



Department of
Primary Industries and
Regional Development



Grains, Seeds and Hay
Industry Funding Scheme

Grains, Seeds and Hay Industry Funding Scheme

Annual Report

2019/2020



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From the Chair

I am pleased to present the 2019/20 Grains, Seeds and Hay Industry Funding Scheme (IFS) annual report to the Scheme participants, stakeholders involved in the Western Australian grain, seed and hay industries and to the Minister for Agriculture and Food.

2019/20 saw us take a major step toward eradicating three-horned bedstraw from Western Australia. During the year, the weed was officially eradicated from one of the affected properties and eradicated from the arable areas of the second property. The difficulty in eradicating any weed from the environment cannot be understated – this outcome would not have been possible without the dedication and commitment of the landholders and staff from the Department of Primary Industries and Regional Development.

The Skeleton Weed Program continues, with 2019/20 seeing the surveillance and control activities expanded. The new measures were well-received by landholders, and will continue to be monitored to see what impact they have on skeleton weed spread.

On that note, the Industry Funding Scheme Management Committee commissioned a major review to assess the effectiveness of the Skeleton Weed Program as a whole. Although the area of land infested by skeleton weed continues to slowly expand, the review found that the Program had significantly suppressed its spread and, therefore, minimised its potential impacts on the WA grain/seed/hay industry. The review made four key recommendations to improve the effectiveness of the Program, including increasing the investment in research and development of new/alternative control and surveillance methods and technologies.

I, along with the rest of the Management Committee, look forward to further developing the IFS-funded programs to meet the biosecurity needs of the WA grain/seed/hay industry. Your participation in the Grains, Seeds and Hay Industry Funding Scheme makes these programs possible and helps safeguard our industry from pests and diseases.



Rohan Day

Chair, Grains, Seeds and Hay Industry Funding Scheme Management Committee



Image 1 – Field of wheat

List of acronyms

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
CBH	Cooperative Bulk Handling
DPIRD	Department of Primary Industries and Regional Development
GBAC	Grains Biosecurity Advisory Committee
GIWA	Grains Industry Association of Western Australia
GPS	Global positioning system
IFS	Industry Funding Scheme
LAG	Local Action Group
WA	Western Australia

1. Overview of the Grains, Seeds and Hay Industry Funding Scheme

The Grains, Seeds and Hay Industry Funding Scheme (IFS) was introduced in June 2010 to address biosecurity threats relevant to Western Australia's (WA) grains, seeds and hay industry. The Scheme was established under the *Biosecurity and Agriculture Management Act 2007* to enable growers to identify the pest and disease priorities at a whole-of-industry level and raise funds for activities to address these priorities.

There are currently three Industry Funding Schemes in operation. In addition to the Grains, Seeds and Hay IFS, there is a Cattle IFS and a Sheep and Goat IFS. The three IFSs operate in a similar manner.

For the Grains, Seeds and Hay IFS, funds are raised through grower contributions that are collected by registered receivers¹. These payments are forwarded to the Department of Primary Industries and Regional Development (DPIRD). In accordance with the IFS regulations, DPIRD maintain and administer the Grains, Seeds and Hay Industry Declared Pest Control and Compensation Account (the Account) in consultation with the industry.

Growers do not have to participate in the Scheme – there is a mechanism that allows them to opt out. Opting out does not remove the legal requirement to deal with the pests and diseases to which the Scheme relates, but does disqualify the grower from any benefits provided by the Scheme such as on-ground assistance and compensation.

The Grains, Seeds and Hay IFS is overseen by a seven-member Industry Management Committee. The Minister for Agriculture and Food appointed the committee members after inviting industry nominations and receiving advice from an industry-based Appointments Committee. As required by regulation, the majority of the Industry Management Committee are full participants of the Grains, Seeds and Hay IFS.

The Industry Management Committee is responsible for approving payments made from the Account and approving the biosecurity-related programs funded through the Scheme. They also provide advice to the Minister on the Scheme's area of operation and the contribution rate.

The State Government, through DPIRD, provides the necessary support to ensure proper governance and the effective operation of the Scheme and Management Committee. This includes secretariat, communications, policy and technical support, as well as financial management. Furthermore, the normal regulatory inspection and compliance activities undertaken by DPIRD closely complement the priorities of the Management Committee.

¹ As defined by the Biosecurity and Agriculture Management Industry Funding Scheme (Grains) Regulations 2010

2019/20 Grains, Seeds and Hay Industry Funding Scheme at a glance

During 2019/20:

- Contributions of 25 cents per tonne applied to the first sale of all grain and seed produced within the agricultural areas² of WA
- Contributions of 12.5 cents per tonne applied to the first sale of all hay produced within the agricultural areas² of WA
- Contributions totalling \$3 247 081 were received
- Contributions were used to fund programs to control skeleton weed and eradicate three-horned bedstraw
- The cost of the skeleton weed program was \$4 842 854
- The cost of the three-horned bedstraw program was \$422 844
- Compensation totalling \$114 923 was paid during the year
- Committee costs were \$17 353
- Sixteen growers opted out of the Scheme in 2019/20, with a total of \$7366 to be refunded to five of these growers in the 2020/21 financial year.



Image 2 – Harvest

² The agricultural areas (roughly a line from Northampton to Esperance) are defined as all local government districts excluding Broome, Halls Creek, West Kimberley, Wyndham-East Kimberley, Ashburton, Carnarvon, Coolgardie, Cue, Dundas, East Pilbara, Exmouth, Laverton, Leonora, Kalgoorlie-Boulder, Meekatharra, Menzies, Mount Magnet, Murchison, Ngaanyatjarraku, Port Hedland, Roebourne, Sandstone, Shark Bay, Upper Gascoyne, Wiluna and Yalgoo

2. Industry Management Committee

The Grains, Seeds and Hay IFS is overseen by a seven-member Industry Management Committee. In 2019/20, four new members were appointed to the Committee, Ms Belinda Eastough, Mrs Judith Foss, Mr David Leake and Mr Steve Tilbrook, and Mr Rohan Day was reappointed as Chair for a two-year term. Mr Rod Birch was appointed by the Committee to the position of Deputy Chair.

The Committee terms of reference can be found at Appendix 1.

The purpose of the Industry Management Committee is to support a profitable, viable and sustainable grain/seed/hay industry by maintaining a funding process for the effective mitigation of biosecurity risks to WA growers.

Mr Rohan Day (Chair) owns an 8400 hectare cropping enterprise located south-east of Merredin. He is actively involved in various local community groups.

Mr Rod Birch (Deputy Chair) has been active in the grains industry for 40 years. He is currently involved in a 9400 hectare grain growing business in the Midwest region of WA. Rod is the Deputy Chair of Grain Growers Ltd and a Director on the External Advisory Board of the Institute of Agriculture at the University of WA.

Ms Belinda Eastough farms a mixed stock/crop family farm at Yuna with her husband and is also a part-time agronomist for Elders Limited. She has had an extensive career working with grain growers and grower groups, and is heavily involved with the Yuna Farm Improvement Group.



Image 3 – Export oaten hay baled in a paddock

Mrs Judith Foss has more than 20 years' experience as a self-employed primary producer in a mixed broadacre family farming enterprise in Bruce Rock.

Mr David Leake is a self-employed farmer on an 8000 hectare farm in Kellerberrin. David has held various positions in WAFarmers, served on the Wild Dog and Barrier Fence committees and was an inaugural member of the Grains, Seeds and Hay IFS Management Committee.

Mr Steve Tilbrook is a retired farmer that still helps out on the family farm at Mt Madden. Steve has held various positions including Deputy Chair of the Grains Industry Association (GIWA) of WA, Director of CBH Group, member of the Grain Growers Limited National Policy Group, member of the Agriculture Produce Commission and Chair of the GIWA Barley Council.

Mrs Anne Wilkins has 30-years' experience, predominately in the grains industry, including research and development, agronomy, market research, trade development and working with end-users. She has worked in the commercial, government and not-for-profit sectors and, with her husband, owns and operates a cropping and sheep farm in Badgingarra.

Membership terms

Name	Position	Expiry of term
Rohan Day	Chair	30 June 2021
Rod Birch	Deputy Chair	31 December 2021
Belinda Eastough	Member	30 June 2022
Judith Foss	Member	30 June 2022
David Leake	Member	30 June 2021
Steve Tilbrook	Member	30 June 2022
Anne Wilkins	Member	31 December 2021

3. Operation of the Grains, Seeds and Hay Industry Funding Scheme

Since the introduction of the IFS in 2010, the Industry Management Committee (the Committee) has governed the collection, management and use of industry funds to deliver a biosecurity funding scheme that benefits the WA grain, seed and hay industry. During the 2019/20 year, the Committee held four ordinary meetings and two extraordinary meeting, and worked on a number of key activities during the year.

Industry priorities for funding

Approved programs: In April 2019 the Committee approved funding to continue programs targeting skeleton weed and three-horned bedstraw into 2019/20. Detailed information on the 2019/20 IFS-funded programs can be found in Section 5 this report. In early 2020, industry priorities were once again considered by the Committee, and the programs were approved for a further 12 months.

Other industry priorities: The Committee was represented on the Grains Biosecurity Advisory Committee (GBAC) – an industry-government consultative group. The GBAC was established to provide a forum for communication on grains biosecurity and related matters such as market access and traceability. Importantly, the GBAC may advise the Committee on the biosecurity priorities of the WA grains industry.

Governance

Strategic plan: The Committee was guided by its [Strategic Plan](#). The Plan documents the purpose, role, goal and strategies of the Committee, as well as criteria for making investment decisions. During the year, the plan was reviewed and updated to meet the needs and direction of the new Committee membership. The updated Strategic Plan was endorsed by the Committee in February 2020.

Program monitoring and evaluation: Over the course of the year, the Committee actively monitored the implementation of the IFS-funded programs. Written and verbal progress reports were provided to the Committee at each ordinary meeting, including issues, successes and expenditure.

In April 2019, the Committee resolved to undertake a comprehensive review of the Skeleton Weed Program. As part of this, in May/June 2019 Dr David Bowran was contracted to review the management and impact of skeleton weed on grain/seed/hay production in eastern Australia. The results of this work were summarised in the 2018/19 annual report and are available from the [IFS reports webpage](#)

The Committee engaged Dr Bowran to coordinate ‘phase 2’ of the Skeleton Weed Program Review to assess the appropriateness, effectiveness and efficiency of the Skeleton Weed Program. The purpose of the review was to provide reliable information to help the Committee make informed decisions on the level of industry investment toward skeleton weed. The results of the review are summarised in Section 5 of this report.



Image 4 – Canola in flower

IFS finances: The Committee monitored the financial position of the IFS over the course of the year. This included quarterly financial reports from DPIRD as well as expense reports relating to the IFS-funded programs. This oversight helped the Committee ensure that funds were being expended appropriately and enabled the Committee to forward-plan.

Governance procedures: Good governance is an essential part of the operation of the Committee. Potential conflicts of interest were reviewed at the beginning of each meeting, and processes were in place for decision-making and voting procedures. The Committee abided by its Code of Conduct and the Public Sector Code of Ethics.

IFS regulations: During the year, the Committee participated in a session where the IFS regulations were reviewed and explained. This was particularly important to assist the new Committee members better understand the regulations under which the Scheme and Committee operate.

Compensation

Compensation for foregone production: As part of the Bedstraw Eradication Program, an approved program was developed and put into operation on areas quarantined due to the presence of three-horned bedstraw. The management practices specified in the approved program can result in reduced production from the quarantined areas. As such, affected landholders may apply to the Committee for compensation.

During the 2019/20 financial year, two applications for compensation were made to the Committee (one of these applications related to the 2018 growing season). The applications were assessed by the Committee and offers of compensation were made, which were accepted by the landholders.

Compliance with Industry Funding Scheme regulations

Remittance of IFS contributions: The Committee monitored the remittance of IFS contributions to ensure compliance with the regulations and maximise the funds available to address biosecurity issues of concern to the industry. Where discrepancies occurred, the Committee requested these entities be followed up by DPIRD.

Opt out refunds: From September 2019, DPIRD advised the Committee that seven applications for refunds of the IFS contributions paid during the 2018/19 financial year were received. All seven applications were from growers that had opted out of the Scheme for that particular year. After considering the applications, the Committee directed the Director General to repay the amounts – in accordance with the requirements of the IFS regulations.

IFS area of operation and contribution rate: As required by the IFS regulations, in May 2020 the Committee made its recommendations to the Minister for Agriculture and Food on the 2020/21 Grains, Seeds and Hay IFS contribution rate and area of operation. The Committee recommended that the contribution rate remain at 25 cents per tonne (grain/seed) and 12.5 cents per tonne (hay) – to be applied to the first sale of grain, seed and hay produced within the agricultural areas of WA.

The Minister endorsed the recommendations made by the Committee, as published in the *Western Australian Government Gazette*.



Image 5 – Lupin crop

Communications and consultation

Industry consultation: Opportunities to consult with growers and industry groups were actively sought during 2019/20. The Pastoralists and Graziers Association, WAFarmers, WA Grains Group and GIWA were offered opportunities to meet with the IFS Chair and Executive Officer to discuss the operation of the Scheme and Management Committee. The GIWA Board took up the Committee's offer, and were pleased with the update and requested it be kept informed with the operation and direction of the Scheme. In addition, Committee members met with various Skeleton Weed Local Action Groups to discuss the IFS-funded programs and the Scheme.

Industry consultation was also an important aspect of the review of the Skeleton Weed Program, with a number of industry and community groups invited to discuss their views. More information on the Skeleton Weed Program Review is provided in Section 5 of this report.

In addition to the above, passive communications (e.g. media, articles) were used to encourage industry/grower feedback on the operation of the Scheme following the release of the 2018/19 annual report in November 2019.

Communication activities: The Committee participated in various events and other activities to increase grower awareness and understanding of the Scheme, develop networks and encourage industry feedback. To do this, the Committee:

- Presented at various grower/industry group meetings
- Participated on the Grains Biosecurity Advisory Committee
- Had information stands at major field days
- Put out several media releases resulting in articles in the rural press
- Participated in several radio interviews
- Published articles in industry newsletters.

IFS webpages: During 2019/20 the Grains, Seeds and Hay IFS provided up-to-date information through its webpages on the DPIRD agriculture and food website. The [IFS webpages](#) include links to key documents such as the strategic plan and annual reports.



Biosecurity Funding Schemes

Industry Funding Schemes are a means by which agricultural industries can raise funds to control pests and diseases.

The Schemes are **industry-driven**, with industry itself deciding if, when and to what extent the Scheme is used.

Managing biosecurity threats requires a collaborative effort. Working together through the Schemes, industry are **addressing the priority issues** that can impact on the industry's future.

The banner features a photograph of a sheep and a wheat stalk. The sheep is in the foreground, looking towards the camera. The wheat stalk is in the background, partially obscuring the sheep. The banner has a green and blue gradient background at the bottom.

Further information

Contact:
Industry Funding Scheme
Executive Officer
IFS@dpird.wa.gov.au

agric.wa.gov.au/IFS

Image 6 – Banner used to promote the three IFSs at field days and other events

4. Effectiveness of the Scheme

A total of \$3 247 081 in contributions to the Grains, Seeds and Hay Industry Funding Scheme was received during 2019/20.

The number of growers opting out of the Scheme remains low, with only 16 growers opting out in 2019/20 (Figure 1).

Of the 16 growers that opted out in 2019/20, five applied for a refund of their contributions. These refunds amounted to \$7366.

More than 99% of Western Australian grain/seed/hay growers participate in the Scheme, which may indicate the value of the Scheme to the industry.

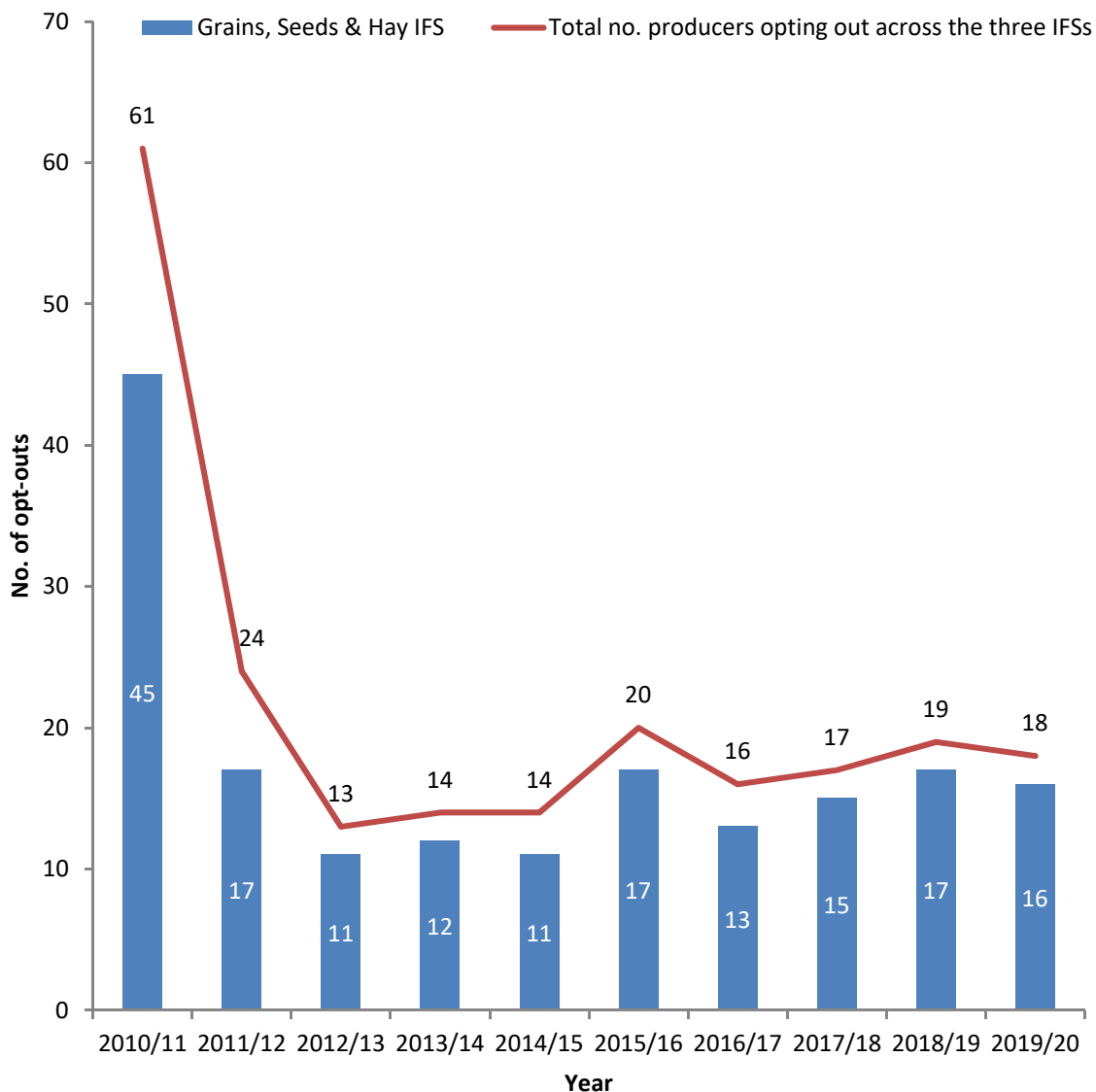


Figure 1 – Number of producers opting out of Industry Funding Schemes since 2010



Image 7 – Hay being raked

More than 99% of Western Australian grain, seed and hay growers participate in the IFS, which may indicate the value of the Scheme to the industry.

The amount of IFS contributions collected on the sale of grain/seed during 2019/20 is approximately 12% greater than expected, based on the reported 2019 harvest of 11.3 million tonne (GIWA, February 2020). The amount of IFS contributions collected on the sale of grain/seed during 2019/20 equated to 12.69 million tonne.

The contributions collected on the sale of hay during 2019/20 equated to 593 976 tonnes. ABARES reported that 549 928 tonnes of hay was exported from WA during the year. This represents a collection rate of 108%. The Committee identified discrepancies in the level of remittances from some hay receivers during the 2018/19 financial year. The increased level of contributions to the IFS from the sale of hay during 2019/20 are likely due to the remittance of unpaid contributions from the previous financial year.

5. 2019/2020 approved biosecurity programs

Skeleton Weed Program

Skeleton weed (*Chondrilla juncea L*) is a weed of pastures, crops and native bush. The Skeleton Weed Program is a coordinated program to prevent the weed from spreading.

The aim of the program is to prevent seed-set and movement of skeleton weed and, where feasible, to eradicate it from properties.

Five key areas of activity are undertaken to help deliver the program aim:

1. Surveillance to detect skeleton weed plants
2. Treatments to prevent seed set and/or destroy plants
3. Communication/extension to i) raise awareness of skeleton weed within the general farming community; and ii) increase the understanding of affected landholders with regard to skeleton weed and its management
4. Research to i) ensure best practice control methods; and ii) improve surveillance/detection methods; and
5. Audit/compliance to ensure program/legislated requirements are met by affected landholders.

The main focus of the Skeleton Weed Program is to assist and work with landholders to eradicate skeleton weed. Six Local Action Groups (LAGs), which receive funding from the IFS, are instrumental in this. All of the LAGs now deliver many of the program's operational activities, whilst DPIRD continues as the compliance management authority.

Surveillance

During 2019/20, approximately 430 000 hectares were searched for skeleton weed. There was a significant decrease in the area of infested land under eradication treatments (from 5259 hectares to 2700 hectares). However, there was a significant increase in the area of land classed as 'heavily infested'³ (from less than 3000 hectares to 10 000 hectares).

The significant increase in the area classed as 'heavily infested' has been attributed to a new program initiative, introduced in 2019/20, whereby the program provided chemical to landholders to treat 'heavily infested' areas. In previous years, many of the borderline 'heavily infested' areas were undertaking eradication treatments. This meant that only the infested areas on these paddocks were taken out of production and treated. With the availability of chemical for whole-of-paddock treatments for 'heavily infested' areas, many landholders in these borderline situations took the opportunity to crop the entire paddock and undertake a whole-of-paddock

³ Where a paddock is more than 10% infested by skeleton weed

treatment. Consequently, these areas are now classed as ‘heavily infested’, with the whole paddock recorded as ‘infested’ rather than only the infested area.

A total of 111 newly infested properties were identified, whilst the weed was eradicated from 30 properties. Although the overall number of infested properties continues to climb, the increase is gradual. Without a coordinated program to control the spread of the weed, skeleton weed would likely be much more abundant and widely established throughout the agricultural area of the State – a point that was highlighted in the recent program review.

Figure 2 identifies all the sites within the WA agricultural area that are infested by skeleton weed at 30 June 2020.

Treatments

Twenty-seven hundred (2700) hectares were identified for eradication treatments with Tordon®; and 10 000 hectares were identified for whole-of-paddock control treatments with Lontrel®.

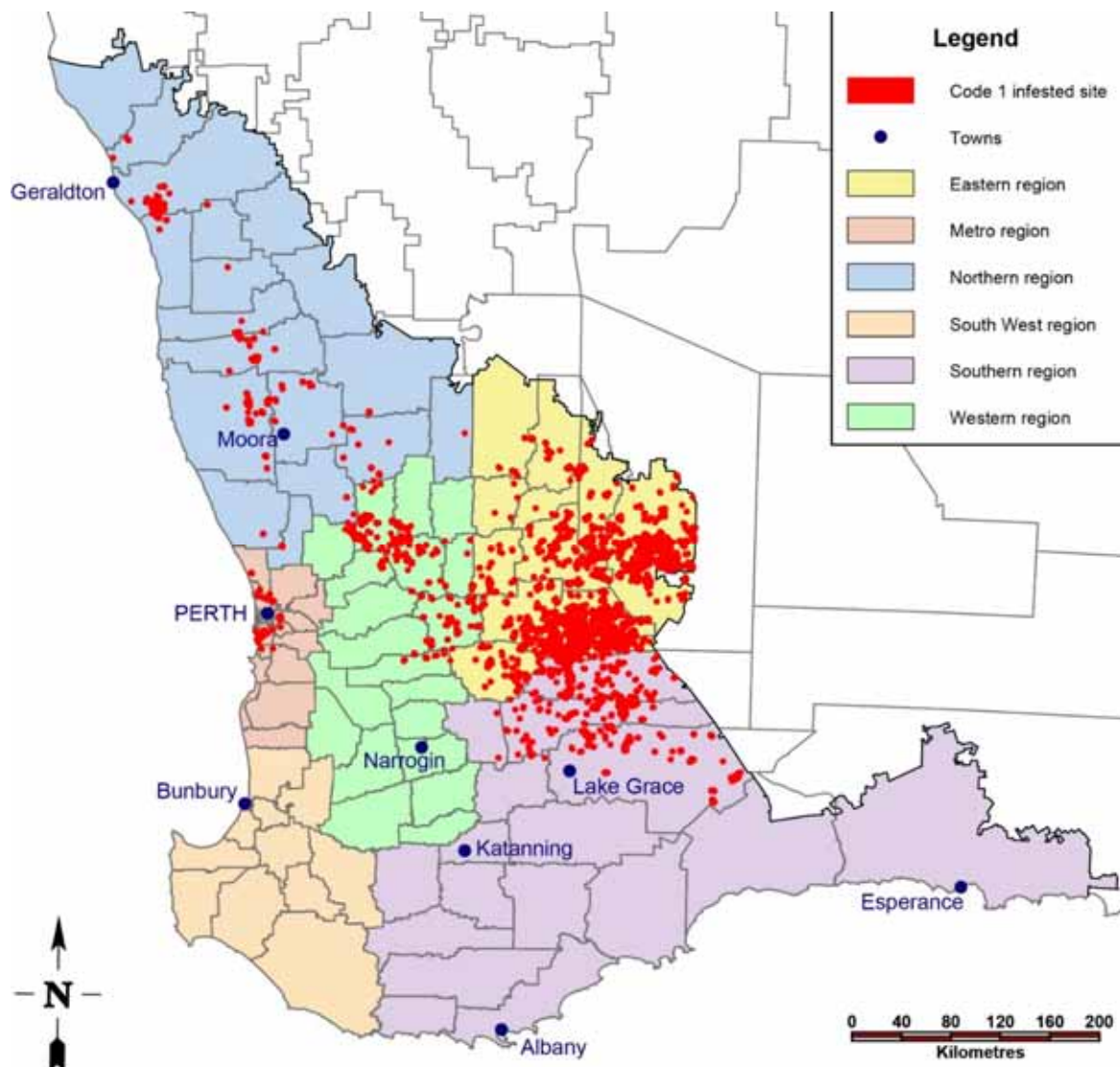


Figure 2 – Distribution of skeleton weed infestations in the agricultural area of Western Australia

Communication and extension

A strategic communication and extension campaign was undertaken to coincide with the start of the summer search season (November 2019). This was very well-received and has contributed to an improved profile and recognition of the program by landholders. The program was also promoted at major machinery field days and farmer events, including information to help raise grower awareness of skeleton weed and its management.

Audit and compliance

As the focus of the Program is to work with landholders, there are few significant compliance issues. During 2019/20, the level of auditing was increased. In particular, audits were undertaken to ensure paddock searches were undertaken to an appropriate standard and a dedicated Quality Assurance officer was appointed.

Research

During 2019/20, a number of areas of research were initiated. These included:

- Research on summer chemical treatments
- A trial to test the use of a pre-cropping application of Picloram; and
- Investigations to determine the efficacy of using microwaves to eradicate skeleton weed plants.

In addition, drones were used for surveillance activities for the second year. More than 20 000 hectares were surveyed, with 360 000 images taken. The images were analysed using the OptiWeed software, developed as part of this research and development project. OptiWeed uses machine learning (convoluted neural network) to process the images captured by the drone flights. Although the machine learning model delivers >99.9% accuracy, precision is currently at 40%. To improve precision, the 'library' of skeleton weed images in the machine learning model will be increased from 669 to 3000, and will include images of skeleton weed plants from different environmental conditions. Additionally, future images captured by the drone will be collected at 0.25-0.3cm to enable small, individual skeleton weed plants to be detected.

This research and development project remains one of the largest multi-rotor drone projects undertaken in Australia.

Continuous improvement

In 2019/20 there were four key changes made to the program:

- Additional chemical control options were made available to landholders
- Search assistance rates were increased to \$9 per hectare for contractors and \$6 per hectare for landholders
- Re-infested Code 2⁴ paddocks were eligible for search assistance, to enhance the level of searching to detect skeleton weed plants; and
- Clopyralid herbicide was provided to landholders to use on 'heavily infested' paddocks.

The *Skeleton Weed Program 2019/20: Report to grain growers* provides a full report on the operations of the program. This can be accessed from the DPIRD website.

Expenditure

The costs of the 2019/20 Skeleton Weed Program are presented in Table 1.

Table 1 – Costs of the 2019/20 Skeleton Weed Program

Expenses	\$
Landholder searching subsidies	2 490 906
Employee expenses	988 602
Local Action Group support	990 000
Vehicles and DPIRD charges	195 837
Drone surveillance and research	117 695
Contract services	52 054
Chemical	48 352
Travel	39 233
Consumables	23 505
Lease, rental and hire costs	22 305
Services and contracts	16 644
Communications	11 574
Advertising and promotion	9 032
Repairs and maintenance	7 099
Miscellaneous other	1 601
Catering	932
Other supplies and services	133
Licences, fees and registrations	110
Revenue for fee-for-service work	-172 760
Total cost of program	4 842 854

⁴ Paddocks that are found to have skeleton weed plants present in the year following a clear search (i.e. no plants found in the previous year)

Skeleton weed review

The 2019/20 financial year saw the Committee implement ‘phase 2’ of its comprehensive review of the Skeleton Weed Program. The purpose of the review was to provide the Committee with reliable, up-to-date information to inform Committee decisions on the level of industry investment in skeleton weed control.

The review follows questions from industry on whether the program is providing value for industry investment, particularly as the infested area is not decreasing. Further, some parts of the industry believe skeleton weed is a weed that should be managed on-farm like any other weed – that is, a ‘farm health’ issue rather than a whole-of-industry issue. Industry feedback also suggested that the program requires modernising, with a perception that the program has been ‘doing the same thing for the last 40 years’. Reviews are essential to delivering programs that are as effective and efficient as possible, and that meet industry expectations.

Phase 2 of the review was undertaken in two stages. The first stage involved a comprehensive review of the literature and analysis of the skeleton weed database. This was augmented by benefit-cost analyses and targeted one-on-one discussions with key informants. The second stage involved consultation with key stakeholders to build on the findings of Stage 1 and identify perceptions and attitudes amongst the WA grain/seed/hay industry with regard to the Skeleton Weed Program.



Image 8 – Skeleton weed plant

Stage 1 was undertaken and substantially documented by Dr David Bowran, with assistance from Ms Rebecca Heath. Dr Jonathon Dodd and Mr John Moore provided feedback to Stage 1 findings and conclusions. Stage 2 was coordinated by Dr David Bowran, with assistance from Ms Rebecca Heath. Dr Jonathon Dodd, Mr Michael Lamond and Mr Rohan Day inputted to the discussion and analysis of data collected via the stakeholder consultation, including participating in semi-structured interviews with key stakeholders.

The Skeleton Weed Review Panel (Dr Bowran (Chair), Dr Dodd and Mr Lamond) was tasked with discussing and assessing all the data collected via Stage 1 and Stage 2 and developing recommendations for the Grains, Seeds and Hay IFS Management Committee.

Key questions to be answered through the review were:

Appropriateness: Is the program (as a whole) the best use of industry resources? / To what extent does the Program address an identified need? / Does the Program represent a legitimate role for industry investment?

Effectiveness: To what extent has the program met its objective to ‘prevent seed set and movement of skeleton weed and eradicate it from properties (where possible)’?

Efficiency: To what extent does the program and its components represent value for industry investment?

The review was completed in April 2020. The Conclusions are presented in Box 1, and the full report is available from the [IFS reports webpage](#). The Skeleton Weed Review Panel made four recommendations, which were accepted by the IFS Management Committee:

1. A Skeleton Weed Program that facilitates skeleton weed containment and property-level eradication should continue whilst a comprehensive review and analyses are undertaken, and critical research and development identified and assessed. The cost of the program should be maintained at a level consistent with the income generated at the current IFS contribution rate.
2. The Grains IFS Management Committee should commit to a well-constructed awareness-raising program prior to undertaking broad stakeholder consultation as the final as part of this Review. Information from this review report should form an important part of the communications.
3. Within a two-year period, the Grains IFS Management Committee should commission and fund a detailed and comprehensive review of the Skeleton Weed Program that investigates the biological, economic, social and environmental impacts of both the weed and the program. The review should identify whether removal, reduction or broadening of the program is in the best interests of growers and the critical decision processes needed to achieve any change.
4. The Grains IFS should increase funding to research and development on skeleton weed and establish a scientific advisory group to provide strategic advice on research/development investment in regard to skeleton weed control, surveillance and database analysis.

Box 1. Skeleton Weed Program Review – conclusions

1. The long-running Skeleton Weed Program has significantly suppressed the spread of skeleton weed by keeping it in the early stage of the invasion curve. This is akin to the 'flattening the curve' concept currently discussed in regard to COVID-19.
2. Stopping the program suddenly, and therefore removing oversight of the suppression measures (preventing flowering and seeding) of known infestations, without farmers committing to controlling every new find on their properties, could be likened to 'taking the foot off the brake'. This would likely result in the weed spreading more rapidly, invading many more properties and infesting a very much larger area than at present.
3. Any decision to change the program should be taken only after a strategic analysis to clearly identify the economic, social and environmental consequences of such a change.
4. It will be necessary to have new knowledge on current and alternative herbicides and/or non-chemical weed control, as well as surveillance technologies, in order to ensure an efficient and cost-effective program. New surveillance technologies to identify new infestations will be critical to finding plants before infestations spread seeds widely. A greater portion of the program budget should therefore be allocated to research and development.
5. The program team, consisting of a) Local Action Groups (LAGs) undertaking search, control and community coordination; b) contracted search teams; and c) Department of Primary Industries and Regional Development officers undertaking compliance, searching and governance, have been instrumental in maintaining the suppression of skeleton weed in recent years.
6. Skeleton weed presents a particular risk to the lupin industry. With large areas of lupins grown in WA, the co-suitability of soil types for both species, the high levels of competition between skeleton weed and lupins and the lack of appropriate herbicides to control the weed in lupin crops, the production risk of skeleton weed to lupins is greatest of the major crops grown in WA.
7. Awareness-raising about skeleton weed and its potential impact on production is necessary to address the diverse industry opinions regarding the value of the Skeleton Weed Program to the industry. A greater portion of the program budget should be allocated toward these types of activities.
8. The exceptional data contained within the skeleton weed database should be analysed to fully document the invasion by this weed. Such analyses will help identify ways to target expenditure to better contain skeleton weed, including property-level eradication. It may also provide learnings on how best to deal with future invasions of pests into the grain industry in WA.
9. LAGs are integral to skeleton weed control in WA. They also have the potential to provide various other positive outcomes in terms of the biosecurity of the grain/seed/hay industry. However, the reliance on a small number of people driving each LAG presents a risk. Succession plans must be considered.
10. With skeleton weed being confined to such a small area of the wheatbelt, herbicide use to control the weed in crops is minimal. This reduced use, particularly of clopyralid (Lontrel®), is likely to have substantially delayed the development of skeleton weed tolerance/resistance to the herbicide.

Bedstraw eradication program

Three-horned bedstraw (*Galium tricornutum*) is a competitive climbing plant. It can cause considerable yield loss in crops and its seeds are contaminants of fodder and grain. In WA bedstraw is targeted for eradication – that is, any bedstraw plants found in the State must be destroyed.

The Grains, Seeds and Hay IFS continued to fund a program addressing bedstraw. The program included activities to eradicate the two known bedstraw infestations in WA and surveillance to detect the presence of other potential bedstraw infestations.

In 2019/20, six of eight quarantined paddocks on one of the affected properties completed the final year of the three-year 'release phase' and were formally released from quarantine restrictions in February 2020. The remaining two arable quarantine areas entered the final year of the release phase. Several small bush areas within the released quarantine paddocks remain under various stages of the eradication phase; however, no bedstraw plants were found on any of these areas during the 2019 season. These bush areas have been fenced to exclude livestock, and they continue to receive chemical eradication treatments.

The program has been successful at preventing seed-set and reducing the soil-borne seed bank on both properties.

For the other property, the quarantined paddock completed the final year of the three-year release phase and was formally released from quarantine restrictions in November 2019.



Image 9 – Three-horned bedstraw

Bedstraw surveillance

The eradication activities were complemented by a surveillance program that was funded by the IFS in partnership with Cooperative Bulk Handling (CBH).

A total of 7372 grain samples from the 2019 harvest were collected from 110 targeted sites across the wheatbelt and screened using CBH screening technology. The screening technology, which uses image analysis software, is used by CBH for the commercial grading of grain. The partnership between the IFS and CBH has allowed this technology to be used to screen grain for contamination with bedstraw seed.

Of the 7372 samples that were screened, no bedstraw was detected. At the current level of sampling there is a 90% probability that large infestations (>150 hectares) will be detected. However, as the cumulative number of samples screened increases each year, so does the confidence in the probability of the technology detecting a bedstraw infestation. Over the last six years, 36 597 samples have been taken, given a 90% probability of finding an infestation greater than 41 hectares.

Continued surveillance is recommended as the risk of bedstraw incursions into WA is ever-present and early detection is the best strategy to quickly eliminate infestations at a minimal cost.

GrainCam development for detecting bedstraw seeds

In November 2019, the Committee approved funding of up to \$29 779 to DPIRD to produce an artificial intelligence program ('GrainCam'), run through mobile devices, to detect bedstraw seeds in cereals at the time of harvest. Being able to detect bedstraw seeds during harvest, with precise GPS information, will provide an effective early detection method and, therefore, reduce the costs of eradication.

There were three aims of this research:

1. To produce an artificial intelligence program that will run on a mobile phone to detect bedstraw seeds in cereals and record the GPS location of the detection.
2. To determine which image analysis systems on modern harvesters can be used as input to the GrainCam on a mobile smartphone to produce an integrated unit with no special wiring or modifications to the harvester being required.
3. To build a device that will collect grain from the clean grain elevator and present it for photographing by a mobile phone or mini camera.

After contacting major agricultural machinery manufacturers, developing an integrated GrainCam was suspended (Aim 2). The key reason for this was because the systems currently being used on agricultural machinery were not conducive to providing an easily accessible video feed, and detecting contaminants was not a priority of the manufacturers.

Nevertheless, a grain collecting and imaging system was made and tested under laboratory conditions. The system, which uses two mobile phones and attachments, collects images at the time of harvest. The system will be field tested during the 2020 harvest.

Images from the system are later processed on a computer using an image analysis module. The analysis module uses artificial intelligence and deep neural networks that can detect bedstraw in wheat and barley. It is anticipated that the analysis module will be deployed via the mobile device; however, at this stage the mobile phone version of the analysis module was not robust enough for field deployment.

Expenditure

The costs of the 2019/20 Bedstraw Eradication Program are presented in Table 2.

Table 2 – Costs of the 2019/20 Bedstraw Eradication Program

Item	\$
Employee expenses	233 499
Services and contracts (labour hire)	84 949
Diagnostic and laboratory (grain screening)	54 545
Vehicles and DPIRD charges	30 585
Chemicals and consumables	11 477
Travel expenses	7 042
Equipment repairs and maintenance	432
Communication	366
Lease, rental and hire costs	59
Miscellaneous	36
Interest revenue	-145
Total cost of program	422 844

The *Bedstraw Eradication 2019/20: Report to grain growers* (available online at the DPIRD agriculture and food website) provides a full report on the operations of the program for the 2019/20 financial year.

6. 2019/2020 financial details

The IFS finances are administered by the Director General of DPIRD through an agency special purpose account called the Grains, Seeds and Hay Industry Declared Pest Control and Compensation Account (the IFS Account). DPIRD manages these funds on behalf of the Committee and prepares financial reports including the end of financial year statements.

- The balance of the IFS Account was \$7 558 611 at 30 June 2020.
- The total cost of the 2019/20 Skeleton Weed Program was \$4 842 854 and the Bedstraw Eradication Program cost \$422 844⁵.
- Two compensation payments associated with the bedstraw program were paid. These totalled \$114 923; however, one of the payments related to the 2018 season.
- Industry contributions to the IFS totalling \$3 247 081 were received by DPIRD in 2019/20; however, \$9704 of this was reimbursed to growers that had opted out of the Scheme in the previous financial year.
- Interest applied to the IFS funds during 2019/20 amounted to \$86 908.
- The activities of the Committee resulted in expenditure of \$17 353.

Tables 3 and 4 contain the financial details for the 2019/20 Grains, Seeds and Hay IFS. Figure 3 identifies how the funds held in the IFS Account were used during the year.



Image 10 – Drone surveillance for skeleton weed

⁵ Some of the costs of the 2019/20 programs were deducted from the Account during the 2020/21 financial year.

Table 3 – Grains, Seeds and Hay IFS income and expenditure for 2019/20

Expenses	\$
Programs:	
Skeleton weed	4 842 854
Bedstraw	422 844
Other expenses:	
Professional services	14 100
Board member fees	7 690
Board member travel	6 711
Meeting expenses	1 678
Communication services	696
Advertising and promotion	368
Stationary and printing	210
Compensation	114 923
2018/19 opt out refunds	9 704
Total expenses	5 421 778
Income	
Contributions	3 247 081
Interest revenue	86 908
Total income	3 333 988
NET COST OF SERVICE	2 087 790

Table 4 – Balance sheet for the Grains, Seeds and Hay IFS at 30 June 2020

Balance sheet	Total (\$)
EQUITY at 30 June 2020	7 558 611

Note: the amounts shown in Table 3 for the skeleton weed and bedstraw programs are the total cost of the 2019/20 programs. Some of these costs were debited from the Account during the 2020/21 financial year. The balance sheet (Table 4) identifies the actual equity at 30 June 2020.

The net cost of service for the 2019/20 Grains, Seeds and Hay Industry Funding Scheme was \$2 087 790.

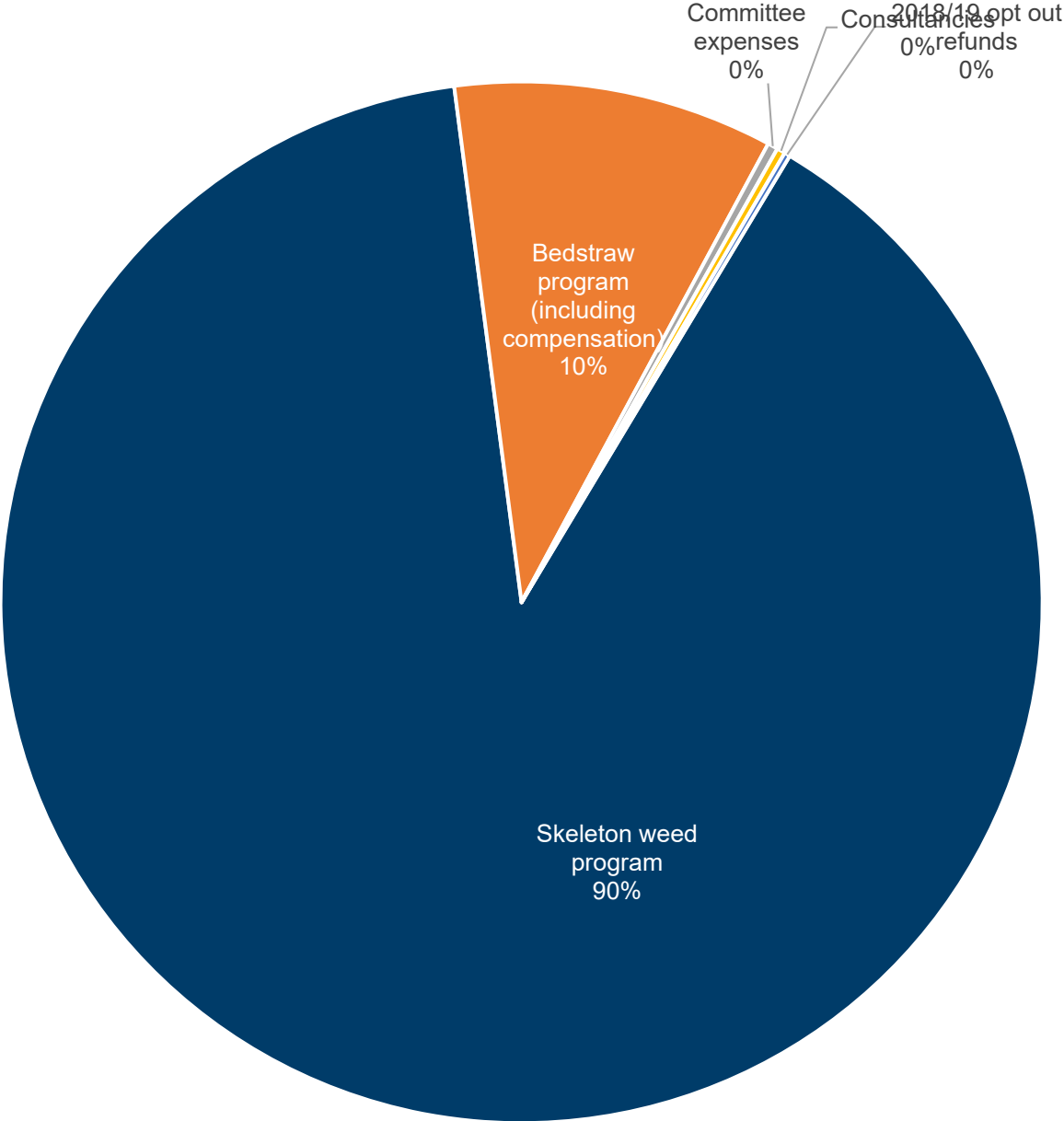


Figure 3 – Use of funds held in the Grains, Seeds and Hay IFS Account during 2019/20

7. Direction for 2020/2021

Implementing the recommendations from the review of the Skeleton Weed Program will be a major activity for the Management Committee during 2020/21. As highlighted by the review, there will be little benefit to the WA grain/seed/hay industry of cutting its investment (or increasing its investment) in the Skeleton Weed Program without having appropriate information and tools in place:

- a) for landholders to ensure all skeleton weed plants will not set seed at the property-level, in the event of a reduced level of program activity
- b) to better understand the economic, social and environmental consequences of changes to the level of industry investment, via the Industry Funding Scheme, in skeleton weed control; and
- c) to communicate the 'what, why and how' of skeleton weed and the program to the industry.

Already, the Committee have committed additional funding for research and development focused on skeleton weed control, surveillance and database analysis. The Committee will also ensure that a well-constructed awareness-raising program is developed and implemented during 2020/21; and will begin planning for a comprehensive investigation of the biological, economic, social and environmental impacts of both skeleton weed and the Program.

In partnership with DPIRD, the Committee will continue to manage and monitor the programs it has in place to address skeleton weed and three-horned bedstraw. As the bedstraw eradication program comes to a conclusion, the Committee will work closely with DPIRD to document the learnings and translate these into a revised plan for managing any future bedstraw incursions.

The Committee will participate in a joint meeting with the other IFS Committees. This will provide an opportunity to reflect on progress made to address the issues identified at the last joint meeting (held in 2017) and to discuss the operation of the IFSs into the future.

2020/21 will also see the Committee undertake its biennial review of all its governance practices and procedures to ensure efficient and effective decision-making and accountability.

Industry feedback is critical to the Scheme's success. The Committee welcomes feedback and input to the Scheme, its programs and grains/ seeds/hay industry issues in general.

The Committee can be contacted at any time through its Executive Officer. The Committee is particularly keen to hear the industry's views on the biosecurity risks and opportunities. Committee members are available to participate in industry forums, meetings and field days to discuss the Scheme and answer any questions from industry.



Appendix 1. Committee terms of reference

1. Act in good faith at all times, and without conflict of interest, to fairly and impartially represent the best interests of the industry concerned and the contributors to the Scheme.
2. Provide effective governance over the Scheme.
3. Discharge the functions conferred on the Management Committee by the *Biosecurity and Agriculture Management Act 2007* and the enabling Regulations, including but not necessarily limited to:
 - advising the Director General of the Department of Primary Industries and Regional Development on the administration of the prescribed account
 - recommending annually to the Minister for Agriculture and Food the area(s) of the State in which the Scheme should operate
 - recommending annually to the Minister for Agriculture and Food the rate or rates at which contributions are to be paid
 - approving programs and other measures to be implemented under the Scheme
 - approving payments from the prescribed account for compensation in respect of losses (as described in the regulations)
 - consulting annually with the industry for the purpose of ascertaining industry views on the operation of the Scheme and the performance by the committee of its functions
 - reporting at least annually to the Minister for Agriculture and Food on the operation and effectiveness of the Scheme, and any matters relating to the operation of the relevant regulations as the Minister specifies.
4. Undertake such other functions related to the operation of the Scheme as required.