO THE NEXT STAGE ...

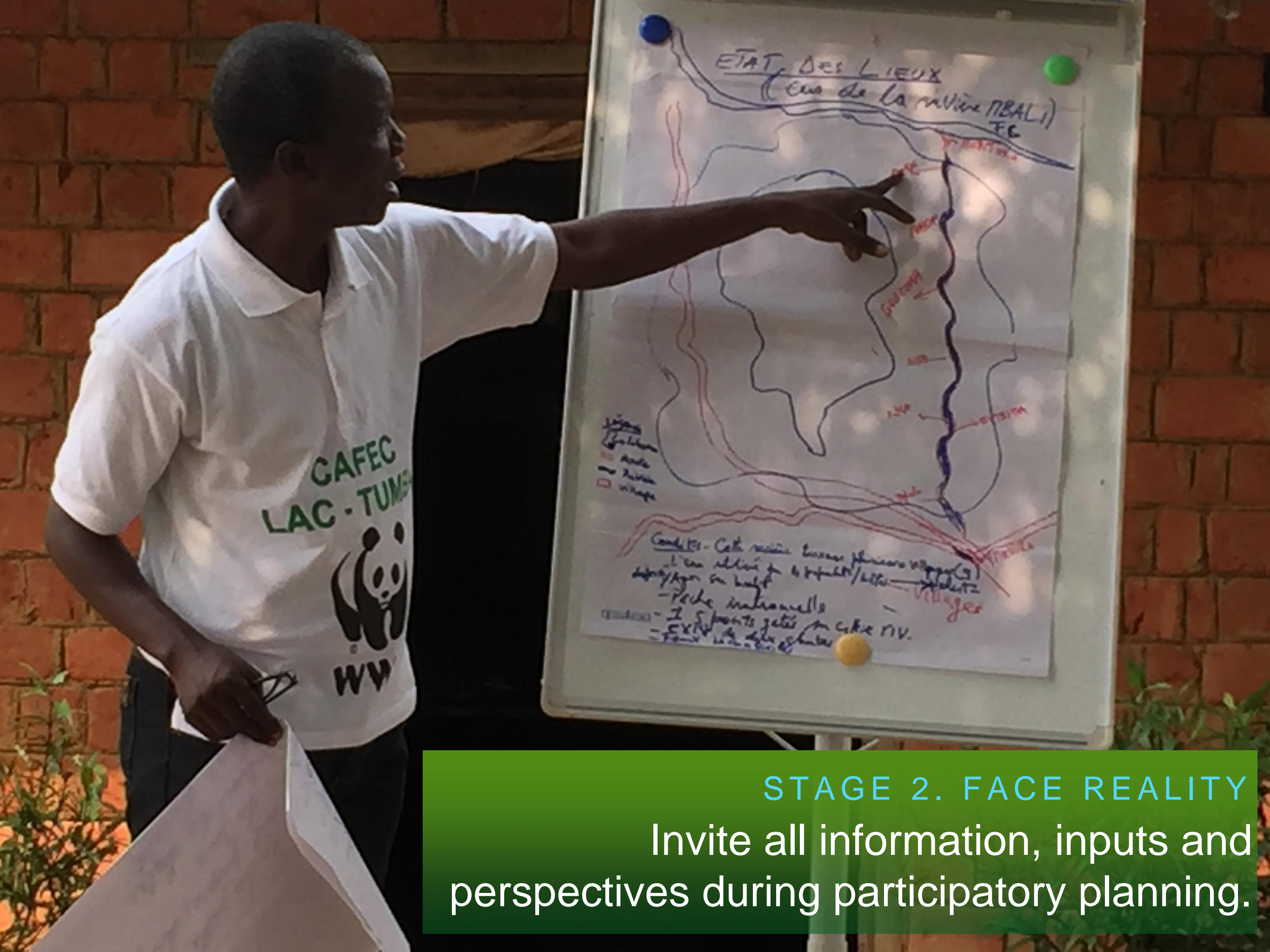
STAGE 2. FACE REALITY

- Collect information about the issues and potential solutions.

Listen to different land
management objectives.

Accept the work ahead.





STAGE 2. FACE REALITY

Invite all information, inputs and perspectives during participatory planning.

STAGE 3. MAKE A CHOICE

A trained
“burn boss”
(capitao de
feux) ignites a
“cool season”
fuel break,
burning fuels to
protect a
plantation and
village from
later, “hot
season” fires.
Bandundu,
DRC. February
2017.



What type of fire will shape your land?
How will you “Guide the Hand of Fire”?

A photograph showing a controlled fire in a forest. Five firefighters in yellow helmets and orange or black gear are walking away from the camera along a dirt path. To their left, a line of fire is burning through dry brush and grass, with white smoke rising. The forest is filled with trees and green foliage in the background.

STAGE 3. MAKE A CHOICE

In Bolobo, DRC, the strategy choice selected is “Community Engagement with Fire Brigade Training.”

This supports regional fire planning and coordination, on of burning early-season “cool” fire breaks to create stronger protection against ho

A group of people are gathered outdoors under a large tree, sitting on blue plastic chairs around a table. They are looking at a large map spread out on the table, which shows a landscape with green and pink areas. A man in a striped shirt is pointing at the map. A woman in a purple shirt is also looking at the map. In the background, there are more people and a dirt path. A red banner is overlaid on the top of the image.

STAGE 3. MAKE A CHOICE

The Community Engagement strategy includes the integration of village-level participatory mapping into regional land management and fire management plans.

The Community Engagement strategy includes the integration of village-level participatory mapping into regional land management and fire management plans.

A village fire brigade shares their terroir's land use and fire management plan, which includes input from and harmonizes with plans for neighboring terroirs.





STAGE 3. MAKE A CHOICE

Villages gather to support the work of the Technical Secretariat and their village's newly trained Fire Brigade firefighters.

STAGE 4: BRIDGE THE GAP

SUPPORT LOCAL EXPERTS AND ACTION

A newly trained “trainer” teaches other community members how to create a backfire to protect a village from a bushfire. This student participated in a USFS/International Programs training in Malawi in 2016.



STAGE 4: BRIDGE THE GAP

AFFIRM THE PLAN & CELEBRATE



STAGE 4: BRIDGE THE GAP

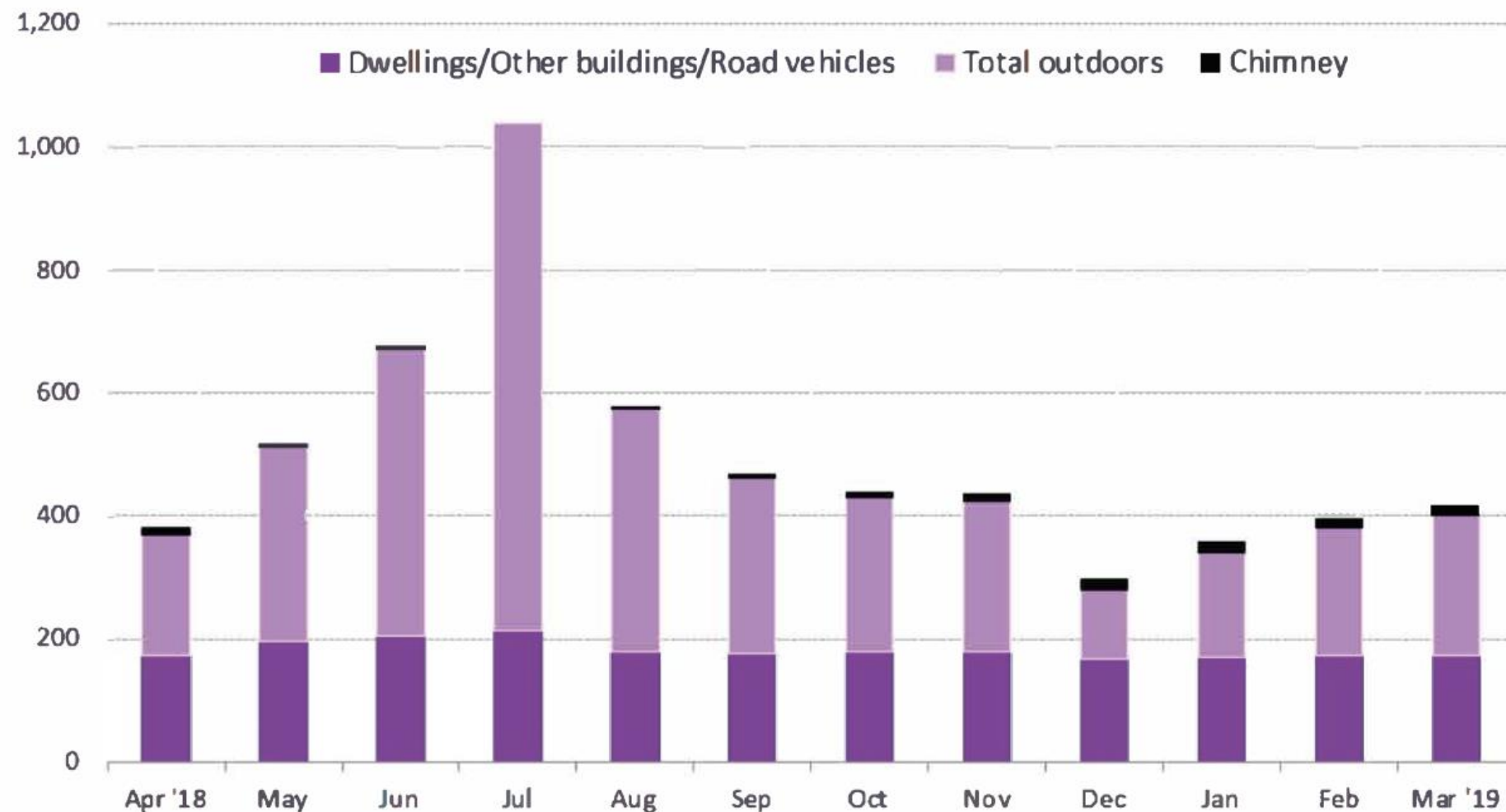
ENGAGE
EVERYONE
IN SHARED
GOALS

A mother is
trained as a
firefighter, and
she will teach
her children to
respect and
manage fires.



7. FUELS OF ENGLAND - YOUR RISKS? - TOO LITTLE FIRE AND TOO MUCH

July 2018 had the highest daily rate of fires, caused by the hot dry summer



The high rate of fires in July 2018 was driven by fires in 'grassland, woodland and crops', which had a daily rate more than two and half times as high as the peak for that type of fire in the previous year.

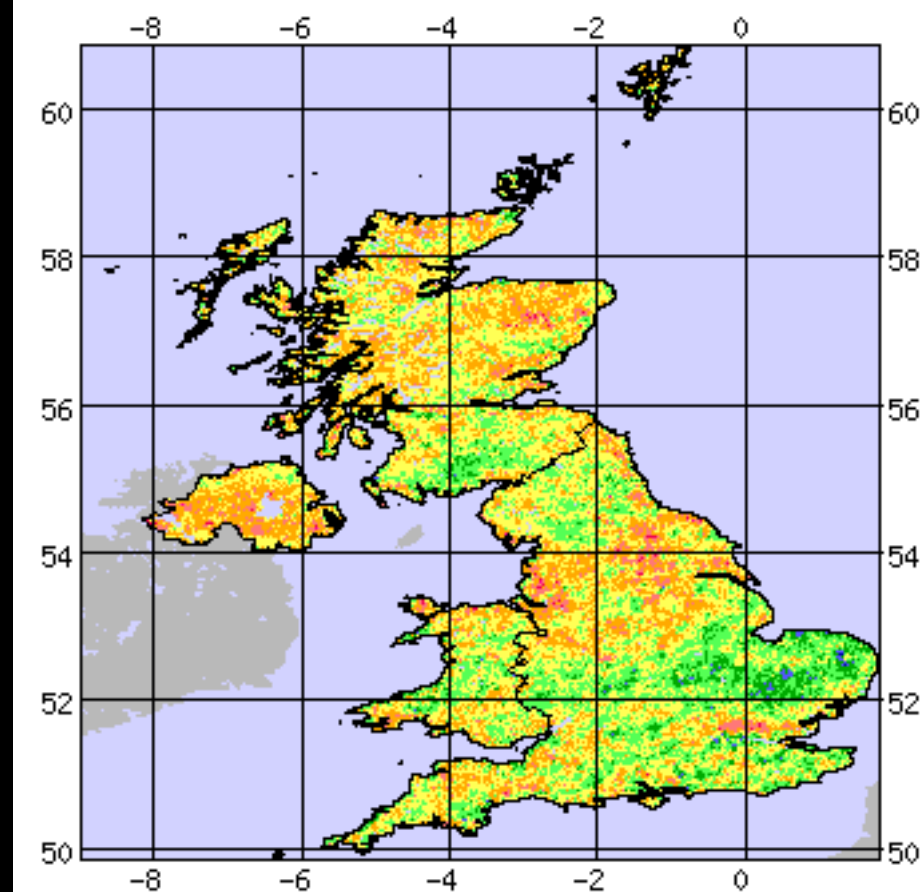
Fires in dwellings, other buildings and road vehicles showed relatively little seasonality.

For data sources and definitions of the types of fire and other incidents described in this sheet, see this page:
<https://www.gov.uk/government/collections/fire-statistics>

For more information contact the Fire Statistics team:
FireStatistics@homeoffice.gov.uk

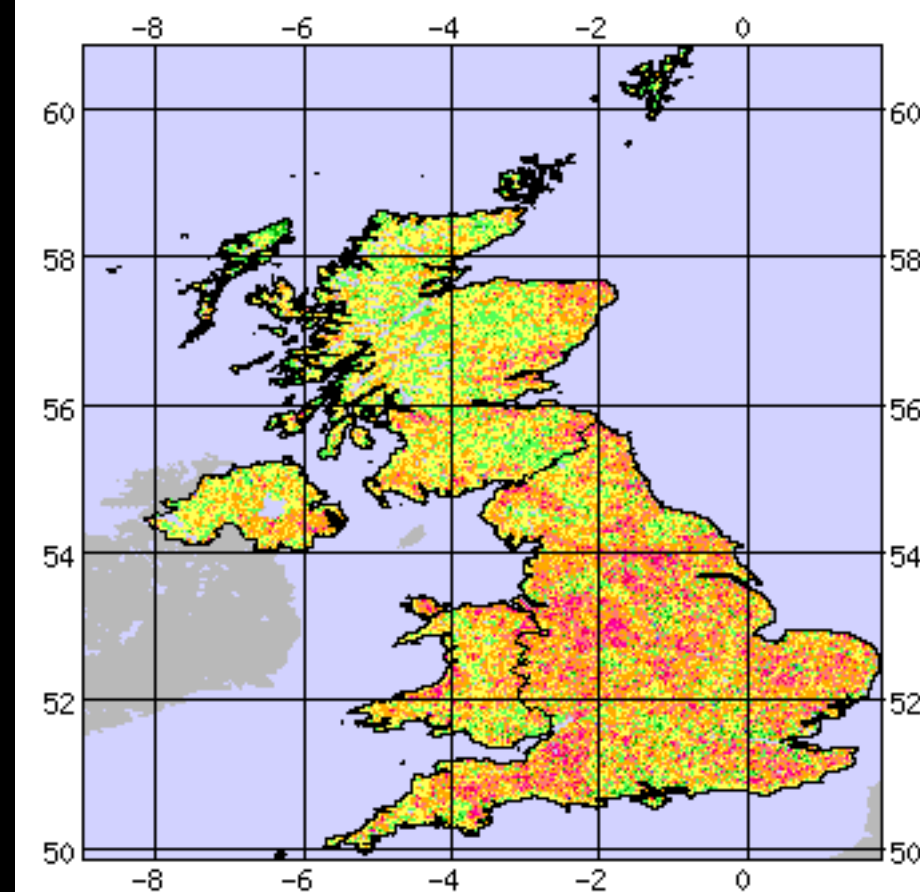
7. FUELS OF ENGLAND - YOUR RISKS - A RETURNING FIRE —TOO LITTLE FIRE THEN TOO MUCH

VHI of previous year, July 15, 1983 (week 28)



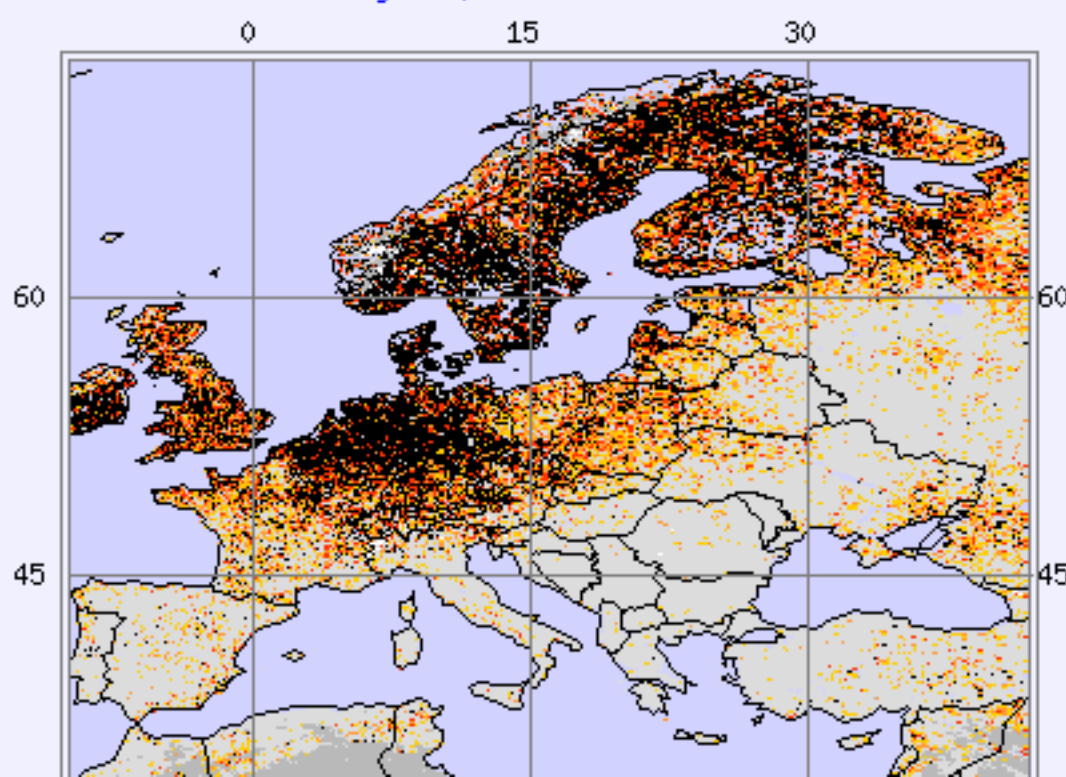
AVHRR-VHP Zoom=1

VHI of previous year, July 15, 2018 (week 28)



VIIRS-4km Zoom=1

July 15, 2018 (week 28)

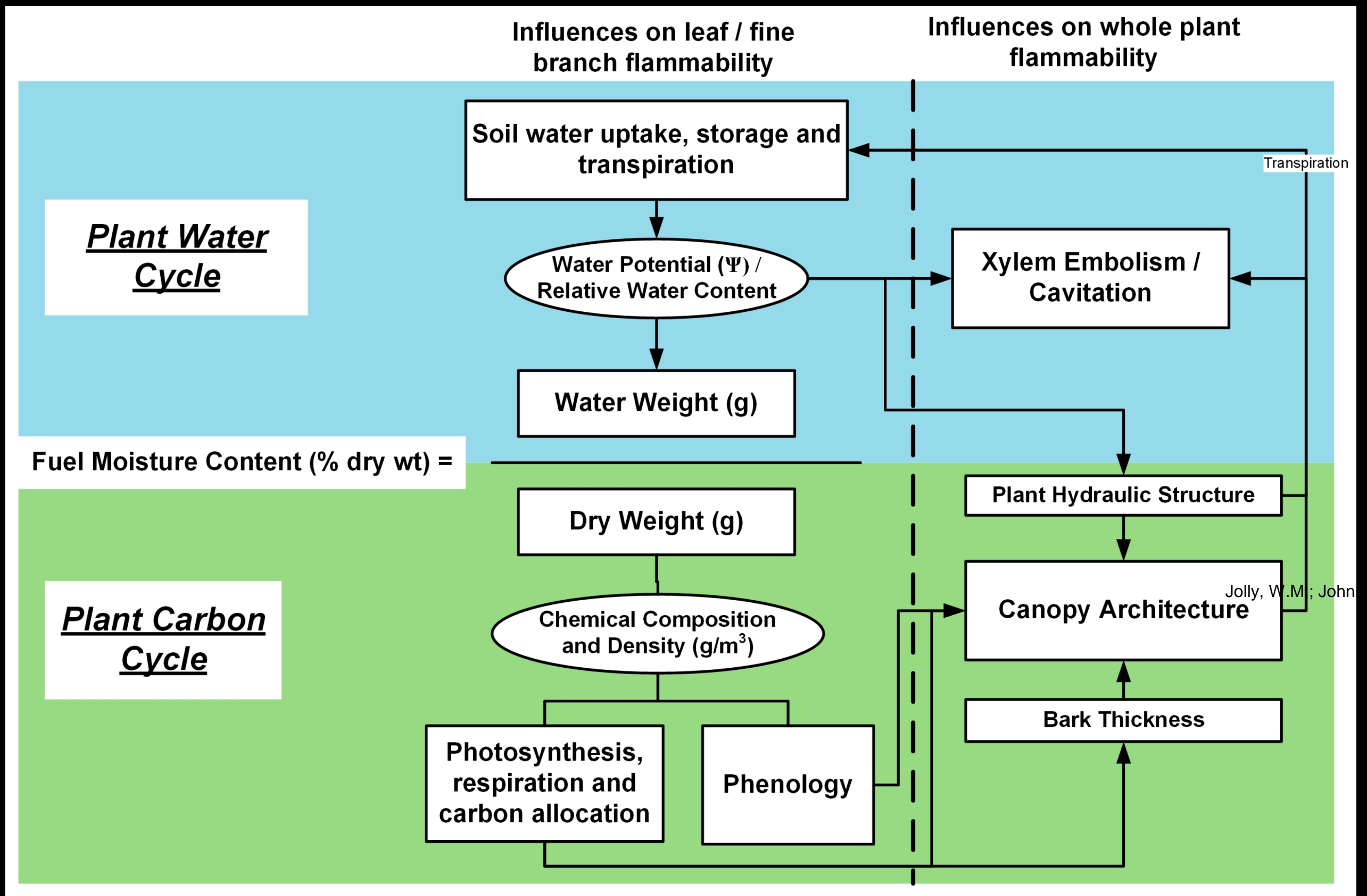


“Fuel moisture content exerts by far the major control in the variation in fire spread rate within broad vegetation types (forest, woodland, shrubland, grassland), while fuel structure metrics dominate the variation observed in fireline intensity, except in woodlands, where fuel moisture content is slightly more influential. Efforts to understand potential fire activity and fire regime shifts in relation to global change, and the formulation of policies for adaptive fire management will benefit from the results of this study.”

(22) (PDF) Paulo Fernandes et al. Drivers of wildland fire behaviour variation across the Earth. Available from:

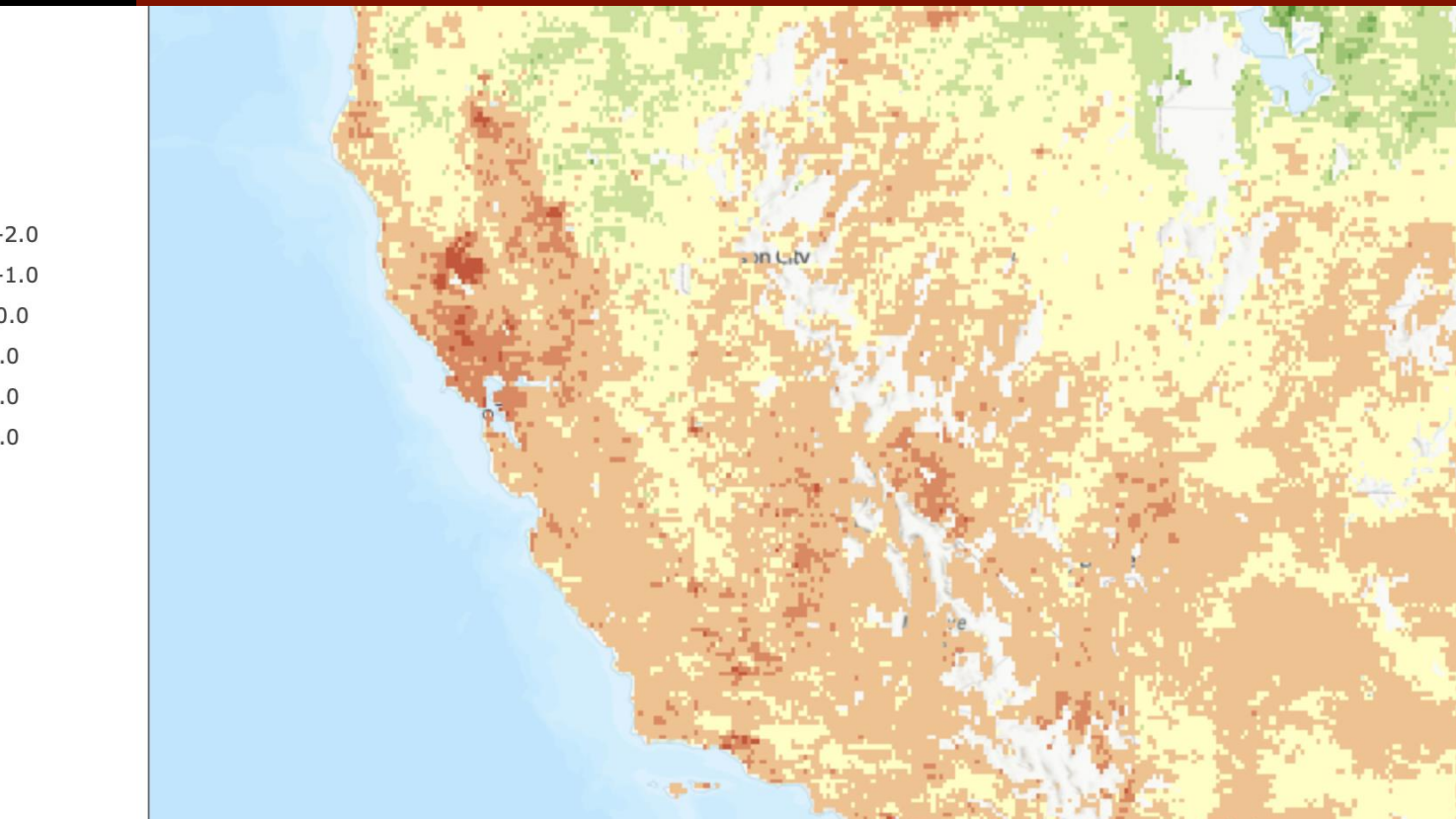
https://www.researchgate.net/publication/329016675_Drivers_of_wildland_fire_behaviour_variation_across_the_Earth[accessed Nov 11 2019].

8. FUELS EVERYWHERE - MORE AVAILABLE, MORE OF THE TIME

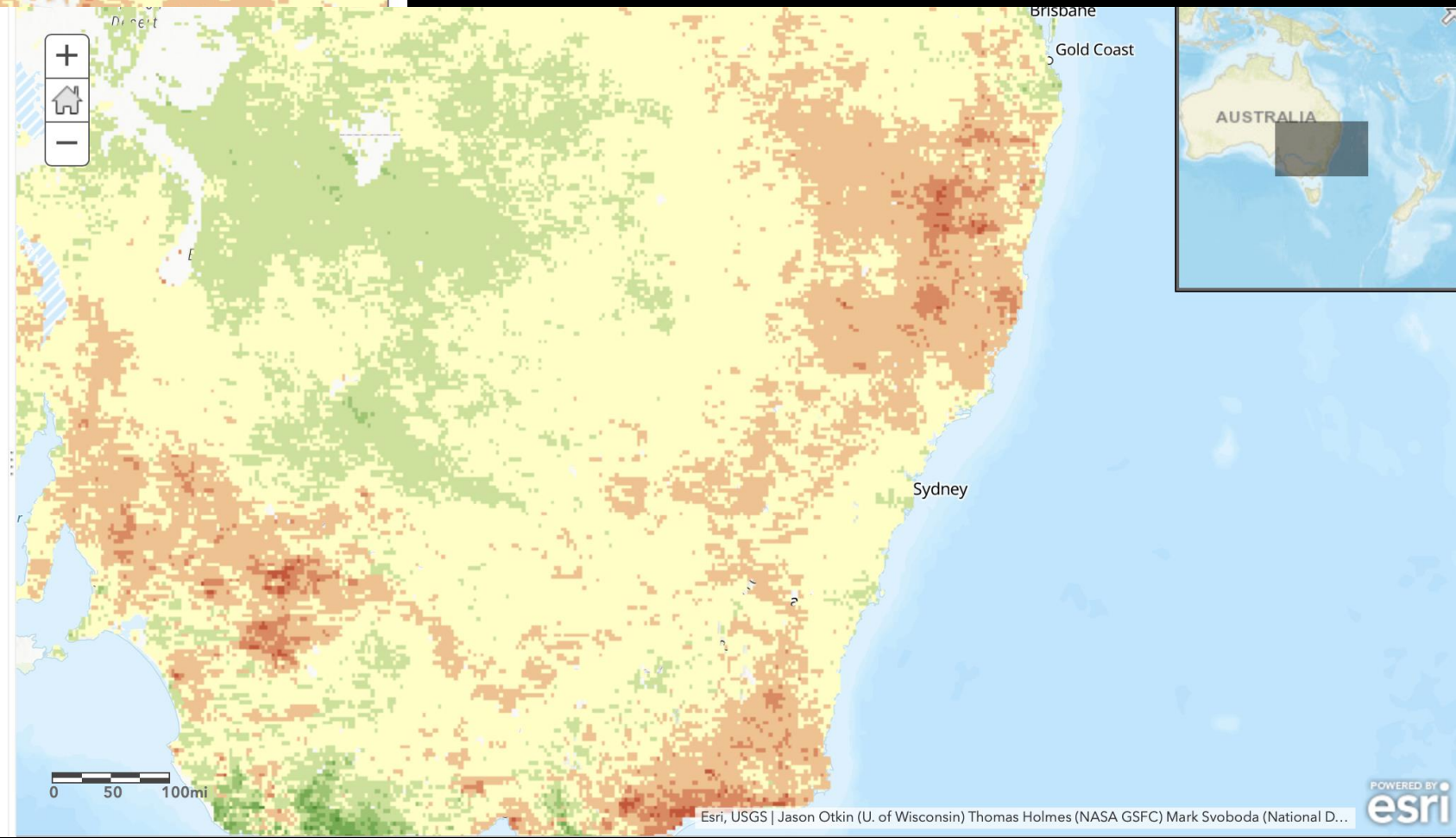
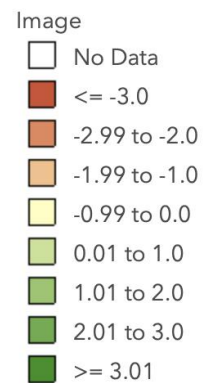
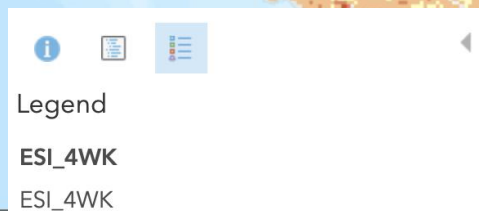


8. FUELS EVERYWHERE- MORE AVAILABLE, MORE OF THE TIME

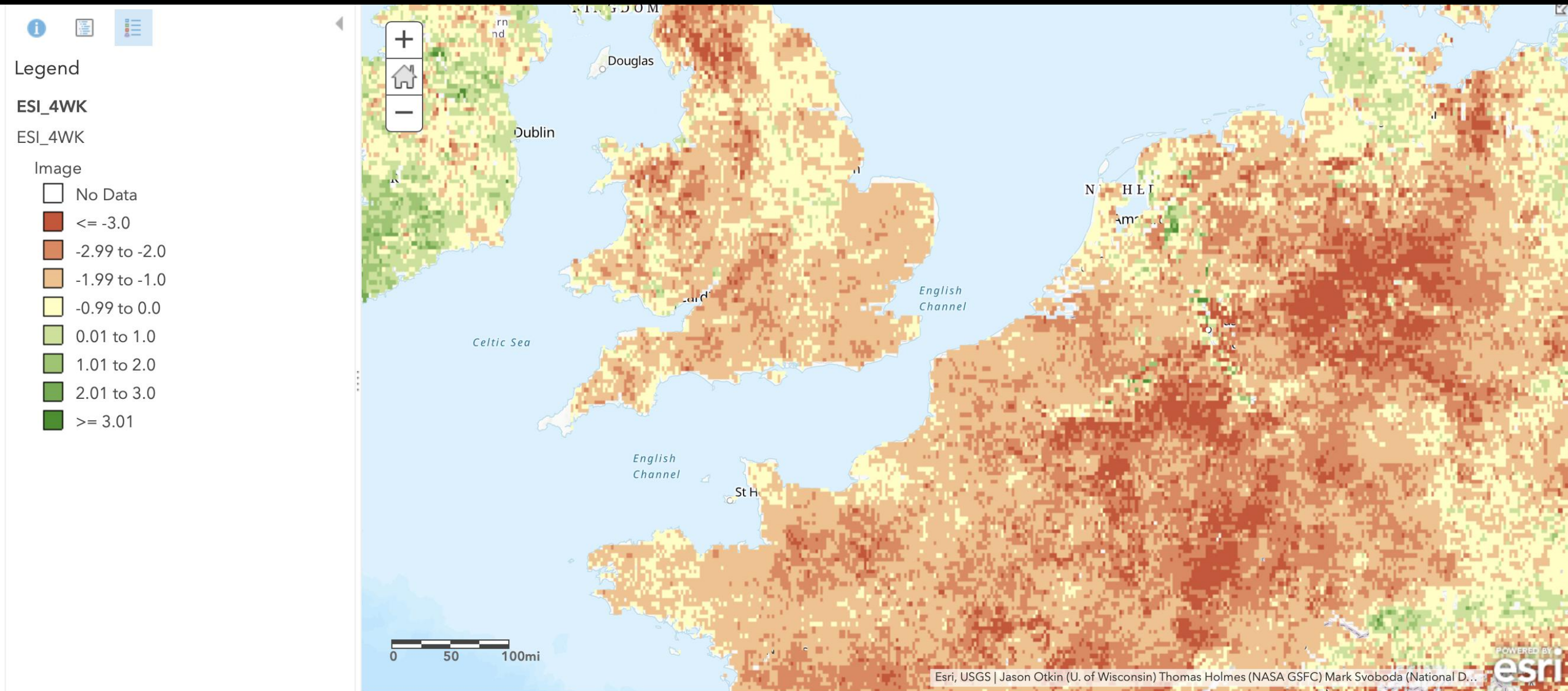
Early November
2019.
Four-week drying in
California (above) and
SE Australia (below).



S | Jason Otkin (U. of Wisconsin) Thomas Holmes (N
Nebraska) Feng Gao (USDA-ARS) Xiwu Zhan (NOAA
Tetrault (USDA-FAS) | Sequoia and Kings Canyon



8. FUELS EVERYWHERE - MORE AVAILABLE, MORE OF THE TIME



Index for Wales-UK-NW EU, for 2019-02-10 to 2019-03-10

8. AND YOUR STRATEGIES? CLIMATE CHANGE IS GLOBAL; THE WAY TO BURN IS LOCAL



Welsh Saying — Translation: Things turn sour when you play with fire

<https://www.walesonline.c.uk/lifestyle/fun-stuff/24-beautiful-welsh-proverbs-sayings-9299776>

Approximate pronunciation: My chooar-eye'n troy'n chooerr-oo oorth chooar-eye efo tarn

8. FINDING A HOME WITH THE FUELS PARADOX.
WHEN WE FIGHT FIRE, FUELS WIN.
WHEN WE LIVE WITH AND SPEAK WITH FUELS,
FIRE MANAGERS ARE MORE LIKELY TO WIN.

TIME

- By state in time (process): Unburned. Burned. Accumulated. Green-up. Cured.
- As frequency and role of fire: Fire regime. Fire return interval.

SPACE

- North slope, south slope, elevation.
- Risk via flammability: canopy, ladder fuels, ground fuels, surface fuels. Shaded vs unshaded.
- By physical properties: 1 hour, 1000 hour. Live herbaceous, live woody.

RISK

- By geospatial ... fuel buildup, burning, burnt. Such as https://gwis.jrc.ec.europa.eu/static/gwis_current_situation/public/index.html
- By flammability ratio with non-flammability: Fuel moisture. Moisture of extinction. Fuel availability. 90th percentile moisture. Hauling chart.

VALUE

- Smokey Bear's unburnt green. Aspen buffers, shaded fuel breaks. Invasive, decadent, wildland urban interface, ag burning, abandoned lands.
- As component of risk: surface fire vs. crown fire.

Thanks for the opportunity to talk
about our fuels and to learn
your fuels and wildfire issues.

