In his key-note presentation at a “FIRE FORUM” hosted by DFES, Chris Henggeler outlines remote catchment challenges to delegates (Broome, Western Australia, 2017)

Link: [Three-minute introductory video to Kachana]

3
Like an aircraft, grader or chain-saw.... We see Fire to be a tool.

We like fire to be in the tool-box.

4
Now that we have put fire into the tool-box where it belongs…
When do we take it? What do we do with it?

We'll get to that …

5

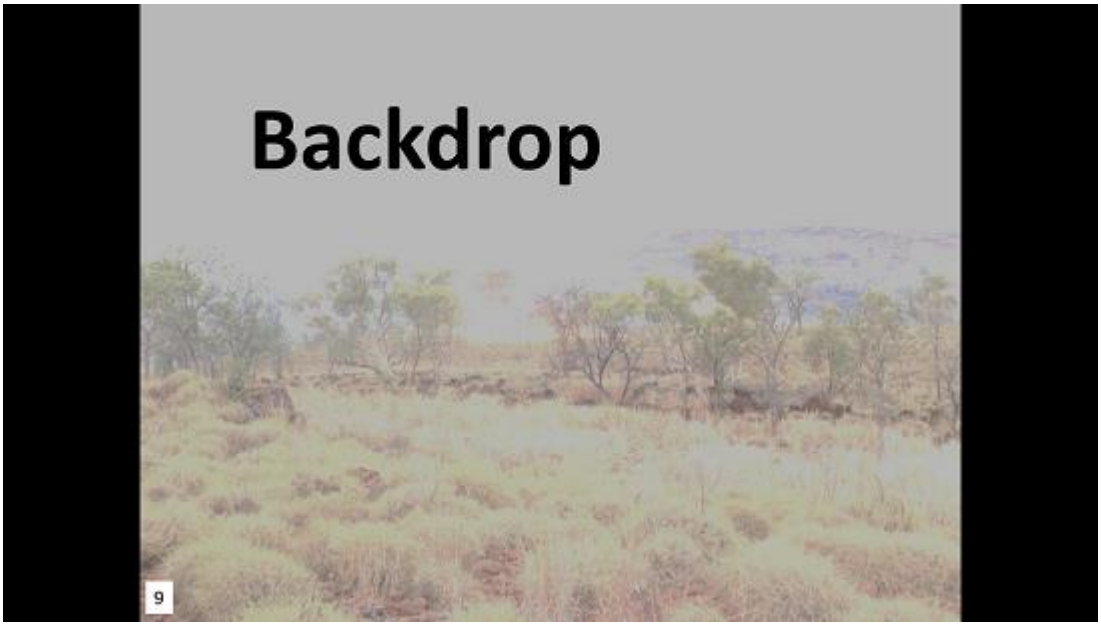
[Three-minute introductory video to Kachana] that we just watched should have summed up who we are.

6

We have a lease in the middle of deteriorating watersheds.
We have the experience and ability to reverse some of the undesirable trends around us.
We are accumulating local knowledge and our learning continues.
Community support for what we do is beginning to show.
We have a new generation chomping at the bit, wanting to get on with the job.

7
Kachana Pastoral Company aims to continue its custodianship of the land under lease.
Growing herds and sound pastoral practices are key.
I am working at handing over the reins, but plan to remain based on Kachana.
(The children know where to bury me.)

8
We'd be naïf to think we have everything under control.

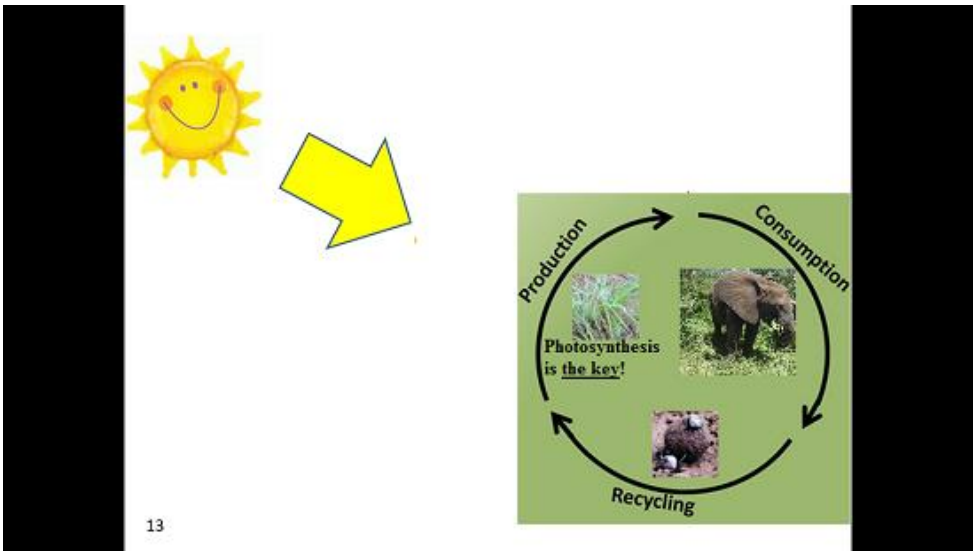


9
Nature is highly dynamic and “change” is a constant.

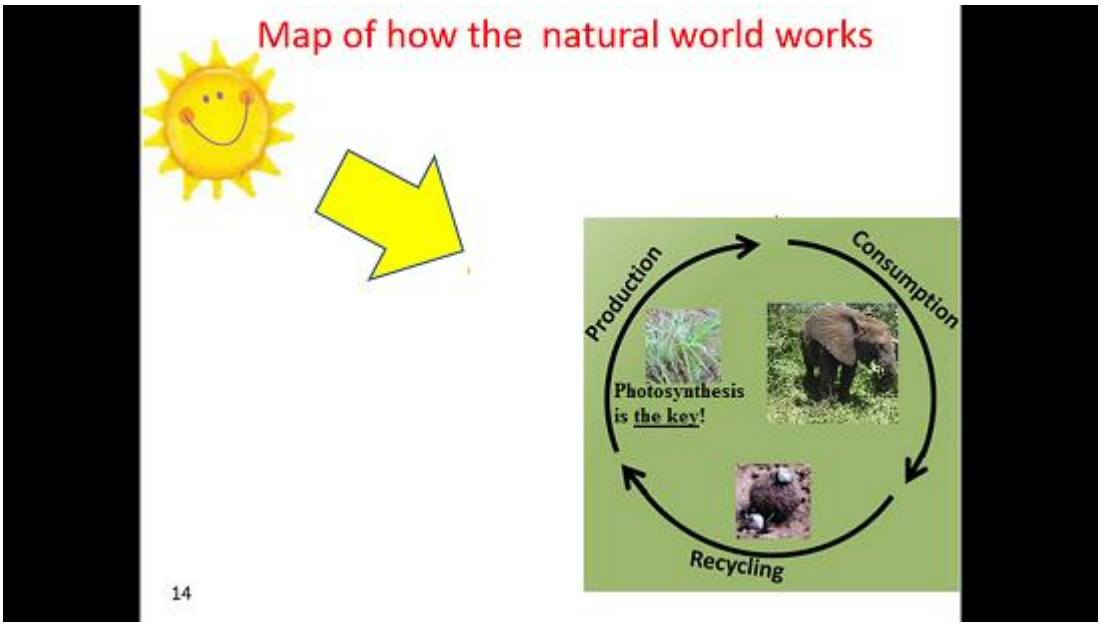
10
There are other constants as well.
For example, processes we can observe in a landscape.

11
Nature runs on sunshine.

12
However, we also need water.



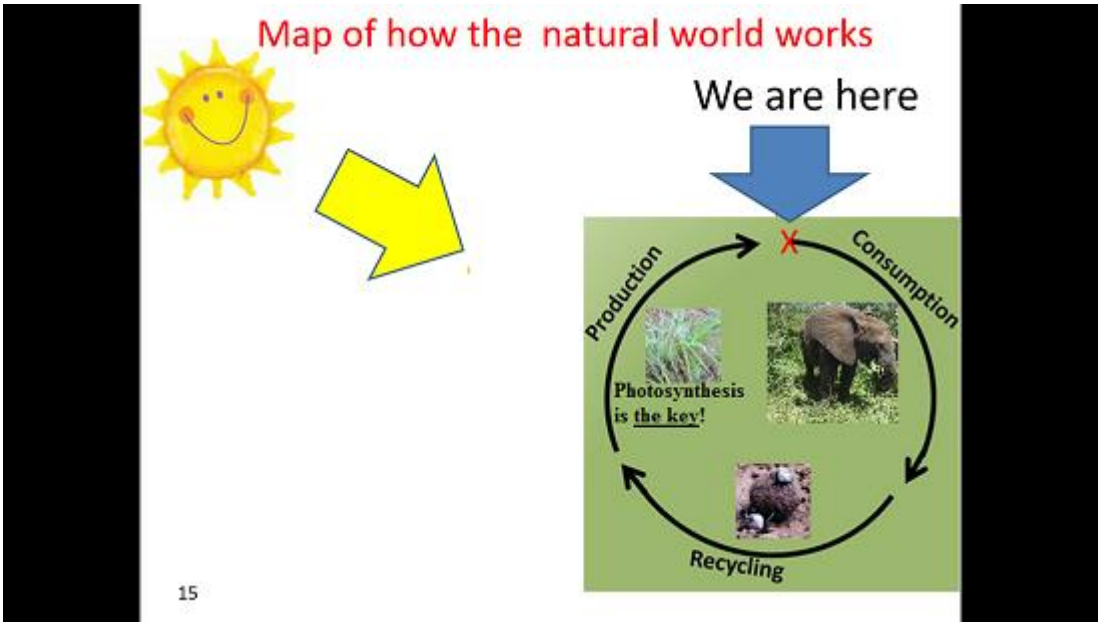
13
This is actually a map.



In functional savannah landscapes we find three teams at work.

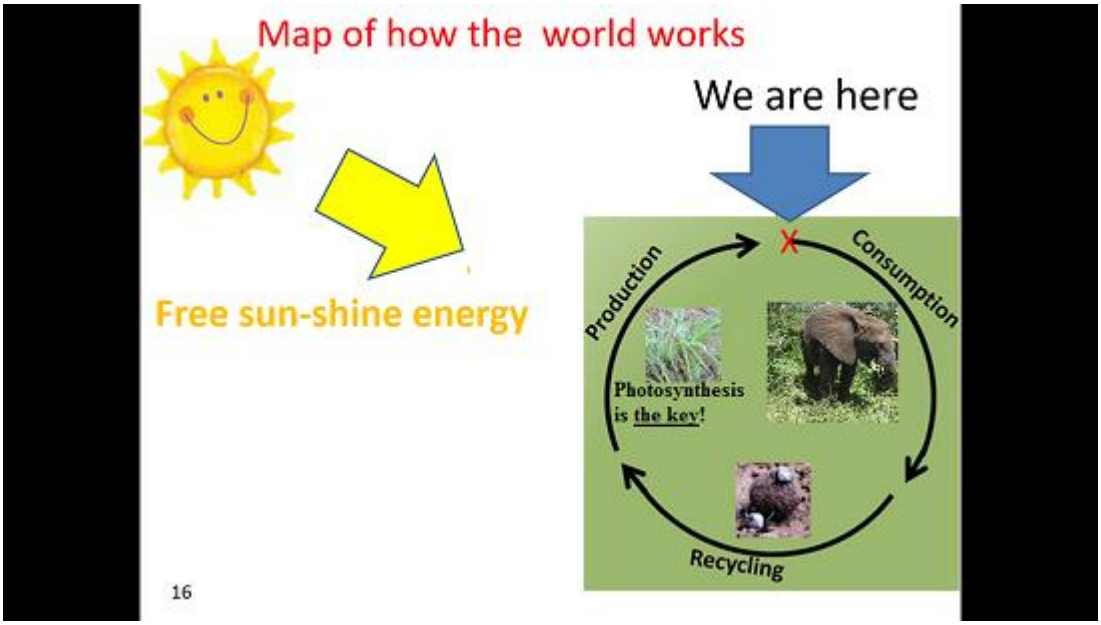
- Producers or sunlight-harvesters (as we like to call them)
- Consumers
- Recyclers

Teams do not compete. They actually play for each other… using sunlight energy to up-cycle water and nutrients.
I've got the elephant in there because it is the largest land-based herbivore left on the planet.
According to scientists nearly all of Australia's large herbivores disappeared soon after humans arrived on this continent.



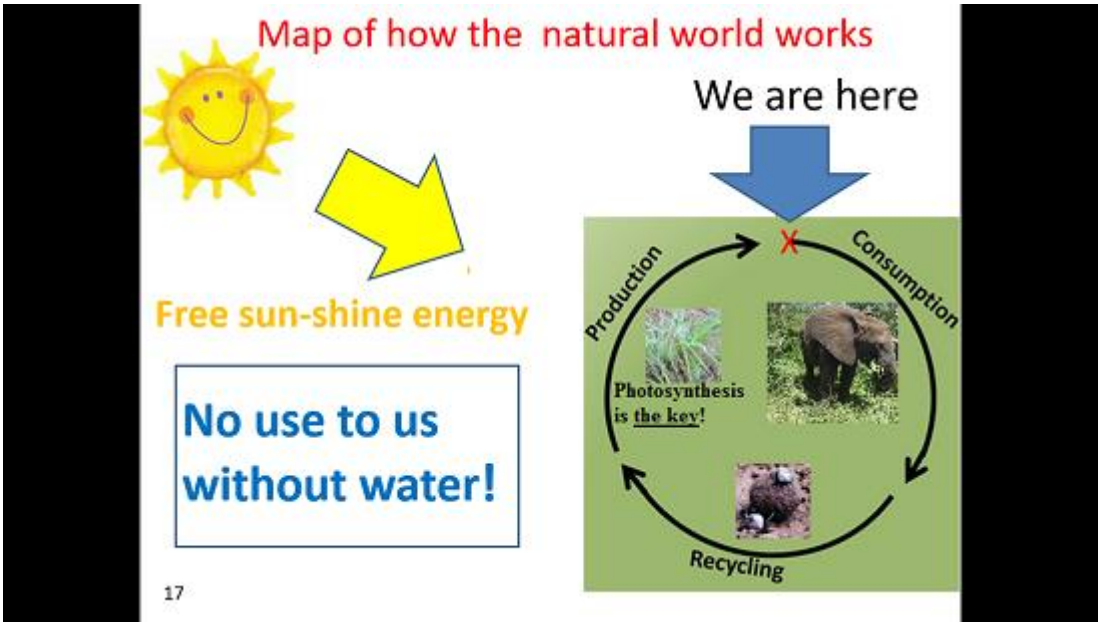
15

There is nothing wrong with consumption. Provided we play by Nature's rules… and the up-cycling continues.



16

Sunshine may be the fuel that runs life on earth…



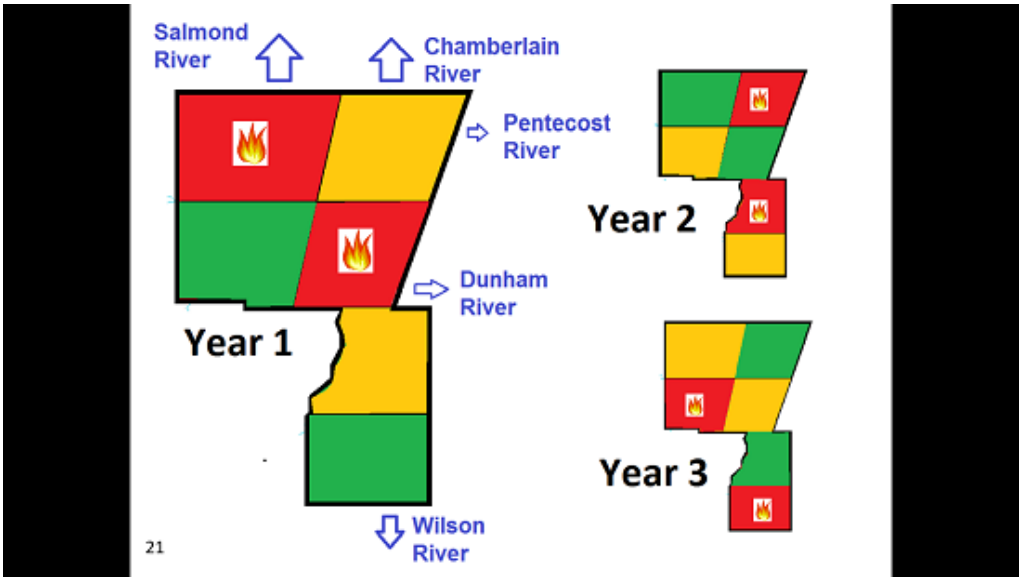
17
However, Water is fast becoming a limiting factor…
…at times even in the Kimberley

18
World-wide we are finding that more grass is a very doable step that leads to more water.

19
Unmanaged fuel-loads tend to be ticking time-bombs.
Hence the need to manage what we grow each year.

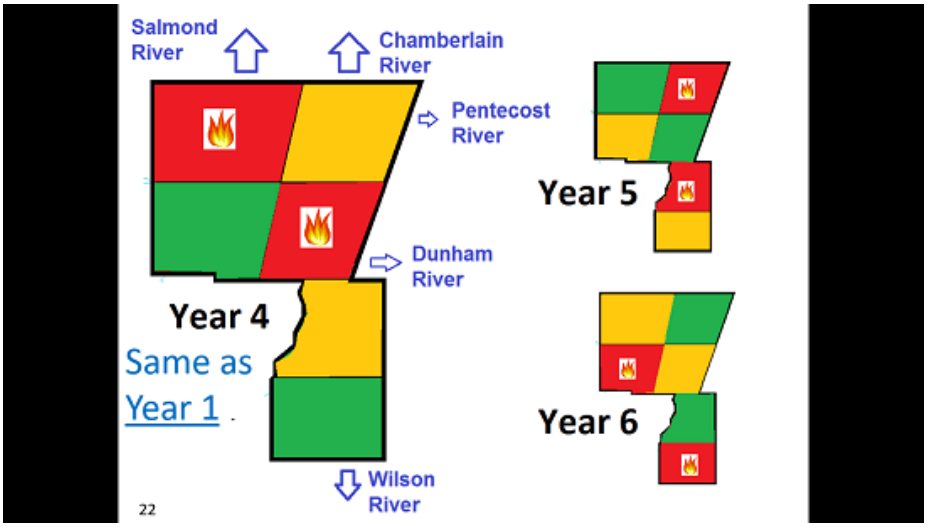
20
Where possible, we use our animals to manage fuel-loads…
Only we do not have enough herbivores to process what grows each season.
Over the last thirty years we have had to contend with a major wild-fire every three years, on average.

In practical terms this means - **if we do not wish to lose 100%** of our litter every three years, we need to burn one third of what grows each season.



21
Here is what a managed three-year cycle could look like.

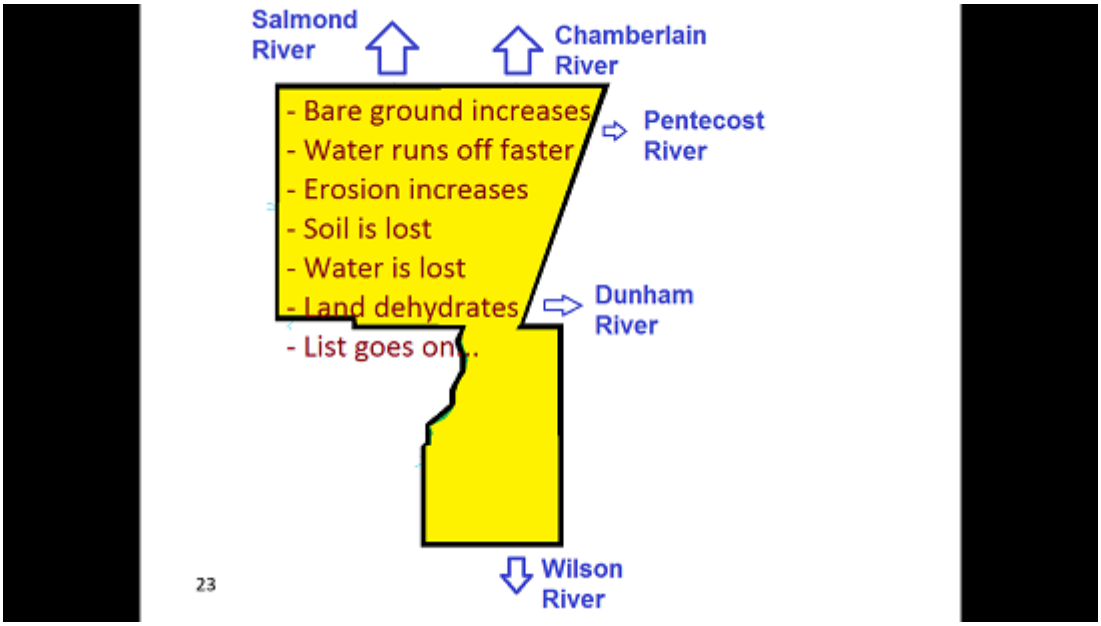
Each year we'd need to reduce the fuel and ground-cover of one third of the property…
The green areas would have had had fire last year;
The red areas get fire this year;
The amber, next year.



22 Year 4 Year 5 Year 6

Year 4 is the same as year 1 and so on…
It looks good in theory… even quite doable… and would make short-term beef-production much easier, safer and cheaper…

But it is hardly advisable…



23

I have been flying over the country since 1985.

We can see the results of this three to five-year fire-cycle in many of our Kimberley Catchments…

24

Here is an example I am monitoring on the ground.

25

25
It is within walking distance of where I’m based.

26

26
It used to be a wetland-sponge.

27
There has never been any mechanical disturbance in the area.
Since at least 2002, we have had 100% stock-control.
The last fire came through here in 2005…

28
… and we are only just beginning to halt the deterioration!

29
If we get fire in here now … even a “cool” burn…
Water is going to run off faster…
… and take loose stuff with it.

30
… soil-erosion and loss of biodiversity will once again accelerate.

31

Bit by bit, season after season, we are losing sponge after sponge in much of the Kimberley.

32

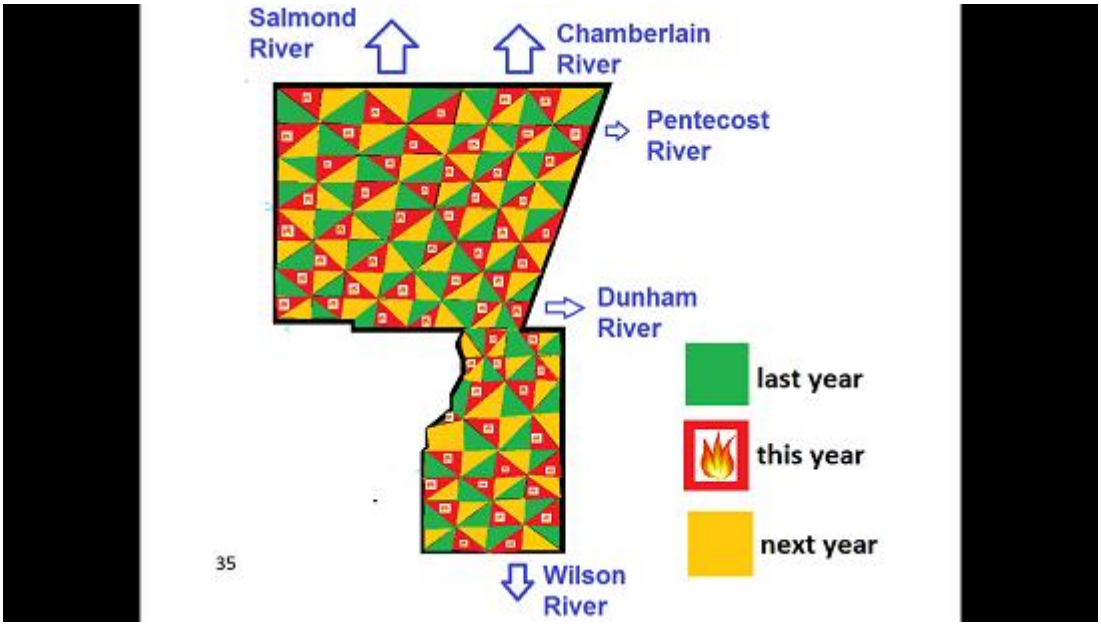
Photos were taken here.

33

33
This is would have been the size of the wetland-sponge 100 years ago… perhaps even only sixty?

34

34
About this much of the sponge has been lost since 1991.



35

I suspect that even if we were to introduce this level of complexity…
… we could not heal our sub-catchments or rebuild our sponges…
If fire were our only tool, the deterioration would continue.

The results would be the same. Only blurred and slowed down because some species would hang in there longer.

36

These processes take place not only in sponges…
In terms of volume, soil remains the Kimberley's greatest net export.

37

Let's go back to our map….

38

Biomass-burning short-circuits savannah economies – This is a FACT.

Another FACT, which is why I am here today, is: **Unmanaged fuel-loads can cause even greater havoc!**

40
Sometimes Nature lets fire out of the tool-box

41
We have experienced five such ignitions.

42
Once daylight had arrived, I was able to find the ignition-site.

43
We're not always this lucky.
Fire has <u>always</u> been an **<u>occasional disturbance in the landscape</u>**.
Lightning, rock-falls, spontaneous combustion, volcanoes, meteorites…
These are about the only ways that I know of nature <u>letting fire loose</u> on us.

44
Then humans came along.
Now fire is a **<u>frequent disturbance in the landscape</u>**.
We light fire right through the wet-season… To cook our meals, to warm our showers,
but also, to create patchiness in senescent vegetation, to create edge-effect, and to begin the next season's fire-breaks…

45

Although we pride ourselves in the use of biology…

46

… to create low-fuel zones…

47

48

… and even fire-breaks…

(The animals did this. There has been no fire here since well before 1988)

49

… We also grow grass.

Which we need to protect ….

50

… for when we need it…

- To feed our animals
- To feed the soil and to slow down and filter water

51
So, yes fire remains part of the deal.
… whether we like it, or not…
... whether we feel comfortable using it, or not…
… whether we are good at using it, or not…
Once fire is out of the tool-box and running, it is advisable to manage it.

52
Our strategy is simple and flexible

- we anticipate wild-fire
- we put in breaks to protect areas where we do not want fire
- We plan and strengthen lines of defence
- We break up uniform age-structure in vegetation

We try not to fight fires. - We extinguish them, we contain them or we let them run their course.

53
Earlier I mentioned that:
World-wide we are finding that more grass is a very doable step that leads to more water.

How is that done?

54
Most of your spellchecks will not recognise these four words.

Yet these four processes determine our future!

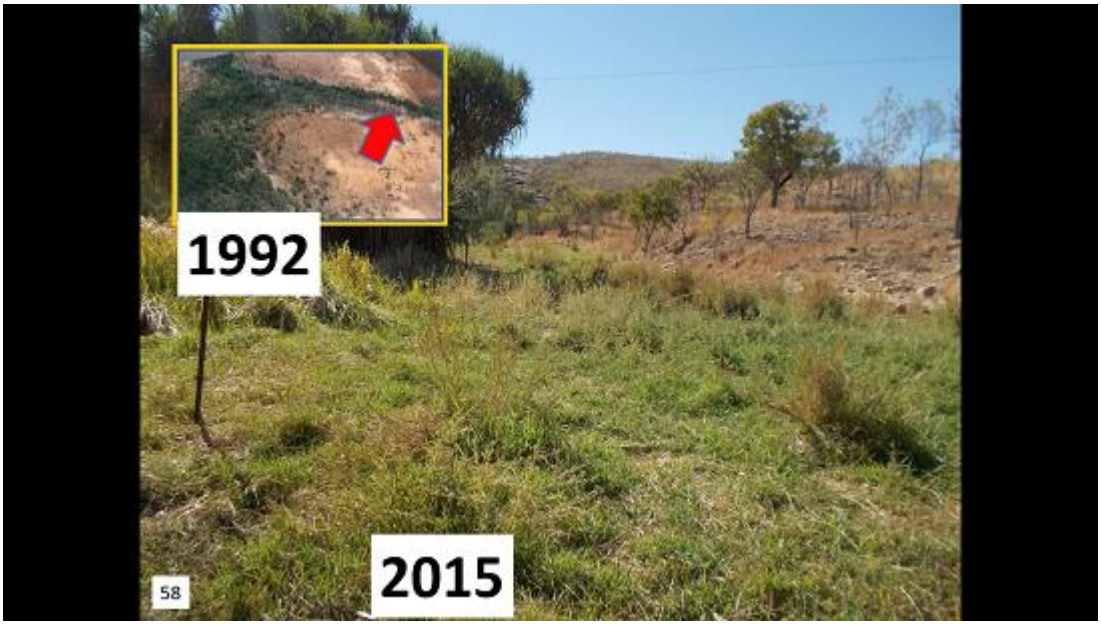
55

It is about planning and then achieving this sort of transformation…

56

… within a workable time-frame.

57
It took us five years to re-establish permanent creek-flow in a watercourse that most years used to stop flowing by about July.
In fact, 300 Metres upstream of here is the take-off for our main water-supply. It feeds a two-inch polly pipe.
The **water** came back because OF THE GRASS
This may seem counter-intuitive, but the water is there because of the grass and not the other way round!

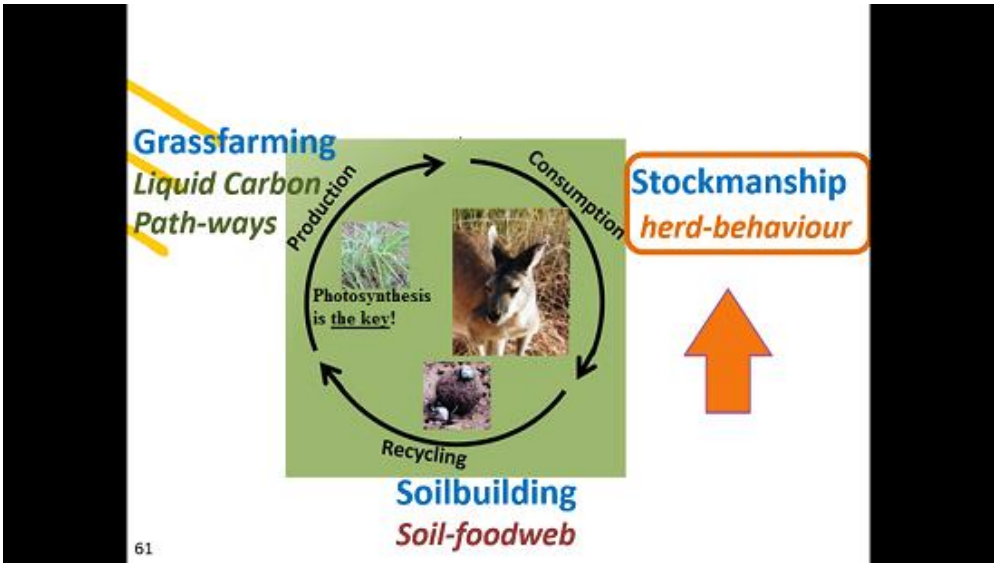


58
…. same place, only from a different angle.

59
This is about as dry as Cockatoo Creek gets these days.

60

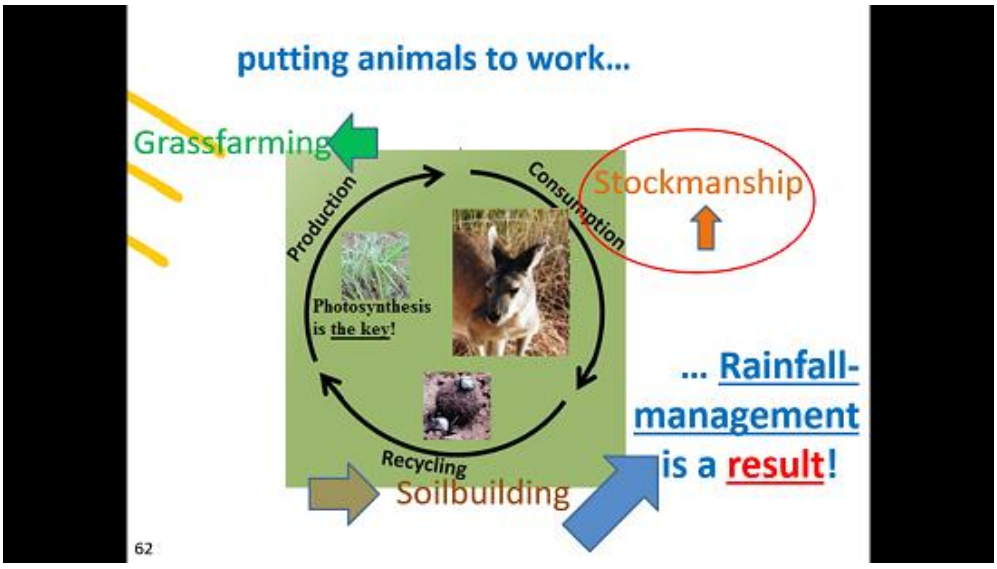
- No silver bullets
- No secrets
- The science is available



61

- ✓ As stockmen we put together and manage herds.
- ✓ Functional herds grow healthy vegetation. (Christine Jones talks about liquid-carbon pathways)
- ✓ Healthy plants feed the organisms that build and manage productive soil. (Elaine Ingham explains very well what should be happening in the world below our feet)
- ✓

Those of us who have read up on micro-biomes, probably relate to this…



62

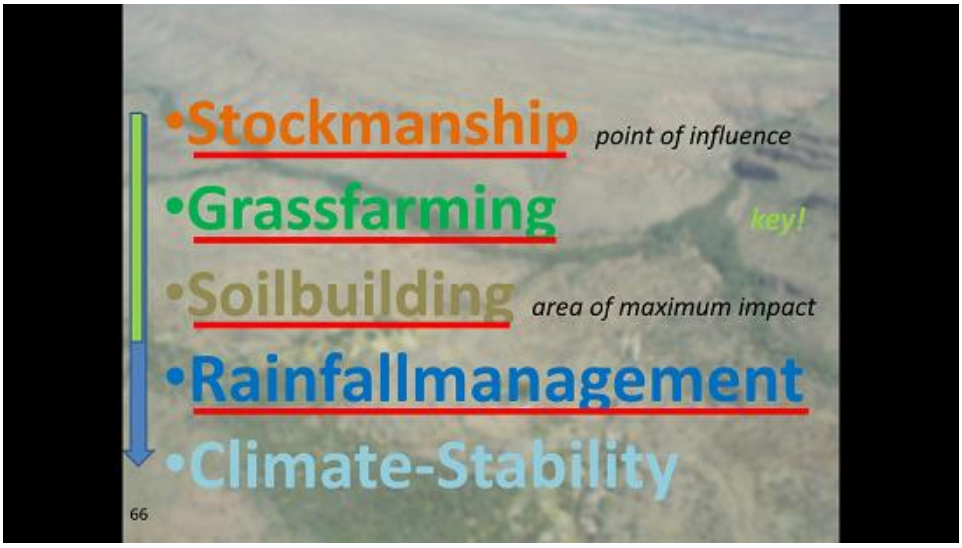
Rainfallmanagement is a result! - It all begins with sound pastoral practices.
We end up hanging on to a **little more** water for a **little longer** each season.
In a cattle enterprise, an increase in the **kilos of beef/ hectare** is the easiest way to measure success.
Water-security and **biodiversity** are also useful indicators.

63
The saying goes: If the only tool you have is a hammer – everything looks like a nail.
We have <u>many</u> tools to choose from to manage our landscapes…
… including <u>Australia's new mega-fauna</u>…

64
As pastoralists we can offer solutions that are in line with how nature works.
Solutions that are family friendly, community friendly, low tech / high skill.
Such solutions promise new knowledge, new skills, new jobs, new industries, **new wealth.**
This gives me hope, for us and for our children in this part of the world.

Let us connect the dots again:

- **Our point of influence is Stockmanship:** managing and influencing **all** herbivore-behaviour
- The Key is **Grassfarming:** a dramatic increase of photosynthetic activity
- The area of maximum impact is **Soilbuilding:** this is associated with building and filling **"carbon-accounts"** in and on our soils
- **Rainfallmanagement** rehydrates our soils, replenishes our ground-water and aquifers, and has other beneficial flow-on effects…
- **Climate** is how we experience the interaction of the 4 simple, but complex processes above



Rainfallmanagement, seen as a process, is a result of how we manage or influence the first three processes.
Rainfallmanagement will also determine our viability, as a region, as a community, as a business.
As already mentioned, 'Climate' too, is also a result.
Again: **Climate** is how we get to experience the interaction of these four processes.
Climate-stability is what we achieve if we rebuild nature's biological processes and buffers.

Back to the paddock…
We can grow vegetation faster than we can grow the animals that process it.
More grass leads to more water soaking in each season.
More grass also leads to greater risk.

We know the tap will shut off each year (usually sometime between March and July).
So, we prepare.
Late during the wet season, it is safe to put in lines of defence from which we can later back-burn, should the need arise.

We like do that before we begin dropping incendiaries from aircraft.
This is where we left our tools the day before.
In 2010 my brother put the first ‘blower’ into our tool-box!

Time to light up.
Normally I’d have somebody along to assist, but my off-sider needed to go fishing at Timber Creek.
Now I am on my own for a few days.

Ideally, we work in pairs.

When things get hot, I like to have teams of four.
Four is a good number. (Easy to relocate with only two hops in an R-44 helicopter.)
No. One: with the blower, working the edge and blowing ash, heat and glowing cinders back into the burnt area; all the while playing havoc with the air:fuel ratio of the flames
No. Two: close behind with the mister... Making sure that nothing re-ignites and that No. One does not get too hot.
No. Three: patrolling for anything still smouldering, close to the edge, and dealing with potential flare-ups;
No. Four: providing back-up or a spell as needed

In this case I lit up along the gully.
I then go back with my fire-stick and close any gaps in the front.
Where possible, we are after straight lines. (This makes patrolling easier and gives us something to work off the next year.)

74
It is starting to get warm now.
My window for being effective is closing.
Once the strip is wide enough, I extinguish the burning edges with the blower.
The mister is there just in case things go wrong.

Patrol…

This sort of thing can bite us in the butt, even at this time of year.

Easily fixed with the blower

Job done.

Tidy up and one final patrol.

Sometimes everything looks good
And then we get a run like the last three seasons… followed by lightning and too little rain…

There was not even that much fuel!

Those who had to contend with the Ellenbrae Fire would know exactly what I'm talking about.

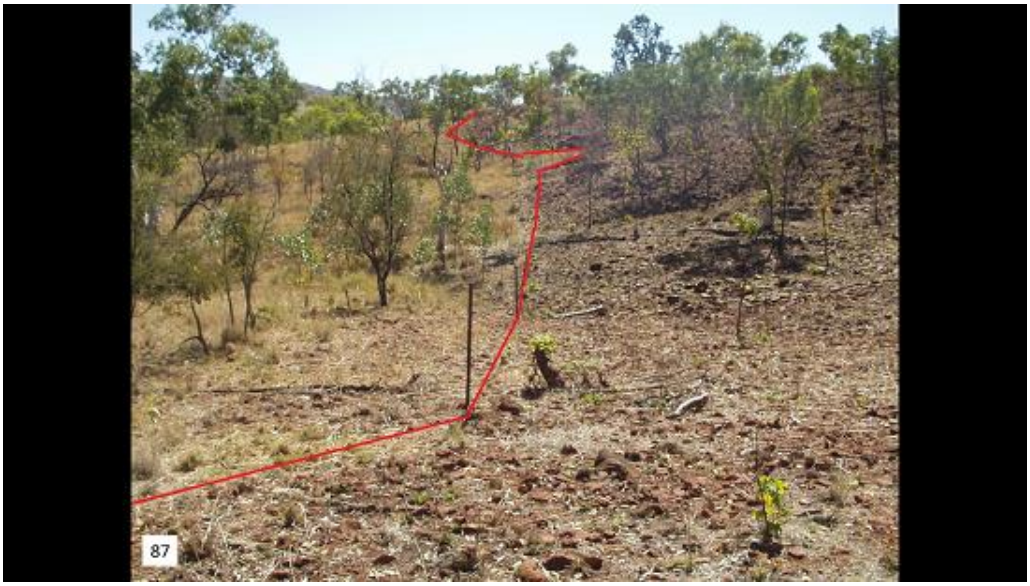
When we do have to respond…
During daylight hours I want that eye in the sky up there at least once an hour to make sure we are acting on current information and being as effective as possible.
It's very important to have a chopper-pilot who thinks as part of the team.

We have a clear chain of command.
The instructions are basic:
One Personal safety first and keep an eye on your mate. Always have a safe avenue of retreat. Keep hydrated.
Two The chopper pilot is responsible for safety of the chopper - not yours, unless he is telling you to get on-board.
Three Use good sense and get the job done.

- Get everybody who is not on patrol, back to base by 09:00
- Take stock; de-brief; check all equipment; rest…
- Monitor & plan, but do not commit to an evening action-plan before 03 p.m. (wait for the sun to lose its sting)
- The chopper-pilot is in command of timing extractions.
- All those to be extracted need to know when “last light” is, and where their pick-up point is.

The take-home message for today is threefold:

1. Fire is one of many tools we can use when we manage landscapes
2. Unmanaged human-lit fires are mostly bad news… (little different to a hoon taking control of a dozer in a building-site)
3. With the coordinated and skilled use of tools available we can produce more desirable trends in our landscapes



Here is an example where we blended three tools: Biology, Technology and Fire

1. We used Biology on the left. We treated this area twice with planned animal impact.
2. The Technology is represented by the line of pickets we use to run hot-tape when the cattle are in the area.
3. The Fire we lit at noon on top of the ridge to the right. (It was January and we'd had a little rain the night before.)

By the time we came back at four o'clock in the eventing the fire had crept down the hill, reached the line of pickets, and gone out of its own accord.

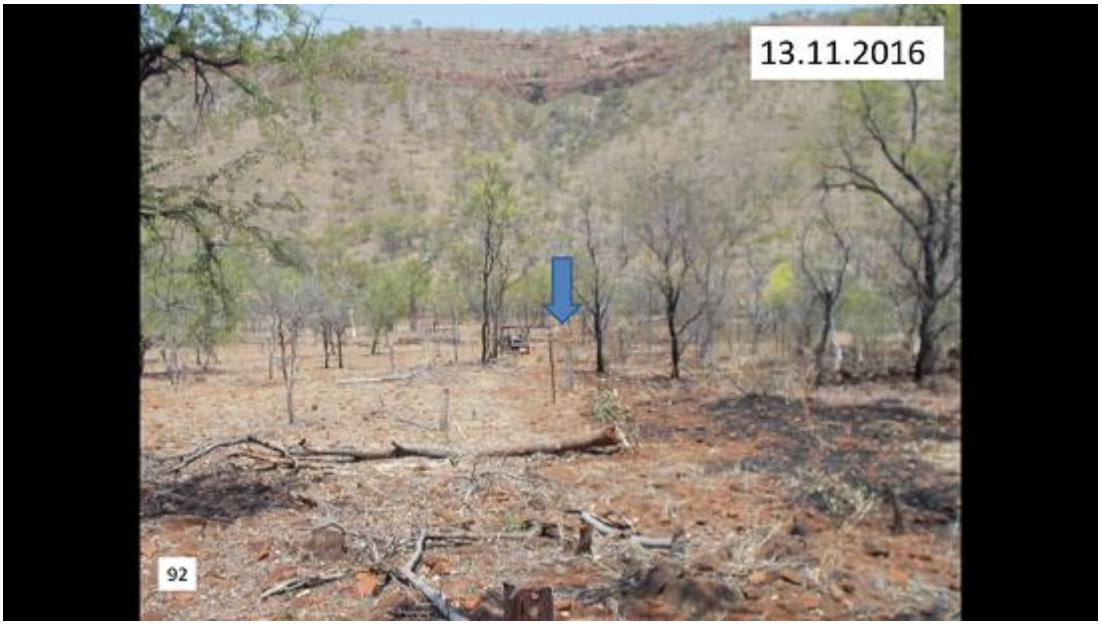
Because the area had been treated with animal-impact the vegetation below the picket-line was healthier and transpiring; any litter was tightly pressed to the ground retaining moisture from last night's rain. - The fire did not want to burn any further.

Another example of putting Biology to use: Again using Australia's new Mega-Fauna …

A working herd…

I've marked the stump so we know where we are

We created a low-fuel zone that could serve as a line of defence.



Three months later, lightning struck and we were glad we had it…

This is what it looks like now, after 1600mm of rainfall in the last few months…

There is our stump

In the formerly treated area, grass is seeding and haying off. Plant-spacing is tightening and we have reasonable ground-cover.

Where the fire was, the grass is still maturing and we observe that plant-spacing is sparse and the ground-cover is poor.

None of us have all the answers, but I'm sure we could all agree on one point…

We all want: Shorter hot dry-spells, less flooding, less wild-fire…
We all stand to benefit from: Improving biodiversity, higher productivity and water-security…
Many of us are working towards this goal at literally the grass-roots level.
But we need community understanding and support.
The work that Toby, Rhyse & others and their respective teams, are doing to help people re-establish relationships to the land is absolutely critical.
Our success as a region hinges on communication and the building of trust – the rest we can learn as we go...

I wish to thank especially Kim Maldon (who sadly is no longer with us) for his efforts in promoting constructive communication.
Communication between FESA and people in the field, communication across geographical, social and departmental boundaries.

I thank the DFES team for doing their best to keep this up.

These past four years, it has been refreshing to work with department-people who focus on achieving results despite the tyranny of distance, bureaucratic hurdles and sometimes dubious regulation.

102

The above was derived from a key-note presentation at the Fire Forum, hosted by the Department of Fire and Emergency Services (DFES), Broome Western Australia, March 2017.

The original presentation was delivered in 25 minutes, followed by 35 minutes of questions and discussion.
In order to encourage a lively exchange of ideas, no recordings took place at the time.