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CROPPING AND WETLANDS IN SOUTH-WEST VICTORIA

Exploring opportunities for cropping and wetland protection to co-exist on private land

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CROPPING AND WETLANDS IN SOUTH-WEST VICTORIA: EXPLORING OPPORTUNITIES FOR CROPPING AND WETLAND PROTECTION TO CO-EXIST ON PRIVATE LAND

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EXECUTIVE SUMMARY

The aim of this study was to capture the opinions and experiences of a sample of farmers in south-west Victoria to explore how wetland protection can co-exist with cropping practices on private land. These insights can then be used by the Glenelg Hopkins Catchment Management Authority and the Beyond Bolac Catchment Action Group to design pilot programs to improve their engagement with local farmers on wetland protection.

Based on the insights collated from a series of interviews with farmers, we observed a number of tensions related to cropping co-existing with wetland protection. These included the need for greater clarity around defining what a wetland is, why they should be protected, alternating opinions around whether wetlands are an asset or a liability, and weighing up of different drivers and barriers when it comes to the decision to crop (or drain) wetlands. We also explored the merits of the cropping practice of using GPS coordinates to program machinery to avoid wetlands, influential information sources, and the future of cropping in the district. Finally, we asked what approaches or strategies would need to be established to promote wetland protection co-existing with cropping. In addition to addressing the question of what needs to be protected, why and how, other areas included dealing with the distrust between farmers and non-farmer groups, and the need for financial incentives to support farmers to segregate, protect, manage and somehow make money from these wetlands or not being financially penalised for them existing on their private land.

A workshop with key project stakeholders was also conducted to explore how the insights from the interviews could be translated into pilot engagement programs. Outcomes from the workshop revealed the importance of a locally-relevant definition of a wetland, the development of a draft list of self-administered questions that farmers can apply when unsure about the presence of seasonal wetlands, different ways wetland protection can be framed in a more persuasive way (beyond altruistic motivations), the importance of enlisting credible and trusted local community leaders, and how a prospective incentive program could prompt practice changes in the present. Based on the insights gathered from the interviews and final workshop, we believe the proposed wetland protection strategies raised in this report are intricately entwined and cannot, for the most part, be separated from one another. Ignoring any one of these strategies will compromise the effectiveness of any pilot program that aims to support wetland protection and cropping co-existing on private land.

The interviews and workshop provided some tangible foundations for how future farmer engagement efforts might proceed for the GHCMA and BBCAG. These are presented below:

Intervention category	Examples of future farmer engagement efforts
Education	• Define and/or provide clarity in relation to what is a wetland • Develop a list of self-administered questions that farmers can apply proactively to identify sensitive wetland areas for their cropping machinery to avoid. Depending on the answers, farmers will be prompted to seek clarification on potential wetland areas
Training	• Skill development through whole farm planning, “paddock walk” demonstrations from other farmers
Persuasion	• Messages around wetlands as “assets” (e.g., grazing, run-off management, drought proofing, biodiversity protection, integrated pest management, savings from not wasting inputs on non-profitable cropping attempts) • Messages around advantages of using GPS coordinates to promote autosteer (e.g., accuracy, preventing driver fatigue – but needs to counter, if possible, the inefficiency arguments of interviewees) • Messages that display an understanding of farmers’ fears and economic pressures • Messages focused on “anticipated regret” that leverage existing concerns related to cropping’s future in the district, and potentially losing a future income stream if wetlands later become part of an incentive program.

Incentives	• Rate relief or concessions (where wetlands are treated differently in council rates) • Different approaches to land valuations (where wetlands are treated differently by financial institutions) • Offsets/compensation where farmers can essentially make money from wetland protection
Social norms	• Enlist trusted local community leaders as credible messengers (to address the current breakdown in trust between farmers and external groups) • Other farmers (paddock walks) • Create leverage from other relevant farm community events (e.g., "machine-offs") • Extending the role and influence of agronomists
Enablement	• Coordinate engagement efforts with greater "bandwidth moments". That is, when farmers are open to or are looking for new information. • Possible examples could include a change in ownership, a whole farm planning exercise, the introduction of a new government policy or program, a change in market conditions, the end of (or just before) the peak growing season.

It is clear from this table that just relying on one approach will not address the challenge of wetland protection co-existing with cropping. It requires an integrated program that recognises the need to develop approaches that influence both the willingness and ability dimensions of farmer decision-making. These approaches can also be supplemented by insights from the behavioural sciences that recognise some of the unconscious influences that impact on farmer decision-making (which are typically not elicited during an interview). These insights include evidence-based considerations related to personalising messages, harnessing the influence of social norms and loss aversion, designing more compelling incentives, and taking account of the limited cognitive bandwidth that farmers are regularly confronted with.

While laws exist to protect wetlands on private land, in the absence of significant enforcement resources and/or a shared understanding and mandate (among farmers, the community and government) that recognises the mutual value that wetlands can offer, legislation alone will be ineffective. While the farmers we interviewed were typically proud multi-generational custodians of the land who see themselves as delivering a range of economic, social and environmental values to the district, perhaps more than ever before they are under tight margins and significant economic pressures to get a return on investment from their cropping activities within their rights as private land owners. The insights detailed in this report, along with some complementary insights from the behavioural sciences, identify potential pathways to design interventions and pilot programs to improve farmer engagement so that wetland protection can co-exist with cropping on private land.

BACKGROUND

The Glenelg Hopkins Catchment Management Authority (GHCMA) and the Beyond Bolac Catchment Action Group (BBCAG) work with local landholders and groups who use land and water resources in the south west of Victoria. Their aim is to support activities and programs to improve landscape health that deliver a range of social, economic and environmental outcomes for the region.

GHCMA and BBCAG also recognise that a range of factors influence the decisions farmers make about how to best manage their land and water resources. Swamps (or seasonal wetlands) represent one of these resources. The south west region of Victoria contains more than 5,400 wetlands, covering 73,000ha of the catchment. This represents approximately 44% of Victoria's total wetlands[1].

With the drying climate, cropping has moved south into the region, posing risks to the swamps. While the GHCMA and BBCAG have conducted landholder extension programs and community engagement events to assist in managing and protecting the swamps, these have only reached 10-20% of the region's landholders. GHCMA and BBCAG would therefore like to better understand a broader cross-section of opinions, practices, and experiences of farmers in relation to how the protection of swamps can co-exist with cropping practices on private land. Without a more complete knowledge, there is a risk that relationships, resources and approaches are developed that are irrelevant to the daily decision-making processes of a broader cross-section of farmers and ignore the practicalities of implementation.

To assist with this task, GHCMA and BBCAG have engaged Monash University to conduct a project that is guided by the following objectives:

1. Explore different understandings and current farm practices in relation to cropping and wetlands in the south west region of Victoria
2. Identify influential drivers and barriers that impact on farmers' adoption of specific practices to protect wetlands
3. Recommend potential engagement strategies to GHMCA/BBCAG based on a more in-depth understanding of the opinions of farmers when it comes to protecting wetlands.

To achieve these objectives, the project involves three phases of work. Phase 1 involved a workshop (and follow-up discussions) with key stakeholders to identify and prioritise farm practices to assist in the protection of wetlands. Phase 2 involved a series of interviews with a cross-section of farmers to explore the different influences that impact on the adoption of these practices and how wetland protection can co-exist with cropping practices on private land. These insights will be supplemented by a brief evidence review of the literature on the effectiveness of different farmer engagement strategies. Finally, Phase 3 involves a workshop where the results from the interviews and the evidence review are presented, and options for future engagement and support strategies are discussed to assist farmers to protect wetlands on their land.

This report focuses on the outcomes from the interviews, which are complemented by some additional insights from the final workshop.

1 Previously, there were around 25,000 natural wetlands in Victoria, but many of those identified by the Department of Environment, Land, Water and Planning do not exist anymore.

METHOD

Given the anticipated complexity of the issues related to exploring how the protection of wetlands can co-exist with cropping practices on private land, an exploratory qualitative approach was adopted for this study, so that a rich and in-depth understanding of the issues could be achieved by capturing the honest opinions and experiences of farmers. This involved a series of semi-structured interviews with farmers in the south-west region of Victoria that are part of the Glenelg-Hopkins Catchment.

An interview guide was developed and revised over several iterations in collaboration with the GHCMA and the BBCAG (Appendix 1). Following the first interview, the interview guide was shortened, with supplemental questions added as further prompts if time allowed. The questions focused broadly on:

- Farmers understanding of wetlands and their value to farming
- Challenges associated with the co-existence of wetland protection with cropping
- Advantages and disadvantages of specific cropping practices (i.e., using GPS coordinates to program farm machinery to avoid wetlands/swamps)
- Strategies to support wetland protection
- Information sources that farmers rely on for decision-making
- Interactions with the GHCMA/BBCAG
- Opinions on the future of cropping in south-west Victoria

Recognising that people experience and interpret behaviours, events, and challenges differently, multiple interpretations from a range of individuals were sought until saturation of broad recurring themes was reached. Farmers were sourced through a list of contacts provided by the BBCAG. Before being contacted by the research team, BBCAG informed farmers about the project and asked if they were interested in participating in the interviews.

A total of 15 farmers were interviewed. While we had contacts for seven more farmers, three farmers did not agree to participate when contacted by the research team and an additional four farmers were unable to participate due to time constraints. Originally, it was planned to visit farmers in person and conduct interviews on the farm. However, due to the COVID-19 travel restrictions, we were not able to conduct face-to-face interviews and so had to implement telephone interviews instead.

Each interview lasted between 30-55 minutes, and was recorded provided that permission was granted by the interviewees. Interviews were transcribed and then imported into the qualitative data analysis software package NVivo to identify patterns of meaning across the interviews that provided insights to the research questions. Patterns were identified through an inductive process of data familiarisation, data coding, theme development and revision, where codes and themes were directed by the content of the interviews. Specific topics or insights that were mentioned by only a few interviewees were typically not collated under a separate theme heading, as they were considered topics that were not predominantly held across the interviews, and may have been biased by particular subject matter expertise.

For the final (Phase 3) workshop, a 2½ hour Zoom meeting was held on 3 June 2020. Again, COVID-19 travel restrictions required the workshop to be delivered online. Invitations were sent out to approximately 20 potential participants. Eight external participants accepted the invitation and participated. The workshop involved a presentation of the key insights gathered from the interviews, followed by breakout room sessions where three future pilot engagement strategies were discussed. Opinions gathered from the workshop are integrated into relevant sections of this report. A copy of the workshop slides can be found in Appendix 2.

RESULTS

In this section, we summarise the main themes that emerged from the interviews. In presenting these themes, we have provided direct quotes that typify the opinions and language of the interviewees when answering the questions. This reduces the risk of inaccurate paraphrasing that might undermine the meaning of the insights provided.

Background of interviewees

All of the interviewees reported a mixture of livestock (e.g., Merino sheep) and crops (e.g., wheat, barley, canola, oats, beans, lupins) on their farms (although one was transitioning out of cropping). The ratio between these two activity types varied across individual farmers. Farm sizes ranged from 700-6000 hectares, with interviewees working or managing their current land between eight and 50 years. Many were the latest generation of farmers in their family, representing, for example, a fourth or fifth generation of farmers. Specific activities and experience related to cropping dated back to the past 20-25 years.

Definition of wetlands

One of the first questions asked of interviewees explored how they defined a wetland or swamp. During the current project, we discovered that wetlands or swamps mean different things to different people, and that these understandings may vary from generation to generation due to changes in climate and drought conditions. There was also uncertainty whether using the word "swamp" was better than the word "wetland". In Table 1, we provide a list of wetland/swamp definitions expressed by interviewees, including some additional clarifying comments that were provided.

Table 1: Definitions of wetlands/swamps provided by interviewees

Definition	Clarifying remarks
"A swamp is an area that goes underwater periodically in wet years."	• Some wet areas are under water most of the year, but other ones are spasmodic swamps, i.e., they hold almost no water in an average year but could hold around two feet of water in a wet year. • Can be saltwater swamps which are inappropriate for grazing or cropping, or fresh water where cropping is possible
"Swamps are an area that has water in it the majority of the time … And then we obviously have other areas that are lower lying. But I suppose when it really rains, then you do obviously get a lot of water in them too. So it's mainly a wetland really."	• Permanent swamps are more often defined as those bigger in size whereas temporary swamps come and go and are much shallower.
"… a seasonally inundated wetland. …[But] I don't have the answer for you, because I struggle to understand that myself."	• Seasonally inundated is difficult to define as it is influenced by the natural flood plain, changing climate and changing land use • Swamps often contain Lignum bushes and are wet every year
"Wetlands are permanent or sump swamps where the water drains to and can't go anywhere else. And then we've got our shallower and mostly smaller swamps that are within our cropping paddocks, usually that are stone free, and are wet areas that we just farm through."	• Wetlands are classified as permanent/hold water throughout the year and cropping is not possible (also filled with stones) • Swamps are defined as smaller and shallower and lie within paddocks, are usually stone free and dry in some years. In a wet year the yield in swamps is

	reduced because they are waterlogged, but in an average or drier year, they usually produce well.
"I call a swamp or a wetland where water aggregates in the wintertime."	• Can be permanent or temporary (i.e., hold water for a minimum of two months) • Of no particular size
"It's an area that has water in it nearly every year."	• Because of the changing climate, swamps do not hold water every year which makes cropping possible • Heavy clay specific soil type • Swamps can be saltwater and freshwater
"… a swamp or a wetland is a low lying area that gets inundated typically"	• Soil type: heavy cracking clay, potentially black soil • Saltwater and freshwater swamps
"Generally a low lying area that will hold water and that grows usually a different soil type, a cracking type of clay basin and usually a slightly different sort of vegetation that grows there"	• Often populated by bird life • Example vegetation include tussocks and sedges
"[I define a] swamp as probably more permanent versus a wetland that's perhaps semi-permanent; dries up most years, but then most winters has water back in it. Whereas, a swamp … most of the time has water in it."	• Swamps sit in a chain that are in a sealed system and they are all salty (on their property). • Wetlands sit along the side of the salt chains, are not purely freshwater but have vegetation that grows in the bottom.
"Somewhere that catches water each year seasonally and dries up"	• Soil and vegetation: A heavier soil and rocks around the edge and tussocks and red gum trees sometimes
"Swamps are just probably a large round, flatter type area which generally holds water"	• Soil and vegetation: volcanic rocks and lignum bushes • Salt and freshwater swamps
"… an area that I couldn't crop or do anything with … because you'll get bogged in it."	• Temporary nature of swamps
"Wetlands are ones that hold water for maybe three or four months of the year. Usually they're a clay base and are harder to farm soils."	• Swamps and wetlands can vary in size from 4-5 acres up to 30-50 acres.
"… the un-arable country or depressions in the country that hold water. Very heavily clay based depressions.	• Swamps are permanent but it varies. Some hold water others don't depending on how well they are drained.
"A swamp should be defined as an area that has water in it each year, but not the whole time … They're shallow depressions in paddocks. A wetland is something better than a swamp, as far as the ecology of the countryside goes. [Unlike swamps, wetlands are] sunken into the ground. They've usually got rocks exposed around the edges of them. They can get quite a depth of water in them."	• Swamps: bigger swamps are sunken into the ground, might have a lot of stone exposed around the edges; would be like lakes if they had water to fill them and if they held water. • Wetlands: Usually have rocks exposed around the edges of them; can get quite a depth of water in them; swans nest here; can be dry at times and then grazed by sheep

Based on these definitions, there was general agreement that swamps/wetlands are (low lying) areas or depressions that are periodically inundated with water, are often distinguished by different soil (clay) and vegetation types, and can hold salt or fresh water. However, in providing these definitions, at least three interviewees made a distinction between swamps and wetlands, although the basis of this distinction was not consistent between them (some described wetlands as more permanent, while others described swamps this way). During the workshop that we ran before the interviews, some of the farmers in attendance also made a distinction between wetlands and swamps (and just "wet areas/patches"). Using the terms wetlands and swamps interchangeably is probably therefore not advised, as for some farmers we have met or interviewed during this project, wetlands and swamps mean different things to them.

After asking interviewees for their definition of a swamp/wetland, we then provided them with the following definition supplied by BBCAG: "A wetland is an area that becomes waterlogged or flooded at some time and to such an extent that it affects the plant, soil and biological processes that occur there. They can also be dry for extended periods". Providing this definition meant that all the interviewees answered the remaining questions based on this common understanding.

We asked interviewees for their thoughts and feedback on this definition. Most agreed with this definition (although some need for additional clarity remained), which we believe holds similarities to the definitions and comments provided in Table 2. Below we provide quotes from two interviewees who expressed some reservations:

> *[With last year's rainfall] that definition would mean 50% of our property would have been classified as effected by water, where some seriously large areas of the farm were water logged for extended periods of time. I could show maps that back that up on the plant growth that were well and truly effected ... Because a year like last year, a year like 2010, which was an extremely wet year here, we would have up to 50% of the farm classified as a wetland under that definition … No one's been able to really give me that true definition of a swamp. I've heard that definition before, but I don't understand how that can be.*

> *It's got to be regularly filled with water, to a depth of six inches or more annually. I think where that's where all of this falls down. There is no definition or graduation of scale of what a swamp is.*

Wetlands: Assets or liabilities?

We asked interviewees whether they considered wetlands on private land an "asset" or a "liability" in the context of farming (without making specific reference to cropping). We used these opposing terms to cover a spectrum of responses (which also reflected language we had encountered from informal discussions with farmers prior to the interviews), fully acknowledging that using the term "liability" conveys a sense that wetlands impose an element of undesired obligation or indebtedness on the farmer. There was an even split in the responses across these two dimensions.

Assets

Four themes emerged around how wetlands were viewed as an asset to farming. First, wetlands provide good grazing paddocks for livestock, especially in the summer when they are dry (grazing also helps to manage potential fire risks and weeds). Second, they provide an area where water can run-off and drain into. This helps prevent crops and paddocks from becoming waterlogged, while also offering a water source (if required) to pump water into dams during the summer. Third, wetlands offer aesthetic value to the countryside and the community. Finally, they offer habitats for beneficial insects, birds and other wildlife that contribute to the biodiversity of the area while also assisting in pest management (in terms of insects that might eat the crops). This final theme was the most regularly cited by interviewees who considered wetlands an asset to farming:

> *We've got a healthy population of stripe, legless lizards and tangled lignum if that's allowed to grow, which is one of the species that was endemic to the area that provides nesting sites for all sorts of small ground dwelling birds as well as waterbirds … I'm not a guru on the botanical side of things, but there's just numerous wetland plants locally that require these areas and as soon as you add a crop to them, they're gone.*

> *Wetlands are an area where birds breed, and not just birds, but we have frogs. We have all manner of creatures that live there, including foxes I might say. We had last year a pair of brolgas that nested and hatched a chick successfully. I watched those on a daily basis for some months and eventually they flew*

> *away, and it was great to see. So that sort of thing happens and it's just vital for the country's future, for everybody's future.*

> *I like having the animals about and like having somewhere for the ducks and the birds to live, and I also wonder in the bigger picture whether they clean up a lot of insects that I don't want on the farm, for example, and then I don't have to use anywhere near as much chemicals.*

Liability

Two recurring themes were apparent when interviewees described wetlands as a liability. While wetlands can provide a habit for beneficial animals and insects, they can also provide a habitat for pests such as foxes, feral cats and other unwelcome wildlife (e.g., kangaroos) and weeds. But the more dominant theme was around monetary considerations, where wetlands were described as "unproductive", as what can be grown on them is limited, and therefore detract from the value and profitable acres of the farm:

> *In the western district of Victoria, every bit of land that can be used is a massive asset, because we've got very tight margins to make money out of that bit of land. I would see a swamp as a bit of a liability because they're not as arable and they don't produce as much as land that's not a wetland or a swamp.*

> *[Swamps are] wet and unproductive, in a monetary sense … You don't earn any money from it. You pay rates on it, the same rate as everything else is rated. It is just non-productive in the monetary sense.*

> *I wouldn't say they add value to our farm at all. They probably take value away. But that's what we've got to deal with, so we personally have worked very hard for a lot of years to try and stop them getting any bigger, and in actual fact, try and make them decline in size, which we have.*

Other liability factors mentioned including having to fence wetlands off so livestock don't enter these areas (in wetter times), farm equipment getting bogged, and a building up of the water table that can reduce yields of the surrounding crops.

Cropping

Self-reported cropping of wetlands

A central focus of the current research was to explore how the protection of wetlands can co-exist with cropping on private land. We therefore asked interviewees what they thought were some of the challenges with this aspiration. In the process of answering this question, many interviewees revealed (unprompted) whether they crop wetlands. There was an even split among interviewees in relation to this practice. Below are some accounts from interviewees who currently crop wetlands:

> *Basically we crop … We put boundaries in on areas we don't want to enter. So I've got a 20 foot fence sprayer and if it goes over the boundary it'll automatically shut off that part of the boom. So we do that. But then I suppose we are probably cropping a lot more wet, swampy areas now because of the climate, how it's changing. Some of those boundaries are probably getting wiped out and getting redefined a little bit.*

> *We have definitely drained areas that probably would've once made quite a modest swamp and cropped them … I don't think anyone crops a swamp by accident. Maybe I'm naïve. But I don't think anyone out there just goes, "oh yeah well, I forgot".*

> *We crop [wetlands] and then it's the luck of the draw how that goes. If we get a wet winter and wet spring, we get reduced yields because their waterlogged, and if we get average or drier [conditions], they usually produce very well.*

> *We do crop former wetlands that have been drained before we bought the actual land. They are as successful in growing a crop from being drained as the surrounding lands. So, that's why I'd say farmers have cropped wetlands because they have been drained.*

As alluded to in the previous quote, cropping practices are facilitated by draining wetlands so crops don't become waterlogged and can therefore produce a profitable outcome:

> *We probably are spending more on drainage to get rid of these lowlands too. The ones that aren't permanent. So there's a cost in doing that. But then we obviously think that we can make that money back quite easily with what we produce off it.*

> *But financially the best alternative is really always to drain the swamp for farmers to profit from it. Very rarely is the financial incentive significant enough to change that.*

> *Well, a lot of people have set up drainage systems to drain all those areas so that they can crop it all. Once again, that will come back to the cost of the land. To make a living you have to drain the land. You can't get a crop that's kept too wet, or you haven't got a crop.*

> *If you can get your drainage right, it'll be very good land, because I suspect over many, many years with a bit of runoff here and there that a lot of those really good nutrients will have ended up in the swamp.*

Interviewees who indicated that they didn't crop either chose not to for environmental reasons, or have previously tried with little success:

> *Well look, we did it once on this particular swamp that I'm referring to and we tried a small patch of something or other, can't remember what it was, and it was a total failure. So that was the end of that and we've never done it again since.*

Later in this report, we ask interviewees about the practice of using GPS coordinates to program machinery autosteer to avoid wetlands. This practice was chosen to investigate further in the interviews given its perceived positive impact on wetland protection and that it is relatively easy to implement. However, based on the responses articulated in this section, exploring farmer decisions around the drainage of wetlands might also be an important area of exploration, as it seems to be a necessary precursor to the cropping of wetlands.

Drivers of cropping behaviours

Interviewees were asked what factors might influence a farmer's decision to crop a wetland (or not). The question was framed in a way so interviewees did not have to describe their own personal influences and circumstances (in case this was something they did not want to reveal). As one interviewee described, farmers will often weigh up different benefits associated with wetlands, which might be based on personal choices or values (e.g., economic, social, environmental), or the directives of senior management for larger corporate farms:

> *It becomes a personal and/or corporate choice in this day and age. A personal or a corporate choice as to how much people value those areas [wetlands], to what extent they value them to either their business end, or their land assets. Some people will value them as wanting to encourage a variety of flora and*

> *fauna onto their farm. Others, the thing they will value the most is just being able to farm more profitable acres, and that's the number one priority. So I think it's exactly the same in the beginning. It's the attitude of the person that owns or manages the land, whether they be a person or a corporate entity, that then becomes the trigger as to what happens.*

The most common factor (mentioned by 13 participants) for cropping wetlands was to maximise profits from the land. This was typically associated with the high prices paid for land (that place an imperative on getting a return on investment) and the small margins farmers are currently faced with, which seem more pronounced than previous years or generations:

> *I suppose it all comes back to dollars and cents … If we can see we can save a dollar or make a dollar, that's probably the biggest motivator … At the end of the day we own the land, pay rates on this land and we're trying to make a dollar off the land … We're in a very fortunate area where we are seeing a pretty good production a lot of the time, but our costs are just really getting out of hand a bit, which is a worry. And our land is getting very expensive too. So this is probably why we're trying to open a bit more of it up that we haven't used before.*

> *I think the main challenge that I face is probably an economic one. We're a pretty low equity business, we're probably growing pretty quickly and we don't have a lot of money, so financially we have to be very profitable to make things work. And I suppose the challenge we say with managing and retaining wetlands that can be dried for cropping, which a number of them can be - there are certainly ones that can't be and shouldn't be - the challenge is that we would have possibly about four million dollars' worth of assets tied up in a wetland. That is value. And we buy a farm and typically at least 10 percent of that will be wetland, and we can dry that wetland and it becomes very productive.*

> *Because of the pressure on farming now, the margins in farming used to be reasonable. Nowadays, they're extremely tight, and therefore you've got to try and take advantage of all the land that you've got … It forces you to push your soil greater than you should for the long term benefits of the whole environment.*

> *Well, because the land's become so expensive … you don't really have the luxury of [not cropping wetlands]. If there's an area that you can crop and make money out of, well that's what you'll tend to do ... It's the fact that you paid so much for the land, so you need to make use of every single inch of it.*

Cropping wetlands was also driven by considerations of efficiency (based on the responses of seven interviewees). Requiring farm equipment to avoid wetlands and disrupt the efficiencies of travelling in straight lines was considered an unnecessarily inefficient practice:

> *As cropping machinery has got bigger, farmers like to just keep driving in long straight lines. And sometimes just from an efficiency point of view, it's easier just to continue sowing straight through a wetland than actually turning and going around it. Which actually sounds pretty weird, but it's true. If you're in a huge wide machine and a wetland may only be 100 or 200 metres across, it's far more efficient just to continue straight in, cross it and out the other side.*

These efficiency considerations will be explored in a later section when we report on interviewees' responses to the proposed practice of using GPS coordinates to program machinery autosteer to avoid wetlands.

In terms of drivers to "not" crop wetlands, while a few farmers mentioned environmental considerations ("I want to protect wildlife and protect native grasses and things too. I don't want to destroy that environment completely."), the more common reason mentioned by half the interviewees was the risk of not producing a profitable crop and therefore wasting time, money and resources:

> *I'd say the outcomes are whether that wetland actually made a return or whether it didn't. Every acre in this area needs to make a return purely because our margins are so tight. So, yeah it depends whether that swamp or wetland made a return or not. If it didn't, well it probably wasn't beneficial trying to crop it.*

> *I'm not sure if people are just cropping through wetlands all the time. I don't think they would be because the input costs are too high, it's too high a risk and it's too much to waste I think. It's going to be a waste of money cropping through wet areas if they know they're not going to get any return from it.*

> *Getting the water off the swamps properly, clearing the rocks. If you don't clear the rocks properly, you don't spray the weeds out properly, and you don't drain it properly, it's a waste of money.*

Our impression from the interviewees was that some were willing to take the risk of low yields from cropping wetlands, as the prospect of producing a profitable crop was worth it given specific economic and efficiency imperatives. And it also seems that taking such a risk has produced enough profitable crops in the past to influence farmers to continue to crop wetlands.

Programming farm machinery to avoid wetlands

As described in the Background section of this report, Phase 1 of the project involved a workshop and follow-up discussions with key stakeholders to identify and prioritise farm practices to assist in the protection of wetlands. The practice that emerged from these discussions to reduce the risk to wetlands from cropping was to use GPS coordinates to program farm machinery to avoid these areas. This practice was chosen to investigate further in the interviews given its perceived positive impact on wetland protection and that it is relatively easy to implement as a substitute practice (as opposed to just telling farmers to "stop" doing something else).

When we asked interviewees their opinions on implementing this practice, it was originally framed as "using GPS coordinates to program machinery autosteer to avoid wetlands/swamps". While this wording was reviewed by the GHCMA and BBCAG when they were given the interview guide to provide feedback on, we discovered after the completion of the interviews that the behaviour of greater interest was to use GPS coordinates to lift cropping gear and/or turn off inputs (e.g., seeds, fertiliser) when machinery is traversing over wetlands. We therefore returned to the interview transcripts to determine what insights we could garner based on this practice. While not all interviewees provided insights specific to this practice, two interviewees did indicate that they do lift equipment and/or turn off inputs when driving over wetlands. In contrast, others (as mentioned in the previous section) were willing to take the risk of low yields from cropping wetlands, as the prospect of producing a profitable crop was worth it.

Despite this discrepancy in the purpose of using GPS coordinates to program farm machinery, we present the results based on how the practice was originally framed, as we believe it revealed some influences and considerations that we might not have otherwise gathered. All interviewees agreed that using GPS coordinates to program machinery autosteer to avoid wetlands is relatively easy to implement (provided you have the equipment to do this, which most did). Five interviewees also mentioned the additional benefits of protecting biodiversity, saving money from wasted inputs being sprayed on wetlands, while also helping machinery operators to avoid wetlands (especially those who are inexperienced contractors), be more precise and prevent operator fatigue:

> *It's quite easy. It's just helping a machine to do the first lap around the paddock and when you get back to the spot you started, you just press a button and there's your boundary. And then you can do internal boundaries. So, if you've got a swamp in the middle you don't want to go near, you just go around that. It*

> *just basically draws the line on a map and then it knows that it's to shut off at those areas … If we know it's an area that we're not going to be producing anything off, we save money by not wasting products on these areas. And then we can obviously have a less skilled operator on the machine. So the machine's basically doing everything and the operator is doing not much.*

> *The use of guidance systems takes the fatigue away from the operator, whether it's in the arms and the shoulders because of less overlap, less human error in the driving, putting every individual row where it needs to be placed. In the cropping programs, it's more accurate than what a human can do, is the positive of guidance systems. Takes the fatigue away from the drivers so that they can run more hours or you can use huge machinery that an individual wouldn't know where they were driving.*

> *The positive outcome for the crop if operators use the GPS system and they're going around them, well, it just leaves an existing environment that Landcare projects can continue to plant them out for trees or wetlands of the sort. But somebody's still got to maintain weeds and things like that, that may grow in those environments too.*

But the most common response (mentioned by ten interviewees) was that this practice was *inefficient*, takes away from the *productivity* of the paddocks, and reduces net profits because *straight lines* represent *profitable lines*. In some of the quotes below, it is suggested that cropping efficiency decreases by approximately 50% when avoiding wetlands:

> *Straight lines or profitable lines is a pretty common thing in cropping … That's the only thing I have to say with going around swamps everywhere is the paddocks become really, really unproductive. There was a paddock here where there were some areas where we're going around … I spent 2/3 of my time driving around it in that paddock. And our efficiency was almost half of what it was compared to the paddock next door which was all straight lines … When one of the operators pointed that out, I was pretty shocked.*

> *It's not efficient, you've got to keep your machinery extremely efficient, and that's why everybody is just taking out all the fences and going through all the swamps and taking out the trees … I don't agree with it, but that's how it's done ... Swamps are never straight lines … You've got to double [your time to avoid the swamps]. I know that the technology can do it, but it's not very efficient in the use of that technology.*

> *In a lot of cases for a small wetland in a paddock, it's actually cheaper just to go straight through than it is to turn it [the machinery], do all the turns, and to try and go around it. It actually becomes cheaper for people to just run straight through it, and [say], "Well, if it doesn't get wet, I'll get a crop off it, twice in 10 years", and it's actually cheaper than all the headlands to try and leave it out.*

> *It just increases the amount of turning you have to do. So every turn you do in a paddock, it makes it less efficient. So yes, all that [programming GPS] can be done. If the swamp's there [in the GPS programming], well then they've got to do extra turns to go around it. Whereas if a swamp's not there, they save the turn on either side of the swamp by going directly through it. So they save two turns and also the overlap of headlands going around it. And so, the efficiency of going through something and the less turns you can do with a GPS system, the more efficient that system is … It's very easy to program any of those obstacles into a GPS mapping system. It's easy to do, but it's easier if you don't have to do it.*

One interviewee also pointed to the interesting psychology of straight lines for farmers:

> *A lot of farmers have a very linear mentality and they simply like the look of the straight lines that go straight through the swamp. They don't want that little round area in the middle of the paddock. It just doesn't sit easily with them.*

Finally, two interviewees mentioned that the decision to use GPS coordinates to program machinery autosteer to avoid wetlands was less important compared to an earlier decision where a farmer decides to crop wetlands or not on their land, which might also include considerations around drainage (although we would argue that these decisions would also potentially manifest in using GPS coordinates to avoid wetlands).

Strategies to support wetland protection

A key objective of the current project was to explore how the GHCMA and the BBCAG could better engage and influence farmers on wetland protection and potential risks associated with cropping. We therefore asked interviewees about possible approaches or strategies that could assist croppers when it comes to wetland protection. Responses were categorised under the following themes. :

Clarity on what needs to be protected, including why and how

Earlier in this report, we summarised how interviewees typically defined a swamp or wetland. While we found some elements of consistency in these definitions that aligned to the one provided by the BBCAG, we still noticed some recurring sentiments that further clarity was still required. Furthermore, there was also a need for clarity around "why" wetlands should be protected, specifically (but not exclusively) the benefits they potentially offer to farmers:

> *I suppose it comes back to defining what is a real wetland or swamp. That's going to be difficult. It's probably defining the value for us and for the environment, I suppose. So I don't really know the answer to that one … If there is [clarity of definitions], I haven't seen anything. Not that I've ever probably looked, but I don't think there's a lot of clarity around it.*

> *We need much greater clarity. And we do need those reasons why. I think that's vital. We don't just need someone to say, "You must not do this," without giving very good, clear reasons.*

> *The thing about all of this is we're told that there's something that's got to be preserved in these swamps, but I haven't seen it documented anywhere as to the value of whatever is there.*

> *I think there's a big difference between them [wetlands and wet areas] and there's probably been lots of categories in between as well, if that makes sense, so I think before you start talking about having agreement on things, you would need to have a fairly good guideline around all those levels of wetland, because I don't think many farmers will agree that every depression in a paddock is a wetland. Whereas I know a scientist walking around looking for frogs or different bugs or species of grass would say, "Oh, here's this frog, this must be a wetland."*

> *Well, explain how farmers can benefit financially or where they can get assistance for not cropping their swamps. If you can't come up with that, well people are going to keep cropping their swamps, aren't they?*

> *I think you just need to make farmers more aware... The CMA needs to make people more aware of what the advantages of what having wetlands are. Not just to the farmer, but to the community.*

In terms of "how" you achieve this clarity, some interviewees suggested that farmers need to be visibly shown the benefits of wetland protection (beyond what might be articulated on paper) from influential sources such as other farmers:

> *Paddock walks. Farmers learn a great deal from paddock walks because they're out there seeing something that they're used to all the time.*

> *Yes. I think if they can demonstrate the outcome of conservation and take people and show them what can be done along these creeks and around swamps and that sort of thing, then I think it goes a long way in a practical sense, actually showing them what the outcomes can be.*

Two interviewees also mentioned the potential of whole farm planning as a means of finding ways to find some common ground between wetland protection and cropping. This might be particularly important during periods of transition, succession or changing ownership that provide "teachable moments" where property managers or farmers might be confronted with uncertainty and are looking for information to resolve this uncertainty:

> *I felt [whole farm planning] was really empowering. To actually sit down with someone and go "okay, let's look at this asset we've got here. And let's come up with an alternative plan of what we're going to do". Obviously, things are not always going to change. But it's a really valuable thing to offer people that have just bought a farm or something like that. So, when the farm changes hands, or when succession happens or something like that. Someone's sitting there and having a pretty good look at things and going, "Well, what am I going to do. What point am I at here?" If at that time there was some sort of support to actually go and get some elevation mapping here and look at this and do an environmental audit of the farm or something like, well, these are significant. It'd be really good official process.*

> *Whether you're sheep or cropping, or whatever you do, there's still a role for whole farm planning. There's still a role for people to look down and actually understand they're different soil types, they're different slopes, they're different prevailing winds. And with cropping, that could go the next step. I mean, 30 years on, 25 years on, the next step with a lot of the technology that's coming with cropping could be overlaid on whole farm planning with yield mapping, the satellite imagery stuff could probably be overlaid and whole farm planning could be far more technical … I think there is a role there for people truly understanding what's working well with their land and what doesn't. And when it's laid down, and as part of an entire picture, there's a chance people actually working out, "Well, look, that wetland isn't probably performing, or the ground to the north or the south of that wetland isn't performing. Really, if we take that out, it's not going to be a big loss. How could we fence that to make it easy to work in a cropping system, or as livestock grazing system, or whatever it is."*

Finally, there was little mention of any legal obligations to protect wetlands on private land (e.g., under the Environment Protection and Biodiversity Conservation Act 1999). While this might suggest an opportunity to address an apparent knowledge gap, we suspect this might amplify some of the distrust that already exists among farmers (see below), unless the reasons for wetland protection are compelling and (financially and environmentally) persuasive. Alternatively, any mention of legal obligations might have instead been a "no-go-zone" during the interviews to retain a degree of ambiguity around wetland protection and provide some justification to why wetlands are cropped.

FEEDBACK FROM PHASE 3 WORKSHOP

1. What would help provide a clearer definition of a wetland?

Workshop participants acknowledged there was a need for farmers to have a better understanding of what a wetland is. But trying to arrive at a blanket definition that doesn't align to cropping and local conditions should be avoided. Focusing on soil type and texture might be a more appropriate local approach given that most of the vegetation at cultivation is already gone (and what are perceived as weeds are instead aquatic plants).

Other considerations included the need to distinguish a wetland from a low area in a paddock, accounting for the movement of wetlands over time, and validating the location of wetlands through multiple sources (e.g., fire maps, aerial mapping, Google Earth, ground inspections), acknowledging that the accuracy of some of these sources might be contested.

It was also suggested that instead of (or in addition to) arriving at a single, locally-appropriate definition, an alternative approach could involve a self-administered checklist of questions that farmers can apply proactively to identify sensitive wetland areas for their cropping machinery to avoid. Ideally these questions would be explored in February before the cropping season starts in April, or at a time of a new land purchase or as a component of a whole farm planning exercise. These questions could include:

- Does the area lie within a mapped wetland zone?
- Does the soil show evidence of previous waterlogging (e.g., is reduced iron present)?
- Is this a non-cropped area?
- Do wetland species grow when this area becomes inundated?
- If answers to these questions are 'yes' or 'uncertain', then seek advice from [to be nominated] before cropping.

However, this approach would still be faced with the challenge with "who" to seek advice from (accounting for the trust issues that will be described in the next strategy to support wetland protection), and "why" (e.g., what benefits will the farmer receive from asking these questions and seeking advice)?

2. What should the "why" focus on to justify wetland protection?

Most of the previous reasoning for justifying wetland protection has been along altruistic lines (e.g., for the community, for future generations, for biodiversity). While there was some thought in the workshop to focus more on native wildlife that moves and can be seen in the local landscape (e.g., birds frogs) rather than rare, endemic or endangered algae or grass or plants (which are sometimes mistaken as weeds), previous attempts at highlighting the importance of wetlands to brolga's have been met with resistance.

Other mentioned approaches to justify the protection of wetlands is to highlight (through economic figures) that wetlands are not productive in terms of crop yield (and are therefore costing farmers in their attempts to produce something off that land). However, based on the interviews with farmers, some have experienced successful crop yields from wetlands, and so countering this direct experience could prove problematic. An alternative approach, which would link to the latter discussion around incentives, is to highlight the lost (financial) value that farmers might experience (and regret) if, in the future, a financial value or offset is placed on wetlands and biodiversity protection (as reported in the recent media - Foley (2020)), and so if the wetlands are lost, so is that source of income. This could involve framing an argument based on "anticipated regret", which is discussed later in this report.

Trust

The second category of approaches (mentioned by over half the interviewees) to foster some common ground between cropping and wetland protection involved addressing some of the current distrust issues. This distrust stems from fears or experiences of farmers being told what they can and cannot do with their own land by government officials, environmental groups or other sections of the community. For some farmers, this level of distrust means they are reluctant to have external people come onto their land where there might be a risk they see a wetland and tell the farmer what they can or cannot do with it, which might have implications for their financial livelihood:

> *If they [the CMA; government officials] found something and said, "You need to shut down and stop cropping completely", we would be in all sorts of financial trouble … We have to be able to make money from it.*

> *I think one of the biggest fears for want of the better word that faces farmers and this topic is the worry about restrictions on our normal farming practices … If we get restrictions on what we can do around or near wetlands, a big lot of farmers would be very negative with that type of thing.*

> *If I thought that by declaring what I'm doing and everything else would put me at risk of someone coming onto my farm and saying, "Right, as of 9/2021 you can't actively crop this area, or you have to fence these off and you've got to do this and you've got to do that." I think that would be pretty restrictive on most farms and then the backlash would be pretty severe. I think the landcare groups and others need to be seen to be working with farmers, not against them.*

> *You've got Big Brother [government] looking over your shoulder all the time. They should just stay right out of it and everyone will be happy. Because no one has proved what's going to be saved by staying away from these swamps that they're all worried about … If it can be proved that there's a value from staying away from a swamp or a particular swamp, I think people will cooperate, provided that it's not to their detriment … I think it's important to have the farmers on side rather than creep up on them with plans to ban things.*

For some interviewees, this uneasy relationship between farmers and various external groups has also been influenced by accusations (rightly or wrongly) of environmental impact, a lack of understanding of traditional farming practices, and the environmental and community benefits that have been delivered by farmers:

> *Typically, when something environmentally goes wrong, it's pointed at the croppers. "We use chemicals, we use too much fertiliser". We're not, [but] that's the sort of thing that's quite often levelled at croppers. I think there's not often a celebration of the fact that we've definitely seen really, really positive economic and environmental outcomes from our work with cropping.*

> *I think a lot of people working on this sort of stuff [wetland protection] are coming through universities and perhaps not farm-based. And so some of the principles or theories that could be applied to a national park or to a fairly isolated wetland or something else, are completely different when we come to 200 year old farming practices where things have been put in place for a reason. And I think people underestimate how much farmers actually value and care for their land. We're not just here to make money … There's a lot of negative stuff around and a lot of the time that gets misconstrued. But as farmers, we're not very good at promoting ourselves.*

According to the GHCMA and BBCAG, while they have conducted landholder extension programs and community engagement events to assist in managing and protecting wetlands, these have only reached 10-

20% of the region's landholders. Our impression is that addressing some of the distrust issues articulated above might be a first step to improve engagement.

FEEDBACK FROM PHASE 3 WORKSHOP

1. Between "who" does the trust need to be built?

Workshop participants acknowledged there has been a lingering level of distrust between farmers, scientists, "greenies" and government agencies. This distrust has manifested in emotionally-charged debates and questioning of the recounted science, experience and evidence. Farmers are also concerned with being hit by more regulation and accountability.

2. How would this trust building start?

Some mentioned starting points included a mutually agreed process for identifying wetlands (see previous section), enlisting respected and credible community leaders (champions), and facilitating interactions and experiences that purposely avoid previous accusations/"baggage" and offer an opportunity to reset (and also involve the families of farmers). Some of these interactions could be facilitated through indirect means, such as a farm-based "machine-off" showcasing new machinery (that also happen to deliver mutual benefits to farmers and wetlands).

As highlighted in this report, agronomists could be potential intermediaries, as they are seen as providing accepted and trusted advice to farmers. However, enlisting agronomists as advocates for sustainable farming practices would extend their main farm production focus, which would require further scoping and exploration as a future opportunity

Financial incentives

The most frequently mentioned (by 13 interviewees) approach for creating common ground between wetland protection and cropping involved financial incentives for farmers to offset the loss of productive acres (especially for cropping-only farms) and/or whether there is a public co-contribution (in some form) to wetland protection:

> *The general public wants wetlands to be preserved and also want the trees and all those sort of things, but the expectation is the farmer doesn't. Some farmers are able to afford to do that, but a lot aren't. If you bought the land and then you've got to pay the money back, you've got to be making money. To preserve wetlands is a cost to a farmer and if the general public wants those areas to be preserved, they've got to contribute … Farmers basically can't afford to protect the farm, the swamps, for somebody else.*

> *You want the honest truth? I actually think it can be unfair to ask people to protect a wetland or an area with no financial incentive to do so, particularly people that are all cropping … Protecting them, trying to look after them, takes out valuable acres that people can crop. And with land prices the way they are now, it's a tall ask to ask anybody to protect these areas, and focus money on them, and capital to do so, and take out acres of land that is so highly valued … So that's got to be the common ground, is creating incentives, whether they be financial, or whether they [the CMA] can come up with how this does make a positive difference … Somehow or another, the general public needs to fund that. They can't expect for the land owner to fund what the general public want.*

> *If bureaucrats are going to come out with a wad of money and tell people, "Well, you've got 100 acres of swamp there, we don't want you to crop it, but we're going to pay you X amount of dollars a year not to crop it," well that's a different story … So if people want to conserve this for the average person, well the person that's giving it up has got to be compensated one way or the other, otherwise it just won't happen in a lot of cases.*

> *There has to be incentives put in place to encourage people … We pay X amount of dollars per acre and it doesn't stipulate whether it's a wetland or farming country, you pay per acre across the whole lot, so it's up to you to work out how much is arable and how much isn't … If you want to start deducting the wetlands from the title area, of course you need to be compensated. And I think most farmers would think that why should the farmers have to carry the weight of all of that [wetland protection] on their own when it's the rest of the world that wants the benefits of it.*

> *The government have got to do more or subsidise those areas … At the end of the day all farmers want to make as much money off every bit of land they have, so if there's a way of being able to make more money out of swamps, well every farmer would listen.*

Our understanding from these responses is that the economic value of wetlands (in terms of land prices) and the rates paid on them is treated no differently to non-wetland areas. Segregating or protecting them therefore takes away profitable acres, introduces inefficient cropping practices and maintenance costs, and potentially impacts on land value. Many interviewees were clear that if wetlands are to be protected on private land, farmers need to somehow make money from them or be compensated for their protection. While longer-term economic or environmental benefits might emerge from, for example, integrated pest management and savings from not wasting inputs on crops that might become waterlogged, such outcomes are unlikely to address the top-of-mind financial imperatives and pressures confronting farmers in the short-term. In this context, one farmer made specific reference to the financial benefits offered to the protection of native grasses and that something similar could be directed at wetlands:

> *Because there is now such a big financial ticket associated with protecting native grasses, anybody that's got a native grass, it's now actually a massive asset for their farm ... If you got a farm valued now, and it had an area of native grass, it would possibly be worth the same, or more, than the area beside it, because of its income, because of its revenue creating ability versus 20 years ago, that part of native grass would have been worth a fraction of what the improved pasture was beside it. So now all of a sudden, anybody that's got any native grass, they want to hang onto it … Ultimately, the revenue that they can now generate off native grass through selling offsets, it's become a more valuable asset than it was 20 or 30 years ago.*

Admittedly, couching the value of wetlands in monetary terms can distract farmers from having to think about the non-monetary value of wetlands. Furthermore, offering financial incentives as a form of extrinsic motivation to protect wetlands can "crowd-out" existing internal motivations to do so (this phenomenon is something we explore further later in this report). But in the absence of government resources to enforce private land owners legal obligations to protect wetlands (e.g., under the Environment Protection and Biodiversity Conservation Act 1999), it sits largely with farmers to be willing and able to deliver these wetland protection outcomes. While the promise of non-monetary and/or distal benefits might hold some appeal to a select number of farmers, many are likely to discount these future benefits given the financial pressures they are currently facing. Indeed, this sentiment was echoed in a recent article in *The Age* newspaper that describes a potential Federal government scheme whereby farmers could realise financial rewards for reducing greenhouse emissions while improving biodiversity on their land (Foley, 2020)

FEEDBACK FROM PHASE 3 WORKSHOP

1. How can farmers be compensated (financially or otherwise) for wetland protection?

A couple of workshop participants acknowledged that the financial question is the key to keeping crops out of wetlands. A guaranteed income incentive for sustainable management of wetlands would perhaps offset the risk taken to achieve an income from crops. How this can be done remains an unanswered question. Possible options included linking incentives to Landcare programs, rate relief, compensation for protected areas, or the government buying the land.

The effectiveness of incentives on achieving environmental or socially desirable outcomes has a mixed history. Unless new practices become entrenched and become the "new business as usual", previous practices that harm wetlands might return once the incentives are removed. The best way forward is to pilot incentive programs to see "what works", taking advantage of recognised community leaders and group pressure in the design of incentive programs. Examples of these options are discussed later in this report.

Information sources

We asked farmers what trusted information sources or programs they currently draw on to inform their decision-making around land management. Interviewees mentioned a range of different ways they receive information. The list below provides an overview of the different sources that were mentioned (with Agronomists being the most frequently mention information source):

1. Agronomist
2. Landcare (active members or receiving a newsletter)
3. Common sense / personal experience
4. Word of mouth / talking to other farmers
5. Southern Farming Systems
6. GHCMA (mainly through newsletters)
7. Periodicals (e.g., Kondinin Group, Grain Magazine, GRDC - Ground Cover)
8. Personal research (e.g., Internet)
9. BBCAG (mainly through newsletters)
10. Birchip Cropping Group
11. Vegetative consultant / private consultant groups
12. Seminars, webinars, field days (e.g., through Farm Plan 21)
13. Rural retailers
14. Independent advisor on organic cropping methods
15. No-till farming (Conservation-minded)
16. Department of Agriculture

We discuss some of these information sources in the following sections:

Agronomist

Almost all interviewees received information about growing techniques for cropping and pastures from an agronomist. Interviewees typically described their agronomist as a trusted source of information.

> *I can't speak for all farmers, but a lot of people hang their hat on what their agronomist tells them.*

> *We all just basically seem to go with our agronomists and what they're saying.*

Although agronomists are a significant source of trust information for farmers, the type of information farmers seek from agronomists focuses specifically on increasing farm productivity. For some interviewees, agronomists are a less relevant source when it comes to sustainable farm management practices and the protection of swamps and wetlands:

> *I work with an agronomist. But that's purely cropping and pasture species. They've obviously got knowledge on salt tolerant species and that sort of thing, so if you wanted to embark on a wetland project, they would have some information. But personally I'd go through a CMA type [authority] ... They would have more information than my agronomist.*

Other interviewees thought agronomists could be more persuasive on farmer decisions around wetland protection rather than the CMA:

> *If you can engage someone, not the CMA, but if you can engage someone like agronomists, if they're spreading the benefit of wetlands, that would have a huge bearing on it.*

Whether agronomists see themselves as playing such a role in the context of their employment and sources of income and commissions is a question that could be explored in later research.

Landcare

The second most prominent source of information was Landcare Australia (the national not-for profit that works in partnership with multiple stakeholders to support the community with funding and capacity building opportunities for on-ground projects that care for the land). Most interviewees were active members of the local Landcare group or have worked with Landcare on projects to fence off waterways or revegetation works. Interviewees generally valued the help that they received:

> *Well, for us personally, the wetland was going saline, and therefore, no grasses were growing on it or anything like that. Landcare helped me fence it off and planted salt-tolerant grasses and some trees in applicable places and now it's quite fresh again, so I'm quite happy with that.*

Other farmers use Landcare purely as a source of information by reading their newsletters and fliers.

One interviewee described a Landcare program around integrated pest management as very successful, because it was easy to implement and easy to explain its benefits to farmers. The success of this program was assigned to its environmental and financial benefits, which was described as a rare combination.

Personal experiences and farmer word of mouth

Interviewees frequently stated a reliance on their own personal experience and common sense. Often personal experience is complemented through reading periodicals and working with an agronomist, particularly around new or changing aspects of land management. Personal experiences are also drawn on when trying to do things differently and trialling its success:

> *We're trying to reclaim some of this salty area. Now, a lot of that is self-taught, with guidance from talking to the CMA, and what other trials and stuff have been done over the years, but also just trying to do different stuff ourselves, and see whether we can notice a difference or not.*

Stories of success (or not) from such trials or practices are often shared among farmers, with some interviewees stating that word-of-mouth was a particularly important information source.

Southern Farming Systems

Southern Farming Systems was described as a key source of information and a good way to communicate with farmers. However, it was also mentioned that the importance of Southern Farming Systems seemed to decrease over the years because of the declining numbers of farmers in the area. Additionally, farmers' greater reliance on their agronomists seemed to reduce the importance of Southern Farming Systems:

> *Southern Farming Systems … they've been pretty major. But to be honest now I think it's all changed a bit. There's less farmers around. We all just basically seem to go with our agronomists and what they're saying and just general talking to other farmers. So a lot of those groups have really gone by the wayside a little bit.*

Overall, interviewees received information through a range of different sources. However, a key role was assigned to their local agronomists for information on how to increase farm productivity. In instances where a farmer might seek advice or guidance on sustainable farm management practices such as revegetation and the protection of wetlands, they will often approach Landcare, GHCMA or BBCAG rather than an agronomist.

Experiences with GHCMA and BBCAG

We asked interviewees about their previous contact with the GHCMA or BBCAG. All (with the exception of one) had some kind of previous contact. This ranged from active membership (e.g., a third of the interviewees were members of BBCAG) and/or conducting work with the CMA, to more light touch approaches like attending an occasional meeting or simply just staying informed through reading the newsletter. Projects that farmers referred to in their work with the GHCMA/BBCAG included planting trees, fencing off rivers or wetlands, revegetation around wetlands, and erosion management. Several interviewees emphasised their positive experience with the GHCMA/BBCAG:

> *I love to deal with the CMA. We've had grants from them for tree planting. We've planted probably 50,000 trees on this farm.*

> *I go to their meetings occasionally, I've listened to what they're doing [GHCMA or BBCAG]. It's good. They're doing a good job, they're doing some good work.*

However, some interviewees expressed concerns. According to some, the CMA would benefit from being more open, empathetic and tolerant about farmers' decisions. Some interviewees had the impression that it is difficult to engage with the CMA if they were not willing to have some common ground on wetland protection. Furthermore, the CMA was perceived as not considering the economic pressures that farmers have to operate under. These pressures may limit farmer choices on wetland protection although their general goal is to sustain the land for future generations:

> *I'm someone who, whether or not I sound like it, I actually really want to have a great environmental outcome on the farm in my care. And it's a real practice of mine to get some projects happening and make sure that we're going to leave this farm for the next generation or whoever it is. That it's in better hands. And right at that time [in a conversation with the CMA about wetland protection], I just went, "Wow." That's not a great answer because that's going to make my life really, really difficult in terms of implementing those things because I couldn't give up 2,000 acres. I can't do that.*

As alluded to previously, this connects to farmers' dislike of being told what to do by the CMA or any other authority and the scepticism and distrust that can build:

> *Well, I think CMA needs to be a lot less critical of when farmers do something and work with the farmers because the farmers have the last say in what they're going to do and I find the CMA very threatening.*

> *One frustration that I have is that people, farmers and friends of mine, they do have this real scepticism about organisations like the CMA and I know of farmers who have wetlands that are magnificent wetlands and they wouldn't let anyone look at them for fear that they'd be told of what they're meant to do with them, which is a really hard thing to work with.*

> *I think the CMA potentially has the ability to educate farmers in the benefits of wetlands, how important that they are to the area. And on the other hand, I suppose the CMA has to be aware of some of these issues that we've talked about in protecting wetlands.*

Overcoming the distrust towards authorities is likely to be a key factor in the GHCMA's mission to engage a broader network of farmers on wetland protection.

Future of cropping in south-west Victoria

The final question asked of some interviewees explored their opinions about the future of cropping in the district. Three did see an ongoing future (at least in the shorter-term) given the significant investments by larger corporate farms, technological progress, and the quality of the soil and reliable climate:

> *Well, it's going to continue for a long time, because of the amount of investment that the big operators have put into farming, and they don't have any stock at all. It's not going to change in a hurry.*

> *I think it will continue to get more intensive ... There'll continue to be increased inputs. Technology will continue to play a greater and greater role, whether it be through yield mapping, fertiliser application, automatic driverless tractors ... So technology will continue to keep evolving, and I think production will continue through increased inputs, because of our reliability [of soil and climate]*

> *I see cropping as a very lucrative option for farming and for deriving income from very productive land … Cropping is good and it's a good balance, but I just don't know if it's even sustainable for the next 50 years or 30 years, 20 years, I don't know.*

The sentiment in this last quote was typical of some tempered enthusiasm for the future of cropping in the district. This hesitation acknowledged the potential negative implications for wetlands and the broader environment based on the growing inputs being used and the pressure being placed on the land to deliver economic returns:

> *[Wetland protection will become more difficult] because of the value of the land, and the ability to make a return on it is so much harder now than it was 20 years ago. And if we looked at a long-term trend, that's going to continue to keep going. It's going to continue to become harder and harder to get people to plant shelter belts, look after wetlands, from an ecological or aesthetic point of view … Unfortunately, I think a lot of answers [to wetland protection] are going to have some sort of financial incentive against it. But I think that's just the way in which agriculture's moving.*

> *Because farmland is getting less and less through urbanisation and everything ... I can foresee, in the future, where more and more wetlands will actually be drained on a regional basis to be able to feed all the people in the world.*

> *I just think the amount of chemicals that we're pouring onto the land, it's a wonder Eastern Australia doesn't glow if you're looking at it from a satellite. It really is. It should just about light up … I mean, there'll be [chemical] excesses and of course it ends up in the creeks and ultimately in the lakes and then eventually in the sea. I just think we're digging a hole for ourselves. I really do. I think what the no-till farming people are doing and the regenerative farmers is great and needs further study and encouragement and a lot more finance … But if you can't afford to do something, if you can't afford to be a regenerative farmer, if you can't afford to fence off, if you can't get grants, then you don't do it.*

> *Well, you've only got to look up at the Wimmera and the Mallee, how many failures there are up now because the soil has been overused.*

> *There are going to be significant issues that will keep coming. As we continue to use more and more inputs, we're going to continue to see greater and greater amounts of runoff into our waterways, and creating issues alongside that: algal blooms, and on and on it goes.*

DISCUSSION

What we learnt from the interviews to improve farmer engagement

Prior to the interviews, we conducted a brief review of the existing research to assist in contextualising the insights we gathered from the interviews (Curtis, 2019). Our high level impressions of the evidence base included:

- Much of the research focuses on the drivers and barriers influencing farmer practices across different contexts
- Low rates of conservation-related program adoption among farmers is a common narrative (given other competing imperatives)
- Less focus has been placed of evaluating the effectiveness of different strategies for engaging farmers (potential strategies are framed as "recommendations")
- A significant volume of the research has taken place in Australia
- Over the past 3-5 years, there has been growing recognition of the value of applying the behaviour sciences to inform farmer engagement programs.

Within this evidence-base, it is recognised that in order to understand farmer decisions when it comes to implementing certain practices, in-depth consideration is required of the complex interplay between internal factors and the external context in which farmers operate. This has prompted a number of researchers to develop different models of farmer decision-making to capture this complexity. Some divide influences across internal, external (context) and farmer engagement categories (Mills et al., 2017), while others use categorisations based on cognitive, social, and dispositional factors (Dessart, Barreiro-Hurlé, & Van Bavel, 2019). While it is not our intention to create yet another framework of influences that impact farmer decision-making, we were interested in discussions around different levels or the proximity of influences that impact farmer practices, with those factors that are closest to the decision-making event potentially being the most malleable through policy interventions (Dessart et al., 2019). Examples of such factors include knowledge, attitudes, and capability (as opposed to factors such as personal values, personality, markets, the economy)

Based on the insights collated from the interviews, we observed a number of tensions related to cropping co-existing with wetland protection on private land. These included the need for greater clarity around defining what a wetland is, why they should be protected (with consideration of different benefits to different groups), alternating opinions around whether wetlands are an asset or a liability to farming, and weighing up of different drivers and barriers when it comes to the decision to crop (or drain) wetlands. We also explored the merits of the cropping practice of using GPS coordinates to program machinery to avoid wetlands, and the future of cropping in the district (where a number of concerns were raised relating to the volume of inputs being applied and the soil being over-used while cropping remained in a somewhat lucrative period). Finally, we asked what approaches or strategies would need to be established to promote wetland protection co-existing with cropping. In addition to addressing the question of what needs to be protected, why and how, other areas included addressing the distrust between farmers and non-farmer groups (something that has been observed in other studies) (e.g., Garforth, 2015; Januchowski-Hartley, Moon, Stoeckl, & Gray, 2012), and the need for financial incentives to support farmers to segregate, protect, manage and somehow make money from these wetlands or not being financially penalised for them existing on their private land (which, again is a finding shared with other similar studies) (e.g., Cary & Roberts, 2011; Mendham & Curtis, 2019).

Despite these obvious tensions, we do believe the interviews (and subsequent workshop) provided some tangible foundations for how future farmer engagement efforts might proceed for the GHCMA and the BBCAG. In presenting these, we use a well-established categorisation of intervention approaches (Michie, van Stralen, & West, 2011) to present what these might look like in designing future engagement efforts (see Table 2).

Table 2: Intervention categories and examples to improve farmer engagement

Intervention category	Description	Examples of future farmer engagement efforts
Education	Increase knowledge and understanding	• Define and/or provide clarity in relation to what is a wetland • Develop a list of self-administered questions that farmers can apply proactively to identify sensitive wetland areas for their cropping machinery to avoid. Depending on the answers, farmers will be prompted to seek clarification on potential wetland areas
Training	Personal strategies and skills to increase people's capacity to carry out the behaviour	• Skill development through whole farm planning, "paddock walk" demonstrations from other farmers
Persuasion	Tailored communications in response to target audience beliefs, emotions and biases to motivate behaviour	• Messages around wetlands as "assets" (e.g., grazing, run-off management, drought proofing, biodiversity protection, integrated pest management, savings from not wasting inputs on non-profitable cropping attempts) • Messages around advantages of using GPS coordinates to promote autosteer (e.g., accuracy, preventing driver fatigue – but needs to counter, if possible, the inefficiency arguments of interviewees) • Messages that display an understanding of farmers' fears and economic pressures • Messages focused on "anticipated regret" (described later) that leverage existing concerns related to cropping's future in the district, and potentially losing a future income stream if

		wetlands later become part of an incentive program.
Incentives	Expectations of financial or social rewards	• Rate relief or concessions (where wetlands are treated differently in council rates) • Different approaches to land valuations (where wetlands are treated differently by financial institutions) • Offsets/compensation where farmers can essentially make money from wetland protection
Social norms	Social "rules" that indicate what are common and acceptable behaviours	• Enlist trusted local community leaders as credible messengers (to address the current breakdown in trust between farmers and external groups) • Other farmers (paddock walks) • Create leverage from other relevant farm community events (e.g., "machine-offs") • Extending the role and influence of agronomists
Coercion	Expectations of punishment or cost	• While wetlands on private are subject to legal protection, there is little to no enforcement of these obligations. Wetland protection therefore sits with farmers' willingness and ability to do so. We suggest any attempt to coerce farmers into wetland protection would backfire and potentially make the current situation worse (unless enforcement resources are provided).
Restriction	Reduce opportunities to engage in alternative competing behaviours	• Nothing emerged from the interviews. We suggest that restriction of competing behaviours (e.g., cropping) could be achieved where wetland protection provides an alternative revenue source
Enablement	Removing external barriers to increase opportunities to carry out the behaviour	• Coordinate engagement efforts with greater "bandwidth moments" (described later). That is, when farmers are open to or are looking for new information. • Possible examples could include a change in ownership, a whole farm planning exercise, the introduction of a new government policy or program, a change in market conditions, the end of (or just before) the peak growing season.
Contextual restructuring	Changes to the physical or social context in which the behaviour is performed	• Nothing emerged from the interviews (over and above what has previously been mentioned)

It is clear from this table that just relying on one approach will not address the challenge of wetland protection co-existing with cropping. It requires an integrated program that recognises the need to develop approaches that influence both the willingness and ability dimensions of farmer decision-making – something that has also been reflected in the existing research literature on farmer engagement (e.g., Bartkowski & Bartke, 2018; Dessart et al., 2019; Garforth, 2015; Januchowski-Hartley et al., 2012; Kragt, Dumbrell, & Blackmore, 2017; Mills et al., 2017).

What we can apply from the behavioural sciences to improve farmer engagement

While the interventions presented in Table 2 are a direct response to the insights gathered from the interviews, there are other factors and intervention approaches that should be considered that reflect more unconscious influences on behaviour that are less likely to be articulated during an interview situation.

While farmers' decisions to adopt (or not) practices to protect wetlands are more likely to be informed by a business-like deliberation of different pros and cons, this does not mean that farmers' decisions are free from the influence of common "rules of thumb" or decision-making biases, and that the eventual outcomes will be ideal or completely rational.

Like most of us, we anticipate that farmers are likely to lean towards the familiar or the status quo, feel losses more than equivalent gains, have ingrained routines that are difficult to budge, seek out and engage in information that confirms their own beliefs, are risk adverse, look to others "just like them" to guide their own behaviour, and discount future benefits for those that are more immediate and tangible in the short-term.

Indeed, there is growing recognition of the need to consider these decision-making biases when engaging farmers and designing interventions (e.g., Dessart et al., 2019; Martin & Hine, 2017; Mills et al., 2017; Rare and the Behavioural Insights Team, 2019), as traditional policy tools such as education and incentives are less likely to be effective against these more unconscious factors. In the remainder of this section, we suggest a selection of additional behavioural insights that can be deployed and tested to design interventions to better engage farmers.

Personalise

In Table 2, we allude to possible education and persuasive communication interventions that provide clarity on what a wetland is, why they are important, while at the same time conveying empathy to the challenges faced by farmers.

In designing these communication-based interventions, we would recommend personalising them as much as possible, as research has shown that personalising content can make a difference to engagement efforts compared to more generic approaches (e.g., Borg et al., 2018; Edwards et al., 2009). This might involve addressing recipients of the education or communication material by name (rather than using some generic label), having the material "signed" by an actual person (rather than just using the name of the delivery organisation as the signatory), and connecting the content of the material to a local context in a meaningful way.

On this later point, drawing connections to what is happening "on the ground" locally might take advantage of the sense of place attachment and stewardship farmers might feel from being the latest in a long list of generations who have farmed within the district. Put another way, instead of saying how the wetlands offer benefits to the environment or Victoria more broadly, a better approach would be to translate these benefits to the local farming context. Evidence suggests that messages about the local effects of, say, climate change, combined with a strong sense of place attachment, can make calls for climate change action feel more personally relevant and help to focus attention and energy on topics that are at times complex and abstract (Scannell & Gifford, 2011).

Socialise

Harnessing the power of social norms is one of the most frequently used mechanisms to influence behaviour across a range of different audiences and contexts. Essentially, social norms refer to commonly performed and approved behaviours in a given situation. By highlighting how many people "just like you" perform a behaviour, and that important social referents approve of this behaviour, then the logic and evidence suggest that this will positively impact on the uptake of the desired behaviours (Cialdini, 2003; Goldstein, Cialdini, & Griskevicius, 2008).

Based on the interviews, we can already see normative influences that impact on farmer decisions. These include the advice and experiences offered by agronomists and fellow farmers (who are considered to be "like

us", "on our side" and credible), as well as a potentially undesirable norm that many farmers do crop wetlands. This latter point places an important caveat on the effectiveness of norms. Where desirable behaviours are not yet the norm, we need to think of other approaches to convey a desirable norm, such as highlighting a "dynamic norm" instead (e.g., "The number of farmers using this equipment tripled this year"). We also need to consider who are the most credible messengers to influence farmers. While agronomists and other farmers were identified as potential influential sources, the choice of farmer may not be one that is known for environmentally sustainable practices, but rather a recent "convert" who previously engaged in cropping wetlands but has since stopped (and therefore considered to be more "like" current farmers who crop).

Finally, the influence of norms can be amplified when the related behaviours or practices are in some way made public, observable or accountable to others (Rare and the Behavioural Insights Team, 2019). This can be achieved through a variety of means - from informal public acknowledgements or awards recognising certain accomplishments, to more formal surveillance or auditing processes. Either way, the desire is to amplify the power of peer pressure (where there are shared interests among members of a defined group) and our desire for positive reinforcement and feedback.

Incentivise

As highlighted during the interviews, a number of farmers raised the need for financial incentives to create a degree of common ground between wetland protection and cropping to offset the loss of productive acres. While incentives can be a highly effective behaviour change strategy, they are not without their risks. For example, offering financial compensation to farmers to protect wetlands may undermine or "crowd out" the intrinsic motivation to do so. Put another way, paying someone to adopt a certain agricultural practice may imply that it is an otherwise undesirable thing to do since it "deserves" compensation (Rare and the Behavioural Insights Team, 2019). In some examples, offering incentives can actually be counter-productive and result in a decline in the desired behaviour because of these crowding out effects (Gneezy, Meier, & Rey-Biel, 2011).

Based on the current study, we believe offering financial incentives remains a viable option, as the tight margins and the need to generate income from the land remains a real and pressing concern for farmers. Nevertheless, there are ways of designing incentives that can potentially make them more compelling and take advantage of the normative influences between farmers. This might involve using "group incentives" (e.g., in the form of rate relief or financial offsets) where financial rewards are paid to *all* members of a group that meet specific expectations (e.g., wetland protection) or collectively achieve some pre-determined target (Rare and the Behavioural Insights Team, 2019). If a certain threshold of participation or expectations are not reached, then the incentive is not offered to any farmer.

Avoid losses

A common decision-making bias is "loss aversion". It implies that "losses loom larger than gains", and so we are more sensitive to losing something that is ours now to gaining something equivalent (either now or in the future). Loss aversion plays out a lot in pro-environmental behaviours, where, for example, consumers or businesses are asked to invest in energy efficiency appliances or equipment (which represents the immediate loss), which will pay-off in the long-term. But this promise of future gains is often not compelling enough to justify the losses in the short-term (Kahneman & Tversky, 2018).

While wetland protection was seen by interviewees as a tangible loss to their productive acres, we believe that loss aversion could be harnessed by combining it with the previous interventions related to norms and incentives. If, for example, rate relief was offered upfront to all farmers based on group practices related to wetland protection, this compensation could later be taken away (or reduced) if these practices were not

consistent or no longer being performed at an expected level. Loss aversion would essentially "kick in" with farmers not wanting to lose the upfront rate relief they are currently benefitting from. This strategy would also tap into feelings of reciprocity – by offering farmers something up-front, they are likely to feel an obligation to reciprocate the gesture in some way (Cialdini, 2009).

Finally, loss aversion might also be triggered through mechanisms like "anticipated regret". This forward-looking emotion essentially conveys a negative experience we might feel when we anticipate that our future situation could be better if we decide or act differently in the present (Zeelenberg, van Dijk, Manstead, & vanr de Pligt, 2000). It encapsulates the various worries that beset a decision maker before any losses materialise from making a decision. Given that regret is a pervasive and powerful emotion that people want to avoid, the anticipation of future regret can influence current decisions by changing the subjective utilities of uncertain outcomes. The idea behind interventions based on anticipated regret is that when future regret is brought to the timely attention of decision-making individuals, this regret will receive a higher weighting in the decision process, often provoking hesitation and greater deliberation (Zeelenberg, 1999). Given the concerns raised by some interviewees around the future of cropping in the district, engagement approaches based on anticipated regret could be influential in shaping current farmer decisions. These approaches might also highlight the prospect of future income earning opportunities that wetlands might offer to farmers through government incentive programs (e.g., Foley, 2020), which will be lost if wetlands are not protected now.

Scarcity

During the current study, we were advised of "when" the best time was to approach farmers to participate in the interviews. This advice recognised that farmers are typically confronted with different priorities and responsibilities at certain times of the year, meaning they don't always have the capacity to engage with certain requests or information. Put another way, farmers are regularly confronted with conditions of "scarcity" where individuals have reduced cognitive "bandwidth" to focus on issues beyond the here and now, to solve problems objectively, to retain information, and to plan and take action (Mullainathan & Shafir, 2013). When this scarcity is taxing the mind, it often leads to a form of "tunnelling" in people's decision-making, where they focus on pressing and immediate needs but ignore other important (but perhaps less urgent) concerns. As such, scarcity can make us less insightful, forward thinking, planned and controlled in our decision-making.

In response to the scarcity mindset that farmers might be confronted with during certain times of the year, a number of complementary engagement strategies (beyond persuasive appeals, knowledge, incentives and capability building) might assist. These strategies are less to do with the *content* of specific programs, but more about the *delivery* of these programs using techniques that have proven successful in other contexts. Some examples of these strategies include:

- **Reminders, prompts, notifications, feedback**: Whether delivered via mobile phones, email, digital platforms, over the phone, or other forms of communication and engagement tools, these techniques have proven critical to keeping important tasks salient ("top of mind"). Indeed, there is a growing body of research on how to design, for example, SMS alerts using specific behaviour change techniques (e.g., norms, loss aversion) to achieve desired outcomes among a range of different audiences and contexts (e.g., Hallsworth et al., 2015).
- **Implementation intentions:** These "if-then" plans link critical situational cues with goal-directed responses to overcome the common intention-behaviour gap. The "if" component of an implementation intention spells out the when and where of a situational cue or occasion (e.g., a date and time; a location where intentions might get derailed), while the "then" specifies the response that is initiated (Gollwitzer, 2014). The assumption is that making plans or commitments in advance of behavioural enactment is an effective strategy to fulfil our intentions by shielding them from unwanted distractions, our tendency to

procrastinate and forget, and overly optimistic estimates of our propensity to act (Rogers, Milkman, John, & Norton, 2015).

- **Substitute constant vigilance behaviours with one-off behaviours, defaults or automation:** When a person is experiencing circumstances of scarcity, the cognitive bandwidth to be constantly vigilant is compromised. To this end, looking for situations where constant vigilance can be converted to one-off behaviours or automated should be pursued. We believe that the farm practices of programming GPS coordinates into machinery is an example of automation where the need for farmers to be constantly vigilant around wetlands is no longer needed.
- **Smaller and more frequent goals:** Tools related to goal setting have been used to provide people with a level of direction, motivation, persistence, feedback and support that might not have otherwise existed in the absence of a goal. Under conditions of scarcity, smaller and more frequent goals are better at maintaining attention and momentum, as longer term goals are likely to be viewed as distant events and perhaps not requiring attention in the here and now (Mullainathan & Shafir, 2013).
- **Timing engagement with greater bandwidth moments:** While people experiencing scarcity will often have their cognitive bandwidth or capacity compromised, they will inevitably experience peaks and troughs over time. So when designing and implementing interventions to engage farmers, it is important to do this at a time of greater bandwidth moments where people are more receptive and capable of processing information. This approach is certainly not new, as similar concepts of "teachable moments", "moments that matter" and "habit discontinuity" have all proposed that there are certain times when people are more open to information and changing their behaviour (Dai, Milkman, & Riis, 2014; Verplanken & Roy, 2016). In this context, it is less about *what* is being communicated, but *when*. Possible examples of these moments in a farming context could involve a change in ownership, a whole farm planning exercise, the introduction of a new government policy or program, a change in market conditions, the end of (or just before) the peak growing season, and/or a major weather event where previous "business as usual" practices have been disrupted

We believe that combining the data gathered from the interviews with complementary insights and strategies informed by the behavioural sciences will assist the GHCMA and the BBCAG in developing farmer engagement strategies based on a more holistic understanding of the conscious and unconscious influences that impact decision-making.

What a future pilot program should consider

Reflecting on the insights gathered from the interviews, the final workshop, and the reviewed evidence, we believe the proposed wetland protection strategies raised in this report are intricately entwined and cannot, for the most part, be separated from one another. For example, while we appreciate the reasoning behind not having to arrive at a definitive localised definition of a wetland (as raised during the workshop), replacing it with a series of self-administered questions (that direct farmers to seek "clarification" depending on their answers) still raises the question "who" they need to seek this clarification from (which links to the trust strategy), and "why" (which potentially links to the incentive strategy). Ignoring any one of these strategies will compromise the effectiveness of any pilot program that aims to support wetland protection and cropping co-existing on private land.

To help guide the design of a future pilot program, there are a number of questions that need to be considered. We have outlined these under the following headings, including some provisional answers and directions based on the findings detailed in this report.

"What do we want to protect?"

- Best to avoid trying to achieve a blanket definition of a wetland – must be more contextualised and reflect local conditions and experiences (e.g., focus on soil type and texture rather than vegetation).
- Address and resolve contested information sources for identifying wetland locations.
- Develop a list of self-administered questions that farmers can apply proactively to identify sensitive wetland areas for their cropping machinery to avoid. Depending on the answers, farmers will be prompted to seek clarification on potential wetland areas.

"Why do we want to protect wetlands?"

- Previous justifications for protecting wetlands have often been altruistically focused (e.g., to protect rare and endangered animal and plant species) and have been met with resistance. These reasons could still be "appealed" to but shouldn't be the focus.
- Other reasons (based on the interviews) could include the value of wetlands for grazing, preventing surrounding crops/paddocks from becoming waterlogged, and providing habitat for beneficial insects and other animals that might reduce the need (and costs) for farm inputs. Need to be able to demonstrate these benefits through, for example, paddock walks, whole farm planning etc.
- Other wetland protection justification approaches could allude to avoiding lost income earning opportunities if programs are later introduced to incentivise wetland/biodiversity protection (which provide an alternative income to cropping, while also delivering other benefits articulated above).
- Some interviewees expressed concerns about the future of cropping, so messages around anticipated regret could project these concerns (as well as lost earning opportunities, as alluded to above if incentive programs are implemented).

"What practices do we want farmers to do?"

Possible practices could include:

- Seek clarification if unsure whether an area in a paddock is a seasonal wetland
- Participate in "paddock walks", whole farm planning exercises, or community/farmer led events where opportunities for wetland protection and cropping to co-exist are explored
- Programming GPS coordinates into farm machinery to lift equipment/turn off input nozzles when travelling over wetlands (which is accompanied by the additional benefits of reduced operator fatigue and more precise and efficient operating of the machinery).
- (Prospective strategy) – Sign-up to an incentive program to protect wetlands on private land

"Who needs to be involved?"

- Need to identify and enlist respected and credible community leaders/farmers (champions) that assist in overcoming lingering trust issues.
- Some of these social interactions could be facilitated through indirect means, such as coordinating with a planned "machine-off" showcasing new machinery (that also happen to deliver mutual benefits to farmers and wetlands).
- Agronomists could be potential intermediaries, as they are seen as providing accepted and trusted advice to farmers. However, enlisting agronomists as advocates for sustainable farming practices would extend their farm production focus, which would require further scoping and exploration as a future opportunity.

"What could be the underlying platform for running a pilot?"

- Pilots could adopt different focus areas and aspirations. These could include: achieving a greater understanding of wetlands and why their protection is important (but does NOT focus on practice change); encouraging farmers to seek clarification of seasonal wetlands on their land; participating in events that demonstrate how wetland protection can co-exist with cropping; and/or signing up to a (group) incentive program (which might be real or something that is proposed in the future).
- The choice of platform will depend on the priorities and resources of the GHCMA, BBCAG, and prospective government programs.

"When to deliver the pilot program?"

- Need to time pilot programs with greater "bandwidth moments" (that is, when farmers are open to or are looking for new information)
- Possible examples could include a change in ownership, a whole farm planning exercise, the introduction of a new government policy or program, a change in market conditions, the end of (or just before) the peak growing season etc.

Answers to these questions should be integrated in the pilot design process. While not all of these considerations might manifest in the final pilot, it does provide a "roadmap" of the range of elements that could (and should) be considered.

CONCLUSION

The aim of this study was to capture the opinions and experiences of a sample of farmers in south-west Victoria that impact wetland protection co-existing with cropping practices on private land. These insights can then be used by the GHCMA and the BBCAG to improve their engagement with local farmers on wetland protection. While laws exist to protect these wetlands, in the absence of significant enforcement resources and/or a shared understanding and mandate (among farmers, the community and government) that recognises the mutual value that wetlands can offer, legislation alone will remain insufficient to protect wetlands on private property. While the farmers we interviewed were typically proud multi-generational custodians of the land who see themselves as delivering a range of economic, social and environmental values to the district, perhaps more than ever before they are under tight margins and significant economic pressures to get a return on investment from their cropping activities within their rights as private land owners (Mendham & Curtis, 2019). The insights detailed in this report, along with some complementary insights from the behavioural sciences, identify potential pathways to design interventions and pilot programs to improve farmer engagement so that wetland protection can co-exist with cropping on private land, even in the face of these financial pressures.

In presenting this report, we acknowledge that the findings are based on a sample of 15 farmers who were willing to participate in the research. While this presents some obvious limitations in terms of the generalisability of the findings to other farmers, we do take some confidence from the clear convergence of the key central themes that emerged, as well as the alignment of the findings from other studies. However, in focusing on depth over breadth, we have also captured something that is not always feasible in surveys or summations of previous bodies research. That is, we have captured in-depth the opinions, experiences, language and "voices" of the farmers on this topic and in their own words, which can lay the foundations for future engagement efforts.

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APPENDIX 1: INTERVIEW GUIDE

1. **Tell me about your farm**
   - History/years of operation/size
   - Why did you get involved in farming (e.g., family, lifestyle, business)?
   - Your role
   - Crops (including type) vs livestock vs other
   - How long have you been cropping?

2. **We know that terms like "swamps" or "wetlands" mean different things to different people. How do you identify or define a swamp or wetland? PROMPTS:**
   - Permanent vs temporary
   - Observable
   - Vegetation type
   - Soil condition
   - Size
   - Swamp vs wetland

For the rest of the interview, please consider the following definition of a wetland: "An area that becomes waterlogged or flooded at some time and to such an extent that it affects the plant, soil and biological processes that occur there. They can also be dry for extended periods".

3. **How do you view the value of wetlands/swamps in the context of farming? PROMPTS:**
   - An asset? Why?
   - A liability? Why?

4. **GHCMA/BBCAG want to explore how the protection of wetlands/swamps can co-exist with cropping on private land. However, they also acknowledge this can present challenges to farmers. How would you describe these challenges? PROMPTS:**
   - Are there specific farm operations where these challenges are more pronounced?

Supplemental questions (if needed)

Based on your experience, what are some of the specific factors or influences that might prompt a farmer to crop a wetland/swamp (or not)? PROMPTS:

- Economic imperatives
- Changing climatic conditions
- Managerial direction
- Peer influence
- External advice
- Personal identity
- Calculated risk

What have been some of the outcomes from these decisions to crop (or not) wetlands/swamps? PROMPTS:

- Think of different timeframes (to account for different weather conditions)
- Positive and negative

5. **One practice that has been suggested to reduce the risk to wetlands/swamps from cropping is to use GPS coordinates to program machinery autosteer to avoid wetlands/swamps. What factors make it easy or difficult to implement this practice?**

Supplemental questions (if needed)

What do you see as the positive or negative outcomes of implementing this practice?

Are there any other factors you can think of that might impact on implementing this practice? PROMPTS:

- Social influences (e.g., family, employees, agronomists, other farmers, Land care groups)
- Established farming routines that are difficult to change

How likely are you to implement such a practice (if not already)? Why/Why not? PROMPTS:

- What else needs to be in place/implemented to support such a practice (e.g., offset program)?

6. **Given GHCMA/BBCAG are interested in exploring how the protection of swamps/wetlands can co-exist with cropping practices, what "common ground" do you think needs to be established between GHCMA/BBCAG and farmers on this topic?**
   - Is there clarity around "what" needs to be protected and "why"?

Supplemental questions (if needed)

How could this be supported by specific roles/resources/materials delivered by GHCMA/BBCAG or other organisations or programs (e.g., stewardship programs)?

What previous contact/exchanges have you had with GHCMA/BBCAG? PROMPTS:

- What did it involve?
- What outcomes did it lead to?
- How was the overall experience?

7. **What trusted information sources or programs do you currently draw on to inform your decision-making? PROMPTS:**
   - Agronomists
   - Other farmers
   - Southern Faming Systems
   - Gorst Rural/local rural stores
   - CMA/BBCAG/Landcare
   - How do you use the information?

8. **Can you give me an example of a program or initiative that you thought was particularly successful in engaging farmers? PROMPTS:**
   - What factors contributed to its success?

9. **Where do you see the future of cropping?**

We have reached the end of our questions. This is an opportunity for you to tell me any thoughts you had that you might not have had the chance to share with me earlier. Do you have anything else to add?

APPENDIX 2: PHASE 3 WORKSHOP SLIDES

MONASH University | MONASH INDIGENOUS STUDIES EXPERTISE INSTITUTE | BehaviourWorks AUSTRALIA

CROPPING AND WETLANDS IN SOUTH-WEST VICTORIA

Exploring opportunities for cropping and wetland protection to co-exist on private land

Jim Curtis and Julia Mais-Harris

July 2020

1

Project objectives

Synthesise the opinions and experiences of a sample of farmers in south-west Victoria to explore how wetland protection and cropping can co-exist on private land.

Identify opportunities for the GHCMA and the BBCAG to adapt and improve their engagement activities with local farmers on wetland protection based on these "common ground" insights.

2

Project activities

- Workshop: Unpacking and identifying farm management practices — Oct 2019
- Brief evidence review — November 2020
- Site visits with farmers — December 2020

3

Project activities

- Interviews with farmers — March-April 2020
- Draft Report — May-June 2020
- Workshop: Presentation and discussion of the results — July 2020

4

Workshop objectives

1 To present the insights gathered from the interviews with farmers about opportunities for wetland protection and cropping to co-exist on private land

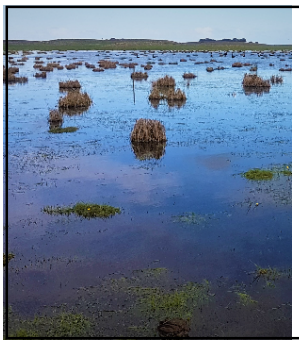
2 To discuss how these insights might translate into pilot engagement programs and initiatives delivered by the GHCMA and BBCAG

5

AGENDA

TIME	Activity
12.30	Log-in to Zoom and technology check
12.40	Welcome and Introductions
12.45	Project Background and Workshop Objectives
12.50	Presentation of the Results
13.30	**BREAK**
13.45	Breakout Rooms: What could future pilot programs look like?
14.45	Wrap-up and next steps
15.00	**FINISH**

6



Workshop "rules"

1. Results are based on the opinions and experiences expressed by interviewees
2. Personal judgements about the "accuracy" of these opinions is not the focus of the workshop (or the project)
3. There are no "bad" questions; there are no right or wrong answers
4. Beware of your own "confirmation bias"

7

Wetland definition

Low-lying

Periodically inundated

Differentiated by different soil and vegetation types

Salt or freshwater

Wetlands vs swamps

8

Wetland definition

From BBCAG:

"A wetland is an area that becomes waterlogged or flooded at some time and to such an extent that it affects the plant, soil and biological processes that occur there. They can also be dry for extended periods".

"Because of a year like 2010, which was an extremely wet year, we would have up to 50% of the farm classified as a wetland under that definition … No one's been able to really give me that true definition of a swamp. I've heard this definition before, but I don't understand how that can be."

"There's a big difference between wetlands and wet areas and there's probably been lots of categories in between. You need to have a fairly good guideline around all those levels of wetland, because I don't think many farmers will agree that every depression in a paddock is a wetland."

9

Wetlands: Asset to farming

Grazing paddocks for livestock, especialy ina dry summer

Run-off areas for water to drain into (prevents waterlogged crops and paddocks)

Aesthetic value to the countryside andthe community

Biodiversity protection and habitats for beneficialinsects, birds and other wildlife

10

Wetlands: Liability to farming

Habitat for pests (foxes, feral cats, weeds)

$

Detract from the value and profitable acres of the farm

"In the western district of Victoria, every bit of land that can be used is a massive asset, because we've gd very tight margins to make money out of that land. I would see a swamp as a bit of a liability because they're not as arable and they don't produce asmuch as land that's not a wetland."

"Wetlands are wet and unproductive, in a monetary sense … You don't earn any money from it. You pay rates on it, the same rate as everything else is rated. It is just non-productive in the monetary sense."

11

Self-reported cropping of wetlands

Not explicitly asked

Even split among interviewees

Cropping of wetlands is often a calculated risk

Facilitated by draining practices

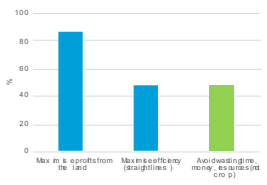
"We crop wetlands and then it's the luck of the draw how that goes. If we get a wet winter and wet spring, we get reduced yields because their waterlogged, but if we get average or dry conditions, they usually produce very well."

"We do crop former wetlands that have been drained before we bought the actual land. They are as successful in growing a crop from being drained as the surrounding lands."

"We are spending more on drainage to get rid of these wetlands that aren't permanent. So there's a cost indoing that. But we obviously think that we can make that money back easily with what we produce off it."

12

Drivers to crop wetlands



"If we can see we can save a dollar or make a dollar, that's probably the biggest motivator ... At the end of the day we own the land pay rates on this land and we're trying to make a dollar off the land. [But] our costs are just really getting out of hand. And our land is getting very expensive too. So this is probably why we're trying to crop a bit more of it up that we haven't used before"

"As cropping machinery has got bigger, farmers like to just keep driving in long straight lines. And sometimes just from an efficiency point of view, it's easier just to continue sowing straight through a wetland than actually turning and going around it."

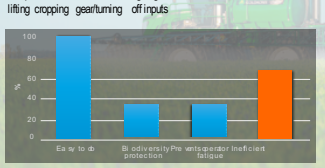
"It depends whether that swamp or wetland made a return or not. If we know it's an area that we're not going to be producing anything off, we save money by not wasting products on these areas."

13

Using GPS to program machinery to avoid wetlands

Framed as "using GPS coordinates to program machinery autosteer to avoid wetlands/swamps" during the interviews

Responses focused more on "going around" wetlands rather than lifting cropping gear/turning off inputs



"The use of guidance systems takes the fatigue away from the operator so they can run more hours. [There is also] less human error in the driving, putting every individual row where it needs to be placed."

"Straight lines or profitable lines is a pretty common thing in cropping ... Going around swamps every where in the paddocks becomes really, really unproductive."

"The less turns you can do with a GPS system the more efficient that system is ... It's very easy to program [wetlands] into a GPS mapping system. It's easy to do, but it's easier if you don't have to do it."

"It actually becomes cheaper for people to just run straight through it, and say] "Well, if it doesn't get wet, I'll get a crop off it, twice in 10 years."

14

Future of cropping

"It's going to continue for a long time, because of the amount of investment that the big operators have put into farming"

"It will continue to get more intensive. There will be increased inputs. Technology will play a greater role, whether it be through yield mapping, fertiliser application, driverless tractors."

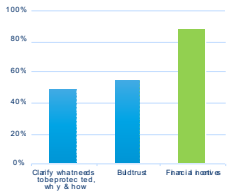
"I see cropping as a very lucrative option for farming and for deriving income from very productive land. Cropping is a good balance, but I don't know if it's sustainable for the next 20 to 50 years"

"You've only got to look up at the Wimmera and the Mallee how many failures there are because the soil has been overused."

"I think the amount of chemicals that we're pouring onto the land, it's a wonder Eastern Australia doesn't glow if you're looking at it from a satellite."

15

Wetland protection strategies



Breakout Room activity

Three rounds of breakout room sessions (10-15 minutes) – one for each strategy

You will be **randomly assigned** to a group

Nominate a **note taker** (notes need to be shared with Jim AFTER the workshop)

Work through the **suggested questions**

What would a "pilot program" look like over the next **6 months**?

16

What needs to be protected and why?

Guiding questions

What would constitute a **clear** definition of a wetland?

What should the "**why**" focus onto justify the need for wetland protection?

How should this information be communicated by **who** (e.g., the farmers, agronomists, GHCMA, BBCAG), and **when**?

"We need much greater clarity. And we do need those reasons why. I think that's vital. We don't need someone to say, "You must not do this," without giving very good, clear reasons."

"No one has proved what's going to be saved by staying away from these wetlands ... If it can be proved that there's a value from staying away from a particular swamp, I think people will cooperate, provided that it's not to their detriment."

"Farmers learn a great deal from paddock walks ... I think if you can demonstrate the outcome of conservation and take people and show them what can be done around swamps, then I think it goes along way in a practical sense"

17

Build trust

Guiding questions

Between **who** does the trust need to be built? How

would this trust building **start**?

How would trust **manifest** in communications, interactions and practices? In other words, what would it "look like"?

"If they [e.g., government officials] found something and said, "You need to shut down and stop cropping completely", we would be in all sorts of financial trouble."

"If I thought that by declaring what I'm doing would put me at risk of someone coming onto my farm and saying, "Right, as of this time you can't actively crop this area", that would be pretty restrictive on most farms and the backlash would be pretty severe. I think you need to be seen to be working with farmers, not against them."

"I think people underestimate how much farmers actually value and care for their land. We're not just here to make money ... There's a lot of negative stuff around and a lot of the time that gets misconstrued. We're not very good at promoting ourselves."

18

Financial incentives

Guiding questions

How can farmers be **compensated** (financially or otherwise) for wetland protection?

Possible **examples**: rate relief, different approaches to land valuations, offsets

Is there an opportunity for **group incentives** (e.g., where a group of farmers receive an incentive based on an agreed set of expectations - otherwise no incentive is offered)

"I think it is unfair to ask farmers to protect a wetland without financial incentive … Protecting them, trying to look after them, takes out valuable acres that people can crop. And with land prices the way they are, it's a tall ask to ask anybody to protect these areas and take out acres of land that is so highly valued."

"We pay X amount of dollars per acre and it doesn't matter whether it's a wetland or farming country, you pay per acre across the whole lot. If you want to start deducting the wetlands from the total area of course you need to be compensated."

THE AGE

"World-first biodiversity scheme could help farmers cash in" (24/05/20)

19

Wrap-up and next steps

Note takers to send summaries to Jim

Comments integrated into final report

GHCMA, BBCAG discuss pilot opportunities

Post COVID-19 – happy to do a return visit

20