

Retrospective & Synthesis

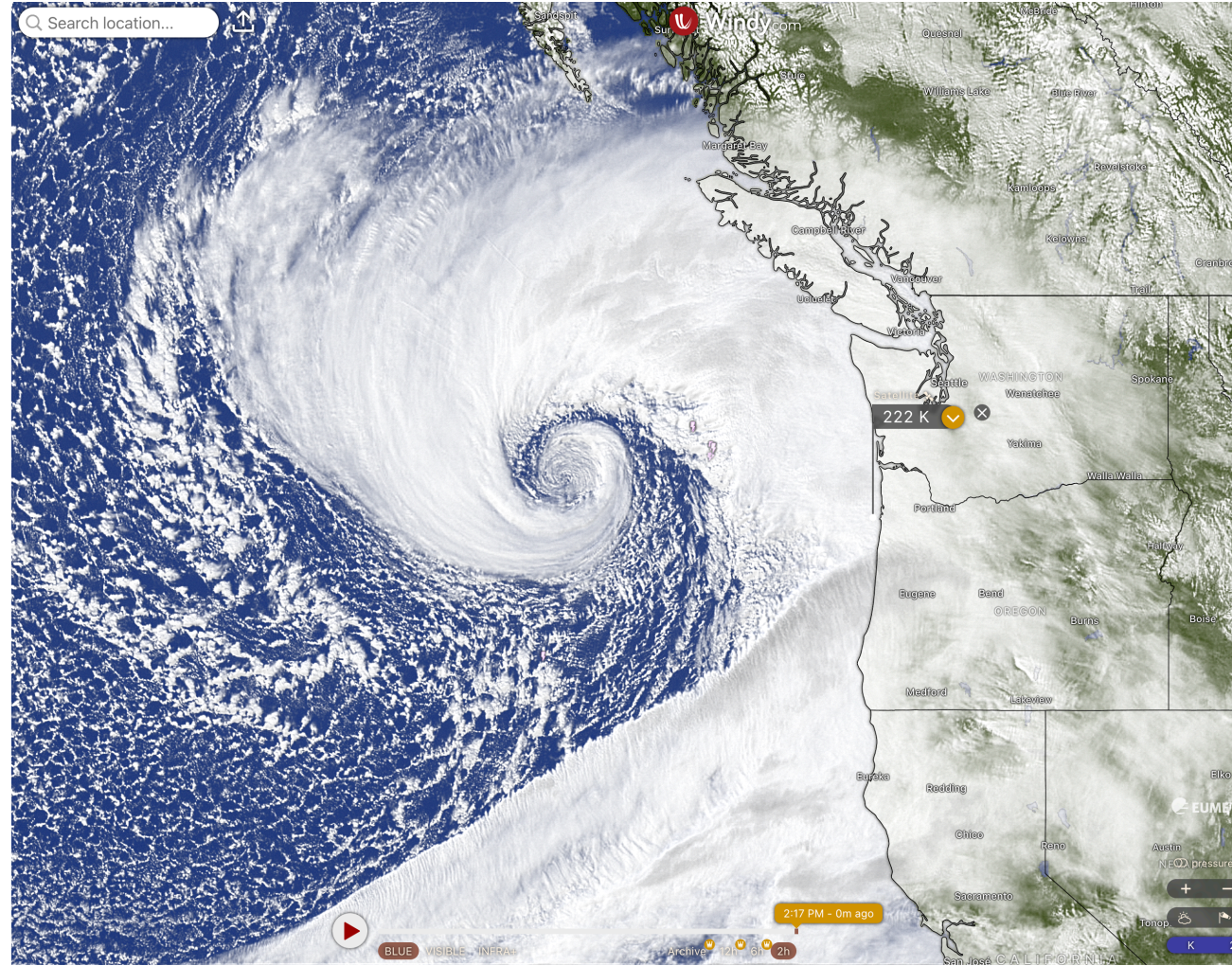
ATSC 413
Forest-fire Weather & Climate

Doug McCollor & Roland Stull
TA: Jalena Bennett

EOAS Dept., UBC



This Course combines weather & fire info



Web resources serve as a 'textbook'.

UBC ATSC 413 - Forest-fire Weather & Climate

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Case-based **Applications**
to practice the combination of fire and weather factors

Topic Schedule

Weather

- Analysis methods for weather charts.
- Types of weather charts: surface, upper air, cross sections. Observations, METARS.
- Weather satellites, imagery & interpretation. Fire hot-spot detection. Sensors for lightning & drought.
- Weather radar image interpretation: reflectivity, Doppler velocity, polarimetric
- Atmospheric soundings, tephigrams, hodographs, stability & convection.
- Extratropical (mid-latitude) cyclones.
- Fronts and airmasses.
- Effect of temperature, humidity, & clouds on fires.
- Convective storms (thunderstorms).
- Climate change vs. wildfires.
- Weather Forecasting (nowcasting, short, medium-range).

Fire

- Intro: Indigenous-part 1; significant fires, types of burns, WUI
- Sources of Fire Info: FIRMS, GWIS, CIFFC, NIFC, BlueSky.
- Fire behavior: fuels, moisture, wind, slope.
- Antecedent conditions. Ignition sources. Fire danger rating systems.
- FWI: Fire weather index system.
- FBP: Fire behavior prediction system. PSPS: Public Safety Power Shutoffs.
- Indigenous fire issues - part 2.
- Wildfire smoke.
- Overview of numerical weather pred. (NWP)
- PyroCB, fire tornadoes, slope & aspect

Case Studies

Covered This Term

1. High Level, AB
2. Camp Fire (Paradise), CA
3. Kimiwan Complex, AB
4. Sparks Lake, BC
5. Lahaina, HI
6. Donnie Creek, BC
7. Williams Flats, WA

Covered Last Year

8. Fort McMurray, AB
9. Quebec Fire Complex, QC
10. Marshall, CO



Guest Lectures



- Matt MacDonald,
BC Wildfire
Service



- Mina Deshler,
Public Safety
Power Shutoffs



- Liam Buchar,
Indigenous
Methods



- Jalena Bennett,
Sparks Lake
case demo



- Lynn Engel,
Modern Online
Forecast Tools

Synthesis of Weather, Fire & Cultural Issues



United Nations Environment Programme (2022).
Spreading like Wildfire – The Rising Threat of
Extraordinary Landscape Fires. A UNEP Rapid
Response Assessment. Nairobi.



Wildfire Factors

Factors influencing wildfire outcomes and management actions

Factors influencing wildfire outcomes and management actions

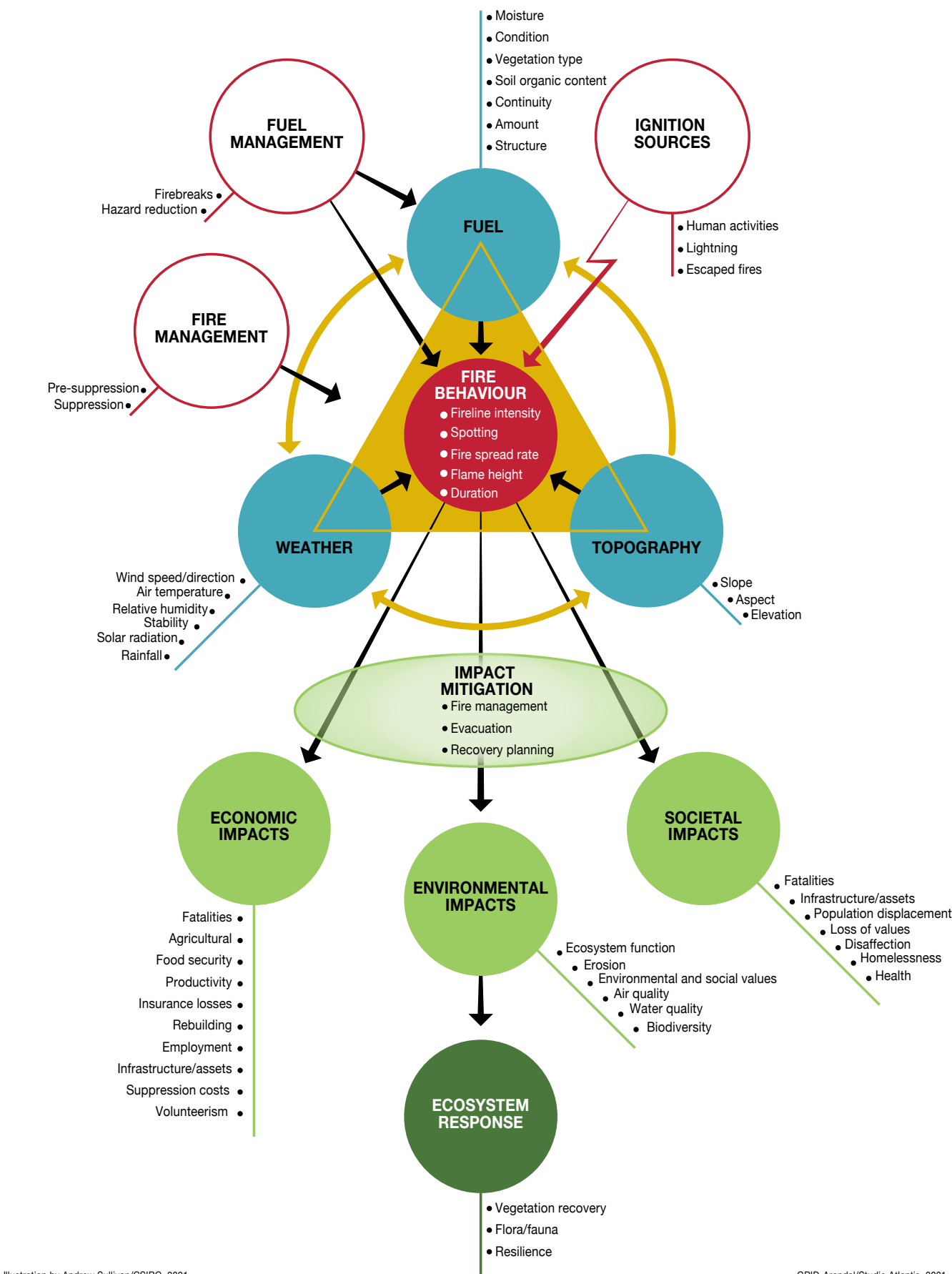
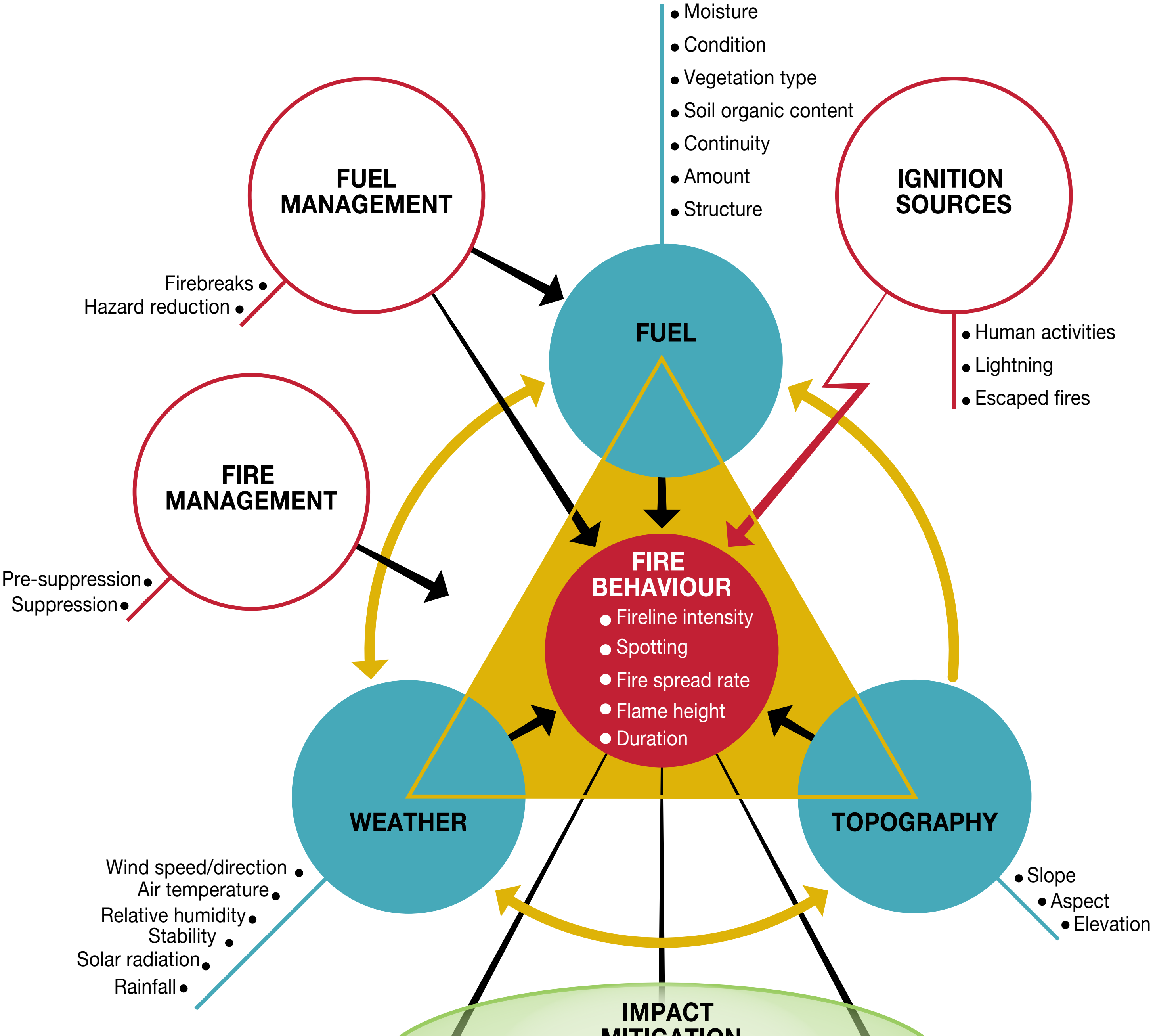


Illustration by Andrew Sullivan/CSIRO, 2021.

GRID-Arendal/Studio Atlantis, 2021



Wildfire Factors

Factors influencing wildfire outcomes and management actions

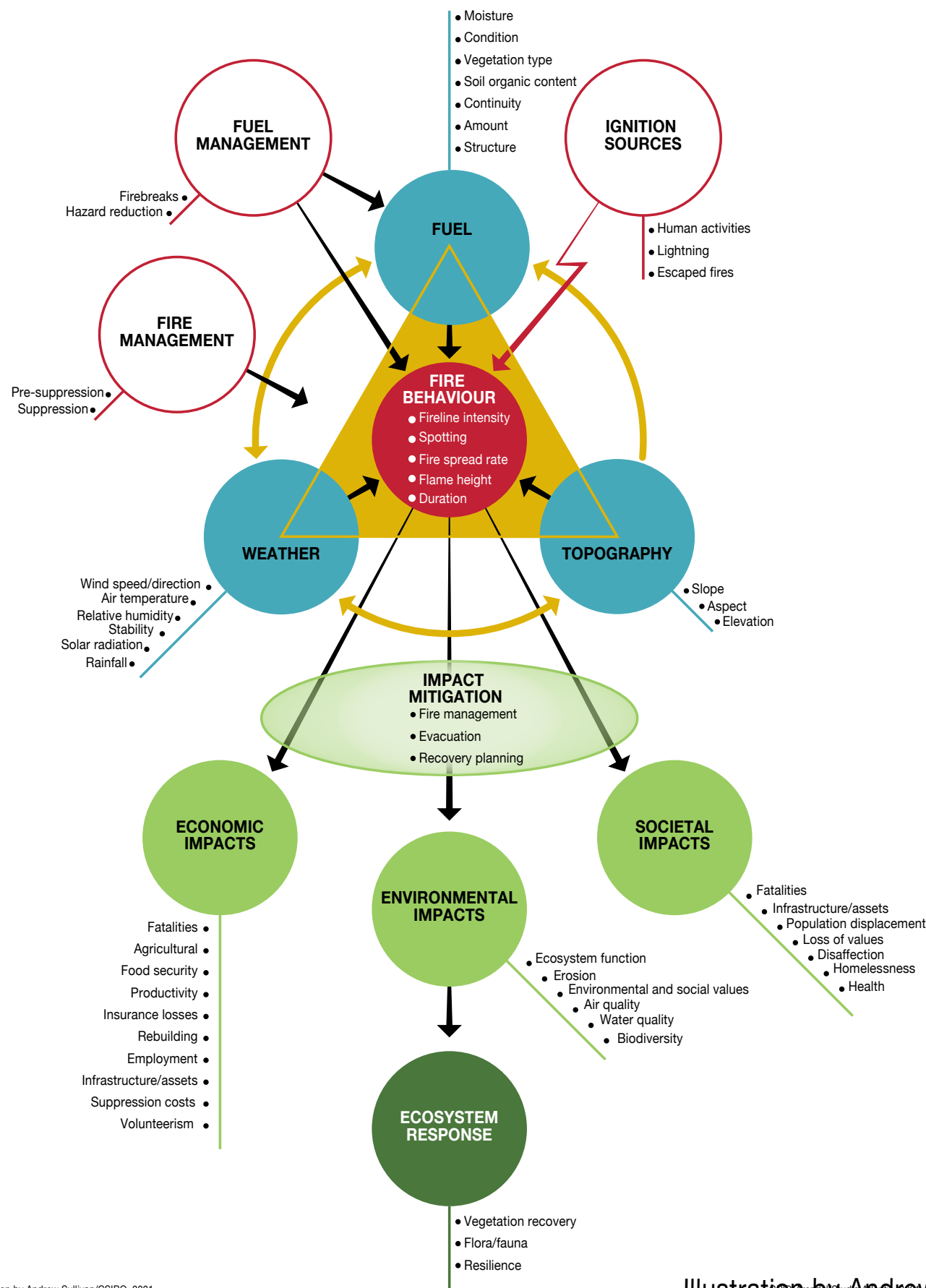
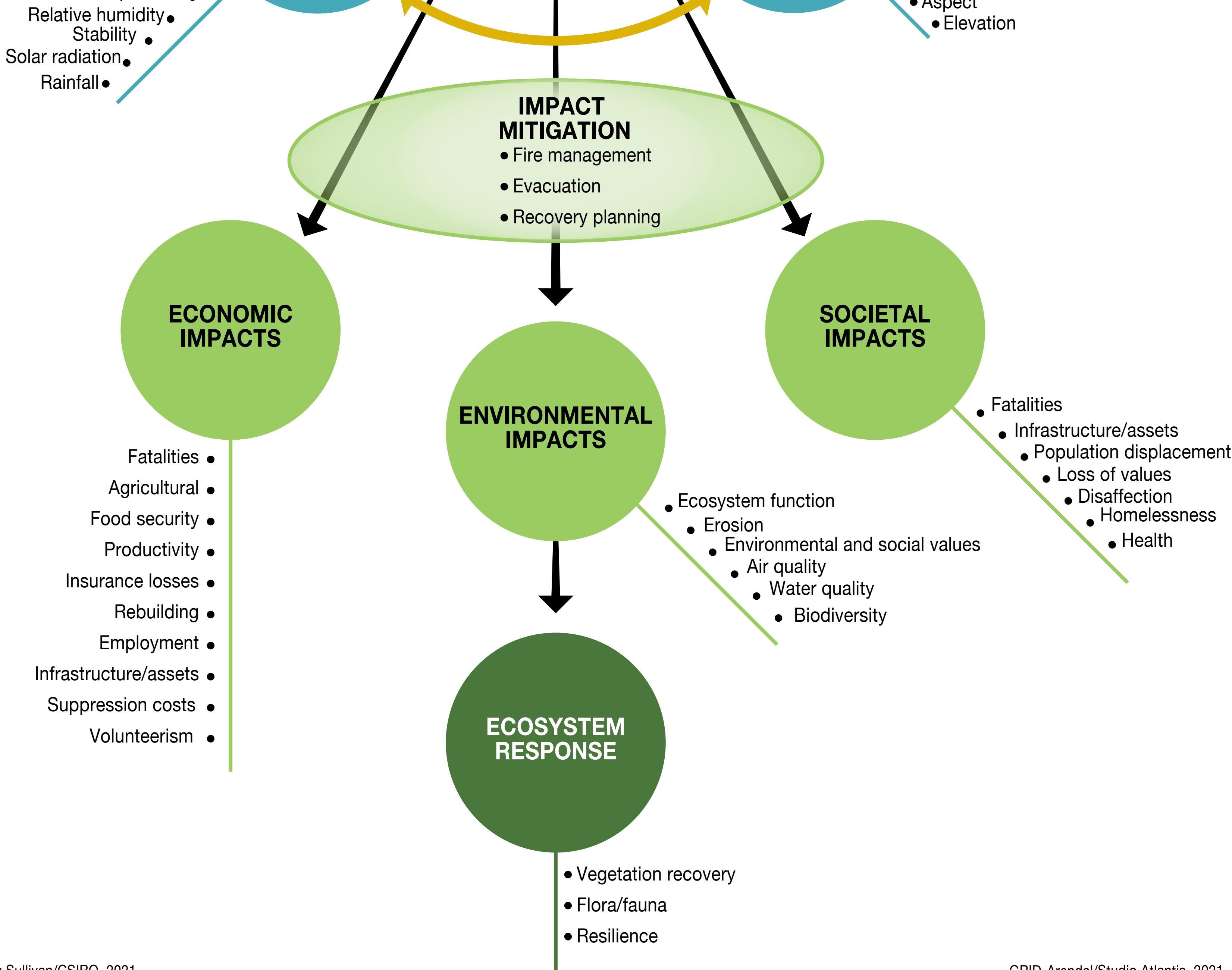


Illustration by Andrew Sullivan/CSIRO, 2021.

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GRID-Arendal/Studio Atlantis, 2021

Fire Severity vs. Forest Regeneration

Fire severity and intensity

HIGH INTENSITY

Full crown defoliation

MODERATE INTENSITY

LOW INTENSITY

Unburnt

Unburnt vegetation

Scorched

Charred

Defoliation

Scorched

Charred

Direction of
fire propagation

Radiation

Convection

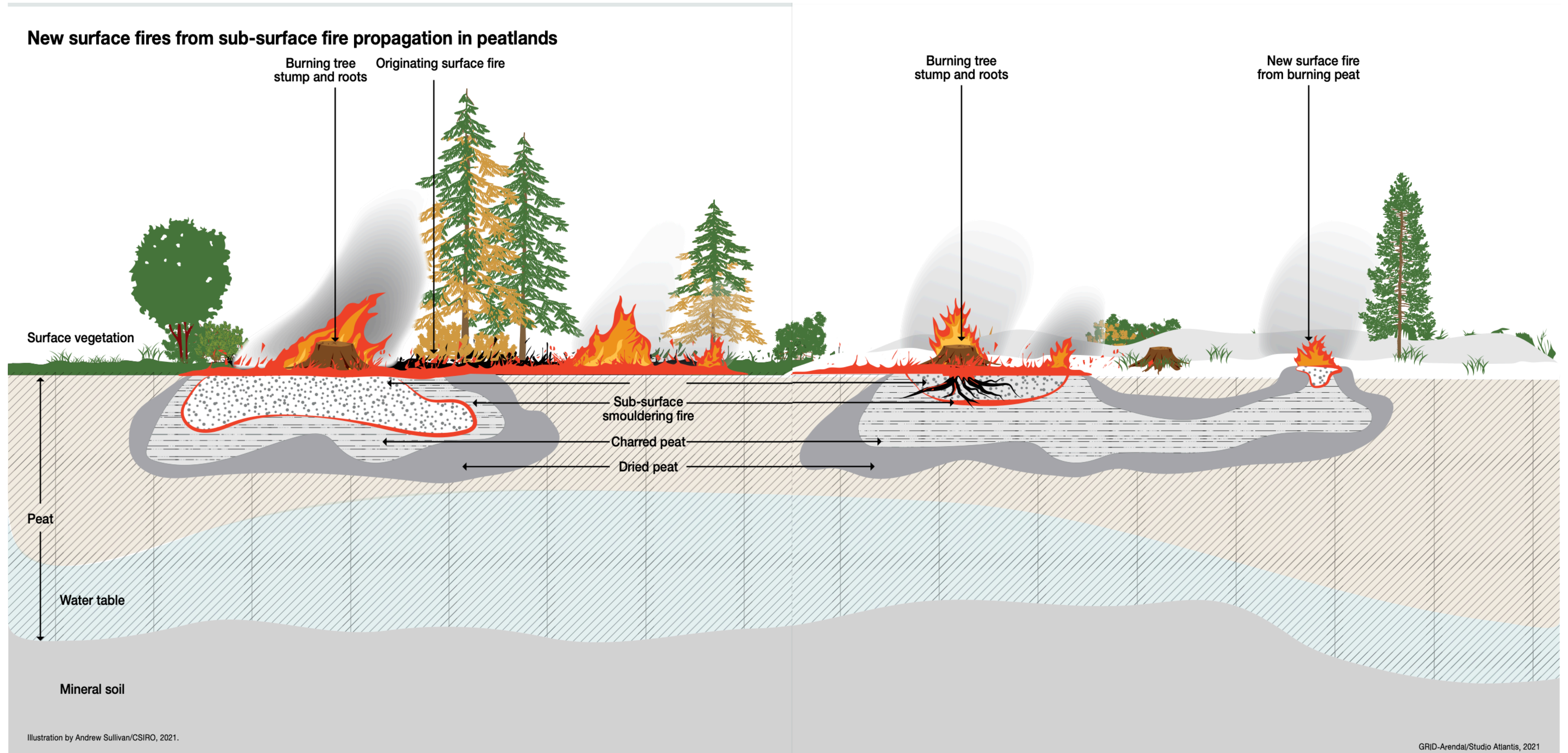
Smouldering
combustion

Flaming
combustion

Illustration by Andrew Sullivan/CSIRO, 2021.

GRID-Arendal/Studio Atlantis, 2021

Holdover Fires



Health Impacts

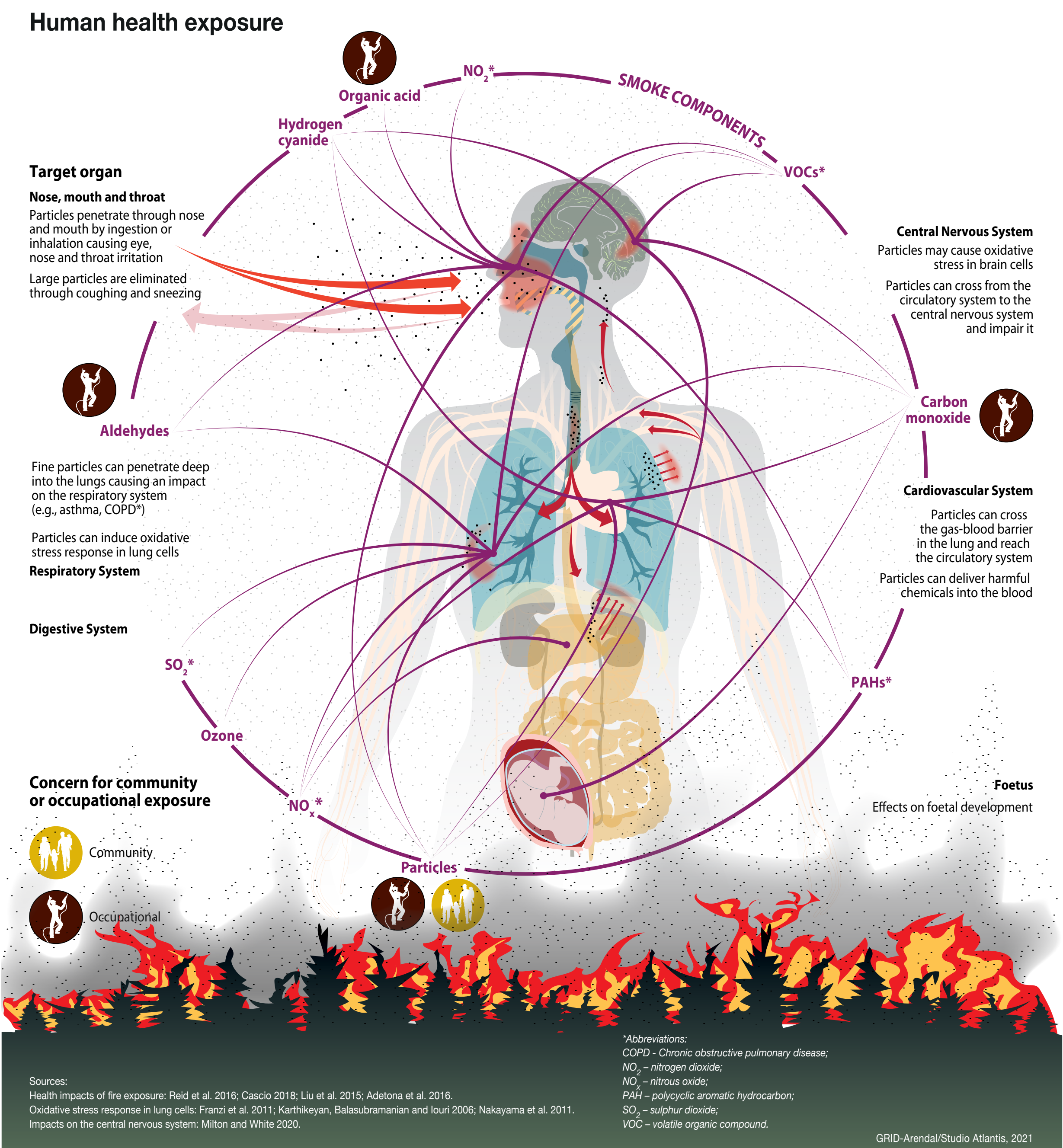
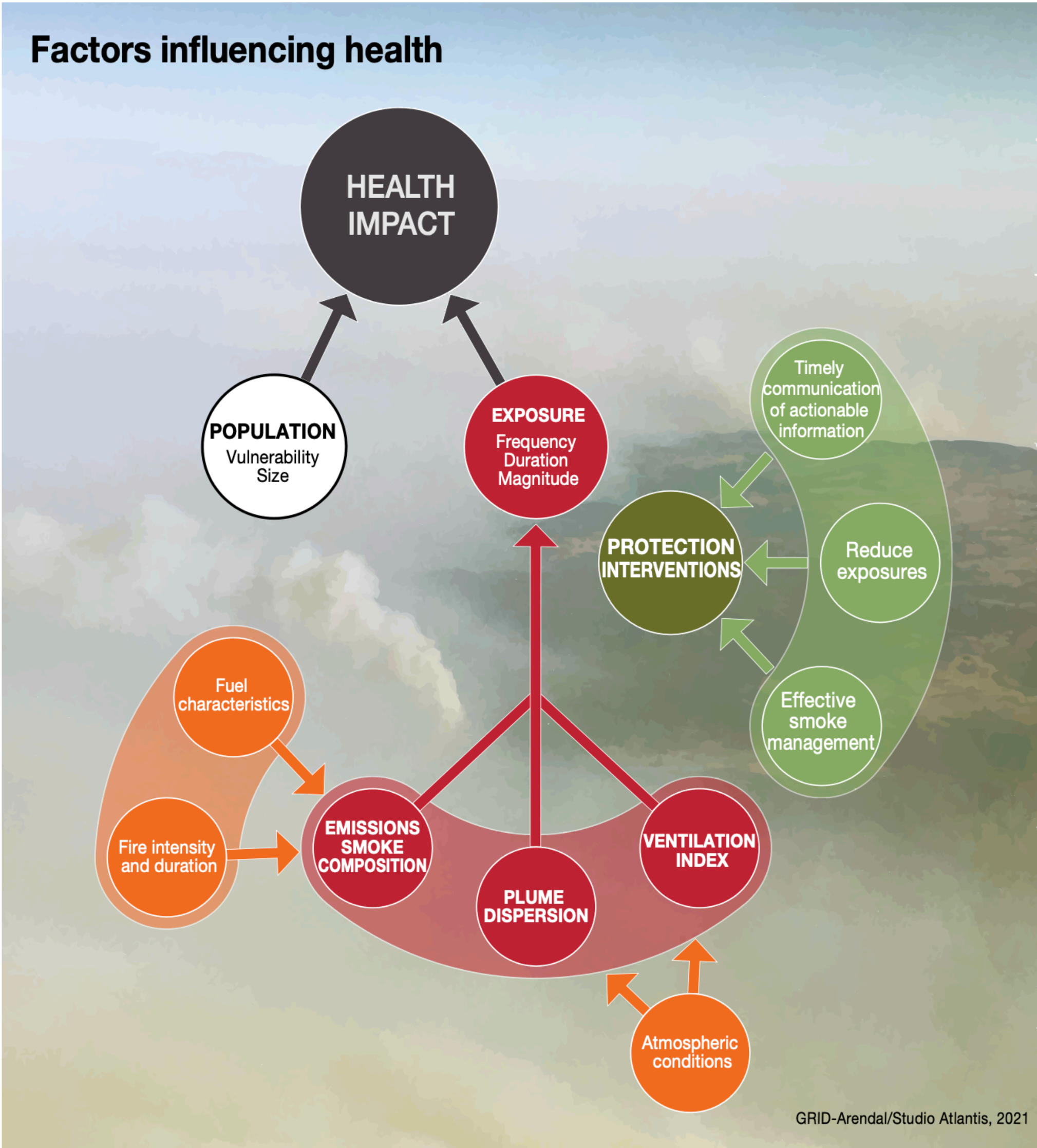
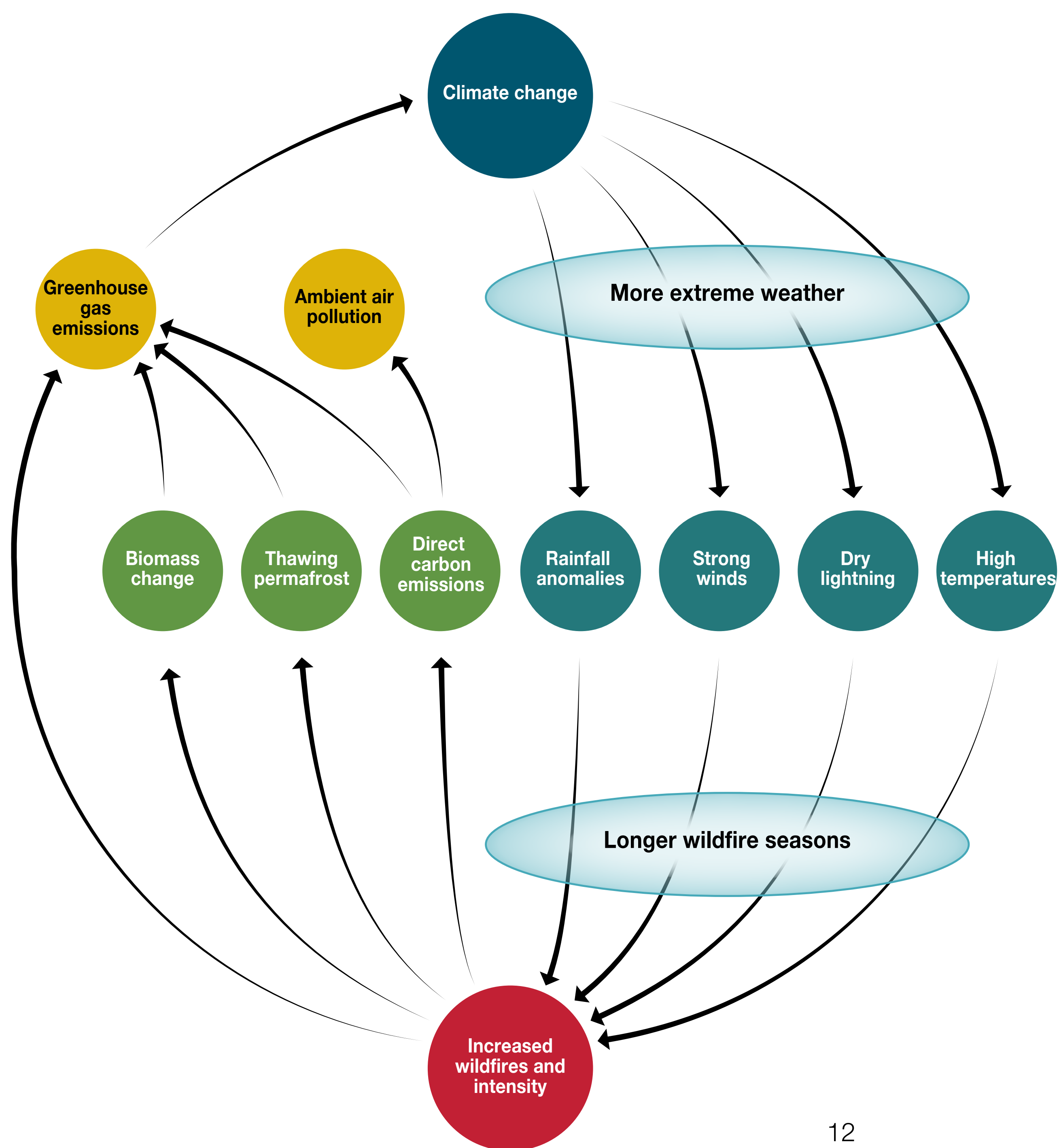


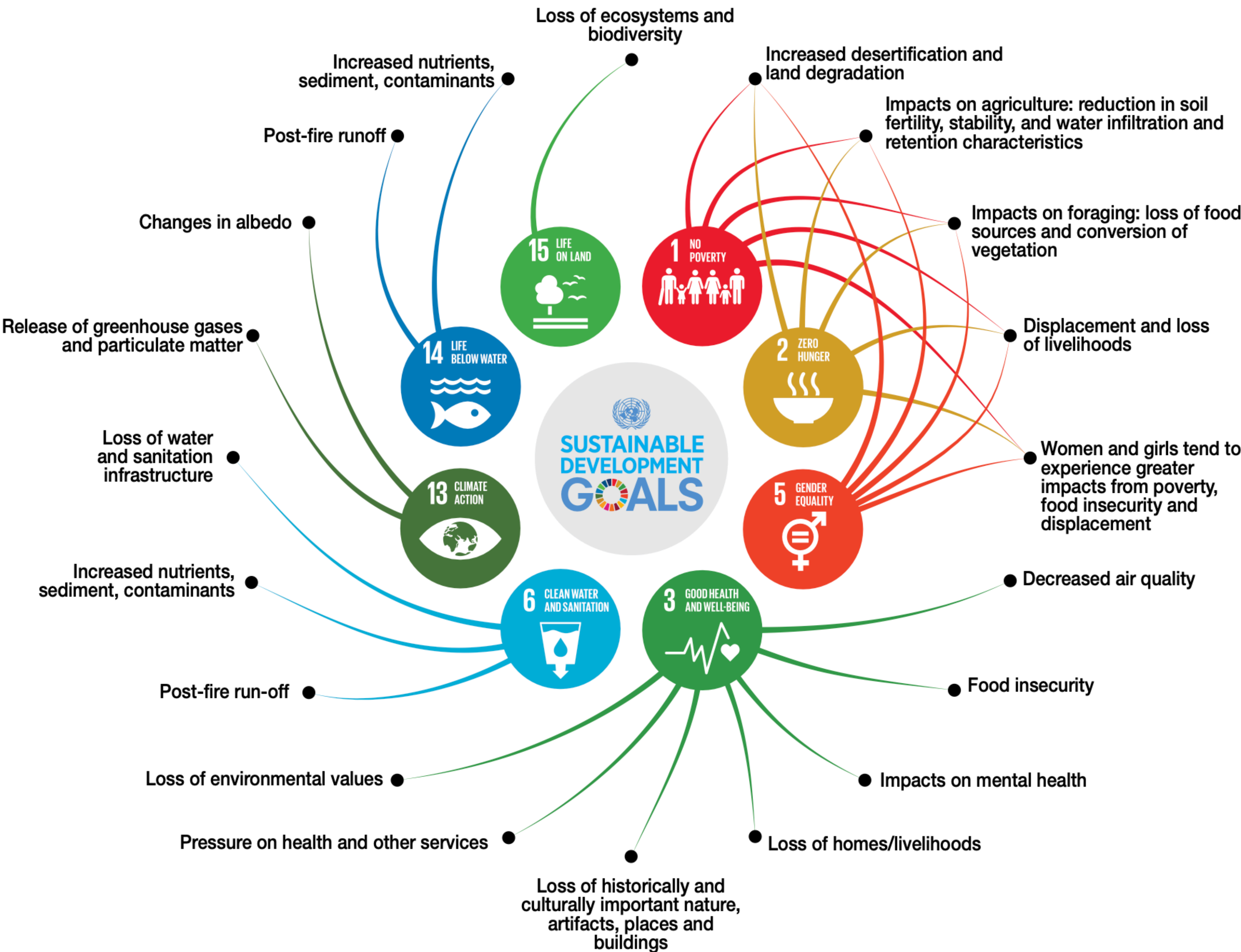
Figure 3.4. Smoke particulate exposure pathways and impacts. Smoke exposure is most commonly measured from land-based air pollutant monitors, followed by satellite-based imagery models, with fewer studies measuring personal exposure to smoke (Liu et al. 2015).

Wildfire - Climate Feedbacks



Impacts of wildfire on Sustainable Development Goals

Societal / Cultural



Additional Resources on our Course Website

Bibliography:

- Textbooks
- Fun Historical & Fiction Novels
- Videos
- Other Reference Books and Journal Papers
- Technical Reports
- Indigenous Fire Info

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ATSC 413 - Forest Fire Weather & Climate

Welcome to this course.

Syllabus:

For New & Prospective Students:

- [Welcome](#) - Glad you are interested.
- [Course Info](#) - Whom this course is for.
- [Syllabus Overview](#) - Main topics in this course.
- [Course Goals](#) - What you will be able to do.
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The playlist of all 100+ Cascadia wildfire webinar recordings can be found here:
<https://research.ubc.ca/cascadia-wildfire-urban-smoke>

Fire on the Land

Native People and Fire in the Northern Rockies

<https://fwrconline.csktnrd.org/Fire/index.html>



Coyote Story
Beaver Steals Fire



Interviews
Elders and Fire Managers



Galleries
Fire Photos Past and Present



Fire Ecology
The Science of Fire



History
Tribes and Fire



Today
Modern Fire Management

Be Open to Alternative Ideas

https://www.meted.ucar.edu/education_training/course/9

Never Stop Learning



Home > Catalog > Courses

Course

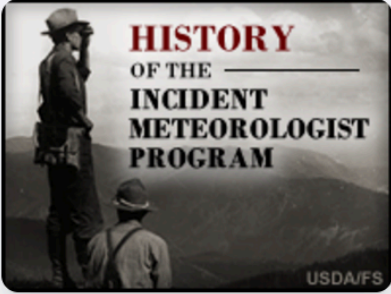
Advanced Fire Weather Forecasters Course

The Advanced Fire Weather Forecasters Distance Learning Course addresses advanced training needs of Incident Meteorologists (IMETs), Fire Weather Program Leaders (FWPLs) in NOAA's NWS weather forecast offices (WFOs), and Regional Program Managers. These individuals are responsible for maintaining local fire weather programs and supporting all-hazards incidents onsite including wildfires, hazardous material releases, and incidents of national significance.

Never Stop Learning

- MetEd Fire Weather Forecaster topics

History of the Incident Meteorologist Program




English

0 - Non-scientists

0 - .25 h

Navigating the National Weather Service Fire Weather Program




English

0 - Non-scientists

.50 - .75 h

Assessing Fire Danger




English

1 - Basic

0 - .25 h

PBL in Complex Terrain - Part 1




English

2 - Intermediate

.75 - 1.00 h

PBL in Complex Terrain - Part 2




English

2 - Intermediate

1.00 - 1.25 h

Fire Weather Climatology




English

2 - Intermediate

3.00 - 4.00 h

Stability, Smoke Management, and Fire Weather Forecasting




English

2 - Intermediate

1.25 - 1.50 h

Fire Model Matrix




English

1 - Basic

.50 - .75 h

Fire Behavior




English

2 - Intermediate

1.25 - 1.50 h

Mesoscale Meteorology Effects on Fire Behavior




English

2 - Intermediate

.25 - .50 h

Fire Weather Grid Techniques: Relative Humidity and Dewpoint Temperature



English

2 - Intermediate

.25 - .50 h

Fire Weather Forecasting: Clear Communications, Second Edition



English

2 - Intermediate

1.00 - 1.25 h

Citizen Scientist

A SCIENTIFIC PERSPECTIVE • Citizen Scientist

Scientists and engineers have at least the same responsibilities to society as do other citizens. Like our fellow citizens, we ultimately decide the short-term balance between environmental quality and material wealth, by the goods that we buy and by the government leaders we elect. Be informed. Take a stand. Vote.

Perhaps we have more responsibility, because we can also calculate the long-term consequences of our actions. We have the ability to evaluate various options and build the needed technology. Take action. Discover the facts. Design solutions.

Science Graffito

“The service we render to others is really the rent we pay for our room on the Earth.”

– Sir Wilfred Grenfell.

Make an informed choice for your “room on the Earth.”



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End of Course. Any Questions?