Indigenous Peoples & Wildfire Research

Newsletter

May 2017

Australia

Publications

Appended to the end of this newsletter is an essay by Dr. David Ward titled "Nyoongars Knew Best: A Bushfire Essay from South West Australia"

Robinson, CJ., Barber, M., Hill, R., Gerrard, E., James, G. (2016). Protocols for Indigenous fire management partnerships, CSIRO, Brisbane. http://www.nespnorthern.edu.au/wp-content/uploads/2016/10/Protocols_for-Indigenous_Fire_Management_Partnerships_WEB_Oct-2016.pdf

Clay Trauernicht, Barry W. Brook, Brett P. Murphy, Grant J. Williamson, David M. J. S. Bowman. 2015. Local and global pyrogeographic evidence that indigenous fire management creates pyrodiversity. *Ecology and Evolution* 2015; 5(9): 1908–1918 http://onlinelibrary.wiley.com/doi/10.1002/ece3.1494/full

Aaron M. Petty, Vanessa deKoninck, and Ben Orlove. 2015. Cleaning, Protecting, or Abating? Making Indigenous Fire Management "Work" in Northern Australia. *Journal of Ethnobiology* 35(1):140-162. 2015 doi: http://dx.doi.org/10.2993/0278-0771-35.1.140

Elodie Fache and Bernard Moizo. 2015. Do Burning Practices Contribute to Caring for Country? Contemporary Uses of Fire for Conservation Purposes in Indigenous Australia, *Journal of Ethnobiology* 35(1):163-182. 2015 doi: http://dx.doi.org/10.2993/0278-0771-35.1.163

Rebecca Bliege Bird, Douglas W. Bird, Brian F. Codding. 2016. People, El Niño southern oscillation and fire in Australia: fire regimes and climate controls in hummock grasslands. *Phil. Trans. R. Soc. B* 2016 371 20150343; DOI: 10.1098/rstb.2015.0343.

Cathy J Robinson, Glenn James, Peter J Whitehead. 2016. Negotiating Indigenous benefits from payment for ecosystem service (PES) schemes. *Global Environmental Change*. Volume 38, May 2016, Pages 21–29

On the Ground

KOORI COUNTRY FIRESTICKS

ABORIGINAL CORPORATION
ICN: 8581
ABN 18 600 328 641

Introduction

'Koori Country Firesticks Aboriginal Corporation (KCFSAC) offer a community driven initiative for assisting private and public landholders to care for Country (manage their properties) using Indigenous / Aboriginal cultural burning knowledge and practices'.

Acknowledgement:

'Koori Country Firesticks respectfully acknowledge Country (our mother earth) and pay our respect to Elders, past and present.

We also acknowledge the Elders of the Kuku Thaypan, Lama Lama Country of Cape York in Queensland who passed on their knowledge to us and inspired the creation of KCFSAC.

In particular, KCFSAC acknowledge the work of Victor Steffensen of Mulong and Oliver Costello of Firesticks who have lead the revival of this important cultural practice. Further knowledge has been passed on by Elders of Country from New South Wales in Australia, where Aboriginal Cultural Burning practices are being reintroduced'.

About Us

'Koori Country Firesticks Aboriginal Corporation (KCFSAC) is a non for profit organisation that aim to revive Traditional Aboriginal cultural practices of burning Country as an alternative approach to Hazard Reduction techniques used by private and public landholders and managers. KCFSAC primary objective is to care for Country (Our Mother Earth), regardless of tenure or ownership. This knowledge has been passed onto KCFSAC by Aboriginal Cultural Elders and knowledge holders. Whilst the Australian landscape is broad and extremely diverse, it is the underlying principles and methodologies of Aboriginal cultural burning that remain the same. KCFSAC now pass on this knowledge to other Aboriginal and non-Aboriginal people to help restore Country that has been impacted by wild fire, th absence of fire and or infestation of exotic weeds. Cultural burning also acts to reduce dangerous fuel loads that surround urban development and regional towns and properties'.

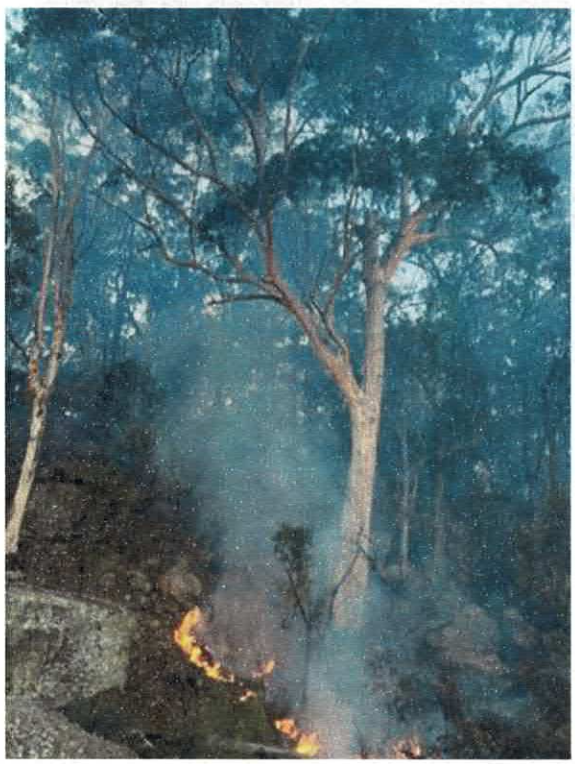
What we do!

'Members of KCFSAC all share similar values of and love for the land. For Aboriginal members especially, an overwhelming desire to fulfil what they perceive to be their custodial responsibilities to care for Country. Cultural burning activities by Aboriginal members have been undertaken as part of cultural practice which they have done so voluntarily and at their own personal expense. There exists an opportunity for cultural fire practitioners to assist land holders with hazard reduction, ecological restoration and weed management through the use of cultural burning. Imagine the many environmental, cultural, spiritual, social and economic benefits that may be afforded to both Aboriginal communities and to the land holders that utilise this knowledge and practice. KCFSAC is well placed to act as a facilitator to cultural learning pathways to fire and land

management for Aboriginal and non-Aboriginal people. Cultural burning may be a valuable part of integrating other land management activities in achieving ecological restoration outcomes'.

KCFSAC activities include Aboriginal Cultural Burn:

- Workshops;
- Demonstrations;
- Presentations;
- Consultancy; and
- Cultural Camps.



What is Aboriginal Cultural Burning?

"...there is only one fire and that is the right fire and fire for your Country,... " (Victor Steffensen, 'Line of Fire' SBS Insight, 15 February 2016)

Indigenous (Aboriginal) Cultural Burning practices have been identified as a major influence in 'shaping' the Country that many European observers described upon their arrival in Australia.

The firesticks project uses the term 'cultural burning' to describe burning practices developed by Aboriginal people to enhance the health of the land and its people. Cultural burning can include burning (or prevention of burning) for the health of particular plants, animals and country. It may involve patch burning to create different fire intervals or used specifically for fuel and hazard reduction purposes. Fire may be used to gain better access to country, to clean up important pathways, control invasive weeds or to maintain cultural responsibilities.

Contact us

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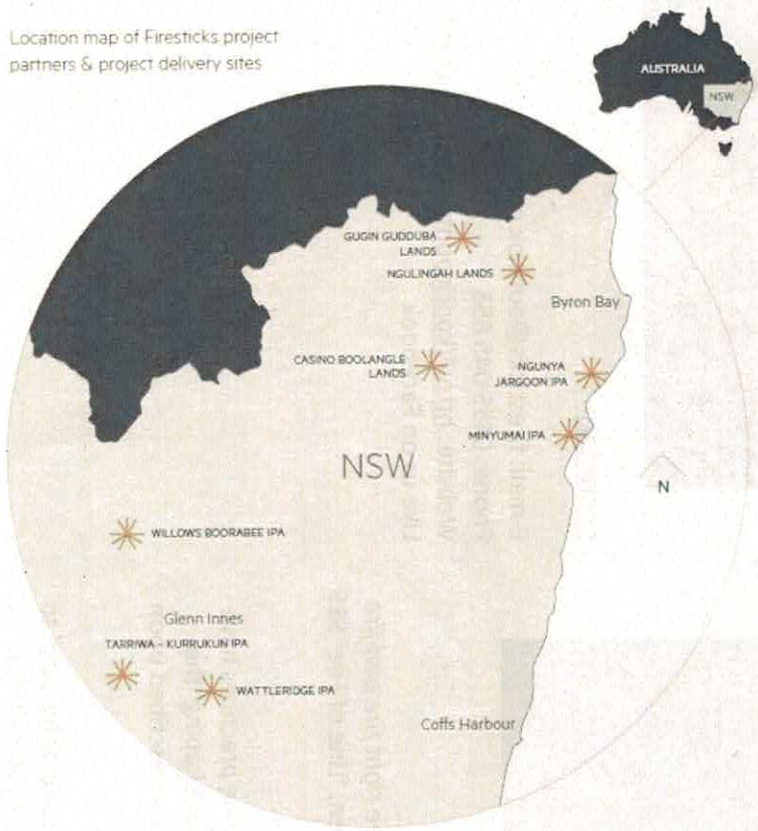
Phone: 0455 045 858
Website: http://kooricountryfiresticks.com/
Like us on Facebook

Location map of Firesticks project partners & project delivery sites



For more information on the Firesticks Project including current news articles and educational resources available for download please go to firesticks.org.au

NSW NCC FIRESTICKS PROJECT CO-ORDINATOR
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Nature Conservation Council of NSW

The Firesticks Project: Applying contemporary and Aboriginal burning practices to enhance biodiversity, connectivity and landscape resilience is supported through funding from the Australian Government's Clean Energy Future Biodiversity Fund

firesticks

Supporting cultural and contemporary burning practices for healthy communities and healthy landscapes

The Threatened Eastern Blossom-bat, a highly specialised member of the flying-fox family and an important pollinator of flowering trees and shrubs in the Minyumai IPA

The NSW Nature Conservation Council Firesticks Project

Applying Aboriginal ecological knowledge and integrated weed, fire and pest management to maintain Biodiversity, Connectivity and Landscape Resilience.

Until recently many Aboriginal people were denied access to their ancestral lands and the opportunities to manage Country in a way that preserves and enhances its cultural and ecological values.

This situation is changing with the creation of Indigenous Protected Areas (IPAs) around Australia, including in northeastern New South Wales, where Aboriginal land managers are directly involved in the management of formalised conservation lands. IPAs currently make up around 40% of our National Reserve System and in NSW provide core habitat and landscape connectivity for a diversity of species.

The NSW Nature Conservation Council's Federally funded Firesticks Project is coordinating a unique collaboration that involves personnel from four Indigenous Protected Areas, three Aboriginal Land Councils, the Northern Rivers Fire and Biodiversity Consortium, University of Technology (Sydney) and government agencies.

Through the development of fire management plans, relevant training opportunities, and expert guidance the project is building capacity for land managers to implement integrated fire, weed and pest management strategies to enhance landscape health and better maintain and protect ecological and cultural values.

The project is implementing on-ground works and conducting scientific monitoring to establish a greater understanding of the ecological impact of low-intensity prescribed burns. The program aims to work with fire to enhance ecosystem health by improving habitat condition and connectivity within culturally connected landscapes; supporting educational pathways that enable and empower Aboriginal and non-Aboriginal communities to work collaboratively towards establishing resilient landscapes.

Additionally the project is raising awareness on a regional and national scale of the high conservation value of Aboriginal Lands for biodiversity and threatened species. Through ongoing ecological monitoring we have demonstrated that the four IPAs alone support populations of a total of 47 Threatened Species including ten species listed under both the Commonwealth's Environment Protection and Biodiversity Conservation (EPBC) Act and the NSW Threatened Species Conservation (TSC) Act.

WATTLERIDGE AND NGUNYA JARGOON IPA'S

WILLOWS AND MINYUMAI IPA'S







WATTLERIDGE AND NGUNYA JARGOON IPAS FROM TOP
The Threatened Eastern False Pipistrelle, a large microchiropteran bat with core habitat in the tall wet forests of the Wattleridge IPA / A New Holland Mouse, a small native rodent listed as Nationally Vulnerable and occurring in grassy forest in the Wattleridge IPA / The Wallum Sedge Frog, a specialised Vunerable species adapted to breed in the acidic waters of Wallum ecosystems in the Ngunya Jargoon IPA / A Long-nosed Potoroo, a Nationally Vunerable species with an important remnant population in the coastal woodlands of the Ngunya Jargoon IPA

WILLOWS AND MINYUMAI IPA FROM TOP Minyumai rangers and fire crew putting in a cool burn in grassy Spotted Gum forest, Minyumai IPA / A Stephens Banded Snake, one of a number of Threatened species with important populations sustained by the forests of Minyumai IPA / A male Turquoise Parrot feeding on seeding grasses, one of a number of Threatened declining woodland bird species, Willows IPA.

PHOTOGRAPHY D. MILLEDGE

Media

Indigenous rangers partner with Nitmiluk National Park rangers in national first for fire management

By Daniel Fitzgerald
Updated 23 April 2017 at 6:44 pm
First posted 23 April 2017 at 6:41 pm

Jawoyn rangers will help to protect and preserve rock art in Nitmiluk National Park.

Indigenous rangers are collaborating with Northern Territory Parks and Wildlife rangers in Nitmiluk National Park to manage its savanna burning program, in an Australian-first agreement. Under the partnership the Jawoyn rangers will work with parks rangers to minimise damaging late dry-season wildfires across the park near Katherine. The savanna burning project will also generate carbon credits worth around $200,000 per year for the Jawoyn Association. Jawoyn rangers will also help preserve Indigenous cultural and rock art sites within Nitmiluk National Park.

Jawoyn Association land management co-ordinator Liam Golding said a dedicated team of Indigenous rangers would be set up to work alongside parks rangers. "They will work with Nitmiluk National Park rangers doing asset burns around infrastructure like camps and trails, they will also do a lot of cultural sites and rock art, and work side-by-side in helicopters doing prescribed burns," Mr Golding said. "We also have a cultural component doing school camps and return-to-country camps, looking at some other well-known cultural sites we will be able to take old people back up to."

Mr Golding said it made sense for the Jawoyn rangers to work in the park, as it was Jawoyn land. "Also, surrounding Nitmiluk is Jawoyn land where we already have existing fire projects, so it was an obvious decisio to work in with the parks rangers to bring that methodology into the park, bring that extra funding, and expand [the park's] opportunity to employ Jawoyn people and the opportunity to engage with more traditional owners."

Nitmiluk National Park senior district ranger Andrew McPhee said the Parks Commission had been wanting to formalise a working relationship with the Jawoyn rangers for many years. He said the agreement would see more money for the park to improve its fire management. "Our fire management here has been very good over a number of years, but we can do a lot better," Mr McPhee said. "This partnership will get us working with the Jawoyn ranger group a lot closer, learning from each other and helping to improve the health of the park."

Carbon credits will be generated from the early dry-season burning in Nitmiluk National Park.

With the addition of Jawoyn rangers on the ground in the park, Mr McPhee said there was scope for more rock art protection, and fire and weed management. "The [lack of] manpower has been one of our concerns and this [partnership] will go a long way in helping that," he said. "Everything is going to be jointly done, whether we are up in a helicopter flying there will be a Jawoyn ranger and a park ranger doing the burning, or on the ground doing fine-scale burning. "It is an [Australian] first and hopefully other parks can enter into these type of carbon agreements to improve fire management, which is one of our main tools for biodiversity management, so it is a big deal."

http://www.abc.net.au/news/rural/2017-04-24/indigenous-rangers-partner-nitmiluk-national-parks-rangers/8461982

Current Research

Hazards, culture and Indigenous communities'
Lead Investigators: Timothy Neale (Deakin University), Jessica K Weir (Western Sydney University)

A group of researchers, led by Timothy Neale (Deakin University) and Jessica K. Weir (Western Sydney University), are about to start a new research project looking at the hazard priorities of diverse Aboriginal communities in southern Australia and the emergency management sector's engagement with these communities.

Over the past decade, the natural hazard sector in Australia has broadened its agenda to prioritise disaster resilience, including a greater emphasis on community engagement, and the risk and resilience issues of culturally diverse peoples. Industry priorities for this work include: to reduce hazard risk to these groups; to increase resilience in these groups and the wider community; to meet societal and policy expectations about cultural engagement; and to broaden the knowledge base utilised in natural hazards management. However, this is a complex cultural context to navigate, not least with respect to Aboriginal peoples living in southern Australia. While most of the nation's Aboriginal peoples live in the south, those peoples are underrepresented in natural hazards research and have less extensive recognised land rights than Aboriginal peoples in northern Australia.

Through the project, researchers will conduct collaborative research with Aboriginal peoples and emergency management practitioners to explore how better engagement and collaboration can be supported, with a focus on the interaction of scientific, Aboriginal and other knowledge sources. 'Hazards, culture and Indigenous communities' is a 3-year research project funded by the Australian government's Bushfire and Natural Hazards Cooperative Research Centre. To find out more about the project please see: http://www.bnhcrc.com.au/research/hazard-resilience/3397

Currently, Timothy Neale is interested in connecting with researchers and practitioners engaged in collaborative bushfire/wildfire or flood management in Canada, particularly where sector agencies are working with Aboriginal groups in new and beneficial ways. Our hope, within the project team, is to learn from others' experience to guide changes across the natural hazards sector here in Australia. You can reach Timothy via email at t.neale@deakin.edu.au or find out more about him at http://www.deakin.edu.au/about-deakin/people/tim-neale and http://www.timdneale.net

Upcoming Conferences

AFAC17 powered by INTERSCHUTZ, the annual conference of the **Bushfire and Natural Hazards CRC & AFAC**, will take place at the International Convention & Exhibition Centre in Sydney from 4-7 September 2017.

The CRC's all-hazards Research Forum begins the conference week. Showcasing the latest natural hazards science, the Research Forum is not just for scientists - it is the perfect opportunity for focused discussions between the research community and emergency managers on industry issues. These discussions are more important now than ever as we continue to embed research findings into practice.

http://www.afacconference.com.au/

10th AUSTRALASIAN NATURAL HAZARDS MANAGEMENT CONFERENCE
Perth 2017

The Bushfire and Natural Hazards CRC is a partner in the 10th Australasian Natural Hazards Management Conference, to be held in Perth from 30 October to 3 November. Hosted by the Office of Emergency Management of Western Australia, the theme for this year's conference is "translating research into practice."

Canada

Publications

Douglas A. Clark, Linaya Workman, Thomas S. Jung. 2016. Impacts of reintroduced bison on first nations people in Yukon, Canada: Finding common ground through participatory research and social learning. *Conservation and Society*. 14(1): 1-12

Conferences

Wildland Fire Canada 2016
Building Resilience
24-28 October 2016
Kelowna, British Columbia, Canada

Wildland Fire Canada 2016 was held in the sunny Okanagan in the fall. Two sessions were held featuring wildfire management and Indigenous communities:

Lessons from Communities:

- Wildfire Evacuation Experiences – First Nations (Tara McGee, University of Alberta)
- Building Community Resilience Around Wildfire Risk Mitigation Through a Long-Term, Community-Directed Research Partnership in Teslin, Yukon (Scott Green, UNBC)
- A Brief History of Fuel Management in Logan Lake, BC (Garnet Mierau, Forsite)

Prescribed Fire & Traditional Knowledge Special Session

- Syilx Traditional Fire Use (Chad Eneas, Okanagan Nation)
- Understanding Social Interactions & Local Knowledge - Nitaskinan QC (Noemie Gonzalez, Laval U)
- Muskrat Mysteries: Revitalizing Wetlands with Fires and Floods (Solomon & Renee Carriere, U Sask and N-28 Trappers Assoc.)
- FNESS Wildfire Prevention & Cultural Heritage Values & Objectives (Shane Wardrobe, FNESS)

- Mobilizing Traditional FN Interactions with Fire to Develop Fire Absorbent Landscapes (Sonja Leverkus, Shifting Mosaics Consulting)

Presentations and videos from the conference can be found here:
http://www.wildlandfire2016.ca/presentations/

The next WFC conference will be held in Spring 2019 in Ontario.

National Smoke Forum
October 29, 2016
Kelowna

The National Smoke Forum was held in collaboration with Wildland Fire Canada 2016.

A joint presentation by Amy Christianson (Canadian Forest Service) and Winston DeLorme (First Nations Field Officer, Alberta Emergency Management Agency) on Indigenous Peoples and Wildfire Smoke can be seen here:
https://mediasitemob1.mediagroup.ubc.ca/Mediasite/Play/17f161593b044ee5a49283b8661e22821d#!

On the Ground

British Columbia

Appended on the end of this newsletter is the newsletter for the Forest Fuel Management Department of First Nations Emergency Services Society (FNESS)

Saskatchewan

A number of case studies from Saskatchewan are available that document the effectiveness of fuel management projects. A couple of these documented WUI incidents are Aboriginal communities.
http://www.publications.gov.sk.ca/deplist.cfm?d=66&c=4476

Current Research

We are always looking for potential students or staff who are interested in Indigenous communities and wildland fire management.
Please contact:
Amy Christianson, Ph.D.
Fire Social Scientist, Candian Forest Service
Amy.Christianson@canada.ca
Natural Resources Canada | Ressources naturelles Canada

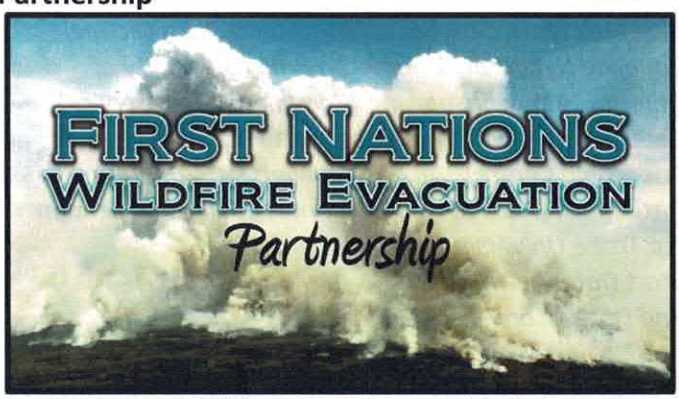
Examining the impacts of wildfires on the health and well-being of Indigenous peoples and communities in the Regional Municipality of Wood Buffalo
Research team: Stephanie Montesanti, Tara McGee, Candace Nykiforuk & Cameron Wild (University of Alberta), Amy Christianson (Canadian Forest Service), Teresa Nahwegahbow (Nistawoyou Association Friendship Centre), Val Austen Wiebe & Katherine Rittenbach (Alberta Health Services), James McLennan (La Trobe University)
Start Date: April 1 2017
End Date: March 31 2019

Teresa Nahwegahbow and family with performers from the community Blessing Ceremony for the research.

This study will examine how the health and well-being of Indigenous residents and communities in Wood Buffalo were impacted from the wildfire, and how this affects

their resilience. Specific objectives of this research are to: (1) Examine definitions of resilience among adults and youth; (2) Examine how Indigenous residents and communities were affected by the evacuation and recovery process; (3) Identify the health impacts of the wildfire of concern to Indigenous peoples living on reserves and settlements, and in urban Fort McMurray; (4) Examine the health impacts of the wildfire on children and youth; and (5) Support our knowledge users, community partners and decision-makers to identify ways to reduce negative impacts of the wildfire and enhance resiliency of Indigenous peoples in Wood Buffalo in the face of a disaster.

The First Nations Wildfire Evacuation (FNWE) Partnership



Funded by: Social Science and Humanities Research Council (SSHRC) and Alberta Centre for Child, Family, and Community Research
PIs: Tara McGee (University of Alberta) and Amy Christianson (Canadian Forest Service)
Students: Kyla Mottershead, Henok Asafaw
Start date: September 2013
End date: March 2018

The aim of this research is to bring together researchers, Aboriginal communities, and agencies involved in wildfire evacuations to examine how Aboriginal residents and communities are affected by wildfire evacuation. The objectives are to: (1) Document how Aboriginal residents and communities were affected by recent wildfire evacuations; (2) Identify characteristics of the wildfire evacuation that influenced how residents were positively and negatively affected by the evacuations; (3) Identify what characteristics of individuals, their social contest, and the Aboriginal communities affected how residents were positively or negatively affected by the wildfire evacuation; and (4) Identify ways to reduce the negative impacts or wildfire evacuations on Aboriginal peoples.

UPDATE: Research summaries for 4 communities can be found at:
http://www.eas.ualberta.ca/awe/

Alberta's Aboriginal Wildland Firefighters: A Proud History and an Uncertain Future
PI: Amy Christianson (Canadian Forest Service)
Start date: June 2012
End date: ?

The goal of the research is to explore the role of firefighting in building human capacity in Aboriginal communities to reduce wildfire risk. The specific objectives of the research are:

1) to determine why Aboriginal people in Alberta are seeking employment in firefighting;
2) to explore the roles of traditional and contemporary knowledge among Aboriginal firefighters in regards to fire behaviour, firefighting techniques, and mitigation activities;
3) to explore if Aboriginal firefighters are interested in leading wildfire mitigation activities in their own communities.

The Challenge of Collaboration Between Indigenous and Non-Indigenous People in the Context of Wildfire

PI: Noémie Gonzalez (Université Laval)

This study focuses on one fire that occurred on the Atikamekw First Nation's ancestral territory – Nitaskinan – close to the Wemotaci reservation. The fire was managed over a ten day period of firefighting. During this period, there were several switches between collaboration and non-collaboration situations between professional forest firefighters and volunteers from the Atikamekw community. This study combines the results of a literature review, an analysis of media coverage of the emergency, as well as ethnographic interviews conducted with different actors of the wildfire event, in order to assess the types of collaboration and non-collaboration that took place between Indigenous and non-Indigenous people in the context of wildfire.

Media

BBC Radio 4: Costing the Earth Fighting Fire podcast

http://www.bbc.co.uk/programmes/b08crzr3

When wildfires engulfed the Canadian city of Fort McMurray last May 90,000 people were displaced and well over £2bn of damage was caused, making it one of the costliest natural disasters of all time.

That fire proved to be just the start of a summer of flames that ripped through California, Greece and France. An area the size of India now burns every year and climate change is blamed for an increase in the length of the fire season across the boreal forests of North America.

Tom Heap visits Fort McMurray to find out how a city could be so easily engulfed by fire and to meet the local scientists and firefighters working out fresh strategies to make sure it doesn't happen again.

Indigenous firefighters battling Fort McMurray blaze follow long Alberta tradition

Jana G. Pruden
LAC LA BICHE, ALTA. — The Globe and Mail
Published Friday, May 20, 2016 4:17PM EDT
Last updated Friday, May 20, 2016 8:30PM EDT

Bruce Cunningham worked an office job last winter, but his thoughts were never far from the dense northern Alberta forest: He missed the trees and wildlife, the feeling of being out on the land with his friends and family, of protecting the land from fire.

"The wildland is our home. That's where we were born, that's where we were raised. We feel the need that we have to protect it because it is our land, after all," said Mr. Cunningham, a firefighter from the East Prairie Métis Settlement in northern Alberta. "It's like nature to us, being out there, right?"

Mr. Cunningham is one of about 500 First Nation and Métis firefighters who worked on the Fort McMurray wildfire in recent weeks. Alberta Forestry information officer Lynn Daina said indigenous crews make up half of all resources on the wildfire right now, and comprise the largest percentage of firefighters working on the blaze.

She said many people may not be aware of the huge role indigenous firefighters play in managing wildfires in the province, or the history of indigenous firefighting in Alberta. "Before Forestry was even an entity, they were putting out fires. They probably trained our first forest rangers on putting out fires, because they were the ones doing it," Ms. Daina said. "They were the original

stewards of the forest." In a video produced by Alberta Wildfire in 2015, wildfire manager Gordon Bisgrove called indigenous firefighting crews "the backbone" of the fire service in Alberta.

Garret Howse, a 15-year firefighting veteran who leads Mr. Cunningham on an eight-person crew, said he grew up with wildfires burning around his community - and with his uncles and other relatives out fighting them. "I always looked up to them," said Mr. Howse, who is also from the East Prairie Métis Settlement. "It's a sense of pride. It's not just a summer thing for us. Fighting the fire is one of the most important jobs."

The Alberta Forest Service began training wildfire firefighters in the 1950s. One of the early trainees, Sam Sinclair, then took that formal training back to indigenous people in the Slave Lake area in the spring of 1960, and helped establish indigenous fire crews in Alberta.

Gordon Sinclair said his father taught firefighters to "work harder than the man next to them," and used both the experience and discipline he gained as a Second World War veteran and his knowledge as a Métis man in his approach to firefighting. "They grew up in the area. They knew what the country was like, they knew what the timber was like," said Mr. Sinclair, whose father died in 2005. "There was a lot of intellect that was in them, and people didn't realize how valuable that was until they started getting native firefighters. It was just like working in our backyard in a lot of places."

Paul Boucher, a Métis man who fought wildfires in the 1960s and 70s, says the indigenous crews in northern Alberta were "the best firefighters in Canada. "I was a devil fighting fire," he said, standing on a sidewalk in Lac la Biche during the Fort McMurrray wildfires last week. "It was only Métis and First Nations firefighters then. The white people were only bookkeepers."

Thinking about the Fort McMurray fire brought a tear to Mr. Boucher's eye, and he turned his face to brush it away. "I've been to a lot of fires, and I know what fire's all about," he said.

Ambrose (Jake) Jacobs was 15 when he lied about his age to get on a fire crew in northern Alberta, and began a firefighting career that continues 44 years later. His own house burned down during the devastating wildfire in Slave Lake five years ago. Mr. Jacobs was out fighting the fire at the time. He says fighting wildfires is hard, dirty, demanding work, but he still loves it – even when he's "crawling around like a dog sniffing for smoke. "What it is, it's for the love of the bush," he said. "When I get asked to go look at a fire, I'm all excited. I told my boss, the day I don't get excited, then it's time to hang up my coveralls."

http://www.theglobeandmail.com/news/national/indigenous-firefighters-battling-fort-mcmurray-blaze-follow-long-alberta-tradition/article30110469/

AFTER THE FIRE || Taking stock of the impact on Indigenous communities

By Michael Brown and Nisa Drozdowski on May 2, 2017

UAlberta researchers are partnering with Indigenous groups to gauge the health of traditional food sources and examine the resiliency of Indigenous communities impacted by the 2016 Fort McMurray wildfires. (Photo by Jeremy Schultz, available under a Creative Commons Attribution-No Derivatives licence. https://flic.kr/p/5gAtno)

University of Alberta researchers are partnering with Indigenous groups to examine the disproportionate toll the 2016 Wood Buffalo wildfires had on Indigenous communities. The excessive burden being felt by people

all over northern Alberta started with concerns about the resilience of Indigenous communities as well as the safety of traditional Indigenous foods. Tests revealed caustic ash—which was created in the razing of more than 2,400 structures in the fire's path—was found in Fort McKay and as far north as Fort Chipewyan, home of the Mikisew Cree First Nation, more than 220 kilometres from Fort McMurray.

Chris Le, a researcher in the Department of Laboratory Medicine and Pathology, will spend the next two years measuring the toxicity of hundreds of samples of locally hunted game meat and locally harvested wild plants. "The unknown creates questions," said Le. "With this project we want to put minds at ease."

Ensuring traditional foods are safe

Le noted that tests in the immediate aftermath of the fire showed the ash contained toxic materials from home construction—led by arsenic and heavy metals in pressure-treated lumber—as well as the more naturally occurring carcinogenic and mutagenic hydrocarbons from combustion of the forest. A soil sample taken just days after the fire from the site of a razed deck and charred wood siding in the hard-hit Beacon Hill neighbourhood of Fort McMurray had an arsenic concentration 100 times higher than recommended safety levels. Although arsenic occurs naturally in the environment, chronic consumption of or exposure to elevated levels of inorganic arsenic is a known cause of a number of cancers as well as diabetes, high blood pressure, and cardiovascular and neurological diseases.

"While watching the fire, my first thoughts were around what the psychological effects were going to be, but the substance of the fire also became a concern," said Le. His research team will analyze and compare traditional food samples obtained before and after the wildfires. The study is being helped along by the fortuitous 2013 First Nations Food Nutrition and Environment Study, which archived traditional food samples over a 10-year period. The traditional food samples available before the 2016 wildfires are being analyzed to provide baseline data for comparison with new samples to be collected.

In the previous First Nations Food Nutrition and Environment Study, which surveyed the dietary habits of Alberta's Indigenous communities, 65 per cent of households reported harvesting traditional foods and more than three-quarters of participants reported that they would like to have more of these foods. Almost half of respondents indicated they experienced food insecurity, which is known to relate to diminished health. "Involving partner communities in the earliest stages of the research is essential for achieving our goal of empowering community members to make more informed decisions about traditional food safety," said Le. "Engaging community members is key to ensuring that the study addresses concerns, rather than contributing to distrust of the environment and fear regarding environmental conditions."

Fostering resilient communities

Meanwhile, Stephanie Montesanti, a researcher in the School of Public Health, will lead a two-year project aimed at measuring the resilience of Indigenous people, many of whom were residents of communities hardest hit by the fire. "Resilience is a concept that varies from culture to culture. We need to define it from an Indigenous perspective," she said. "Factors like traditions and rituals, family relationships and ties to the community all influence how we adapt and recover from trauma."

Early observations suggest that services provided during and after the wildfire haven't adequately addressed the particular needs of the Indigenous community. Montesanti is hopeful her research can identify those gaps and lead to recommendations to close them. "What I'd like to see come out of this is a policy framework for the Government of Alberta for responding to a crisis in Indigenous populations," she said. "This would ensure Indigenous people Alberta-wide are engaged in the process and have the resources and supports they need to be resilient in the face of disaster."

Both research projects are funded through a partnership of the Canadian Institutes of Health Research, the Canadian Red Cross and Alberta Innovates. The

projects are two of seven—including five led by the U of A—to receive special grants from a $3.4-million fund created to support the long-term recovery of residents of Fort McMurray and the surrounding communities.

https://www.ualberta.ca/news-and-events/newsarticles/2017/may/after-the-fire-taking-stock-of-the-impact-on-indigenous-communities

Bringing Back the Bison

Alix Morris of Earthwatch Institute in Voices for Wildlife on May 2, 2017

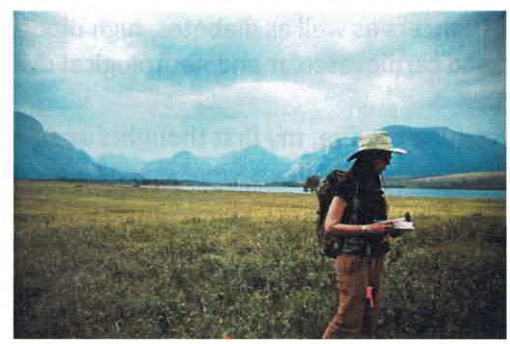
Tens of millions of wild bison once roamed freely across North America, before their populations were decimated by Euro-American settlers in the mid-1800s. Today, Earthwatch's Chief Scientist, Dr. Cristina Eisenberg, in partnership with the Blackfoot First Nation, is leading a study to help prepare for the return of this iconic species to Alberta's Waterton Lakes National Park and tribal lands in the Canadian Rocky Mountains.

The Missing Force of Nature

Narcisse Blood was a big man, the kind of man who, when he stood up, filled a doorway. A respected leader and member of the Kainai First Nation in Southern Alberta, also known as the Blood Tribe and part of the Blackfoot Confederacy, Narcisse believed in the power of relationships to guide us. 'If you just listen to the relationships,' he said, 'if you honor them, then it's like the stars – everything will align and work the way it has always worked.'

Narcisse Blood, respected leader and member of the Kanai First Nation.

His friendship with Dr. Cristina Eisenberg began – as many relationships do – on Facebook. In 2013, after he finished reading Cristina's book *The Wolf's Tooth*, Narcisse sent her a Facebook message: 'I read your book and want to be your friend. Can you show me a trophic cascade?' A trophic cascade, which Cristina describes in her book, refers to the relationships between species within a food web. Cristina, Earthwatch's Chief Scientist and Principal Investigator of the expedition Restoring Fire, Wolves, and Bison to the Canadian Rockies, was surprised to hear from this highly respected Kainai elder, and accepted his friend request immediately.



Earthwatch's Chief Scientist Dr. Cristina Eisenberg

Several months later, Cristina invited Narcisse and his wife, Alvine Mountain Horse, to her field site in Alberta's Waterton Lakes National Park to show him her research. In this biodiversity hotspot, Cristina, her co-investigators,

and her team study the relationships between wolves, elk, fire, grass, and aspen. They spoke about where the wolves had been, how many elk there were, and where aspen had spread into the grassland. They spoke of the fires they had set to maintain the ecosystem. She then turned to Narcisse and Alvine. 'What do you think is going on here?' she asked. 'Well, there's something missing,' Narcisse said.

Tens of millions of wild bison, sometimes referred to as buffalo, once roamed the landscape across North America, including in and around Waterton. But in the mid- to late-1800s, Euro-American settlers decimated the population, effectively "de-wilding" the landscape.

.at night at the Waterton research house, Cristina prepared dinner for Narcisse and Alvine. They spoke about the role that free-ranging bison once played in this ecosystem. At the end of the night, which was filled with stories about wolf encounters, elk hunts, and the importance of science to understand relationships in nature, Narcisse hugged Cristina goodbye and said, 'I want you to do the work that you're doing...on our land.'

The Blood Tribe Timber Limit

For more than 50 years, Blackfoot land in Alberta, known as the Blood Tribe Timber Limit, had been closed off to anyone who was not a member of the tribe. For years, non-tribal members had destroyed the tribe's sacred forests and lush elk meadows through illegal logging and planting of invasive grasses. In a few parting words, Narcisse had granted permission for the first non-tribal member since 1960 to collect scientific data on that land. Cristina could now expand her research into a critical ecosystem.

By partnering with the Kainai First Nation and extending the field site into the Blood Timber Limit, the research could help to inform not only Waterton managers and the conservation community, but Kainai leaders who maintain tribal lands.

That dinner in Waterton was the last time Cristina would see Narcisse. In 2015, he was killed in a tragic car accident in Saskatchewan. But his legacy lives on. "The tribe talks about him today as if he's still alive," said Cristina. "'His death brought us all together,' they told me. That's his legacy."

Read the rest of this article here:
http://voices.nationalgeographic.com/2017/05/02/bringing-back-the-bison/

New Zealand

Publications

Grace Aroha Stone & Lisa Langer. 2015. Te ahi i te ao Māori: Māori use of fire: Traditional use of fire to inform current and future fire management in New Zealand. MAI Journal. 4(1)
http://www.journal.mai.ac.nz/content/te-ahi-i-te-ao-m%C4%81ori-m%C4%81ori-use-fire-traditional-use-fire-inform-current-and-future-fire

Current Research

Māori residents' wildfire experiences in Northland, Aotearoa/New Zealand
PIs: Lisa Langer and Tara McGee

Lisa Langer, Scion, Christchurch and her collaborator Prof. Tara McGee, University of Alberta, Edmonton have revised their first paper on wildfire risk awareness and safe use of fire learning from Indigenous rural residents' on the Karikari Peninsula, Aotearoa New Zealand, which they have submitted to the International Journal of Wildland Fire. This follows field work in Northland by Lisa and Tara in both 2014 and 2015.
As part of the first step of establishing a new case study under a National Science Challenge on Resilience to Nature's Challenges in collaboration with Tara McGee. Lisa Langer made a scoping visit to Northland to discuss options and engaged Mita Harris (Ngāpuhi, Northern Rural Fire Authority and Heritage NZ) to assist in

developing the new case study and establishing relationships with Hokianga hapū of Ngāpuhi.

Lisa Langer was invited to participate in a hui (gathering) of the four hapū (subtribe) of Ngāpuhi in the Hokianga to develop a vision following a Ratana service to commemorate the third and the largest signing of the Treaty of Waitangi on 12 February. The hui was held in a marquee at the Wesleyan Mission station in Mangungu, Hokianga Harbour. There was considerable conversation about their whenua (land) settlement and the wish of some speakers to protest by taking their grievances to the World Court and the United Nations. However, the debates were far reaching and covered topics such as domestic abuse, alcohol, drugs, crime, struggling financially and the need to be sustainable (including the need to live off the sea and land by growing vegetables). Mita Harris addressed the hui about the need put aside the issues of the whenua settlement grievances and to think long-term. He led a discussion around the development of a vision based on aroha (love), rangimarie (peace), manaakitanga (respect and kindness) and being true to their whakapapa (lineage/descent). The kaumatua (elders) of the four hapū present agreed to meet monthly to develop their vision and consider the long-term sustainability of their hapū. Lisa's personal invitation to the hui demonstrated the trust that Mita Harris placed in inviting Lisa into his hapū and extended the trust to the others present. Mita Harris and Lisa Langer discussed the establishment of the new case study focus. This will allow Lisa and Tara McGee, University of Alberta to conduct a hui with the hapū and face-to-face interviews with key people to discuss wildfire and other natural hazards in November.

United States of America

Publications

Armatas, C. A., T. J. Venn, B. B. McBride, A. E. Watson, and S. J. Carver. 2016. Opportunities to utilize traditional phenological knowledge to support adaptive management of social-ecological systems vulnerable to changes in climate and fire regimes. *Ecology and Society* 21(1):16. http://dx.doi.org/10.5751/ES-07905-210116

Matthew J. Liebmanna, Joshua Farella, Christopher I. Roos, Adam Stack, Sarah Martini, and Thomas W. Swetnam. 2016. Native American depopulation, reforestation, and fire regimes in the Southwest United States, 1492–1900 CE. *PNAS*. 113(6): E696-E704 http://www.pnas.org/content/113/6/E696.short

Alan H. Taylor, Valerie Trouet, Carl N. Skinner, and Scott Stephens, 2016. Socioecological transitions trigger fire regime shifts and modulate fire–climate interactions in the Sierra Nevada, USA, 1600–2015. *PNAS*. 113(48): 13684–13689, doi: 10.1073/pnas.1609775113 http://www.pnas.org/content/113/48/13684.abstract

McBride, Brooke Baldauf; Sanchez-Trigueros, Fernando; Carver, Stephen J.; Watson, Alan E.; Stumpff, Linda Moon; Matt, Roian; Borrie, William T. 2017. Participatory Geographic Information Systems as an Organizational Platform for the Integration of Traditional and Scientific Knowledge in Contemporary Fire and Fuels Management. *Journal of Forestry*, Volume 115, Number 1, 8 January 2017, pp. 43-50(8)

Discussion meeting issue:

'The interaction of fire and mankind' organized and edited by Andrew C. Scott, William G. Chaloner, Claire M. Belcher and Christopher I. Roos: *Phil. Trans. R. Soc. B* 371(1696)

Conferences

International Association of Wildland Fire

IAWF's 13th International Wildland Fire Safety Summit & 4th Human Dimensions of Wildland Fire Conference: *Managing Fire, Understanding Ourselves: Human Dimensions in Safety and Wildland Fire. Boise, Idaho. April 20-24, 2015.* *http://inawf.memberclicks.net/upcoming-conferences*

Amy Christianson (Canadian Forest Service) moderated a cial session on Indigenous people and wildland fire management.

- Wildfire Evacuation Experiences of a First Nation community in Alberta, Canada (Tara McGee, University of Alberta)
- In Their Own Words: How a Wildfire Evacuation Affected Residents of a First Nation community (Kyla Mottershead, University of Alberta)
- Using Historical Photographs to Identify Indigenous Burning Practices (Rick Arthur)
- Wildfire Management in New Zealand (E.R. (Lisa) Langer)

Association for Fire Ecology

7th International Fire Ecology and Management Congress held concurrently with the 2nd Applied Fire Science Workshop. *FireVision 20/20: A 20 year Reflection and Look into the Future ~ November 28-December 2, 2017. Orlando, Florida, USA.*

The 2017 AFE International Fire Congress will offer an exciting blend of learning opportunities for fire managers, natural resource professionals, policy and administrative leaders, and the academic and research community. Presentations will feature the latest in research results and applications.

Workshops throughout the week will provide innovative training opportunities built on the research presentations. Special sessions will focus on unifying the science and applications around key management issues. Round table discussions will allow small groups to focus on key topics and principles.

The Congress will conclude on Saturday with field trips that demonstrate how much of the material described and discussed the rest of the week is being applied across Florida.

Westside Fire Regime Summit

Fire in the Pacific Northwest ~ Past, Present, and Future, Implications for ecology, operations, and restoration west of the crest of the Cascade Mountains. May 24-25, 2017. Vancouver, Washington

This summit will bring together fire professionals, land managers, collaboratives & communities, researchers, scientists, and outreach specialists to:
1.Learn, review and discuss the available science on Westside fire regimes and implication for forest, woodland and grassland management, community preparedness and, where appropriate, restoration needs and current activities; •Understanding the historical, current, and future role of fire in Westside systems; •Discuss the opportunities and barriers of using fire as a tool to accomplish restoration and restoring the process of fire; •Understanding what changes are occurring in Westside fire regimes
2.Identify challenges and research gaps;
3.Determine strategies/tools to assist land managers and communities in the WUI

Media

Wildfires Are Essential: The Forest Service Embraces a Tribal Tradition

Nathan Gilles Apr 03, 2017

The Karuk were once denied the right to practice an ancient tradition. Now scientific and resource management circles are seeing the merits of controlled burning.

Nighttime burn operations illuminate the starry sky deep in the Klamath Mountains during the 2015 Klamath River Prescribed Fire Training Exchange. Photo by Adam Shumaker.

Theft brought Fire to the Karuk people.

Coyote, the cleverest of the Animal People, traveled to a high mountaintop where Fire was hoarded by three yellow jacket wasps, sisters, who were old and vain. Using his considerable wiles, Coyote flattered the Yellow Jacket Sisters, extolling their beauty.

Distracted by Coyote's sweet talk, the Sisters left Fire unattended. Coyote saw his chance. He stole Fire, fleeing with it down the mountainside and back to the other Animal People. The Yellow Jacket Sisters followed close on Coyote's heels.

The Animal People exchanged Fire between one another as the Yellow Jacket Sisters buzzed angrily around them. Fire continued to pass between the Animal People, burning slowly down to a single ember. Frog, the last to hold Fire, held that dying ember in his mouth and dove into the Klamath River, not surfacing until he reached the opposite bank, when ...

"He spat Fire into the roots of the willows growing there. This is why we use the willow to make the sticks to make our fire drills," says Leaf Hillman, rubbing his hands vigorously back and forth in a pantomime of making fire.

Hillman heads the Department of Natural Resources and Environmental Policy for the Karuk, an American Indian tribe of around 5,000 individuals in northwestern California and southwestern Oregon's Klamath-Siskiyou mountain region. He's also a tribal member.

"If I had to make up a new story for today," says Hillman, "I would tell how the federal government has taken fire from the people. Now we have to take it back."

The Karuk believe that fire balances their ecosystem; in their words, fire "fixes the world."

For as long as they can remember, the Karuk have used controlled burns to manage the threat of wildfires and cultivate traditional plants. They believe that fire balances their ecosystem; in their words, fire "fixes the world." Yet for roughly a century, these people of fire have been in direct conflict with the U.S. Forest Service, which now has jurisdiction over most of the Karuk's traditional lands. Whereas the Karuk advocated for the use of fire, the Forest Service vigorously suppressed it and, in the process, the Karuk. But attitudes around fire suppression and the use of fire by Native Americans are quickly changing as new research comes to light.

A body of scientific and historical work now suggests numerous North American tribes used fire. While the precise extent and impact of this burning remain controversial, what is clear is that Native Americans hav managed to accumulate a vast storehouse of valuable, evidence-based approaches to managing their lands, and this knowledge is now the subject of a great deal of scholarly investigation. For the Karuk, this ecological knowledge revolves around fire.

Read the rest of this article here:
http://www.yesmagazine.org/issues/science/wildfires-are-essential-the-forest-service-embraces-a-tribal-tradition-20170403?platform=hootsuite

Bureau of Indian Affairs
U.S. Department of Interior

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Division of Forestry and Wildland Fire Mgt.
3833 S. Development Ave.
Boise, ID. 83705
208-387-5575 Work
www.bia.gov/nifc/

Wildland Fire Fact Sheet

June, 2016

Calendar Year	2013	2014	2015
Wildfire – Unplanned Ignitions	3,554	3,830	4,377
Total Acres Burned	181,903	353,436	706,805

Resource Capability (Preparedness)	Firefighters		# of Engines	# of Hotshot Crews	# of Aviation Crews
	BIA: 220	Tribal: 262	205	7	9

Administratively Determined Firefighters*	2013	2014	2015
Count of Casuals Hired	3,500	2,608	2,202
Gross Amount Paid out	$15,121,805	$13,251,518	$13,156,288.

*Source: Casual Payment Center Annual Report

Fuels Treatments	FY13 Completed	FY14 Completed	FY15 Completed
Wildland-Urban Interface (WUI) Fuels Treated			
Prescribed Fire Acres	52,571	102,617	85,582
Mechanical Acres	42,183	45,222	37,775
Other Acres	4,969	5,537	5,800
Total Acres	99,723	153,376	129,157
Non-Wildland-Urban Interface (Non-WUI) Fuels Treated			
Total	61,823	15,302	82,128
Mechanical Acres	14,972	7,615	11,462
Prescribed Fire Acres	46,851	7,687	70,586
Other Acres	0	0	80
Number of Prescribed Fires	185	259	212
Fuels Treatment WUI and Non-WUI Total Acres	161,546	168,678	211,285
Fuels Program Total Expenditures	$26,260,576	$27,487,000	$27,864,281

*Source: NFPORS

Burned Area Emergency Response	FY13 Completed	FY14 Completed	FY15 Completed
Burned Area Rehabilitation			
Number of Projects funded	17	21	17
Acres (i.e, reforestation, seeding)	6,233	6,779	11546
Expenditures/ Obligation**	$2,012,000	$4,911,773	$4,204,000
Emergency Stabilization*			
Number of projects funded	24	29	19
Acres (i.e. soil stabilization)	869	6,038	2048
Units Each (i.e. culvert, cultural site protection)	57	174	117
Miles (i.e. flood protection, channel stabilization)	148	29	214
Expenditures/ Obligation	$1,012,000	$1,464,882	$602,102

*Source: NFPORS ** Some expenditures completed in FY14

Department / Bureau/Agency	DOI/Bureau of Indian Affairs	DOI/ Bureau of Land Management	DOI/ Fish & Wildlife Service	DOI/ National Park Service	USDA/ U.S. Forest Service
Total Acres Managed	57,000,000*	256,000,000*	96,200,000*	84,331,948*	193,000,000*

Source: Bureau/Agency Public Affairs Offices

Current Research

Incorporating tribal TEK for Climate Change Adaptation and Mitigation Strategies

PI: Frank Lake

How are indigenous communities working with researchers and managers regarding wildland fires (wild and Rx), incorporating tribal TEK for Climate Change adaptation and mitigation strategies?. This topic seems to be a "hot" one now with little published research. The North Pacific Landscape Conservation Cooperative has a Science/TEK sub-committee. The Joint Fire Science Consortiums in different regions are reaching out to tribes/indigenous communities in the US. I wonder if this is happening in other regions/countries?

The Indigenous Fire Ecology Collaborative

Contact: Don Hankins

This past fall the Indigenous Fire Ecology Collaborative has implemented prescribed burns in oak woodlands located in California's Klammath Mountains, Central Valley, Sierra Foothills and the Southern Sierra Nevadas with Tribes including the Karuk, Yurok (see note from Frank Lake in this issue for details), Konkow, Plains and Northern Sierra Miwok and North Fork Mono respectively. Approximately 40 hectares were burned in each of the following woodlands; blue oak (Quercus douglassii), valley oak (Q. lobata), and black oak (Q. Kelloggii). Burns were implemented in collaboration with other entities including the US Forest Service, Bureau of Land Management, California Department of Fish and Wildlife, Nature Conservancy, California Indian Water Commission and an array of fire crews including local, state, federal and Tribal. Post-burn assessments will be completed this spring and cultural resources (e.g., plants) will be assessed according to traditional harvest considerations through fall. Despite the prolonged drought, cultural resource plants have thus far responded well to treatments. This one-year exploratory project has been funded with support from the National Science Foundation's Coupled Natural and Human Systems program.

Frank Lake was able (as researcher and landowner) to conduct a late spring/early summer June 17, 2013 prescribed burn around tanoak trees as a "prescribed fire" treatment for investigating the effect (season of burn) that may reduce the acorn infestation levels of filbert weevils and moths. The preliminary results that potentially have causal linkages to reduction of these insect pests in the acorns are provided in comparing fall 2012 (pre-burn) to fall 2013 post burn with the proportion of good to bad acorns collected. Generally the post-burn acorns had less physical/exterior shell insect damage, but nut meat content was similar (could be acorn gatherer desertion while gathering). See the Northern California Prescribed Fire Council presentation link for the Hankins and Lake 2013 "Acorn Productivity, Living Cultural Resources and Fire" at http://www.norcalrxfirecouncil.org/Events.htmlThis research was conducted as part of University of California-Berkeley graduate student, Arielle Halpern's research and National Science Foundation exploratory grant with Stanford University-Doug and Rebecca Bird (that also includes Don's research in Cal.). Although this late spring prescribed burn does not necessarily mimic the tribal/indigenous burning time of year for this resource-forest type (generally fall, just after infertile/buggy infested acorns are aborted-dropped from the tree transitioning to just as the good ones begin to drop), it did occur (several dates difference) during a time of year when wildfires in similar tanoak forests (within 20 miles) were started by lightning.

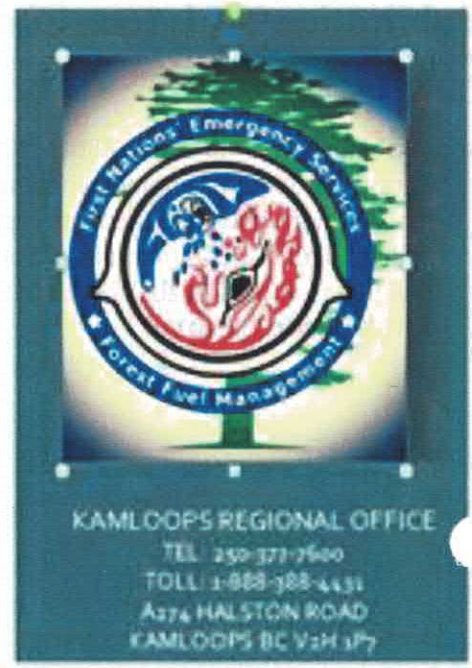
Publications of Interest from Other Countries

Jayalaxshmi Mistry, Bibiana A. Bilbao, Andrea Berardi. 2016. Community owned solutions for fire management in tropical ecosystems: case studies from Indigenous communities of South America. *Phil. Trans. R. Soc. B* 2016 371 20150174; DOI: 10.1098/rstb.2015.0174.

Giselda Durigan and James A. Ratter. 2016. The need for a consistent fire policy for Cerrado conservation. *Journal of Applied Ecology*. 53(1). 11–15. http://onlinelibrary.wiley.com/doi/10.1111/1365-2664.12559/full

Russell-Smith, J., Monagle, C., Jacobsohn, M. et al. 2017. Can savanna burning projects deliver measurable greenhouse emissions reductions and sustainable livelihood opportunities in fire-prone settings?. *Climatic Change* (2017) 140: 47. doi:10.1007/s10584-013-0910-5

First Nations' Emergency Services Society



First Nations' Emergency Services Society | Forest Fuel Management (FFM) Department

FNESS FFM office is located on the Traditional Territory of Tk'emlúps te Secwépemc (TteS) Traditional Territory in Kamloops, British Columbia.

The FFM Department is primarily funded through the Strategic Wildfire Prevention Initiative. Province of BC.

- Supports First Nations access resources, funding for wildfire prevention initiatives.
- Assist communities navigate through funding, applications, and program criteria

We also access federal funds through the Indigenous Affairs Northern Development Canada that supports:

- BC First Nations with Wildfire Prevention Initiative's, and the FireSmart Canada Community recognition program;

The Strategic Wildfire Prevention Initiative (SWPI) is a suite of funding programs managed through the Strategic Wildfire Prevention Working Group – including the First Nations' Emergency Services Society (FNESS), Ministry of Forests, Lands & Natural Resource Operations (MFLNRO) and the Union of BC Municipalities (UBCM).

The FFM department also sits on the SWPI management committee with MFLNRO and the UBCM.

Funding is provided by the Province of BC and is administered by UBCM. The initiative supports communities to mitigate risk from wildfire in the wildland urban interface.

The Strategic Wildfire Prevention Initiative includes the following funding streams:

- Development or update of Community Wildfire Protection Plans (CWPP)
- Development of fuel management prescriptions
- Operational fuel treatments, including maintenance treatments
- Fuel management demonstration projects
- SWPI FireSmart Planning grants.

The FFM provides First Nations Communities information and support.

The FFM staffs play a key role in delivery and participation with our program partners, the BC Wildfire Service and Union of BC Municipalities.

To access funding stream applications, links to program guides follow link to UBCM below.

http://www.ubcm.ca/EN/main/funding/lgps/strategic-wildfire-prevention.html

Commemorative Paddle

Congratulations to Nicomen Indian Band for ıpletion of their SWPI Operational Fuel ıtment

2017 SWPI FireSmart Planning Grant Program

The FireSmart Communities Program, provided by Partners in Protection, is designed to encourage self-organized groups of residents to take the lead in implementing solutions for wildfire safety on their own properties. First Nations and individual neighborhoods or subdivisions within local governments that are in areas prone to wildfire can earn FireSmart Community Recognition status by meeting the criteria set by Partners in Protection.

The 2017 SWPI FireSmart Planning grant ogram provides funding to local governments and First Nations in BC to support residents to undertake FireSmart planning activities for private lands, as identified by Partners in Protection through the FireSmart Communities Program, and/or to develop or advance local planning efforts to mitigate risk from wildfire on private lands in the wildland urban interface. The program can also support residents or community groups within a local government or First Nation to take the required actions in order to achieve and/or maintain FireSmart Community Recognition status from Partners in Protection.

The 2017 SWPI FireSmart Planning grant program can contribute up to 100% of the cost of eligible activities to a maximum of $10,000.

2016-17 Emergency Management Preparedness (EMP) Funding - On Reserve Fuel Treatment Initiative

For the on-reserve fuel reduction, this component resulted in the implementation of completed forest fuel prescriptions in 22 First Nations communities in BC. The purpose of this component of the FNESS Wildfire Prevention Initiative coordinated on-reserve fuel reduction activities for up to 25 BC First Nations communities that met specific criteria and guidelines to implement forest fuel reduction treatments identified in completed Community Wildfire Protection Plans (CWPPs) and Forest Fuel Management Prescriptions—identified as high priority treatment units and assessed as being in either high or extreme wildfire threat rated areas. This funding process was application-based in nature and modeled after the Strategic Wildfire Prevention Initiative (SWPI) and the Aboriginal Forestry Initiative (AFI). Twenty-two BC First Nations communities were approved for up to $75,000.00 minimum all inclusive (with between 7.50 – 28.6 hectares per community in terms of the size of area treated).

For the Local FireSmart Representative Workshops, the FNESS FFM Department worked with Partners in Protection in coordinating and delivering two workshops in Kamloops and Chilliwack respectively. The theme of the workshops centered on providing participants (e.g., community leaders and fire professionals) with the necessary knowledge, skills, concepts and tools/resources to protect their communities from wildland-urban interface (WUI) fires by becoming Local FireSmart Representatives in their respective communities. Participants who completed the entire two day Local FireSmart Representative workshop were issued a Local FireSmart Representative "Certificate of Completion" by Partners in Protection and their Provincial/Territorial FireSmart Liaison.

The project was completed March 31, 2017 and as some community projects went to the end of March, due to weather conditions it took to the end of March to have all fully completed. The project was a success again this year, and looking forward to receiving approval for funds for the 2017-18 fiscal year.

FireSmart Home Partners Pilot Project

The FireSmart Home Partners Pilot Project that has been approved for first of its kind in BC - implementation for the Fort Nelson First Nation IR#2. The pilot project was developed through partnerships with First Nations Emergency Services (FNESS), Partners in Protection, Fort Nelson First Nation, Indigenous and Northern Affairs Canada (INAC), and the Forest Enhancement Society (FES).

Research and case studies have proven that the most effective method of reducing individual structure ignition susceptibility from wildfire is to implement FireSmart mitigation strategies to the structure and site (Home Ignition Zone or "HIZ"). The pilot project is proposed for the Fort Nelson First Nations Indian Reserve #2. Fort Nelson First Nation has just over 700 members and has 10 reserves. Total reserve land base is 9556.5 hectares. IR #2 is the largest and is located at Mile 295 off the Alaska Highway and is the main reserve and home to about half the Fort Nelson First Nation population.

Implementation of the FireSmart Home Partners Home Ignition Zone (HIZ) Assessment Pilot Project for the Fort Nelson First Nation will enable the collection of data required for the development and implementation of specific FireSmart mitigation on individual properties, as well as provide residential and critical infrastructure statistics required for community wildfire protection planning, emergency management planning, fuel management treatments and decision support for Fire Safety Assessments, prevention initiatives and fire insurance providers.

National FireSmart Canada Community Recognition Program

We have been very active assisting First Nations and local governments to engage in the FireSmart Community Recognition Program. The goal of progressing First Nations and local government into the FireSmart Canada Community recognition program was the objective for this year.

As the Province of BC territorial representative/liaison I support First Nations local governments and regional districts and other agencies with the FireSmart community recognition program.

I work closely with the BC Wildfire Service, who this year brought on a new staff member Kelsey Winter Communications and Engagement Specialist – Prevention.

For the 2016-17 we had the following communities receive FireSmart Canada Community recognition, new and renewals.

The following communities recen received FireSmart community recognition.

New 2016 Recognition

1. Akisq'nuk First Nation - 2016 new recognition.
2. Little Shuswap Lake (First Nation) - 2016
3. Xaxli'p (First Nation)- 2016
4. Stswecem'c-Xgat'tem FN – (Canoe Creek Band) 2016 new recognition.
5. Penticton Indian Band - 2016 new recognition.
6. Tsal'alh (First Nation) - 2016 new recognition.
7. Nazko (First Nation) - 2016 new recognition.
8. Gallagher's Canyon- 2016 new recognition.
9. Piers Island- 2016 new recognition.
10. Predator Ridge - 2016 new recognition.
11. Steelhead Community Association - 2016 new recognition.

2016 Renewal Recognition

1. Coldwater Band – 2016 renewal
2. Anarchist Mountain - 2016 renewal

Nyoongars Knew Best

A Bushfire Essay from South West Australia

David Ward

Cover photo:

A mild fire, in autumn, on the author's former block at Roleystone, Western Australia. The litter is marri (Corymbia calophylla), and it is three years since the previous burn. A clump of nine grasstrees (Xanthorrhoiea preissii) was burnt every three years from 1998 to 2013, that is to say six times. They thrived, because the mild fires recycled nutrients, but were too mild to remove all the green crown, as happens in fierce fires at long intervals. Small creatures, such as geckos and spiders, survived mild fires in these cool, green crowns, as would such creatures as Honey Possums (Noolbenger) if they had been present. They definitely would not have survived fires in grasstrees like haystacks, unburnt for twenty years. The temperature in those can reach 1000 ^{0}C.

Grasstree thatch offers a good model of landscape fire. Grasstrees cannot shed their needles – in nature only fire can remove them, and recycle the nutrients as ash. Litter fires like that in the photograph can be easily extinguished with a garden hose, or a wet bag, regardless of whether climate is changing or not. The sort of Hiroshima fires we now get in leaf litter that is twenty years old or more are uncontrollable, even by water bombers and helicopters. The water simply evaporates in the convection column, and pilots often have difficulty seeing the fire due to dense smoke.

Fires like those on the cover produce only a small amount of grey or white smoke, unlike the copper coloured smoke clouds of fierce fires. The copper colour is due to nitrogen being burnt out of the system. This should be of concern to biologists, since all living things need nitrogen.

-oOo-

Foreword

This essay is based on my research and practical bushfire experience in south western Australia going back to 1968. It may, or may not, represent the official opinions of Bridgetown Greenbushes Shire, the Department of Fire & Emergency Services, or the Department of Parks & Wildlife. The opinions of those organisations should be sought independently by interested readers. In the same way, where I quote from another author, I do not imply that they agree with all I say.

Opinions on *Nyoongar* (Aboriginal) use of fire are based on old documents, conversations with over forty *Nyoongar* Elders over several decades, and old fire marks on the stems of several hundred grasstrees. In some cases these stretch back to the eighteenth century, before Europeans settled in Western Australia.

I hope I have interpreted correctly what was written by early Europeans, and said by the Elders, and descendants of early Europeans, such as Jim Muir of Manjimup, and the late Sir Ernest Lee Steere. I do not mention the names of Elders, because some of them have since passed away. Some I contacted through the former Department of Conservation and Land Management, and others through meetings arranged by the former West Australian Department of Aboriginal affairs, thanks to Julie Jones. There is remarkable agreement between all these sources of information. Philosophers call this consilience.

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Early comment on *Nyoongar* burning just north of Albany, between 2nd and 15th November, 1840.

'On our way we met a party of natives engaged in burning the bush, which they do in sections every year. The dexterity with which they manage so proverbially a dangerous agent as fire is indeed astonishing. Those to whom this duty is especially entrusted, and who guide or stop the running flame, are armed with large green boughs, with which, if it moves in a wrong direction, they beat it out. ... I can conceive no finer subject for a picture than a party of these swarthy beings engaged in kindling, moderating, and directing the destructive element, which under their care seems almost to change its nature, acquiring, as it were, complete docility, instead of the ungovernable fury we are accustomed to ascribe to it.'

Commander John Lort Stokes R.N.
Volume II, Chapter 2.6
Discoveries in Australia
Voyage of HMS Beagle 1837-1843
(By courtesy of Gutenberg Press)

Nyoongars Knew Best

The historic records from around the world leave no room to doubt that ... herding and gathering peoples, as well as ancient farmers and herders, for a number of reasons, frequently and intentionally set fire to almost all the vegetation around them which would burn.
Stewart Omer C., Professor of Anthropology, University of Colorado, 1963.

Much has been written, some as scientific papers, some as newspaper or magazine articles, about the supposed harm done to plants and animals by deliberate burning to reduce fuels in south west Australia (**1,2,3**). Claims have been made that burning at intervals less than the time taken to flower and produce seed will exterminate plant species (**4**). This misinformation has led to some disastrous fires, due to widespread, long unburnt fuel.

Those who have observed many bushfires in south western Australia have known, for a long time, that frequent burning, in light fuel, produces brilliant wildflowers, green healthy bush, and a mosaic of burnt and unburnt patches (**5**). In mild weather, and light fuel, even the shadow from a bush can create an unburnt patch. It has now been confirmed, by research based on careful observations of actual fire effects, that frequent burning in light fuels, does indeed produce patchy fires. Some patches may not burn for long periods, perhaps never, so a long term seedbank can be maintained. At the same time, only a tiny percentage of native plants in *jarrah* forest need long intervals between fires, and these occur in obvious fire shelters. The overwhelming majority flower within three to four years (**6**).

Near the south coast of Western Australia, a species of *Banksia*, previously described as 'fire sensitive', was found to actually increase four fold under burning at 2-3 year intervals, despite needing 4 years to flower and produce seed (**7**). Such an apparent paradox shows that ecology is very complex, and what passes as ecology, and appears in refereed journals, is sometimes misleading, being based on simplistic misunderstanding. Medieval Scottish lawyers coined the excellent word 'subreption' to describe evidence which misleads by omitting part of the truth. Although scientific logic is important in ecology, we might recall Ambrose Bierce's definition of logic as 'the art of thinking and reasoning in strict accordance with the limitations and incapacities of the human misunderstanding'. Much earlier, Voltaire suggested that an obsession with logic is a sure sign of stupidity, and he possibly got the idea from the sixteenth century essayist Michel de Montaigne.

Landscape logic can play tricks, and should be cross checked with the humanity of history. An important part of the truth is that before Europeans arrived, *Nyoongar* people managed the south-west Australian dry forests and woodlands very well without the simplistic and self important findings of some academic biologists, and without the quasi military fire suppression efforts of thousands of fire fighters, using fire trucks, water bombers and helicopters; and without the attention of sensation seeking television journalists, theatrical politicians, the Conservation Council, the Conservation Commission, the Wilderness Society, the WA Forest Alliance, the Minister for Emergency Services, the Department of Fire and Emergency Services (DFES), the Minister for the Environment, the Department of Parks and Wildlife (DPAW), the Office of Bushfire Risk Management (OBRM), and not forgetting the Salvation Army to give them all breakfast.

Nyoongars did this very simply, by burning frequently, in most places as often as it would carry a mild, creeping fire. In the *jarrah* forest, this is every 3-4 years, that is to say, in the fire season between the third and fourth winter after the last fire, like the fire shown on the cover. Within the *jarrah* forest, patches of *marri* litter will carry a fire every 2-3 years, and *coondli* (sheoak) groves every year. Historical evidence shows, beyond any reasonable doubt, that most *Nyoongar* burning was in summer (**8**), which is only possible if they burnt in light, patchy fuels. In the *wandoo* forest,

formerly with a grassy floor, it was every 2-3 years. *Wandoo* germinates best on ash beds, and frequent mild burns reduce the mistletoe which kills *wandoo* if allowed to survive for many years.

This frequent, patchy, burning maintained a high diversity of habitats, and so a high diversity of plants and animals, some of which were food for *Nyoongars,* who used green branches to swat out fires heading for places they did not want to burn. These included spear shaft thickets, which, according to a late *Nyoongar* Elder, needed twelve years to reach a useful length. *Nyoongars* walked near fires in bare feet, so, quite obviously, bushfires were much milder in those days than now, when expensive protective boots are essential. Some claim that recent fierce fires are due to hotter summers. Even a rise of a degree or so would make no significant difference to bushfire behaviour, which depends mainly on wind, slope, fuel quantity, and fuel dryness. Some of our hottest recent bushfires have happened on quite mild days, with air temperature of only 25 degrees. The difference between a century ago and now is that litter has been allowed to pile up for decades. A lot more fuel means much hotter fires, regardless of climate vagaries. Anyone who does not believe that has clearly not faced a bushfire, and felt the obviously differing radiant heat between light and heavy fuels.

Even in areas little used by *Nyoongars*, most of the bush would have burnt frequently by unimpeded summer lightning fires, trickling on for months, reducing fuel, raising soil pH, stimulating soil bacteria, and recycling nutrients. Such large lightning fires continued up to the 1920s, before there were any Bushfire Brigades, and before the Forests Department had developed long range fire fighting capacity. Even at a conservative one kilometre a day, a fire starting in spring could travel a hundred kilometres over the fire season, before autumn rain doused it. They would most likely have gone out sooner, due to running into a recently burnt area. Much of the landscape would have burnt as often as it could carry a trickling fire, and this prevented the ferocious fires we see today. Mandatory prompt suppression of all fires, and attempted widespread exclusion, are new fangled notions, poor ecology, and unintelligent fire management.

Frequent fire made the bush safe for *Nyoongars*, and promoted grass for *yonka* (kangaroo), and a host of bush tucker plants. It produced *byoo*, the red fruit of the *djiridji (*zamia), an important *Nyoongar* food. Frequent light smoke germinated seeds, maintained large areas of grass, and provoked flowering of kangaroo paws and *balga* grasstrees. Native grasses, kangaroo paws and *byoo* are increasingly rare, under an advocacy which claims that we should exclude fire from large bush areas for long periods. This foolish idea makes the bush very dangerous, as we have seen in many fierce bushfires over the past eighty years. Unless common sense prevails in bushfire policy, there will, no doubt, be more uncontrollable bushfires, property loss, and, inevitably, loss of human life. The bush and forest will also suffer. Fire cannot be excluded indefinitely, and the longer it has been absent, the fiercer, and more damaging it will be when it does happen. We don't need any more expensive public enquiries into bushfire to establish that fact.

There is a cunning, or naive claim that, left alone, the litter will all rot down to enrich the soil with humus, as it does in temperate climates. The truth, as any observant bush resident will testify, is that there is slight decay in winter, but the summer blizzard of dead leaves, bark, twigs and seed capsules is far greater, so litter builds up. After twenty years or so, there is a mulching effect, and the increase slows down. However, by then most native plants are smothered and straggly, most of the nutrient is locked up in dead matter, and the soil under the litter is acid. Frequent, mild fire releases the nutrients, sweetens the soil, and prunes the plants. Leaving litter to decay acidifies the soil. Gardeners understand that – that's why they put lime or ashes in their compost.

For decades, a small but vociferous group in south west Australia has opposed prescribed burning. Part of the battle goes on in what is called 'refereed literature'. However, standards of refereeing are variable. A recent claim, by those opposed to prescribed or regular burning, is that in former days small mammals reduced litter by burrowing, so making fierce fires impossible. A paper has been published on this idea, in what is claimed to be a refereed journal

(**9**). The statistical sampling is inadequate, and the reasoning subreptive. It may well be the case that small animals, now much reduced, or extinct, once created more small bare patches, so making fires more patchy. However, the authors almost ignore the human history of *Nyoongar* people in the south west for thousands of years before Europeans arrived, and the fact that *Nyoongars* ate many small mammals, and frequently burned the shrubs and leaf litter to frighten such animals out, in order to club or spear them. The authors also ignore the role of fire in germinating seeds, and changing the soil pH, and omit the considerable literature on *Nyoongar* use of fire (e.g. **8, 10, 11**). An email was sent (April 2016) to the author of the paper, and the editor, pointing out that the paper is based on poor evidence, ignores other evidence, and does not answer the question asked in the title. The email was acknowledged by the editor, but no explanation has yet been received. I would have thought that those interested in the scientific truth would be only too glad to enter into debate.

Some other evidence is that in the 1840s, the early West Australian botanist, James Drummond, sent some advice to the Director of Kew Gardens, in London, who was having difficulty growing West Australian plants. Drummond wrote *'When I was a sojourner in England, I never remember to have seen Australian plants in a good state after the second or third years and that, I think, is in a great degree owing to their not being cut down close to the ground when they begin to get ragged; how for the pruning knife and a mixture of wood ashes in the soil would answer as a substitute to the triennial or quaternal burnings they undergo in their native land, I am unable to say, some of our plants never flower in perfection but the season after the ground is burned over...'* [1]

There are many historical references to frequent, widespread burning by *Nyoongars*. In 1837 Lt. Henry Bunbury mentioned *'...the periodical extensive bush fires which, by destroying every two to three years the dead leaves, plants, sticks, fallen timber etc. prevent most effectually the accumulation of any decayed vegetable deposit... being the last month of summer ... the Natives have burnt with fire much of the country...'* [2] Bunbury was from England, and believed that humus is essential to all plants, but he was wrong. In some systems, humus can be replaced by charcoal.

Dr Ian Abbott, a former Principal Research Scientists with the Department of Conservation and Land Management, reports that in 1975 Mr Frank Thompson was interviewed about his memories of fire near the south coast, before the First World War. He said *'You see, the Natives ...they used to burn the country every three or four years...when it was burnt the grass grew and it was nice and fresh and the possums had something to live on and the kangaroos had something to live on and the wallabies and the tamars and boodie rat ...It didn't burn very fast because it was only grass and a few leaves here and there and it would burn ahead and...sometimes there'd be a little isolated patch of other stuff that wasn't good enough to burn the time before, but as it burnt along perhaps there might be some wallabies or tamars ...those animals didn't run away from fire, they'd run up to it and you'd see them hopping along the edge of the fire until they saw a place where the fire wasn't burning very fierce...'*. [3]

It is hard to imagine wallabies hopping along the flame front of recent bushfires, looking for a way through. Long fire exclusion is causing atrocious bushfires, and many avoidable wildlife deaths. Larger animals, such as emus and kangaroos, cannot escape fires, due to the thickets of undergrowth. Small animals, such as possums, burn their feet off, by running on embers. Soil seedbanks can be destroyed. The longer fire has been excluded, the fewer the unburnt refuges, and the longer the bush takes to recover after it eventually, and inevitably, burns. Where mature trees are killed outright, as has happened in several recent fires in heavy fuel, it may take hundreds of years for them to be replaced. Oddly, those who oppose fuel reduction burning are often the same ones who claim to be protectors of the forest.

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[1] Thanks to Dr Lachlan McCaw for this quote from Drummond's letters at the WA Herbarium.
[2] Thanks to Dr Sylvia Hallam for this quote from her book 'Fire & Hearth'.
[3] Thanks to Dr Ian Abbott for this quote from the Battye Library.

Under frequent, light burning, there would have been thousands of small refuges, in rocks or near creeks, which would have burnt less often, some never. Recent fierce fires destroy these, and the fire sensitive plants and animals they protect. The advocacy of long fire exclusion over large areas obtusely ignores the refuges of the very plants and animals it claims to care for.

In some places two to four year burning continued until the First World War. In others, it continued up to the 1930s, and even the 1950s. Some old families in the Perth Hills remember when any fire could be put out with wet bags or green branches. This is only possible when fires are in litter no more than four years old, with flames less than a metre high. *Nyoongars* knew that, and passed that knowledge on to early European settlers. It seems to have been lost in our urban intellectual wilderness.

Far from destroying diversity, this frequent burning enhanced it, by creating a rich mosaic of different aged patches. Animals had both food and shelter, and wildflowers flourished. Today's blanket fire exclusion in National Parks leads to an eventual single, blanket, fierce fire, which simplifies the ecosystem down to a single age. As an example, this is the likely outcome for Yalgorup National Park, where there has been little or no prescribed burning since 1960, when the park was established. When a severe fire happens, most of the remaining tuart trees will be killed outright, as will many equally old grasstrees. In my view, that park is a death trap in summer, since peppermint trees burn like napalm, and, last time I was there, there were few turn around points on the sandy tracks (**12**).

By insisting, through our political representatives, that DPAW burns National Parks at short intervals, and hence more patchily, and that DFES burns the bush around human settlements more often, so creating fine grained mosaics, we will make human life safer, see more wildflowers, have healthier forests, reduce animal deaths, and avoid dense, choking smoke from fierce wildfires. We will have to live with occasional light smoke from prescribed burns. If most litter were less than five years old, smoke would be minimal, and arson would be futile. All it could cause would be a mild, creeping fire, which would benefit the bush. Patchy fire refuges would be protected. Magpies love a mild, creeping fire, in light fuel. They stand around it and snaffle the hundreds of spiders and cockroaches that run out. I have never seen a magpie near a big, fierce fire.

Think of the savings and benefits by working with nature, instead of fighting it. Recent bushfires in heavy fuel have cost tens of millions of dollars. Using *Nyoongar* fire knowledge, there need be no more squadrons of very expensive, taxpayer funded aircraft, anxious home owners, and choking smoke for a week or more. Given current suburban housing, there will always be a need for fire brigades, with their bulldozers and aircraft. However, more young *Nyoongar* people could be employed by DPAW to help manage the National Parks and reserves with fire. This would maintain forest health, and restore *Nyoongar* culture. Those people who live close to National Parks would have some peace of mind in summer. If, as some claim, summers will get catastrophically hotter, then the argument for more frequent burning is even stronger.

Although *Nyoongars* burnt mostly in summer (*biroc*), they burnt some places, such as swamps, in winter, running fire through sedges over the water, which became charged with smoke, and so provoked prolific germination in the following spring. Winter burning of swamps would have avoided the loss of peat, which now occurs due to fierce fires in the dry weather of summer or autumn. This peat loss has caused some environmentalist consternation at Edith Cowan University, but the academics involved seem not to understand the significance of winter burning.

In a submission to the recent inquiry into the Waroona/Yarloop fire (2016), I suggested that *Nyoongar* Elders should be drawn into discussions, with a view to creating more intelligent bushfire policy. I don't know if this will be done this time, but it will eventually. There is no alternative, except for bulldozing all native vegetation. In his report on the Waroona/Yarloop fire, Euan Ferguson AFSM discussed bushfire policies. Good policies will only arise from good philosophy. We must ask the philosophical question, shall bushfire be our enemy, or our friend? *Nyoongar* people

answered that question, intelligently, thousands of years ago. There are still some in our society, even in universities, who do not understand the question.

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