

# Fighting back from flood and fire

SARAH JOHNSON

**In the past 12 months the forces of nature have conspired against the Zwar family, with fire and flood destroying their most prized farming possession: stubble cover. But they are fighting back, and are well on their way to re-establishing full soil cover as quickly as possible.**

Permanent soil cover is the lifeblood of the Zwar family's Wirrabara-based farming operation. Conservation farmers since the mid-1980s, they haven't burnt or tilled their land for at least two decades, retaining all their stubble to preserve moisture, feed the soil organisms and produce the nutrients required to sustain their crops.

Yet in just half an hour, the cover across their entire farm was turned to ash by a bushfire that swept through the Southern Flinders Ranges at the start of this year.

The Bangor fire was started by a lightning strike in the ranges on Tuesday, January 14, and for several days burnt slowly in a southerly direction.

Don Zwar, together with neighbours, took early preventative action, building fire breaks in the family's back paddock, adjacent to Wirrabara Forest.

On Friday, January 17, a wind change pushed the fire into the forest only a few kilometres from the Zwar property and Don's son Russell decided to return home early from a family holiday.

Russell, his wife Davina and their two sons, arrived home and unpacked the car at midday that day. A few hours later they were repacking the car to evacuate ahead of the fire.

At 7 o'clock another wind change meant the Zwar farm was directly in the fire's path. "It was a much stronger wind change than any of us were expecting," recalls Russell Zwar. "It was so strong it blew the hat off your head."

"And it happened so fast. The fire in the forest turned into a firestorm and within half an hour all of our 1,300ha between Wirrabara and Murray Town was burnt."

"I'm not sure how to put it into words. I never thought I'd become emotional because my paddocks had been burnt, but it brought a tear to my eye. The emphasis for us has always been to have 100% cover 100% of the time. It's something that I'm really passionate about. But it was all gone."



DISASTER LOOMING. THE FIRE ELIMINATED ALL THE SURFACE COVER, INCLUDING THIS WHEAT STUBBLE, ON THE ZWARS' 1,300HA WITHIN HALF AN HOUR.

The fire razed the paddocks around Don and his wife Annette's home, but thanks to two CFS trucks, several farm fire vehicles and a cleared yard, the home and farm assets were untouched. However, there wasn't time to get to Russell's property, two kilometres further north, ahead of the fire.

**I guess we'd never had a place so bare. It just reinforces how valuable stubble is for holding moisture.**

"I was stuck at Dad's place because everything happened so fast," said Russell, "so when the fire went through my place there was no one there." He struggled to describe the feelings he experienced as he followed the fire back to his property.

"It was pretty hard to find my way home. The smoke, ash and dust in the air from the wind turned day into night. For periods of time I couldn't see past the bonnet of the ute. It was eerie; everywhere I looked it was just black and burnt."

When Russell reached his property two hay sheds were on fire, with another shed on an adjoining block also alight. Fortunately, like his parent's home, Russell and Davina's house was unaffected. The fire destroyed the three sheds, 1,000 tonnes of hay, a tractor, tubulator grain conveyor and a mother bin. It also damaged 70km of fencing. "It turns out our insurance was fairly adequate, except for our fencing," said Russell. "We always knew we were under-insured with our fencing but we never expected to lose all of our fences."

The Zwars have since removed 30km of fencing and replaced 15km, prioritising fencing around 120ha of grazing country and adjacent to roads. It's an ongoing effort, with some shared boundaries yet to be fixed or replaced.

The Bangor fire continued for a month, burning more than 35,000ha with a perimeter of 195km. Five houses, six sheds and more than 700 head of livestock were destroyed, but there were no serious human injuries. The CFS announced the fire's containment on Thursday, February 13.



RUSSELL AND DAVINA ZWAR WITH SONS PATRICK AND HENRY.

The Zwar family has barely rested since their paddocks were incinerated on January 17, spending two weeks dealing with the aftermath, including putting out fires in trees along their creek line and, when the fire threatened farms and houses near Laura, spending several days fire-fighting and protecting properties there. Back at home they were confronted with the emotional aftershock of their situation, handling insurance matters and working out where to start to get their farm back on track.

"We felt so vulnerable after the fire had gone through. The place was so bare. I've never seen anything like it," said Russell. "We'd spent decades working with a system of full ground cover, so I was praying that we didn't get a big rain."

But the rain came – on Friday, February 14, with 85mm falling in a matter of hours.

"The water was running off like I'd never seen before," said Russell.

"I was freaking out. Our farm is quite hilly and wherever you looked there were sheets of water running off everywhere. We'd spent so much time filling in washouts and metre-deep gutters created during rain events in the 1950s and '60s and I had visions of severe erosion and all of those areas washing out again."

When the clouds cleared Russell was relieved to find little damage, with the soil structure developed by their no-till, stubble retention system holding firm. "The washouts were minimal and there were definitely no big gutters like I was imagining," he said. "We had a good season last year and as a result the root systems were strong. In the gullies you could see where the stumps of the stubble and the root matter in the soil had become slightly exposed. I think that was the key to holding the soil together."

The biggest casualty of the flooding was the ash from the stubble burnt in the fire. "We lost a lot of nutrients, especially nitrogen, when the stubble burnt, but potassium remains in the ash. We were hoping to hold onto whatever we could but it all got washed away with the rain."

"The farm changed colour a lot in the period after the fire. It was so black in the days immediately after the fire then the rain turned it into a bare brown colour. There was more water running down our

creeks than Dad or I had ever seen and it was just black sludge."

The rain also washed away what Russell describes as the crumb structure on top of the soil, which is usually protected by the stubble. "It's the worm castings and the decomposition of the residue over the years. It's probably the most nutrient-rich stuff."

The Zwars had little time for self-pity, occupied with a significant clean-up job, fence repairs and replacement as well as preparing for the coming season. "It was a big effort to get everything done after the fire and then get everything ready for seeding to make sure we were on time."

Hot, windy days were particularly upsetting. "I never ever wanted to see dust blowing off the paddocks at our place, but when we had horrible days after the stubble was burnt some paddocks were blowing dust. It hurts to see but we had to get used to it. It was just how it was," said Russell.

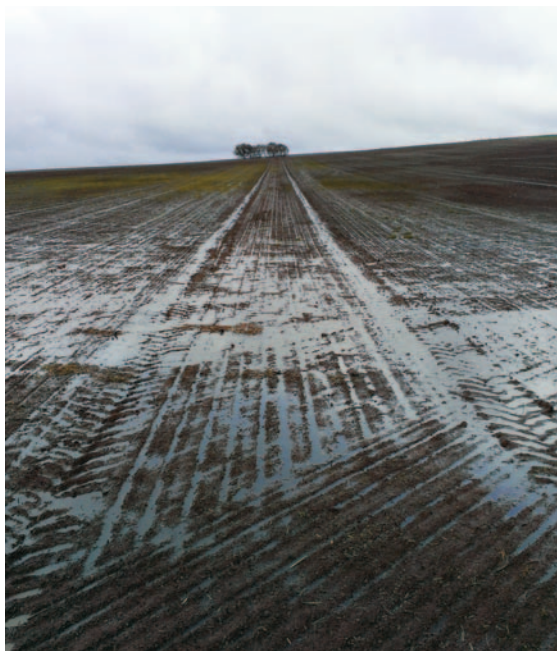
Getting cover back on their paddocks was a top priority and a good opening rain in April provided an opportunity to plant 120ha of Wedgetail, a winter wheat variety on their hillier country following a 65mm rainfall event on April 10.

Russell had been considering this option before the fire and had grown Wedgetail wheat for seed the previous year. "I knew that the topsoil wasn't going to hold the moisture like it used to, so if we got any moisture we had to make the most of it before it dried out," he said.



FROM GOLD TO BLACK. THE ZWARS HAVE ALWAYS AIMED FOR 100% COVER BUT IT WAS ALL GONE IN MINUTES.





SURFACE WATER LIKE THIS (ABOVE) IN APRIL WOULD NORMALLY MEAN ENOUGH MOISTURE FOR THE ZWARS TO SOW ALL THEIR CROPS, BUT WITH NO SURFACE COVER LEFT AFTER THE FIRE, THE TOPSOIL WAS DRY BY APRIL. WATER, WATER EVERYWHERE (RIGHT), BUT DESPITE THE AMOUNT OF RUNOFF THERE WAS MINIMAL SOIL LOSS BECAUSE OF THE GOOD SOIL STRUCTURE DEVELOPED OVER YEARS OF NO-TILL AND THE STRONG ROOT SYSTEMS FROM LAST YEAR'S CROPS.

"It's worked out really well because we'd had some big rain events by mid-May and a lot of our hilly country was too wet to get on. If we hadn't sown it in mid-April we wouldn't have put normal spring wheat varieties there until mid-May, which would have prevented us from getting cover on for longer."

By mid May the Zwars had received 250mm of rain, almost half their yearly average, paving the way for a promising

start to their cropping program that generally includes wheat, canola, faba beans and oaten hay.

Losing cover to the fire meant changing their seeding plans, with the area of faba beans reduced by 40% from their original program. They had planned to plant beans, which prefer heavy residue, into heavy wheat stubble on some hilly country but with the stubble cover gone, decided to grow barley because of its ability to cover

the soil surface quickly.

"Faba beans seem to love growing in cereal residue," said Russell. "The more residue you grow them in, the more reliable and robust they are. It seems to suppress any disease."

The Zwars also increased their area of canola and sowed it deeper to compensate for poor moisture retention.

"The biggest difference we noticed this year was the lost moisture," said Russell. "When we started seeding in April we couldn't believe how dry it was. Normally 65mm of rain with full stubble cover would be enough for us to complete our whole seeding program, but without the stubble we were looking for rain again just 10 days later."

"The top 25mm of soil was dry when we sowed the canola, so we went a bit deeper to get to the moisture. Only 5km away at Murraytown, just over the next hill where the fire didn't reach, farmers had mud sticking to their press wheels."

"I guess we'd never had a place so bare. It just reinforces how valuable stubble is for holding moisture."

Ironically, a week after seeding their canola crop they received another 75mm of rain. "We wished we hadn't sown it so deep,

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but it's coming up all right," said Russell. "It's just Murphy's law.

"The rainfall events have been challenging, but to receive a really good mid-April rain and have the crops in by the 19th of May; we really couldn't have asked for better. And our grazing country is looking fantastic. I was concerned that the fire had burnt a lot of the seed that was on top of the ground but it has really come back well, although it's not ready for stock yet."

The Zwars, who keep their cropping and livestock operations separate, decided to sell their first-cross ewes following the fire. Don and Russell are both indifferent to sheep and were not prepared to hand-feed their stock during seeding. With the speedy recovery of their grazing country, they now face the choice between re-stocking or leasing their land to another farmer looking for grazing.

"The farmers who run sheep were probably more affected by the fire than those who crop," said Russell. "I've got one neighbour who has a significant amount of grazing country and it was all burnt. We've sold our one mob of sheep but he's got thousands of head. He's had to find agistment for them, then bring them home and now he's feed-lotting them. Fortunately, his grazing country looks really good. In another year it might not have rained by mid-May."

Losing their prized ground cover was devastating for the Zwars, but Russell concedes there was a flipside to the natural disaster. The fire eliminated several pests that were thriving in the heavy residue and eliminated any issues with hair-pinning; something they had been wrestling with since changing to a John Deere 1890 disc seeder in 2009.

"The fire burnt a lot of the snails and removed the slug pressure, which has been a problem when establishing canola in heavy residue," said Russell. "We have had a lot of trouble with Portuguese millipedes the past few years and it's significantly reduced millipede numbers too.

"We haven't had many of the problems we usually have to deal with, so the fire has given us a year off worrying about those issues, but I still wouldn't want to be without stubble if I had a choice."

The impact of the fires on the Zwar's soil structure and long-term soil health are too difficult to predict, according to Russell, but he is buoyed by its current condition, which includes lots of worm activity and robust root systems. He has also gained confidence from Gabe Brown,



THE LONG-TERM IMPACT OF LOSING SURFACE RESIDUE IS NOT YET CLEAR, BUT SHORT-TERM EFFECTS OF THE FIRE MEAN THIS SEASON'S CROPS ARE NOT FACING SOME OF THE PEST ISSUES THAT HAD BEEN BUILDING UP IN RECENT SEASONS.



RUSSELL SOWED WEDGETAIL, A LONG-SEASON WINTER WHEAT, IN APRIL TO MAKE USE OF EARLY MOISTURE AND GET COVER BACK ON SOME OF THEIR HILLY COUNTRY AS SOON AS POSSIBLE.

a conservation farmer in the US who presented a keynote speech at SANTFA's conference two years ago. Russell emailed Gabe, who visited the Zwar's farm in 2012, to tell him about the fire.

"He thinks our system will recover very rapidly when we get some cover on because we've spent so many years building up the soil health.

"Whether we see any nutrient deficiencies down the track from the lack of stubble cycling for a year remains unknown. I'll be a lot more comfortable if we have a reasonable season this year, but we have lost multiple seasons of residue and we're not going to have that again for a while."

The fire has set back the Zwars' development of a controlled traffic farming system (CTF) on their property. Problems with erosion from water running along wheel ruts prompted them to hire a tram line (wheel track) renovator last year but

the flood washed some of the renovated wheel tracks out again and, with no time to repair them since, 'it feels like we're back to square one'.

Russell has also had to postpone his plans to experiment with different stubble management treatments.

In less than an hour the Bangor fire upturned the Zwar's farming life, eliminating the organic matter that is the linchpin of their cropping system. But what they have observed, and experienced, in the wake of the fire has hardened the family's resolve to farm with cover.

"Losing the cover made us realise what we had. It reinforced what we were doing and makes me more determined to get back on track," said Russell.

"It will grow back and it's given us the opportunity to rebuild and potentially make things better."

