Communicating complex wildfire science

Fire Summit - Forestry Australia

27 June 2024

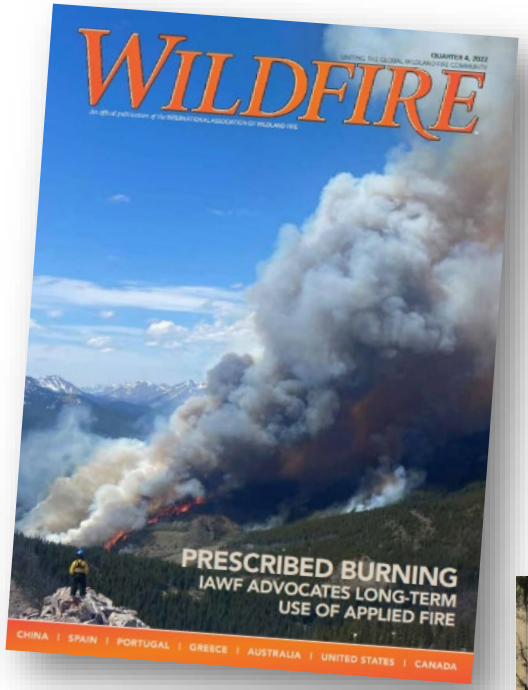
David Bruce
Communications Director
Natural Hazards Research Australia

Where we live

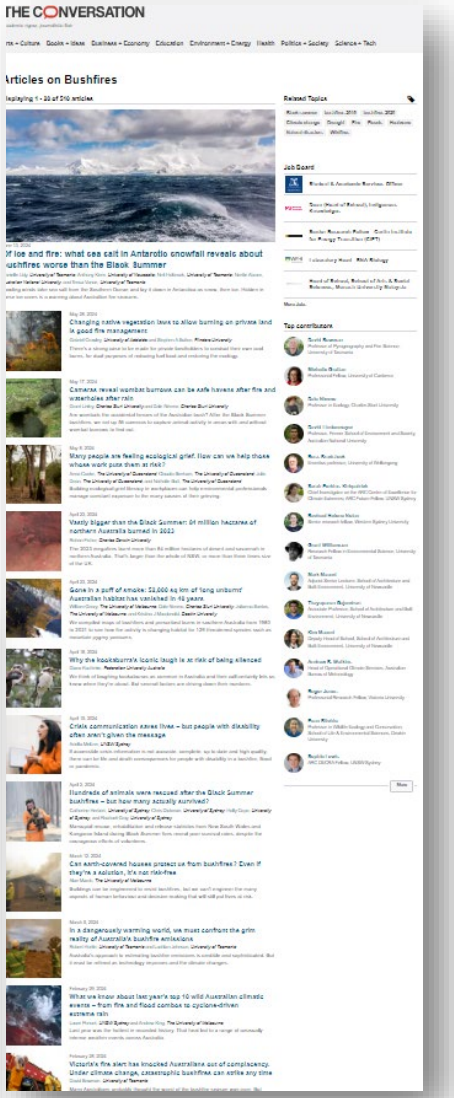
26 July 2024

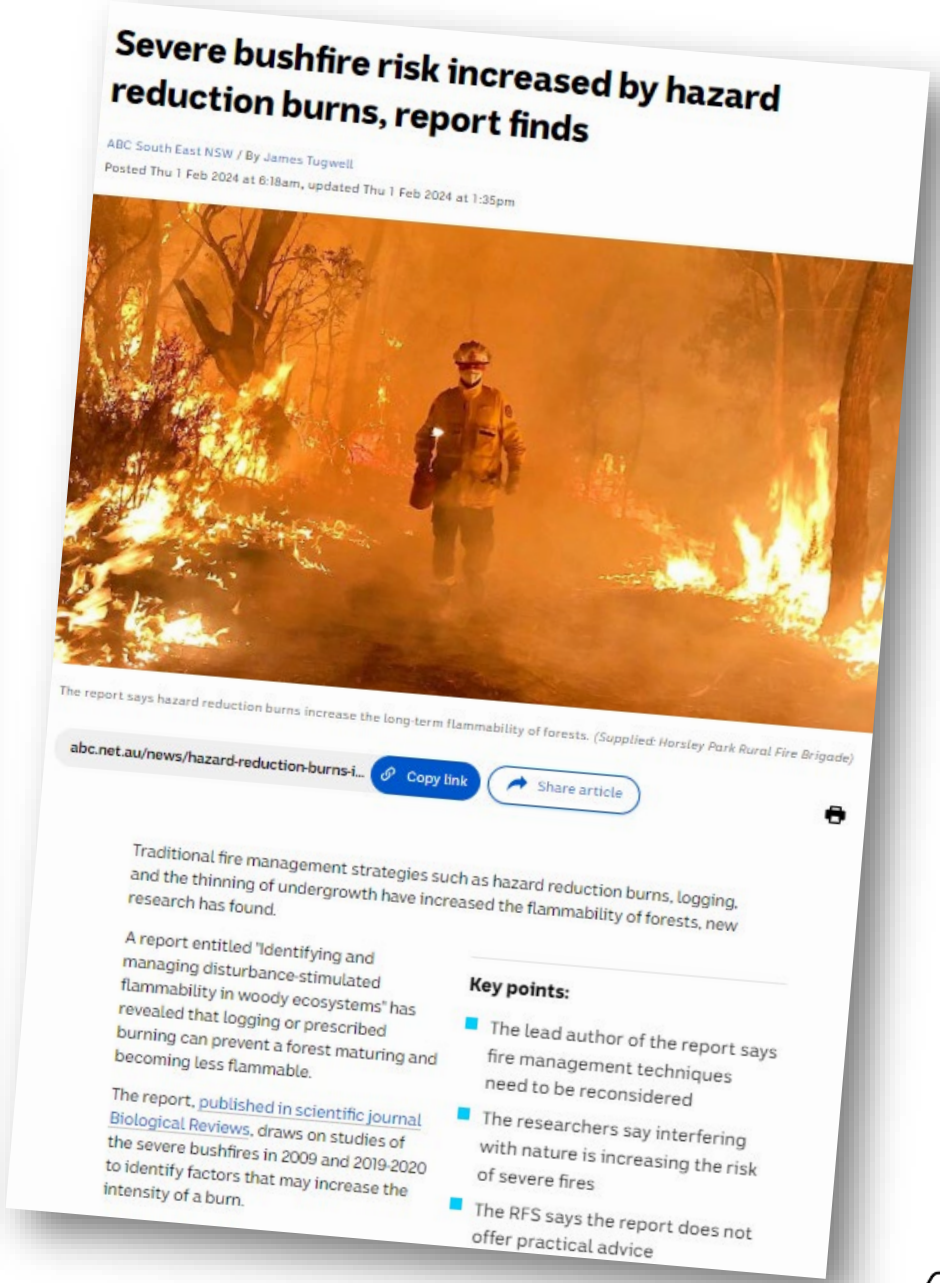

Science
A.C.T PARKS
&
CONSERVATION

In the media


WILDFIRE
PRESCRIBED BURNING
IAWF ADVOCATES LONG-TERM USE OF APPLIED FIRE
CHINA | SPAIN | PORTUGAL | GREECE | AUSTRALIA | UNITED STATES | CANADA


FIRE AUSTRALIA
Building safer communities with the Australian Disaster Resilience Index
Getting ready to phase out HFCs
New guidance on firefighting foams
Avoiding a red hot summer
The science, evidenc
issuu.com
support for prescribed burning


THE CONVERSATION
Articles on Bushfires


Severe bushfire risk increased by hazard reduction burns, report finds
ABC South East NSW / By James Tugwell
Posted Thu 1 Feb 2024 at 6:18am, updated Thu 1 Feb 2024 at 1:35pm
The report says hazard reduction burns increase the long-term flammability of forests. (Supplied: Horsley Park Rural Fire Brigade)
abc.net.au/news/hazard-reduction-burns-i...
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Traditional fire management strategies such as hazard reduction burns, logging, and the thinning of undergrowth have increased the flammability of forests, new research has found.
A report entitled "Identifying and managing disturbance-stimulated flammability in woody ecosystems" has revealed that logging or prescribed burning can prevent a forest maturing and becoming less flammable.
The report, published in scientific journal Biological Reviews, draws on studies of the severe bushfires in 2009 and 2019-2020 to identify factors that may increase the intensity of a burn.
Key points:
The lead author of the report says fire management techniques need to be reconsidered
The researchers say interfering with nature is increasing the risk of severe fires
The RFS says the report does not offer practical advice

I learnt that fire is not scary and that you can burn in good ways

Bushfire and Natural Hazards CRC
8 November 2018 ·

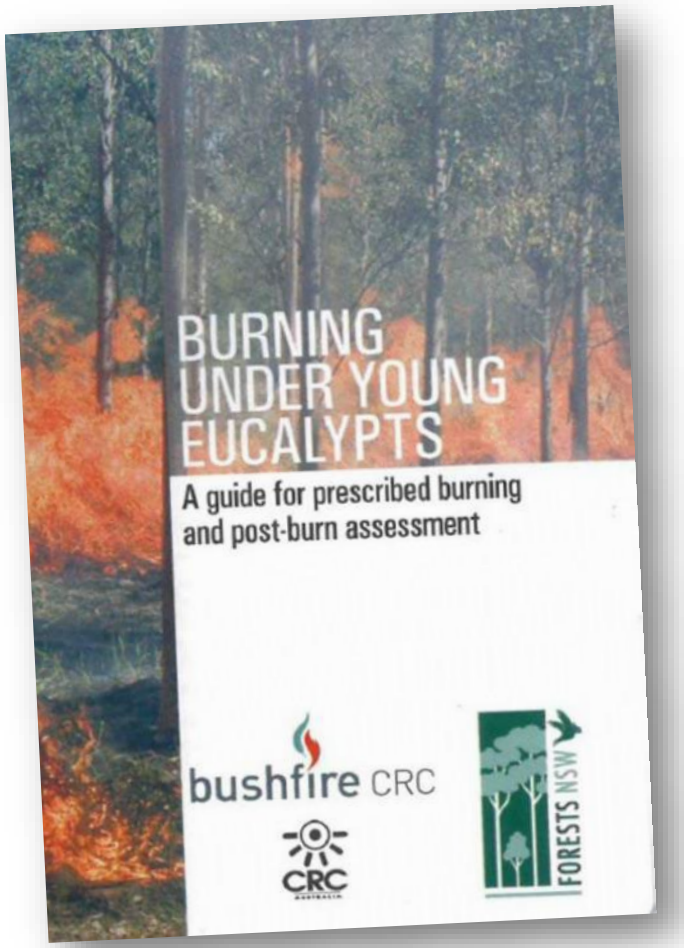
Congratulations to all the winners at #RAA2018 today including Dixon's Creek Primary School for a great project that brings indigenous burning into the classroom. "I learnt that fire is not scary and that you can burn in good ways." said Shanice, on receiving the award. AIDR AFAC News


2018 Resilient Australia National School Award: Firestick Project
Resilient Australia Awards 2018
0:01 / 1:15
Scroll for details

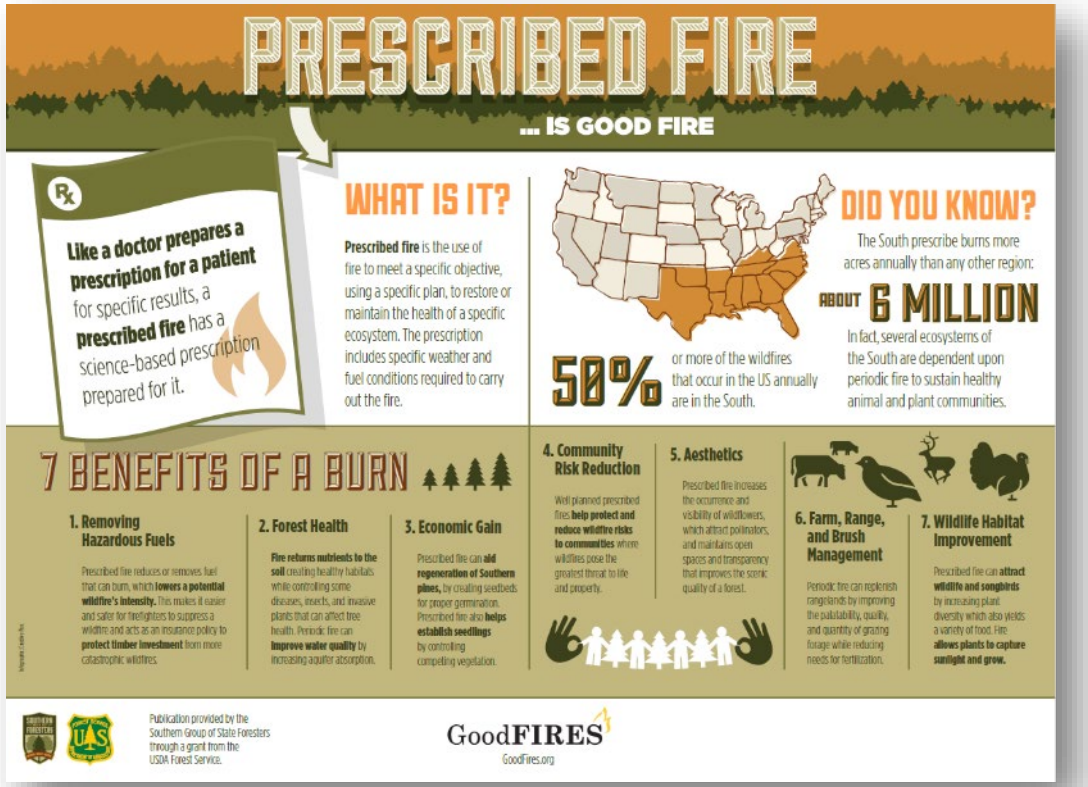
Burner Bob

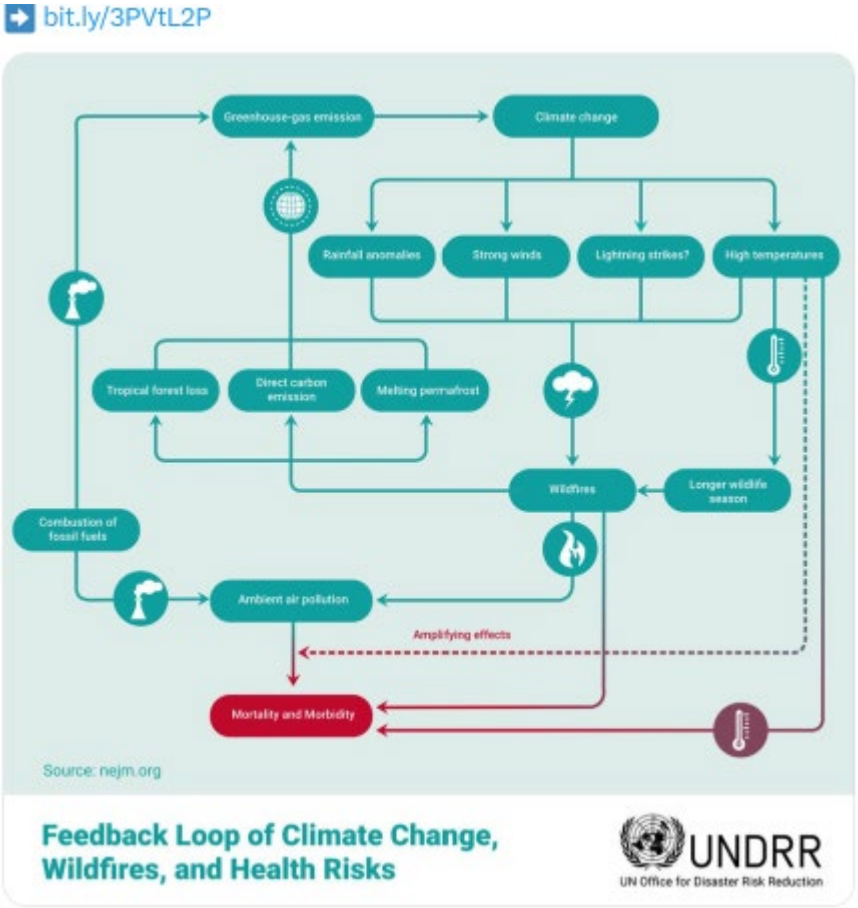
The Bobwhite Quail

Research for use



Informative but complex





Informative a bit less complex

Understanding junction fire physics and scaling laws in order to mitigate the consequences of this severe wildfire event

Natural Hazards Research Australia

Mr Ahmad Hassan[1,2], Prof Khalid Moinudin[2] and Prof Gilbert Accary[3]

[1] Natural Hazard Research Australia, Melbourne, Vic, 8001
[2] Institute for Sustainable Industries and Liveable Cities, Victoria University, Melbourne, Vic, 8001
[3] School of Engineering, Lebanese American University, Byblos, Lebanon

Physical modelling of junction fire behaviour: Underlying physics, fire regime, and scaling laws

Extreme bushfires present severe threats globally. Junction fires stand out for their intense and unpredictable behaviour, requiring comprehensive understanding. This study delves into the physics governing junction fires to better understand their complex dynamics and to establish scaling laws describing their behaviour.

Objectives

- Have a better understanding of the complex dynamics of junction fires.
- Understand the effects of slope angles, junction angles and wind speed on junction fire behaviour.
- Conduct a dimensional analysis of the problem based on Byram's convective number.
- Bring together all scale experiments and simulations into one scaling law.

Methodology and Numerical Modelling

- Use of FIRESTAR3D, a physics-based model developed collaboratively by multiple universities.
- Conducting numerical simulations replicating laboratory and field-scale experiments.
- Explored the effects of parameters such as slope angles, junction angles, wind speed, fuel moisture content ...

Preliminary Results and Discussion

- FIRESTAR3D effectively reproduced experimental results, demonstrating its capability in simulating junction fire propagation.
- Ongoing research aims to further explore the interplay between slope, junction angle, and wind speed.

The research boundaries are pushed using dimensional analysis in order to establish a similarity between real-world wildfire scenarios and scaled-down experimental or numerical models. Using Byram's convective number, we strive to characterise the balance between buoyancy and wind effects on flame trajectory and spread. And through the formulation of scaling laws, this work aims to provide valuable insights into the behaviour of junction fires at different scales. This would help in developing effective wildfire management strategies, ultimately contributing to the protection of lives, property, and ecosystems form wildfires.

For additional information scan the QR code or contact:
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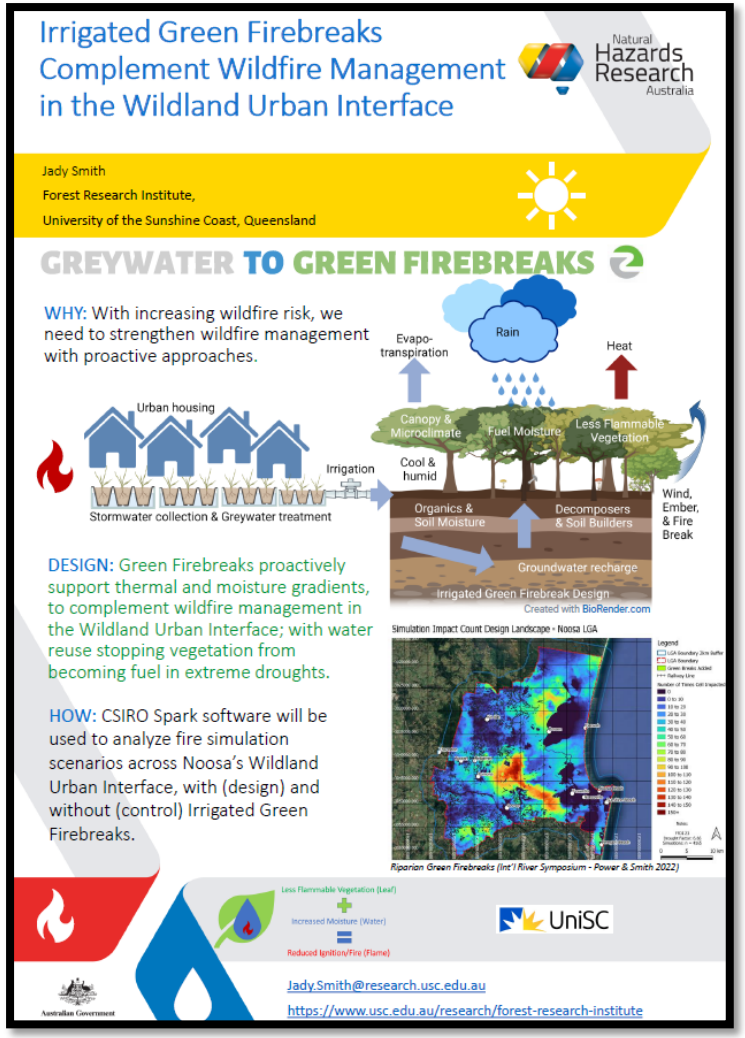
ahmad.hassan6@live.vu.edu.au

Australian Government | Victoria University Melbourne Australia | Natural Hazards Research Australia



Irrigated Green Firebreaks Complement Wildfire Management in the Wildland Urban Interface

Natural Hazards Research Australia

Jady Smith
Forest Research Institute,
University of the Sunshine Coast, Queensland

GREYWATER TO GREEN FIREBREAKS

WHY: With increasing wildfire risk, we need to strengthen wildfire management with proactive approaches.

DESIGN: Green Firebreaks proactively support thermal and moisture gradients, to complement wildfire management in the Wildland Urban Interface; with water reuse stopping vegetation from becoming fuel in extreme droughts.

HOW: CSIRO Spark software will be used to analyze fire simulation scenarios across Noosa's Wildland Urban Interface, with (design) and without (control) Irrigated Green Firebreaks.

Riparian Green Firebreaks (Int'l River Symposium - Power & Smith 2022)

UniSC

Jady.Smith@research.usc.edu.au
https://www.usc.edu.au/research/forest-research-institute

Australian Government

Is climate change alone sufficient to reduce the capacity of Pencil Pine to respond to fire?

Natural Hazards Research Australia

Sarah Cooley,[1] Prof. Michael-Shawn Fletcher,[1] Prof. Russell Drysdale,[1] Dr. John Hellstrom,[1] Dr. Quan Hua,[2] and Ms. Patricia Gadd,[2]

[1] School of Geography, Earth & Atmospheric Sciences, University of Melbourne, Melbourne, Australia
[2] Australia's Nuclear Science and Technology Organisation, Lucas Heights, NSW, Australia

Response, resilience, and recovery of Tasmania's endangered Pencil Pine using a multi-archive palaeoenvironmental record

This project aims to provide a multifaceted understanding of how species composition, fire frequency and moisture variability has influenced the response, resilience and post-fire recovery of Pencil Pine dominated systems across the Central Plateau in Tasmania throughout the Holocene (ca ~11,700 years to present). This aims to facilitate a holistic understanding of how best to target management efforts to protect these highly threatened ecosystems in a future shaped by rapid climate change.

RESEARCH CONTEXT:

The Tasmanian Wilderness World Heritage Area (TWWHA) is home to globally significant and highly valued flora with ancestries in the supercontinent of Gondwana. Anthropogenic climate change is shifting baseline conditions and increasing pressures on long-lived palaeoendemic tree species directly through increasing temperatures and aridity across southeast Australia and indirectly through increased frequency of lightning ignited wildfires.[1-3] During the summer of 2016, where temperatures and rainfall were above and below average, respectively, over 80 wildfires were ignited across the Central Plateau, [4,5,1] decimating stands of Gondwanan refuge in TWWHA and severely threatening core refugia of extremely fire sensitive palaeoendemic conifer *Athrotaxis cupressoides* (Pencil Pine). [1]

Around 76% of the remaining Pencil Pine distribution is currently restricted to the Central Plateau, in areas typically antithetical to extreme fire activity. The uncontrolled wildfires of 2016 burnt approximately 14 000 ha of subalpine vegetation in the Lake MacKenzie region alone, decimating around 141 ha of Pencil Pine forest. [1,6]

In spite of significant funding to manage these threatened Tasmanian ecosystems, the long-term impact of climate change, and other factors on the resilience of these systems remains poorly understood. Thus, there is a lack of understanding of how to apply the most efficient, impactful and cost-effective management strategy. There is a need to develop a deep, long-term understanding of these long-lived ecosystems to execute well informed land-management strategies for their future preservation.

Palaeoecology and palaeoclimatology analysis are critical to meet this objective.

METHODS:

- Sediment core analysis:
  - Fossil pollen and charcoal (macro- and microscopic)
  - Geochemistry (µXRF)
- Speleothem analysis:
  - Stable isotopes ($\delta^{13}C$, $\delta^{18}O$)
  - Hydrologically sensitive trace elements (Mg, Sr, Ba, P)
- Modern analysis:
  - Species distribution modelling (MaxEnt)

KEY FINDINGS (so far...):

- Pencil Pine display moderate-high resilience to fire throughout the Holocene across all sites.
- Northern sites display a higher probability of Pencil Pine occurrence in the contemporary landscape than southern sites, with temperature and elevation being primary drivers of species distribution.
- Pencil Pine increased (decreased) dramatically at sites from the northern (southern) Central Plateau in the past 3000 years.

Further information

For additional information scan the QR code or contact:
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@sarahcooleygeo
https://www.linkedin.com/in/sarah-cooley/

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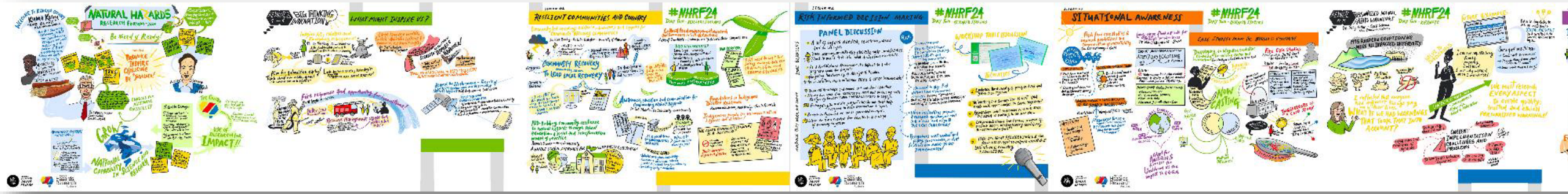
Complex but informative




This video features images and
dramatic reconstructions of
cyclone and flooding events which
may distress some viewers.

Making it simple

Good

Better

Even better

Making it simple


ABOUT
Wildland Fire
PREVENTION
How-Tos
SMOKEY'S
History
Home • About Wildfires • Benefits of Fire
Prescribed Fires
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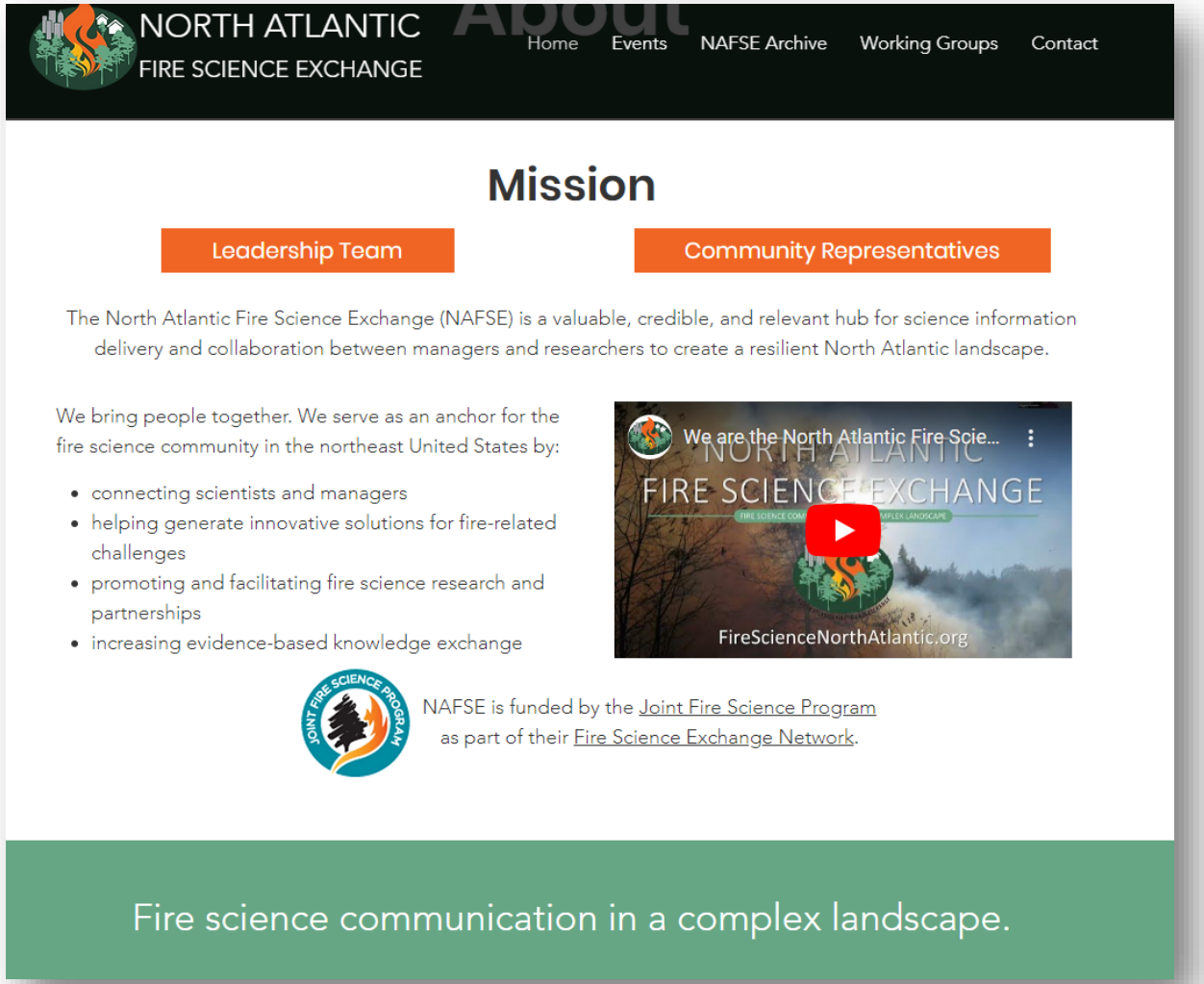
Fire has always been part of the environment, and as one of the most important natural agents of change, fire plays a vital role in maintaining certain ecosystems. Native Americans understood this and used fire to run game, maintain prairies and keep ecosystems healthy. Prescribed fires, also known as prescribed burns or controlled burns, refer to the controlled application of fire by a team of fire experts under specified weather conditions that helps restore health to ecosystems that depend on fire.
Prescribed fires help reduce the catastrophic damage of wildfire on our lands and surrounding communities by:
Safely reducing excessive amounts of brush, shrubs and trees
Encouraging the new growth of native vegetation
Maintaining the many plant and animal species whose habitats depend on periodic fire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The North Atlantic Fire Science Exchange (NAFSE) is a valuable, credible, and relevant hub for science information delivery and collaboration between managers and researchers to create a resilient North Atlantic landscape.
We bring people together. We serve as an anchor for the fire science community in the northeast United States by:
connecting scientists and managers
helping generate innovative solutions for fire-related challenges
promoting and facilitating fire science research and partnerships
increasing evidence-based knowledge exchange
We are the North Atlantic Fire Scie...
FIRE SCIENCE EXCHANGE
FireScienceNorthAtlantic.org
NAFSE is funded by the Joint Fire Science Program as part of their Fire Science Exchange Network.
Fire science communication in a complex landscape.

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Issue 540 | May 24, 2024

Friday Flash - Climate, fire and forests in the Greater Yellowstone area

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Research Supporting Sound Decisions

Friday Flash - Climate, fire and forests in the Greater Yellowstone area

Facebook Twitter Website LinkedIn Email

JFSP Project: 16-3-01-4

Researchers: Monica Turner (University of Wisconsin-Madison), Adena Rissman (University of Wisconsin-Madison), Leroy Westerling (University of California-Merced) and Rupert Seidl (Technical University of Munich)

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PAU COSTA FOUNDATION

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FRIDAY, NOVEMBER 17, 8AM-9AM PST

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Presented by Savannah M D'Evelyn, PhD, Postdoctoral Scholar, University of Washington

November 17, 8am PST

INTEGRATING PUBLIC HEALTH INTO FOREST AND FIRE MANAGEMENT

Savannah M D'Evelyn, PhD
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Working with the Media to Communicate about Fire

Conservation organizations and fire practitioners are increasingly working with the media to communicate about our work. This webinar series will address various aspects of that process, with each webinar featuring a panel of media and communications professionals as well as fire practitioners.

APRIL 24, 1-2:30 PM ET — LEARNING FROM THE MEDIA: A CONVERSATION WITH JOURNALISTS
REGISTER: BIT.LY/LEARNINGFROMMEDIA

MAY 30, 1-2:30 PM ET — WORKING WITH THE MEDIA: HOW TO KNOW YOUR MESSAGES AND COMMUNICATE THEM
REGISTER: BIT.LY/COMMUNICATINGWITHMEDIA

JUNE 26, 1-2:30 PM ET — CRISIS COMMUNICATION: WHAT DO WE SAY WHEN THINGS GO WRONG?
REGISTER: BIT.LY/CRISISCOMMSFIRE

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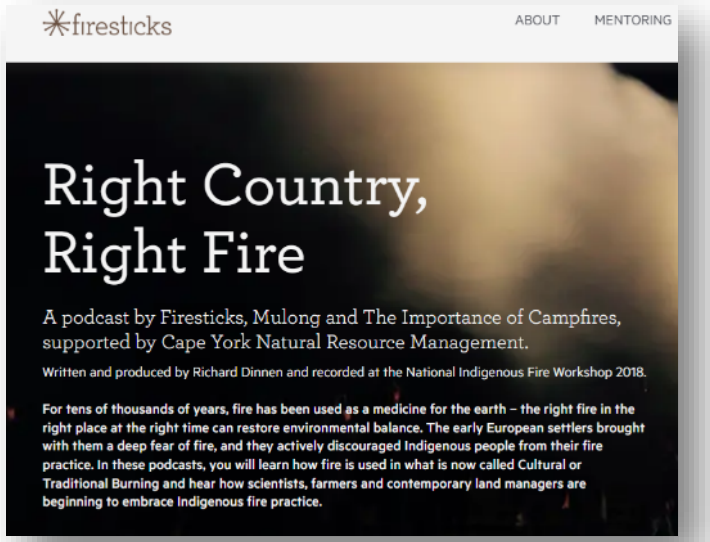
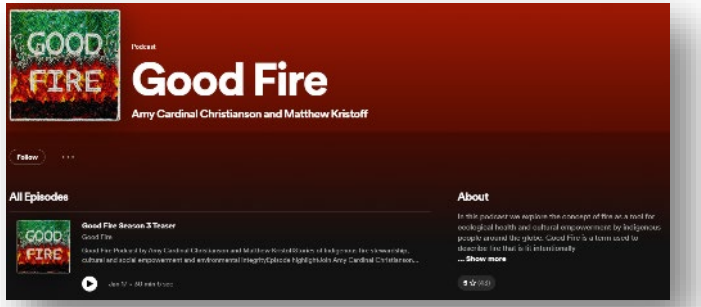

firesticks
ABOUT
MENTORING
Right Country, Right Fire
A podcast by Firesticks, Mulong and The Importance of Campfires, supported by Cape York Natural Resource Management.
Written and produced by Richard Dinnen and recorded at the National Indigenous Fire Workshop 2018.
For tens of thousands of years, fire has been used as a medicine for the earth – the right fire in the right place at the right time can restore environmental balance. The early European settlers brought with them a deep fear of fire, and they actively discouraged Indigenous people from their fire practice. In these podcasts, you will learn how fire is used in what is now called Cultural or Traditional Burning and hear how scientists, farmers and contemporary land managers are beginning to embrace Indigenous fire practice.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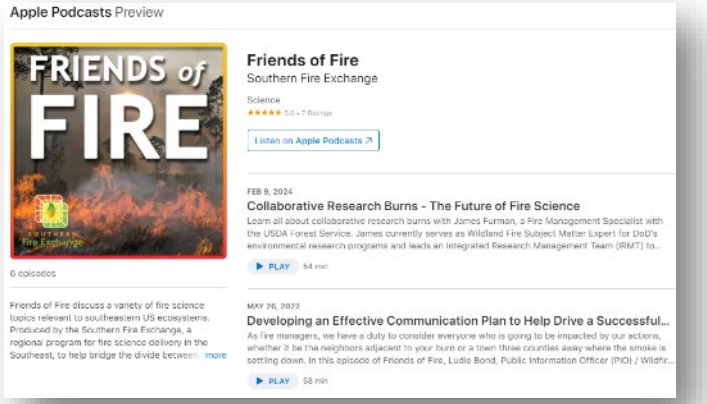
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Complexity simply communicated