

Delivering economic stimulus through the conservation and land management sector

Economic impact assessment

25 June 2020



Acknowledgments

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The Nature Conservancy

NRM Regions Australia

Australian Conservation Foundation

Australian Land Conservation Alliance

NRM Regions Queensland

Conservation Council of SA

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Ernst & Young was engaged on the instructions of Conservation Council of South Australia ("Client") to perform an economic impact assessment of a broad-based program of conservation and land management activities to support Australia's response to the Covid-19 crisis ("Project"), in accordance with the engagement agreement dated 26 May 2020.

The results of Ernst & Young's work, including the assumptions and qualifications made in preparing the report, are set out in Ernst & Young's report dated 25 June 2020 ("Report"). The Report should be read in its entirety including this notice, the transmittal letter, the applicable scope of the work and any limitations. A reference to the Report includes any part of the Report. No further work has been undertaken by Ernst & Young since the date of the Report to update it.

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Mr Craig Wilkins
Chief Executive Officer
Conservation Council of South Australia
111 Franklin Street
Adelaide SA 5000

25 June 2020

Delivering economic stimulus through the conservation and land management sector

Dear Mr Wilkins

In accordance with our Engagement Agreement dated 26 May 2020 ("Agreement"), Ernst & Young ("we" or "EY") has been engaged by Conservation Council of South Australia ("you", "Conservation Council of South Australia", "Conservation Council SA" or the "Client") to provide an economic impact assessment services (the "Services") in relation to a program of conservation and land management activities to support Australia's response to the Covid-19 crisis (the "Project").

The enclosed report (the "Report") sets out the outcomes of our work. You should read the Report in its entirety. A reference to the report includes any part of the Report.

Purpose of our Report and restrictions on its use

Please refer to a copy of the Agreement for the restrictions relating to the use of our Report. We understand that the deliverable by EY will be used for the purpose of outlining the economic and social impact of the Project (the "Purpose").

This Report was prepared on the specific instructions of Conservation Council of South Australia solely for the Purpose and should not be used or relied upon for any other purpose by Conservation Council of South Australia or by any Third Party for any purpose.

This Report and its contents may not be quoted, referred to or shown to any other parties except as provided in the Agreement. We accept no responsibility or liability to any person other than to Conservation Council of South Australia or to such party to whom we have agreed in writing to accept a duty of care in respect of this Report, and accordingly if such other persons choose to rely upon any of the contents of this Report they do so at their own risk.

Nature and scope of our work

The scope of our work, including the basis and limitations, are detailed in our Agreement and in this Report.

Our work commenced on 26 May 2020 and was completed on 25 June 2020. Therefore, our Report does not take account of events or circumstances arising after 25 June 2020 and we have no responsibility to update the Report for such events or circumstances.

In preparing this Report we have considered and relied upon information from a range of sources believed to be reliable and accurate. We have not been informed that any information supplied to us, or obtained from public sources, was false or that any material information has been withheld from us.

We do not imply, and it should not be construed that we have verified any of the information provided to us, or that our enquiries could have identified any matter that a more extensive examination might disclose.

The work performed as part of our scope considers information provided to us and a combination of input assumptions relating to future conditions, which may not necessarily represent actual or most likely future conditions. Additionally, modelling work performed as part of our scope inherently requires assumptions about future behaviours and market interactions, which may result in forecasts that deviate from future conditions. There will usually be differences between estimated and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material. We take no responsibility that the projected outcomes will be achieved.

We highlight that our analysis and Report do not constitute investment advice or a recommendation to you on a future course of action. We provide no assurance that the scenarios we have modelled will be accepted by any relevant authority or third party.

Our conclusions are based, in part, on the assumptions stated and on information provided by Conservation Council of South Australia and other information sources used during the course of the engagement. The modelled outcomes are contingent on the collection of assumptions as agreed with Conservation Council of South Australia no consideration of other market events, announcements or other changing circumstances are reflected in this Report. Neither Ernst & Young nor any member or employee thereof undertakes responsibility in any way whatsoever to any person in respect of errors in this Report arising from incorrect information provided by Conservation Council of South Australia or other information sources used.

This letter should be read in conjunction with our Report, which is attached.

Thank you for the opportunity to work on this Project for you. Should you wish to discuss any aspect of this Report, please do not hesitate to contact me on 0437 979 179.

Yours sincerely



Steve Brown
Partner

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Abbreviations

ABS	Australian Bureau of Statistics
BCR	Benefit-cost ratio
CGE	Computational General Equilibrium
EYGEM	EY General Equilibrium Model
FTE	Full-time equivalent
GDP	Gross domestic product
IPA	Indigenous Protected Area
NPV	Net present value
SROI	Social return on investment

Executive summary

To support Australia's economic recovery from Covid-19, government investment of \$4 billion in a national conservation and land management program could raise economic output by about \$5.7 billion, reduce welfare costs by \$620 million and generate 53,000 jobs over the next four years.

The impact of Covid-19 on the Australian economy has been profound. The economy contracted sharply over the last three months and Australia is now in deep recession, the first in 30 years. Governments have been actively managing the economic fallout of the pandemic with a range of measures put in place to help shore up jobs and businesses.

But the crisis is dynamic, and the sheer scale of the economic harm continues to emerge. It is increasingly likely there will be a sustained period of economic weakness and mounting pressures on government to repair the coronavirus-inflicted damage. In this environment, governments are seeking options to reignite economic activity.

Australia's conservation and land management sector has developed a broad-based program of environmental investment which governments could rapidly mobilise to stimulate the economy and support severely affected regions. The program involves a range of activities to improve Australia's natural assets and agricultural land which can be scaled to requirements, get Australians into meaningful work quickly and may be targeted to areas where stimulatory assistance is most needed.

Scale and scope

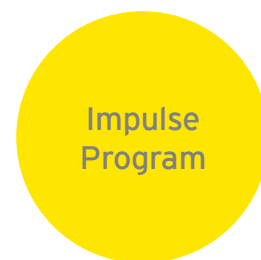
Three key program scale and timing options have been proposed. Two are national level programs involving significant levels of investment (\$4 billion and \$2 billion respectively). An alternative option is a smaller regionally focused program (\$500 million) which could be deployed in severely affected regions. Each option may be rapidly mobilised to support Australia's recovery from Covid-19.



Full program involving \$4 billion of investment over four years



Medium scale program involving \$2 billion of investment over three years



Regionally based program involving \$500 million of investment (\$100 million for five regions) over two years

What activities does the stimulus program involve?

Under each option, the program would be funded by government and recruit Australians who are currently out of work due to the crisis to undertake local environmental and land management activities in the following areas:

- ▶ **Managing environmental threats** – Controlling invasive animals and weeds, environmental improvements to remove plastics and other forms of pollution from Australia’s waterways and marine environment and employing Indigenous rangers, bringing with them Traditional Ecological Knowledge.
- ▶ **Habitat restoration** – Assisted natural regeneration in sensitive areas, restoring river, wetland and coastal habitats as well as native revegetation.
- ▶ **Infrastructure, building and maintenance** – Building fences, repairing and installing new infrastructure to support bushfire and drought recovery, and enhancing infrastructure in Australia’s national parks, local councils and private estates.

The evidence of long-term economic and environmental benefits from these investments is encouraging. Research indicates that they can deliver meaningful gains in agricultural productivity, including by reducing costs and lifting the capacity of the land, improve water quality and natural disaster resilience, and preserve the country’s natural heritage.

Benefits of the program

The program has various features that increase its investment attractiveness:

- ▶ The ability to employ many workers with no previous experience in conservation and land management work, allowing people who have lost their jobs in other sectors to participate in the program.
- ▶ The creation of thousands of jobs in the conservation and land management sector, which will reduce the demand for welfare payments such as JobSeeker and Youth Allowance.
- ▶ The ability to temporarily transfer workers who have lost their job in different industries may prevent displacement of people to other regions.
- ▶ The nature of the program, which involves many labour-intensive tasks, means that much of the work can be completed in a Covid-19 safe environment.
- ▶ The potential for participants in the program to upskill or retrain in conservation and land management roles, ensuring the creation of practical and transferrable skills such as teamwork, communication, leadership and job readiness.
- ▶ The proposed activities build on existing models and mechanisms, which will help drive the success of the program.
- ▶ The increase in conservation and land management efforts has the potential to improve future agricultural productivity and reduce the cost of restoration of degraded environments down the track.

The economic impact of the program

The economic impact of the proposed conservation and land management stimulus program was examined based on high-level investment, management and skills requirements, reflecting that detailed implementation planning is still to occur.

The analysis adopted a whole-of-economy view to examine the program options. Two key channels were examined:

- ▶ The direct impact of the program investment as fiscal stimulus and the potential of the program to jump-start economic activity and boost labour market outcomes.
- ▶ The ability of the program to deliver long term economic benefits from governments' conservation and land management investments. The specific details of constituent projects are not examined individually within the analytic framework, but rather considered as a 'package' of potential initiatives based on the scope and size of benefits which could be realistically available with a concerted emphasis on good project selection and implementation.

The analysis indicates that the proposed conservation and land management stimulus program has the potential to generate substantial economic gains during the immediate economic crisis period and over the long term.

The \$4 billion National Recovery program was estimated to raise economic output by around **\$5.7 billion** and generate **53,000 jobs** over the next four years to support Australia's post Covid-19 economic recovery (see Table 1). Over the period to 2040, when long run gains from natural asset and land management investments may be realised, economic gains are estimated to be in the order of **\$9.3 billion**, with total employment expected to increase by around **62,000 workers**.

The modelled impacts of the smaller program options, the \$2 billion Accelerator Program and the \$500 million regionally based Impulse Program are estimated to increase long term economic output by **\$4.7 billion (31,000 jobs)** and **\$1.2 billion (8,000 jobs)** respectively.

This study also assessed the potential maximum (outer-envelope) gains that may be achieved in the long run – assuming all productivity gains and cost savings from conservation and land management investments are fully realised. Under this scenario, the economic impacts under each proposal option are higher. In the case of the \$4 billion National Recovery Program, the potential economic impacts increase to around **\$12.0 billion** over a 20-year period.

In the current economic environment, there has been drastic increases in unemployment and underemployment. If some of these displaced workers are engaged in the program (and subsequently, no longer receive welfare payments such as JobSeeker), there is the potential for significant fiscal savings in addition to the modelled economic impacts. These savings could be in the order of \$620 million for the National Recovery Program, \$300 million for the Accelerator Program and \$80 million for the Regional Impulse Program.

Table 1: Economic impacts of the proposed conservation and land management stimulus program

GDP (\$ millions)	Fiscal stimulus impact - 4 years (NPV)	Total economic impact - 20 years (NPV)
Recovery Program (\$4 billion stimulus investment)	5,678	9,269
Accelerator Program (\$2 billion stimulus investment)	2,817	4,687
Impulse Program (\$500 million stimulus investment)	717	1,194
Employment (FTEs)	Fiscal stimulus impact - 4 years	Total economic impact - 20 years
Recovery Program	53,428	62,285
Accelerator Program	26,701	31,246
Impulse Program	6,690	7,836

Note: A 7% discount rate was used. Source: EY analysis based on the proposed program expenditures and structure.

Good design principles

Australian and overseas experience with recent stimulus initiatives has reinforced that the capacity to realise program benefits depends greatly on good program design and implementation. A stimulus program of this size will require careful consideration of implementation issues. Indeed, the ability of the program to be rolled out quickly is at the heart of its potential economic benefit.

Due to the program's scale and reach, the involvement of many delivery organisations and different levels of government, the program will have pressing coordination and governance challenges. Robust whole-of-program management will be needed.

In addition, the program has many features which are attractive to government and it aligns well with the Federal Government's objectives for stimulus policy design.

- ▶ **Targeted** – The program involves real jobs on real projects. It's not a make work program. Rather the initiatives have the potential to make our environment and agricultural land better and leave a legacy. Moreover, the program is targeted at alleviating some of the key social and economic concerns of regions affected by Covid-19, as well as the bushfires.
- ▶ **Temporary** – The program has a finite start and end date (depending on the scale of the program) and does not bake in structural commitments to the Budget.
- ▶ **Timely** – The program can be implemented quickly, and it has been structured around the capacity of the conservation and land management sector to mobilise and deliver projects on-the-ground. Program requirements are largely based around unskilled workers and it can help engage the massive pool of currently unemployed and underemployed workers across Australia, including in regions at risk of entrenched disadvantage.
- ▶ **Proportionate** – The program can be scaled up or down. Stimulus decisions, by nature, are made rapidly and in a climate of uncertainty. The proposed program enables policymakers to adjust their investment under each of the program options if necessary.

1. Introduction

A conservation and land management program could assist in Australia's economic recovery from the Covid-19 pandemic, creating thousands of jobs in regional areas and improving our natural environment.

Australia faces enormous challenges managing the Covid-19 pandemic. Large parts of the economy have been shut down, with the Commonwealth, State and Territory governments imposing a range of measures to stop the spread of the virus. Key measures have included restrictions on domestic travel, an effective closure of Australia's international border as well as other social distancing measures.

As a result of the success in maintaining the spread of the virus, some states are beginning the process of unwinding the measures. However, the economic shock has been widespread, and it is increasingly likely there will be a sustained period of economic weakness and mounting pressures on government to repair the coronavirus-inflicted economic damage. Governments are keenly examining options to reignite the economy and assist businesses and workers during and after the lockdown.

Australia's conservation and land management sector has developed a broad-based program of environmental investment which governments could rapidly mobilise to stimulate the economy and support severely affected regions. The program involves a range of activities to improve Australia's natural assets and agricultural land which can be scaled to requirements, get Australians into meaningful work quickly and can be targeted to areas where stimulatory assistance is most needed.

The proposed program involves a myriad of conservation and land management investments in the following areas:

- ▶ **Managing environmental threats** – Environmental improvements to remove plastics and debris from Australia's waterways and marine environment, controlling invasive animals and weeds and employing Indigenous rangers to nurture and maintain the environment.
- ▶ **Habitat restoration** – Assisted natural regeneration, revegetating sensitive areas, and restoring river, wetland and coastal habitats.
- ▶ **Infrastructure, building and maintenance** – Building fences, repairing and installing new infrastructure to support bushfire and drought recovery, laying new, and repairing old, infrastructure in Australia's public and private land.

These activities have the potential to boost Australia's agricultural capacity and resilience, improve water quality, and deliver a range of long-term environmental improvements.

EY has been engaged to examine the impact of the proposed conservation and land management stimulus package to support Australia's economic recovery from coronavirus and deliver permanent environmental and social benefits. The analysis has taken a whole-of-economy view to examine different scale programs. The assessment has focused on the potential of the program to jump-start economic activity, limit permanent damage to dislocated regions and avoid entrenching social and labour market disadvantage, as well as yield meaningful environmental returns from governments' program investment.

1.1 Report structure

This report is structured in the following chapters.

Chapter 2 provides an overview of the proposed conservation and land management program, including constituent initiatives to get Australians into productive jobs and improve the environment. Three alternative scale programs are discussed, along with how they could operate to align with the Federal Government's policy framework for stimulus measures.

Chapter 3 examines the key evidence on conservation and land management initiatives. A cross sector approach is adopted, given the breadth of relevant activities and their settings. It provides a broad-based synthesis of current research in, or relevant to, an Australian environmental context in order to highlight where specific environmental investments have strong potential to improve the capacity of the land and avoid environmental costs.

Chapter 4 discusses the economic, environmental and social benefits of the proposed stimulus program. It shows the potential for the program – across its scale and timing alternatives – to provide an immediate boost to the labour market and struggling urban and regional economies and generate lasting environmental dividends.

An assessment of regions which have been severely harmed by the Covid-19 crisis is provided in **Chapter 5**. A framework for regional prioritisation is then set out to support decisions on where the program could be best targeted to shore up local employment prospects and improve policy outcomes.

Finally, **Chapter 6** discusses some key issues for actioning the program, highlighting how it can be targeted, scaled and mobilised to align with good principles for economic stimulus packages and to appropriately manage risks for government.

EY's approach and macroeconomic model and a summary of evidence on conservation and land management activities are provided in **appendices**.

2. Features of the program

More than 70 conservation and land management groups have come together to design a program to get Australians working and to improve our environment. The scheme is targeted, scalable and proportionate to the current economic climate and the needs of the sector.

2.1 Program overview and scale alternatives

The economic effects of Covid-19 have been felt throughout the Australian economy. For several months, the economy has been in a state of temporary hibernation. As a consequence, sectors such as tourism, retail and hospitality have been significantly affected. For many regional areas, the Covid-19 shutdowns have left communities particularly exposed. This period of hibernation has come on top of the devastation caused by recent bushfires and years of drought. These effects have compounded, resulting in substantial job losses and foregone economic output (see Chapter 5.1 for more information on these regional effects).

Recently, a gradual unwinding of restrictions has begun in most states and territories with many businesses beginning to reopen. The navigation out of this hibernation phase will be crucial, and Federal, State and Territory governments are considering a range of additional fiscal measures to support this transition.

In response, the conservation and land management sector have developed a program which could support Australia's economic recovery from the Covid-19 pandemic. An outline of the program is covered in this chapter.

2.1.1 Program features

More than 70 conservation, land management and farming organisations have collaborated to develop a program that will support thousands of unemployed workers and provide a meaningful contribution to the sector. The broad-based program involves a range of activities that could be undertaken in both regional and metropolitan areas. The scope of these activities ranges from restoring natural habitats, to controlling invasive animals and weeds, to building and repairing infrastructure (see Chapter 2.2 for more information).

On top of the environmental benefits associated with the activities, there are a raft of underlying advantages associated with the program. These benefits, which can be seen below, will help drive the success of the program.

Figure 1: Benefits of the program design



Underpinning each of these activities is a commitment to employ low-skilled workers, or workers who have little experience in practical conservation and land management delivery. In fact, preliminary estimations suggest about 67% of the roles in the program will require workers to have no previous experience.¹ Most activities are labour intensive and involve working outside with minimal previous experience. Therefore, it is possible to conduct this work in a Covid-19 safe environment, while maintaining social distancing. As most roles in the program will require minimal previous experience, this increases the available pool of workers who can participate.

This is a key attraction of the program, as it means that workers who have been displaced from their previous jobs in heavily affected sectors (such as tourism) can substitute into conservation and land management roles. Moreover, by allowing workers to move into roles in the conservation and land management sector, it will help to reduce the number of people relying on Job Seeker and Youth Allowance. The long term social and economic benefits of moving people off welfare and into work are profound – those who are unemployed for long periods of time find it increasingly more difficult to find and hold employment. People are more likely to experience longer, and more frequent, spells on welfare the longer they are out of the job market.² This is a particularly potent issue for young people and highlights the importance of encouraging people off welfare and into work.

Not only will these activities allow people to get into work, and engage in meaningful tasks, it will also allow them to accumulate new knowledge. While many of the proposed activities require a low baseline skill level, there is potential for participants to upskill and retrain in conservation and land management roles. Participants are likely to gain important technical skills such as surveying, fencing and occupational health and safety training. There is also an opportunity to build practical and highly transferable skills in areas such as teamwork, communication, leadership and program management. In addition, engagement in the program is likely to build self-esteem, community capacity and job-readiness. This may increase one's future employment options.

The ability to transfer workers from other industries is an attractive program feature, especially for rural areas. Without this option, some communities may suffer from a displacement of workers to

¹ *Delivering economic stimulus through the conservation and land management sector: Program concept - Discussion Draft Version 27 April 2020, (2020)*

² RMIT Fact Check (2020), 'Does being unemployed for a year nearly halve your chances of ever working again?' <https://www.abc.net.au/news/2020-05-08/fact-check-being-unemployed-for-a-year-reduces-chances-of-work/12211296>

areas with higher demand. This phenomenon, which is often referred to as 'brain drain', has the potential to leave vulnerable and remote communities at risk. Activities can be concentrated in areas with large numbers of unemployment, targeting communities who have a larger supply of available workers (see Chapter 5 for more information on the regional effects of Covid-19). The low entry requirements may be particularly effective in engaging with people who are currently out of work and ensuring they stay in the local area.

The conservation and land management sector has a relatively high proportion of female employees across its broad spectrum of activities. There have been increasing concerns about the effects of Covid-19 on women, with females disproportionately affected by the economic crisis. Based on the sector's strong female engagement, the program has the potential to support improved economic opportunities for women.

Another critical feature of the program is the fact that the proposed activities build on existing models. Thus, established and functioning programs can be expanded to adapt to the needs of the region. Notably, there are no costs involved in designing brand new activities. This is beneficial from a risk management perspective and would assist in the timely delivery of the program. Moreover, there is also a high level of shared knowledge among program coordinators, about the success and failure of previous programs, that can be leveraged.

2.1.2 Scale alternatives

It is proposed that the program be funded through a collaborative approach between the Federal, State and Territory governments. These governments would work in collaboration with conservation and land management organisations, to leverage the sector's established delivery mechanisms. This would allow for the investment costs to be shared, while also utilising the combined resources of the prospective parties.

Three potential investment scenarios have been proposed, as can be seen in Figure 2. The level of investment is proportional to the scale and scope of the program. The National Conservation and Land Management Recovery Program is the largest of the three scenarios – it involves a four-year investment totalling \$4 billion and would facilitate the delivery of a national program. This \$4 billion investment reflects the current capacity of the industry to deliver a national level program. The conservation and land management sector believe this level of investment would best service the needs of the industry, particularly given the current economic climate. However, it should be recognised that the programs are not time limited and governments could begin and end the program to match their priorities.

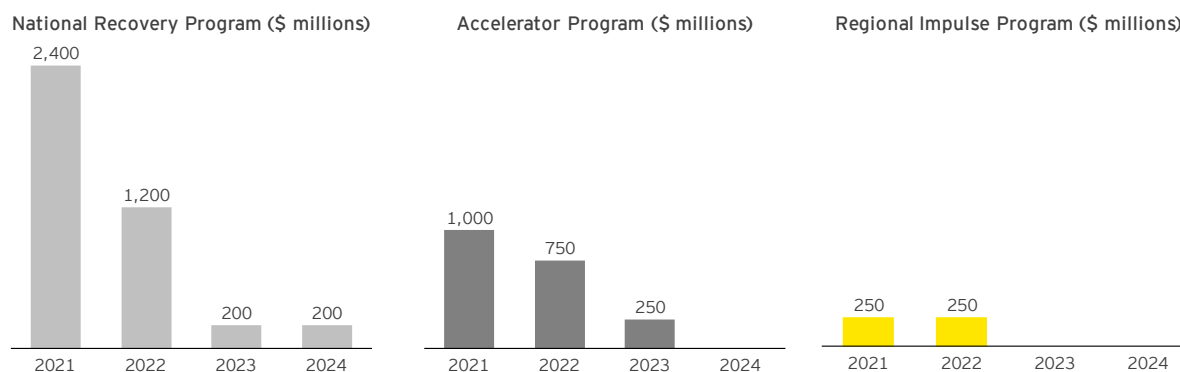
Alternatively, the Conservation and Land Management Accelerator Program would provide less coverage than the previous scenario, while still targeting a considerable portion of the nation. The final scenario is a Regional Conservation and Land Management Impulse Program, which could provide five key regions with \$100 million of investment over two years.

Figure 2: Three investment scenarios



The short-term needs of the economy underpin the investment profile shown in Figure 3. Given the current economic environment, the proposed timing of this investment is concentrated in the first two years. For the National Conservation and Land Management Recovery Program, 90% of the investment is expected to occur in the first two years. This is similar for the Conservation and Land Management Accelerator Program, with 88% of the investment expected to occur before 2023. For the Regional Conservation and Land Management Impulse Program, all investment occurs in the first two years.

Figure 3: Proposed timing of the investment



Of the total investment amount, it is estimated that 75% will go towards salaries for workers, and on-costs, while the remaining 25% will be spent on capital and operational costs. Work by the conservation and land management groups has estimated that for every \$100 million invested in the program, 1000 full-time equivalent (FTE) jobs will be directly created.³ This is based on an annual salary of \$60,000 per worker and an additional 25% of on-costs, bringing the total value of each worker to \$75,000 annually.

2.2 Key program activities

There are a number of prospective program activities that could be undertaken throughout Australia. These activities have been classified broadly into three themes:

- ▶ **Managing environmental threats** – culling invasive animals, controlling the spread of weeds and cleaning up pollution.
- ▶ **Habitat restoration** – restoring natural and coastal environment through revegetation and assisted natural regeneration in addition to coordination with local communities.
- ▶ **Infrastructure, building and maintenance** – investing in infrastructure redevelopment and repairs.

A summary of these activities is shown in Table 2. Potential delivery partners would likely be required to showcase the fact that their work falls under the scope of one of these activities. Such programs should also support the broader national conservation and land management priorities. Moreover, it will be important that existing delivery mechanisms are leveraged. As discussed in Chapter 2.1.1, this reliance on established models is one of the cornerstones of the program.

³ *Delivering economic stimulus through the conservation and land management sector: Program concept - Discussion Draft Version 27 April 2020, (2020)*

Table 2: Summary of proposed program activities

Potential activities	Primary focus
Managing environmental threats	
Weed control efforts	▶ Containment and preventing cross-tenure spread
Invasive animal control	▶ Feral herbivores (such as deer, pigs and goats) and feral predators (such as cats and foxes) that impact on threatened species, as well as farming
Plastics and marine debris clean up	▶ Also developing research to inform future policy decisions
Funding for indigenous rangers	▶ Deliver jobs to vulnerable communities, using existing models
Habitat restoration	
River and wetland restoration	▶ Fencing, revegetation and erosion control
Native revegetation and habitat restoration	▶ In a range of areas including metropolitan, suburban, peri-urban and rural areas, including rehabilitation and creation of safe havens
Coastal habitat restoration and monitoring	▶ In coordination with the fishing industry and local communities
Infrastructure, buildings and maintenance	
Local council, public and private infrastructure	▶ Track maintenance, private estate conservation and park management of fire, weeds and feral animals
Bushfire recovery and resilience activities	▶ Habitat restoration and infrastructure repairs
Fence construction	▶ Prevent grazing of bushland, allow natural regeneration and corridor formation, improve water quality and stop wildlife-car collisions

2.3 The program as a stimulus measure

The program may provide an opportunity for the Federal, State and Territory governments to invest in a scheme that is expected to deliver both short and long term environmental, social and economic benefits. However, given the current economic and fiscal situation that the country finds itself in, the ability for the program to work as a stimulus measure is a notable benefit.

As the country begins to recover from the economic consequences of the Covid-19 crisis, the timely nature of this mechanism should not be understated. For the Government, the largest short-term benefit of investing in the program is the injection of a large sum of money into the economy. In addition, the program itself fits in well with the Federal Government's policy objectives.⁴ In particular, the program is:

- ▶ **Temporary** – the program does not require a long-run fiscal commitment and is concentrated on the short-term time horizon, meaning it should not impact long-run environmental funding for projects.
- ▶ **Targeted** – the program is targeted at alleviating some of the key social and economic concerns of regions affected by Covid-19, as well as the bushfires and drought.
- ▶ **Timely** – the design of the investment schedule for each scenario is concentrated in the next two years, to reflect the needs of the economy and the necessity to employ displaced workers.
- ▶ **Scalable** – the program has been designed in a way that can be built up in scale and scope, depending on the number of regions targeted.
- ▶ **Proportionate** – the three levels of investment being considered are proportionate to the needs of the sectors and the economic challenges the country is facing.

⁴ Prime Minister (2020), 'Economic Stimulus Package', *Prime Minister of Australia*, <https://www.pm.gov.au/media/economic-stimulus-package>

3. Environmental and social benefits of the program

Conservation and land management activities in the proposed program have the potential to generate wide ranging environmental and social benefits across Australia.

3.1 Taxonomy of conservation and land management activities

There is large scope for the conservation and land management sector to provide strong economic benefits to the Australian economy in a time of turbulence and uncertainty. The proposed program activities can be targeted to support Australia's most vulnerable regional communities (see Chapter 5 for more information on the regional impacts of Covid-19). A key advantage of the program is the relatively low skill requirements of many of the roles. However, while the activities focus on low skilled workers, there is also an important role for experienced conservation and land management workers to lead projects and drive results.

The proposed program will create jobs in the conservation and land management sector while delivering associated environmental, social and economic benefits throughout regional, rural and urban Australia. To demonstrate how these associated benefits will be achieved over the short and longer-term, a program taxonomy has been developed that captures three key activity areas (Figure 4). These activity areas are each supported by several program activities. The featured activities were selected as they are expected to be most widely undertaken types of projects. By grouping activities in this manner, we can examine the types of benefits they may generate. A lack of specific knowledge of each activity, its location, as well as the scale and scope mean that detailed analysis is not practical.

Managing environmental threats is typically concerned with reducing, minimising and eliminating man made influences. This includes waste or introduced flora and fauna that cannot be controlled naturally. Indigenous rangers also play a critical role in managing environmental threats on both land and sea. Habitat restoration involves activities that aim to assist in natural regeneration specific to the relevant habitat. Activities also involve working to rehabilitate and preserve native environments. These activities bolster the resilience of the environment and remove the need for costly interventions down the track. There is an emphasis on restoring ecosystems that act as the fundamental regulators of natural resources. This helps to maintain the balance of economic and biological sustainability and achieve maximum benefits, for example, through increased fish stocks.

Infrastructure, building and maintenance is concerned with activities that improve natural land management. This includes improving national parks, in addition to other local government infrastructure such as bushland parks and access to beaches as well as private land. Other activities include fence construction (for pest control, grazing, water quality and farming improvements) as well as infrastructure to manage natural disasters such as drought and bushfires.

While these activities have been identified broadly, their specific composition is still to be decided. This includes details of the specific projects, their geographic targeting and the exact project design. The taxonomy, and its relationship to the overarching program benefits, are explored in further detail in Chapter 3.2. In reality, some program activities may fall under multiple activity areas. For example, the tasks undertaken by Indigenous rangers span across many areas, however, in this taxonomy the work has been classified under the 'managing environmental threats' area.

Figure 4: Program taxonomy

Activity Area	Program Activity
Managing environmental threats	Invasive animal control
	Plastics and marine pollution clean up
	Weed control
	Indigenous rangers
Habitat restoration	River, wetland and coastal habitat
	Assisted natural regeneration
	Native revegetation
Infrastructure, build and maintenance	Local council, public and private infrastructure
	Fence construction
	Bushfire and drought recovery

3.1.1 Approach to analysis

A comprehensive review of domestic and international literature was conducted to identify the benefits of these activities. The analysis synthesises a range of studies to breakdown the potential benefit of the activities. There are several channels through which this benefit can be generated, namely through avoided costs, improved productivity and environmental benefits. Where possible, benefit cost ratios (BCRs) have been identified to demonstrate the potential scale of the benefit that has been experienced and thus, illustrate the expected benefit of such activities.

3.1.2 Key findings

The analysis of the three activity areas and supporting program activities indicates the conservation and land management program has the capacity to deliver:

- ▶ Immediate social and environmental benefits through strengthening regional and urban communities, while delivering immediate environmental improvements.
- ▶ Long-term social and environmental benefits through sustained uplifting of regional and urban communities and enduring environmental resilience.

Appendix B provides a summary of the key benefits of each activity area and program activity, supporting BCRs and the key benefits delivered through each BCR.

3.2 Description of potential benefits of program activities

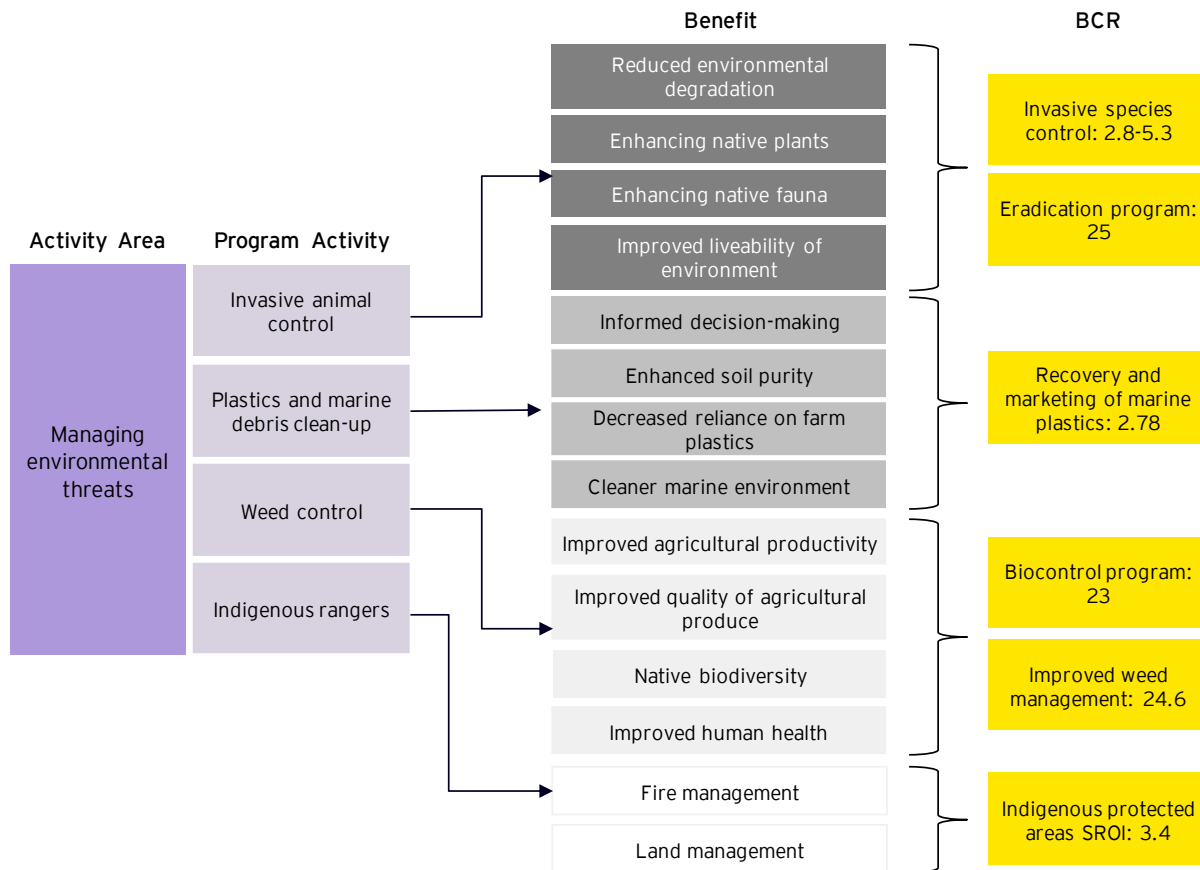
3.2.1 Managing environmental threats

The managing environmental threats activity area targets:

- ▶ Invasive animal control
- ▶ Plastics and marine pollution clean-up
- ▶ Weed control
- ▶ Indigenous rangers

Figure 5 highlights the anticipated benefits of each program activity, with supporting cost benefit ratios. Whilst not explicitly mentioned in the benefits, the activities would all contribute to aiding skill and knowledge development in addition to those listed.

Figure 5: Managing environmental threats benefits



Invasive animal control

The review found domestic invasive animal control programs limited the presence of unwanted species to levels manageable for property and land managers, or, eliminated the presence of the species altogether. These reductions were found to deliver positive environmental outcomes including improvements in the quality of local land and enhanced preservation of native species of flora and fauna. These activities enhanced liveability of the local environment for native and protected species, ultimately delivering greater prosperity for local ecosystems. Invasive animal control activities can deliver enhanced biodiversity outcomes. This enhances local amenities and has the capacity to lead to other important outcomes such as improvements in ecosystem services, which can then improve outputs agricultural productivity.

Further, improved controls and measures have the capacity to alleviate resource and time pressure on land managers to mitigating the impacts of invasive species, which may include land degradation or the endangerment of local flora or fauna. Reduced pressure on land managers to control invasive animals optimises their available time and resources and limits adverse wellbeing outcomes associated with pest management. In the longer term, this has the capacity to deliver increased individual productivity outcomes while reducing pressure on the public health system.

The recent bushfires and drought have had a significant effect on many regional areas. One consequence of these events is the fact that there has been a reduction in pest species. Moreover, land has been cleared and this has increased access to controlling these species. Therefore, it is an opportune time to engage in invasive animal control.

A review of various cost benefit analyses of invasive animal control has revealed positive benefit to cost ratios of 2.8 up to 25. These benefits are shown to accrue predominantly to producers through avoided cost or avoided reduction in the supply of stock. Because invasive animals frequently affect numerous agricultural sectors, these benefits were shown to accrue to various sectors. Similarly cost benefit analysis was not necessarily for one particular animal control program. In addition to the producer benefits, consumer benefits were also found to accrue. Some benefits were also shown to accrue to consumers owing to changes in prices and supply from invasive animals. It is likely that conservation and land management activities that assist in invasive animal control will affect the input costs of farmers in much the same way. It is therefore reasonable to conclude that there will be benefits from a producer and consumer surplus point of view. These benefits include a change in supply and cost inputs to agriculture.

Plastic and marine pollution clean-up

For the purposes of the analysis, land plastic clean-up was separated from marine management due to the variation in activities and the differing outcomes achieved through these activities.

For land management, a range of innovative domestic initiatives are currently underway to remove plastics in soil, increase recycling of materials and reducing dependence on farm plastics.⁵ These activities are delivering improved outcomes in regard to soil quality and purity, while expanding research and development around use of biodegradable alternatives. Moreover, these innovative activities are contributing directly to improved productivity of land through reducing the presence and impact of plastics, as well as enhancing soil quality.

Marine pollution clean-up exercises deliver short-term environmental benefits to aquatic and land-based species, while over the longer term improve the safety and cleanliness of the marine environment. The reduced presence of plastics improves social amenity through delivering a more pristine local environment, strengthening the appeal for both domestic and international tourists. Further, decreased plastics improve ocean and land-based productivity outcomes through limiting the interaction of local species with introduced, harmful materials. Secondary benefits to the commercial and recreational fishing industry are also realised through the direct improvement on marine species' health and fecundity.

The cost benefit analyses examined marine pollution and plastic clean ups. On a financial basis these were found to not be viable, based on recycling and other costs. When social impacts were included, the BCR was found to be 2.78. These social benefits have been estimated as a percentage of the marine economy and the expected avoided damages as a result through a value transfer method. The benefits from this study are illustrative of the kinds of benefits that could be achieved through the proposed program. It is unlikely that these specific values are transferable and should be used as illustrative only.

Weed control

The analysis found weed management programs deliver enhanced environmental outcomes by improving the production of local or intended flora, while reducing risks associated with harm to native fauna or livestock. These activities contribute to the enhanced quality of agricultural produce, creating positive health outcomes for consumers and delivering enhanced reputational and commercial outcomes in domestic and international markets.

Over the longer-term, effective weed management enhances biodiversity outcomes and strengthens local ecology, while increasing the availability of time and resources for land managers otherwise tasked with weed control efforts. This is essentially an avoided cost argument for improved productivity.

⁵https://www.nswfarmers.org.au/NSWFA/Posts/The_Farmer/Environment/How_farmers_can_give_agricultural_plastic_waste_the_flick.aspx

Following the drought and bushfires many regional areas are presented with a unique opportunity for weed control due to the easy access to bushlands. Moreover, a large percentage of weeds have already diminished, significantly reducing costs.

Research and development efforts into biocontrol programs were found to yield a 23 BCR, while direct weed management programs delivered a 33 BCR. It is important to note that these cost benefit analyses were conducted for research and development programs. Therefore, the scale of benefits may not be transferable to the program activities being considered here. In these studies, benefits were found to accrue to producers (graziers, agribusiness) and consumers in the form of increased income from the control of the weed. Given this, it is reasonable to conclude that similar types of weed control programs can deliver similar benefits to producers and consumers. The weed control activities, depending on the specific activities that are undertaken, are likely to deliver these similar types of benefits that will accrue to both producers and consumers in the form of lowered input costs or increased outputs. While the scale of the benefit is not transferable the composition of the benefits and general structure of the benefit (e.g. that positive benefit is delivered) is likely to hold true.

Indigenous rangers

The analysis found that Indigenous rangers engage in meaningful activities that produce a range of benefits. In their role, Indigenous rangers draw upon their ancestral knowledge to protect and manage the nation's land and sea country. Over 40% of Australia's National Reserve System is declared Indigenous Protected Areas (IPAs).⁶ This is particularly important, as many of Australia's threatened species are on Indigenous land.

The literature reveals a wide array of environmental benefits associated with Indigenous land management. These include lower rates of weed infestation, healthier fire regimes, increased action in border protection, quarantine, fire management, wildlife abatement, carbon sequestration, weed and feral animal control and fisheries management.

A 2016 review for the Department of Prime Minister and Cabinet found that there was a social return on investment (SROI) of 3.40 for every dollar spent on Indigenous Protected Areas.⁷ The areas that employed Indigenous rangers reported even higher returns than other protected areas. This is largely due to lower costs of land management, particularly fire management. Additional benefits included local engagement and skill accumulation for workers. This accrued knowledge can then be transferred to other members of the community.

Providing Indigenous people in remote communities with employment opportunities is a critical benefit. The recent Closing the Gap Report 2020 noted that the Indigenous employment rate is considerably lower in remote areas.⁸ Moreover, there are also commercial benefits for Indigenous businesses associated with Indigenous ranger program – about 40% of Indigenous ranger programs run through commercial entities.

There were also a number of avoided costs due to public health system savings, lower imprisonment rates, fewer alcohol related felonies and lower government expenditure on public housing. One study found that lowered blood pressure levels, lower diabetes and heart attack risks associated with Indigenous land management investment saved one rural community \$260,000 annually.⁹ In the western desert of Pilbara, Western Australia, Working on Country programs run by

⁶ <https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/natural-resources/landcare/submissions/ilm-report.pdf>

⁷ <https://www.niaa.gov.au/sites/default/files/publications/Warddeken%20SROI.pdf>

⁸ <https://ctgreport.niaa.gov.au/sites/default/files/pdf/closing-the-gap-report-2020.pdf>

⁹ <https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/natural-resources/landcare/submissions/ilm-report.pdf>

Kanyirninpa Jukurrpa produced cost savings of \$13 million over five years.¹⁰ This was due to lower imprisonment rates, lower alcohol-induced crime and due to other services delivered to the community. An alternative review found that Working on Country program costs were 17% to 23% less than the 'book' costs, due to increased taxation revenue and a decrease in welfare payments.¹¹

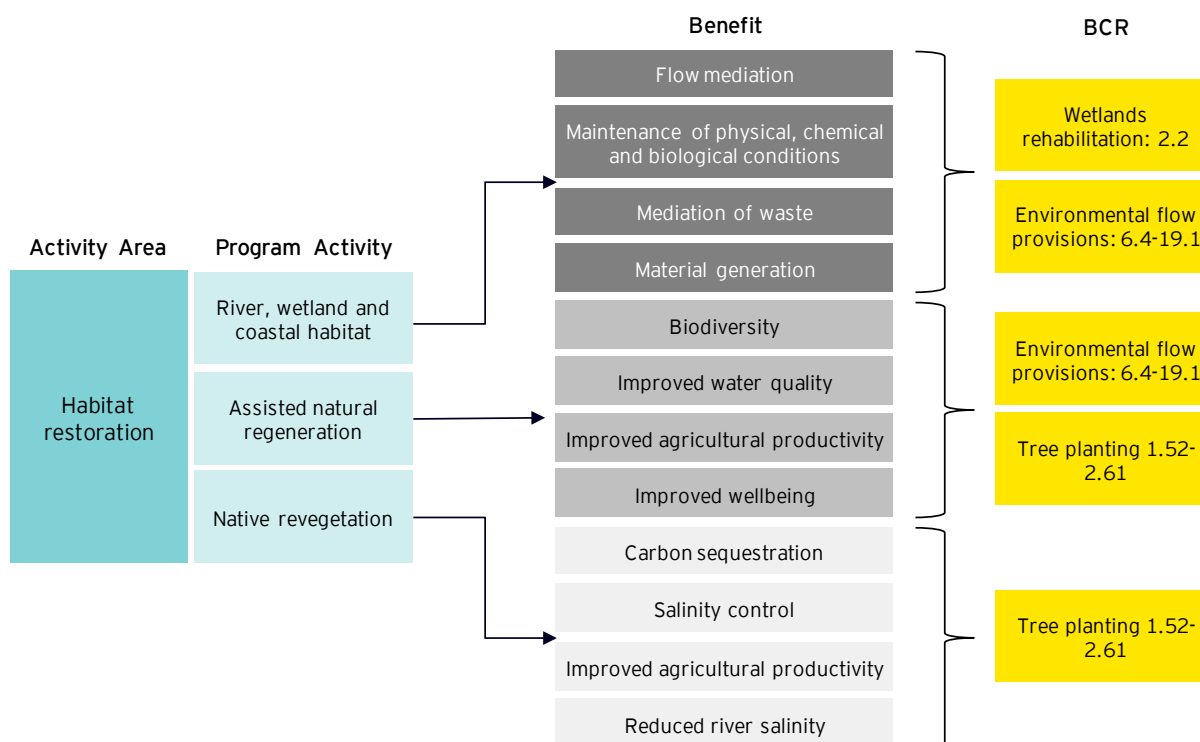
3.2.2 Habitat restoration

This activity area considers the rehabilitation and preservation of marine and land habitats through:

- ▶ River, wetland and coastal habitat restoration
- ▶ Assisted natural regeneration
- ▶ Native revegetation

Figure 6 depicts the anticipated benefits of each of these program activities and provides supporting BCRs to highlight the benefit achieved through similar programs. The benefits from habitat restoration are varied, and the source of these benefits is often multifaceted, particularly given the interlinkages of ecosystem services. All the included activities would also have skill and knowledge development benefits as a result.

Figure 6: Habitat restoration benefits



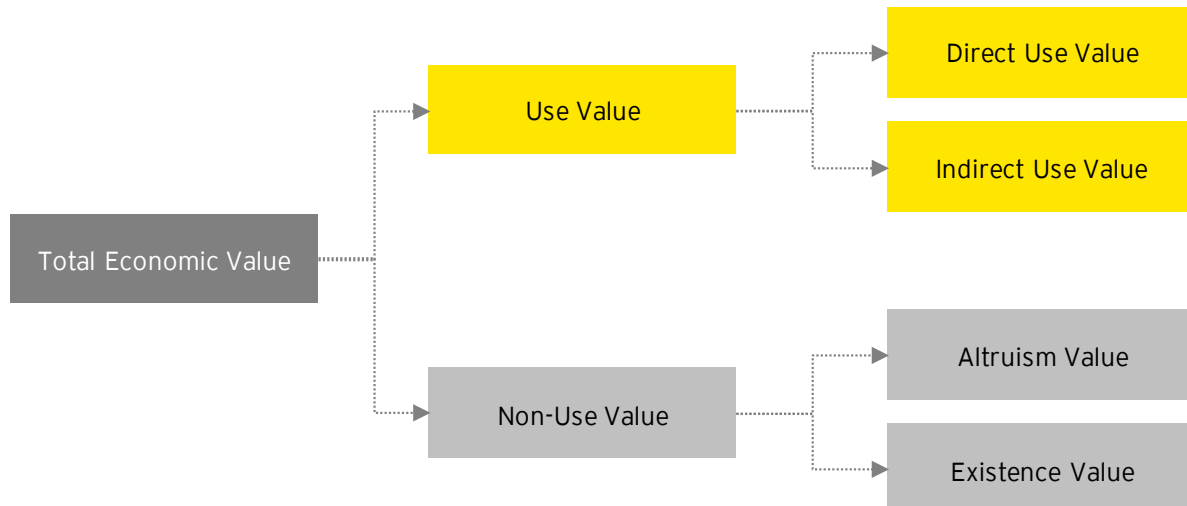
Given the interlinkages and the ability of these benefits to be generated by all activities, this section will talk about the benefits as one.

Program activities

Habitat restoration has the potential for far reaching economic benefits. The economic value generated by these activities can be broadly split into both use and non-use value (Figure 7).

¹⁰ <https://www.pewtrusts.org/~media/post-launch-images/2015/11/economicandsocialbenefitsindigenouslandwhitepaper.pdf>
¹¹ <https://treasury.gov.au/sites/default/files/2019-03/360985-Pew-Charitable-Trusts.pdf>

Figure 7: Types of Economic Value



Note: Adapted from Productivity Commission "A guide to Non Market Valuation", 2014

Direct use values are the value of goods and services derived from the environment. This could include agriculture, tourism, recreation or other resource extraction. Non-use values include the intrinsic value that the public might hold for a good – often referred to as the 'warm glow effect'. For example, someone in the Australian community may never visit the Great Barrier Reef, but its existence can still bring them satisfaction. Other non-use values may be derived through ecosystem services such as cultural knowledge and traditions. Together, non-use and use values combine to equal the total economic value of an activity.

Proposed activities for rehabilitation of habitats include revegetation and assisted natural regeneration. The ecological functions, and economic and societal benefits, from these habitats are vast. Often, these benefits are externalities and are not included within a market. In other words, costs are not attributed to anyone directly. As a result, they are taken advantage of as a public good. The benefits of these functions include:

- ▶ Climate regulation and influence on local precipitation
- ▶ Storm surge protection
- ▶ Prevention of saline intrusion
- ▶ Sediment and nutrient cycling
- ▶ Existence, bequest and altruistic value
- ▶ Health
- ▶ Waste Decomposition
- ▶ Food and other raw materials
- ▶ Water storage/transport
- ▶ Biodiversity
- ▶ Flow regulation
- ▶ Erosion control
- ▶ Recreation and tourism

These benefits can be directly attributed to the long-term economic benefits. They typically fall under consumptive or non-consumptive use values or non-use values. Consumptive uses include direct resource harvesting and water supply. Non consumptive use values are both direct and indirect. Direct uses include recreation, transportation, aesthetics and tourism while indirect are some of the most important, including habitat support, flood control, pollution control and erosion protection. These can directly create impact through avoided costs and agricultural productivity.

An example of a use value is the increased fish population resulting from the rehabilitation of fish habitats. By naturally allowing fish to increase their stock size, the social and economic benefits from recreational and commercial fishing increase.

A flow on benefit of undertaking these restoration projects is the enhanced resilience of the ecosystems. This enables regeneration with less (or even no) human intervention following an episodic event such as drought or fire. The costs of intervening are far less than what would be required for restoration down the track, particularly if the degraded environments face a further negative attack. By creating safe havens through removing key threats to native plants and animals, affected species are able to thrive given their new protected position and be allowed to recover, increasing their populations.

When accounted for, the rehabilitation of ecosystems produces significant benefit. A meta-analysis of international studies considered the following valuations, shown in Table 3 on a \$/ha/year basis:

Table 3: Ecosystem valuations from literature

Ecosystem	\$ per ha per year
Wetlands	\$252,861
Forests	\$6,855
Coastal	\$16,134
Rivers/Lakes	\$22,570
Grasslands	\$7,515

Note: values converted using PPP and escalated to 2020 dollars. Source: Costanza, Groot, Sutton, Van der Ploeg, Anderson, Kubiszewski, Farber, Turner (2014).

These valuations are global in basis and a synthesis of multiple studies. Therefore, they do not necessarily relate to specific parcels of land; however, they do give a general overview of the average economic value that each of these ecosystems delivers to society.

Further evidence of the benefits provided from habitat restoration can be drawn out from a review of various habitat restoration cost benefit analyses. The analyses each had benefit cost ratios ranging from 2 to 19.

These analyses cover various habitat restoration activities, including wetlands rehabilitation, tree planting and revegetation. These activities have resulted in broader public benefits such as biodiversity improvements. They also have direct use benefits including ecosystem services such as water quality improvements, carbon accumulation, nutrient retention and increased farm productivity due to avoided loss benefits from flood mitigation. Other benefits found in the review through non wetlands restoration and other general habitat restoration activities included improved farm productivity, avoided infrastructure costs (through reduced salinity corroding key infrastructure) and provisioning services such as timber sales.

The evidence of clear benefit from a use perspective is apparent from these activities and these benefits last in perpetuity or until the habitat is damaged in some way. The benefits accrue to both society but also, importantly, to productive uses (for example, increasing producer and consumer surpluses by improving margins). While the specific scale of these improvements cannot be directly attributed to the proposed conservation and land management activities, it is likely that these longer-term efficiencies and productivity benefits will be apparent from the proposed activities given the similarities.

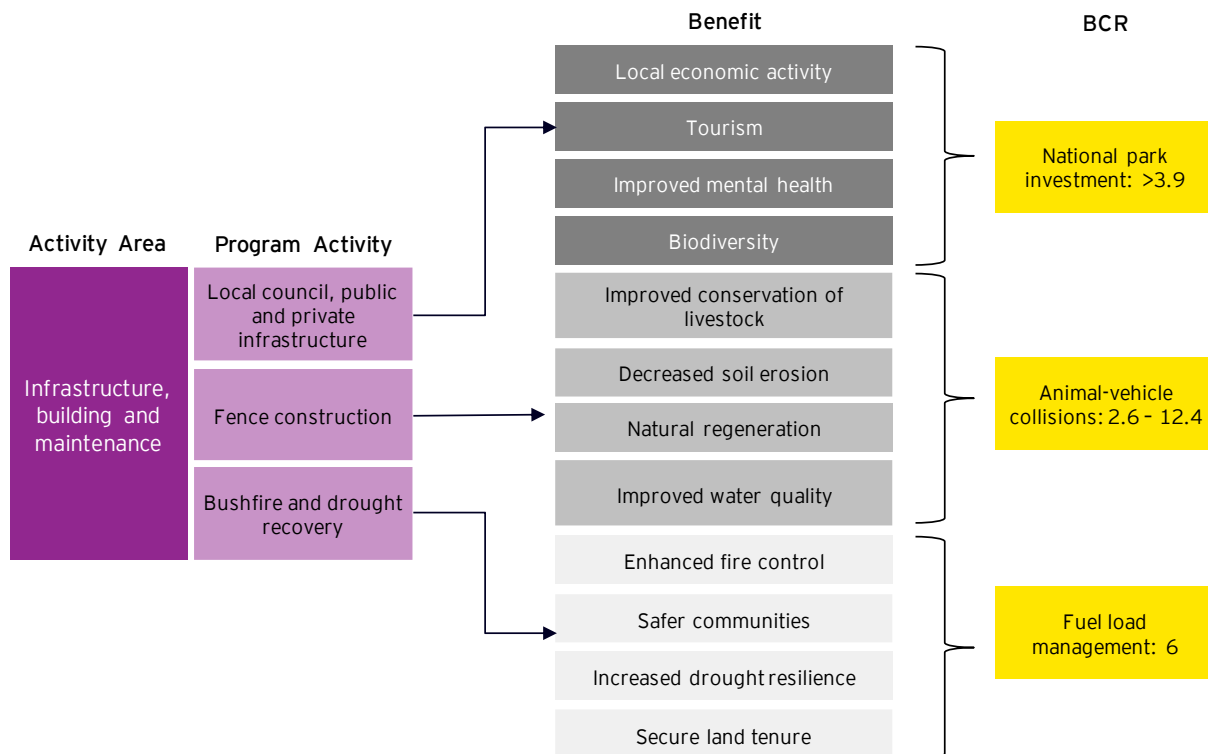
3.2.3 Infrastructure, buildings and maintenance

The infrastructure build and maintenance activity area focuses on:

- ▶ Local council and private infrastructure
- ▶ Fence construction
- ▶ Bushfire and drought recovery

Figure 8 depicts anticipated benefits of these program activities, with supporting cost benefit ratios. Other benefits arising as a result of the program include, but are not limited to, development of new knowledge and skills base, increased community member utility and mental health benefits.

Figure 8: Infrastructure, buildings and maintenance benefits



Local council and private infrastructure

The analysis found that over the long-term, investment in national park infrastructure increased local tourism, which created avenues for more diverse growth in local and regional economies; for example, through the development of tours or accommodation options. National park investment was also found to create positive biodiversity outcomes through enhancing the protection of native species, creating sustained ecological outcomes over the longer-term for native flora and fauna.

Research has revealed that built infrastructure plays the largest role in determining recreational demand for national parks in NSW.¹² Namely, the role that built infrastructure plays in driving national park site demand was tenfold in comparison to other factors such as remoteness or natural site values. Roads and parking facilities, which enable site access, were key determining factors. Another study found that national parks provide value through three key areas: improved local housing values, local business stimulus and increased local funding pathways.¹³ Similarly, in the US, one study found that government investment in national parks carried a BCR exceeding 3.9, due to visitation and an increase in private sector economic activity.¹⁴

¹² Heagney, C, Rose, M, Ardeshiri, A. & Kovač, M. 2018, "Optimising recreation services from protected areas- Understanding the role of natural values, built infrastructure and contextual factors", *Ecosystem Services*, 31, pp.358-370

¹³ Heagney, E.C., Kovac, M., Fountain, J. & Conner, N. 2015, "Socio-economic benefits from protected areas in southeastern Australia", *Conservation Biology*, vol. 29, no. 6, pp. 1647-1657.

¹⁴ <https://www.npsa.org/resources/1109-the-u-s-national-park-system-an-economic-asset-at-risk>

A recent study also found that visits to national parks have a direct link to improved mental health.¹⁵ The current costs of poor mental health in Australia amount to approximately 10% of GDP, while access to national parks is found to improve attention, cognition, sleep and stress recovery. The study estimates that without parks, costs of poor mental health in Australia would rise by \$145 billion a year. This direct recreational value ties in with the ability for national parks to act as a tourism booster. National parks and similar natural capital are part of Australia's natural value proposition to overseas visitors. Increasing or protecting this value proposition will lead to flow on effects for tourism when overseas visitors are choosing their destinations.

Other local government infrastructure, such as reserves, maps and signage, beach access points, green infrastructure such as solar panels and public facilities also contribute significantly to improving social benefits through recreational use, as well as economic benefits from increased tourism. Investment in such infrastructure promotes environmentally friendly practices, such as sticking to clear paths rather than disturbing the soil and vegetation. Supporting the provision of natural infrastructure, such as actively managed constructed wetlands, community gardens or urban forests, will provide larger benefits than what would have been realised from natural systems. They may provide enhanced gains including improved water, soil and air quality, floodwater retention, risk management from natural hazards and climate resilience.

Public land is only part of the picture, where 70% of land across Australia is privately owned and holds some of the most precious ecosystems.¹⁶ Many programs exist, both government and non-government run, which partner with landowners in order to conserve and protect the natural flora, fauna and landscapes. It is becoming increasingly popular for farmers and private landowners to help protect their valuable habitats by volunteering to place conservation covenants over parts their properties that would otherwise not be used. Some simply choose to work alongside organisations to insert sustainable infrastructure and conservation management plans rather than entering into a contractual agreement. Entering a covenant has clear economic benefits to the private owner who signs on, as in return for agreeing to protect the area landowners are supported in weed and fire danger management, water and soil quality, and often receive income benefits such as tax relief. The resulting environmental benefits however are even more profound. Several threatened plant and animal species are only found on private land where historically it would have been up to the individual to protect without outside help. With these partnerships a far greater area can be preserved and managed sustainably under supervision.

Fence construction

Fence construction activities were found to improve land managers' capacity to protect native species, crops and livestock, while delivering the dual benefit of enhanced control over the movement of farmed or native animals. Natural fencing, delivered through planting of vegetation, was also found to reduce soil erosion and salinity, improving the productivity of land. In addition, fencing of natural and constructed water ways significantly improves water quality, particularly for waterways inhabited by livestock.

Over the longer-term, it was found that more effectively controlled and protected properties afforded land managers an opportunity to diversify their offering. For example, land managers were able to offer education, research and ecotourism. Cost benefit analysis of fence construction was found to have a positive benefit.

A key benefit of fence construction is the prevention of wildlife car interactions. One study, from the US, found that benefit cost ratios ranged from 2.6 to 12.4, for constructing a 2.4 metre fence

¹⁵ <https://news.griffith.edu.au/2019/11/13/research-estimates-value-of-impact-national-parks-have-on-mental-health/>

¹⁶ Bank Australia. 2017, "What is private land conservation?", <https://www.bankaustralia.com.au/about-us/news/planet/private-land-conservation/>

to reduce deer-vehicle collisions.¹⁷ Benefits predominately stemmed from the costs of vehicle damage. These findings are merely illustrative of the potential benefits of fence construction.

Bushfire and drought recovery

Technical fire management and community-based risk reduction programs were found to be highly effective at decreasing the adverse environmental and social impacts of bushfires. For example, fuel load reduction efforts were found to effectively enhance control of fires, while enhanced data analysis and predictive technology permitted greater anticipation and proactivity in fire management. These activities contributed to both the perceived and technical safety and preparedness of community members, leading to reduced fear and anxiety around the potential impact of bushfires.

Over the longer-term, these activities have the capacity to reduce both the number and size of insurance claims and the anticipated public expenditure to address the fire recovery. A strong net benefit for enhanced fire management activities is credited to fuel load reduction efforts (independent analysis suggests a BCR of around 6 for these activities).

Investment in drought recovery programs was found to enhance the drought resilience of land in the immediate term, and in the longer term contributed to both a literal and perceived sense of security from the effects of drought. Activities such as building dams and improving irrigation techniques improve the productivity of farms and smooth out revenue curves as farms can withstand adverse conditions for longer. This has the potential to deliver improved productivity outcomes through greater certainty around the presence and sustained availability of local water supplies.

Cost benefit analysis found that activities related to the reduction of fuel loads for bush fires through both mechanical reduction of fuel and fuel reduction burning produced significant benefits. These benefits were predominantly avoided costs with reduced damage to infrastructure, damage to crops and livestock, damage to natural resources, emergency response costs, household costs and other commercial costs. These same benefits are likely to accrue from the activities undertaken in the proposed program and thus the activities could be expected to result in a positive benefit for the same reason.

¹⁷ Reed, D, Beck, T, Woodard, T (1982). Methods of Reducing Deer-Vehicle Accidents: Benefit-Cost Analysis. Wildlife Society. Vol. 10, no. 4, pp.349-354

4. The economic, social and environmental benefits of the program

Modelling shows the proposed program generates substantial benefits to the national economy. Over the period to 2040, the four-year National Recovery Program has the potential to generate 62,000 jobs and increase economic output by \$9.3 billion.

4.1 Economic impact modelling approach

The economic impact of the proposed programs are assessed using EYGEM, EY's in-house computable general equilibrium (CGE) model of the Australian economy. CGE models are used extensively by the Australian Government to assess the economy-wide impacts of major policy changes and economic developments. A description of the EYGEM model is presented in Appendix C.

The approach to the economic impact analysis is to first ascertain the key drivers and primary impacts behind each of the proposed programs and then apply them in our model, which estimates the economy-wide impacts. By doing this, the interactions of the primary impacts with the broader economy are captured, including the flow on benefits. These include things such as the benefits that flow to businesses that supply the programs and the consumption benefits that flow from employment generation.

Three scenarios are modelled to reflect the three proposed programs:

- ▶ The National Recovery Program ("Recovery Program")
- ▶ The Accelerator Program ("Accelerator Program")
- ▶ Regional Impulse Program ("Impulse Program")

The year-on-year total costs, direct employment and wages and the operational costs, are based on the proposed program specifications (Chapter 2).

Our economy-wide modelling also considered any potential flow-on benefits of undertaking conservation and land management programs. A detailed taxonomy of the potential benefits is outlined in this report in Chapter 3.1.

For each of these scenarios, detailed background analysis was undertaken to estimate the value of flow on benefits accruing to the agricultural sector and to infrastructure through to 2040. The estimates are driven by findings in the literature for similar types of projects.

The modelling parameters are based on the results of our cross-sectoral analysis of the scale, timing and composition of returns to investment in the conservation and land management sector. Our environmental scan (Chapter 3.2) indicated that there is the potential for much higher returns on investment in some parts of the conservation and land management sector. This is particularly true for investment in vulnerable areas and in the agricultural space. To capture these potentially higher returns, our modelling also considers a more optimistic scenario, in addition to our central assumptions.

While there has been considerable attention to derive appropriate estimates of the productivity gains, there is significant uncertainty about the scale of these gains, especially recognising the role of localised factors which may moderate or amplify the potential benefits. The economic modelling adopts a conservative approach to guide to quantification of the productivity impacts. However, as a complement, the study also examined a potential maximum or 'outer-envelope' scenario which

recognises the productivity benefits which could be achieved over the long run if all productivity gains and cost savings from conservation and land management investments are fully realised.

The economic benefits were estimated over a 20-year time horizon, over the period (financial year 2021 to 2040). The time horizon includes the initial stimulus-intensive phase (from 2021 to 2024) and the longer-term phase (from 2025), when the productivity gains begin to flow. A discount rate of 7% was adopted.

4.1.1 Estimating the direct economic impacts

This study examined the potential direct impacts to economic activity of a broad-based conservation and land management stimulus program. In estimating the impacts, the study has included benefits made potentially available by the program, broadly construed, as canvassed in Chapter 3. These direct effects provide the policy 'shocks' to the quantitative whole-of-economy model (EYGEM), relative to the business-as-usual base case.

The impacts should be recognised as real market impacts. That is, they represent changes in the real economy in terms of market prices, consumption, output and income to producers and consumers. These are constituent elements which comprise national income or Gross Domestic Product (GDP). The estimated year-on-year direct effects from the program therefore indicate the additional economic activity through GDP from delivering the program.

Under this market-based approach, the analysis does not include non-market and intangible benefits which may also be achieved through the program such as improvements in natural amenity. Many of these potential benefits are captured within the cost benefit analyses examined in Chapter 3. Key differences between economic impact and cost benefit analysis are highlighted in Box 1.

Incorporating cross-sector benefits

Review of available evidence on conservation and land management activities in Australia and overseas was used to assess the impacts of the stimulus program. This involved evaluating the scope of potential investment, noting that specific program activities and where they may take place are still to be identified, assessing how these streams might impact on land use productivity and lower costs to businesses and consumers, and the time scale over which these impacts are likely to occur.

In this regard, the cross-sector review of evidence was instructive in some key areas:

- ▶ It provides clear evidence that economy-wide gains are cumulative over time, with full benefits often materialising beyond a period of 10 years as conservation and land management investments mature.
- ▶ It highlights that the distribution of benefits can be wide-ranging. In particular, program activities as proposed can lead to deep and persistent gains to agricultural capacity, lower production costs, better returns from complementary investments, and broader improvements in productivity.

Both aspects have been integrated in the analysis via the pace and intensity of potential benefits arising from the stimulus program. In each scenario, the central and the outer envelope scenario, the rates of changes in potential gains from program investments occur broadly and gradually. There is little differentiation between the scenarios over the short term (the immediate Covid-19 stimulus period), with benefits becoming more pronounced after a decade or so.

The potential direct impacts of the proposed stimulus program, as guided by available evidence, is summarised in Table 4.

Table 4: Potential direct benefits from conservation and land management stimulus program

Direct program investment impact	Nature of potential benefit	Scale of long-term impact	
		Central scenario	Outer-envelope scenario
Agricultural capacity and productivity	Higher national agricultural output from improving environmental resilience and addressing key environmental impediments Increased operational efficiency and lower costs for agribusinesses	Lower agricultural costs of around 1%, compared to current costs, over the 20-year program investment period	Agricultural capacity and productivity
Economy-wide productivity and business costs	Improved productivity by improving the conditions for regional and urban capital investments Lower costs for businesses, especially in regional areas, arising through reduced O&M costs and enhanced infrastructure durability	Lower cross-sector business costs of around 0.4%, compared to current costs, over 20-year program investment period	Economy-wide productivity and business costs

Source: EY Analysis

Box 1: Economic impact and cost benefit analysis

This study has examined the **economic impact** of a proposed conservation and land care stimulus package. Specific activity components which could be delivered within the broader program were examined in Chapter 3, including the form and scale of their potential economic and social benefits. Individual conservation and land management projects are typically evaluated using **cost benefit analysis**. The differences between economic impact and cost benefit analysis are summarised below.

Economic impact analysis

This form of analysis estimates the economic benefits of a program/project or industry to national or regional economies. Typically, economic impact studies use financial and economic data to generate estimates of output, GDP and employment associated with changes in the level of economic activity resulting from the project or industry being analysed.

Economic impact analysis, such as that undertaken for this study, account for the interlinkages in the economy. That is, it captures the distributional effects as different parts of the economy like consumers and industries transact. In this way it measures of the total economic importance of a program or project operations as they flow through an economy over time.

Economic impact analysis has some important limitations. While it uses standard measures of economic activity – GDP, jobs, wages, tax revenues etc – it does not include some non-market and intangible effects that can impact the living standards of Australians. These could include depletion of natural resources, habitat loss or localised air pollution. It does not also explicitly account for the costs of undertaking a program or project, with the cost of investing a dollar in a project what it could have produced in an alternative use (its opportunity cost).

Cost benefit analysis

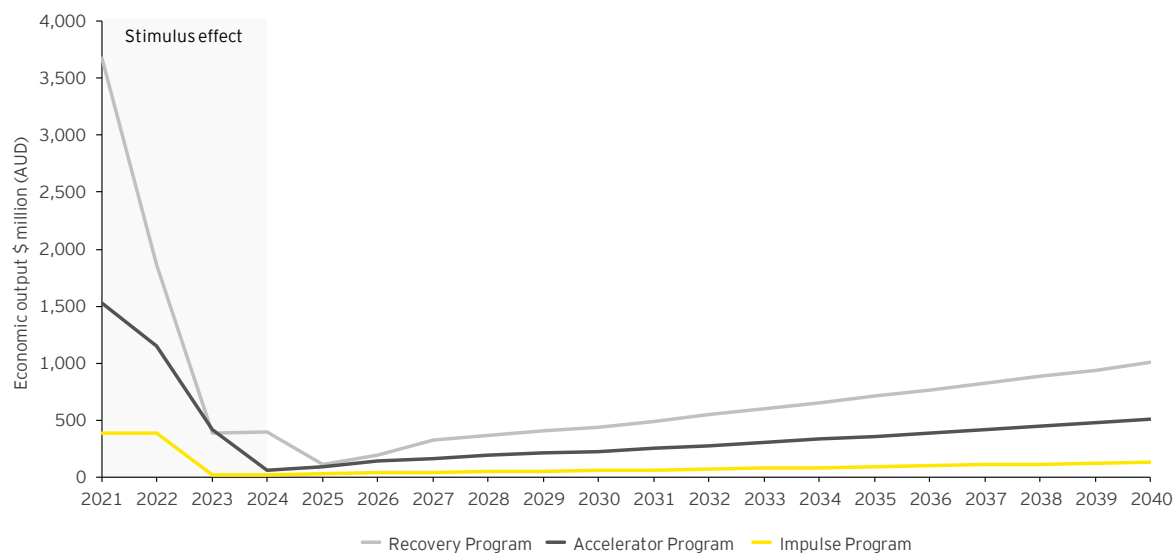
The purpose of a cost benefit analysis is to allow policies or investments to be compared in a consistent way, and for their economic, social and environmental impacts to be assessed. It compares the total forecast costs to the community and economy with the total forecast benefits, to see whether the benefits outweigh the costs and by how much. Cost benefit analysis is not concerned with the transfer of resources in one part of the economy to another, but rather in the increase/decrease in the supply of resources in the total economy as a result of the proposal.

A key aspect of this form of analysis is to assign monetary values to non-market and intangible impacts where possible. This often includes proxy valuations for natural amenity enhancements or improvements to quality of life. By examining – and valuing – the stream of benefits and costs that accrue to society, cost benefit analysis determines whether a program or project is economically justified and makes society better off.

4.2 Economic impacts of the proposed stimulus

The results show that under each of the scenarios, the program may have a strong economic impact on the national economy. Underlying this are two driving factors - the immediate fiscal stimulus effects and the long run investment effects. These two effects can be seen clearly in Figure 9, showing the impact in comparison to the baseline. The box in Figure 9 highlights the immediate stimulus impacts associated with the spending and employment generation of these programs, which are phased out by 2024. There are also the ongoing long-term benefits that flow from the productivity gains in agriculture and infrastructure.

Figure 9: Effect on economic output (\$ millions)



Source: EY Analysis based on proposed program expenditures and structure.

Employment creation is a key driver of the proposed programs and our modelling suggests significant employment impacts. Under the existing economic circumstances of high unemployment and low capital utilisation, the scope for programs like these to generate employment and broader economic benefits is much greater than in 'good' economic times.

This is the case because when the economy is in a healthy state, employment and capital will be reallocated from elsewhere in the economy and therefore 'crowd out' other sectors. Under the present economic crisis conditions, crowding out is unlikely, as unemployment is high and there is a pool of workers who can re-enter the workforce. Our modelling assumes the current economic conditions remain for the duration of the stimulus spending and then reverts to a long-run condition and labour markets begin to tighten.

The GDP impacts for each of the three scenarios greatly exceeds the investment into the programs. This reflects the current and short-term economic situation where unemployment rates are high and there are available workers that can come into the labour market responding to the stimulus measure.

Stimulus effect

In the short run, there is an immediate stimulus effect associated with investment in the program. For the Recovery Program, this stimulus effect is about \$5,700 million (in NPV terms), including an additional \$3,700 million in economic output during the first year of the program (Table 5). For the Accelerator Program and the Impulse Program, the stimulus effect is estimated to be \$2,800 million and \$700 million (in NPV terms), respectively. This represents a strong return on investment.

Under the Recovery Program, it is estimated that 32,000 jobs may be created in the 2021 financial year (Table 6). This comprises of 24,000 directly employed in the program and a flow on benefit of an additional 8,000 jobs. In this first year, the Accelerator Program and Impulse Program are modelled to directly employ 10,000 and 2,500, respectively, and lead to total employment generation of 13,000 and 3,000 respectively (Table 6). The decrease in employment impacts for 2022 and 2023 (reported in Table 6) reflects the winding down of investment into the programs.

Long term effect

Investment in the program will also offer long-run economic benefits. A snapshot of these long term benefits to GDP and employment are provided for selected years 2030 and 2040 in Table 5 and Table 6, respectively. Over the period to 2040, the Recovery Program may increase GDP by \$9,300 million in NPV terms.

Under the central scenario, in 2040, there would be about 800 additional jobs in the Recovery Program and GDP would be \$1,000 million higher. For the Accelerator Program and Impulse Program, in 2040, GDP is estimated to be \$500 million and \$100 million higher, respectively. Moreover, in 2040, the Accelerator Program may generate almost 400 flow-on jobs, and the Impulse Program may create approximately 100 flow-on jobs.

Table 5: GDP impact of the program (\$ million)

Scenario	Fiscal stimulus impact - 4 years (NPV)	Total economic impact - 20 years (NPV)	2021	2022	2023	2030	2040
Recovery Program (\$4 billion stimulus investment)	5,678	9,269	3,677	1,864	387	437	1,002
Accelerator Program (\$2 billion stimulus investment)	2,817	4,687	1,529	1,154	415	222	504
Impulse Program (\$500 million stimulus investment)	717	1,194	382	382	13	56	126

Source: EY Analysis based on proposed program expenditures and structure.

Table 6: Employment effects of the program (FTE jobs estimated to be created)

Employment (FTEs)	Fiscal stimulus impact - 4 years	Total economic impact - 20 years	2021	2022	2023	2030	2040
Recovery program (\$4 billion stimulus investment)							
Direct	40,000	40,000	24,000	12,000	2,000	-	-
Flow-on	13,428	22,285	7,835	3,952	820	484	780
Total	53,428	62,285	31,835	15,952	2,820	484	780
Accelerator program (\$2 billion stimulus investment)							
Direct	20,000	20,000	10,000	7,500	2,500	-	-
Flow-on	6,701	11,246	3,259	2,444	876	245	394
Total	26,701	31,246	13,259	9,944	3,376	245	394
Impulse program (\$500 million stimulus investment)							
Direct	5,000	5,000	2,500	2,500	-	-	-
Flow-on	1,690	2,836	814	810	30	61	99
Total	6,690	7,836	3,314	3,310	30	61	99

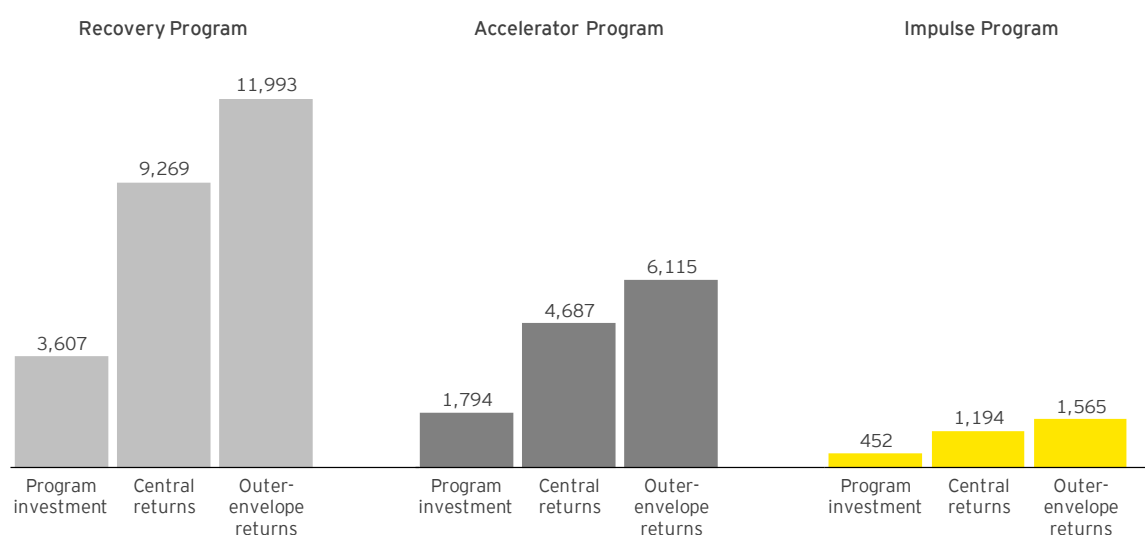
Source: EY Analysis based on proposed program expenditures and structure.

Outer-envelope scenario

Figure 10 shows the NPV of the economic benefits, under the alternative productivity assumptions, in comparison to the level of investment (in NPV terms). As discussed in Chapter 4.1, the modelling considered a central scenario, as well as an outer-envelope scenario. While Table 5 and Table 6 highlight the economic impacts under the central scenario, Figure 10 also shows the potential NPV returns under the more optimistic outer-envelope scenario (for each of the programs).

According to these results, the benefits outweigh the levels of investment. For the Recovery Program, the NPV of the benefits to GDP under the best estimate assumptions for productivity is \$12,000 million compared to the NPV value of the investment, which is \$3,600 million.

Figure 10: Net present value of the program (\$ millions), discount rate 7%, 2021 - 2040



Source: EY Analysis based on proposed program expenditures and structure.

Avoided welfare costs

The analysis has considered the direct investment made by government under the program and its economic impacts over the long term. In the current economic environment, where there are large numbers of unemployed and underemployed workers, there is also the potential for substantial fiscal savings. This would occur by engaging workers in the program who would otherwise receive unemployment support.

The potential welfare savings to government were estimated by considering the current cost of welfare payments (such as the JobSeeker and JobKeeper payments) and the number of jobs created through the program. Under relatively conservative assumptions, the present value of these avoided costs could be in the order of:

- ▶ \$620 million for the National Recovery Program
- ▶ \$300 million for the Accelerator Program
- ▶ \$80 million for the Regional Impulse Program

These foregone costs represent a substantial saving for the government over and above the economic returns already discussed. Moreover, shortening the span of time people spend on welfare decreases their chances of returning to welfare in the future. This is especially important for young people and represents an important feature of the program.

5. Promoting regional development

The Covid-19 pandemic has significantly damaged many regional economies. In some areas, damage has been compounded by recent bushfires and drought. Targeting the most affected regions will be an important consideration in prioritising the location of program activities.

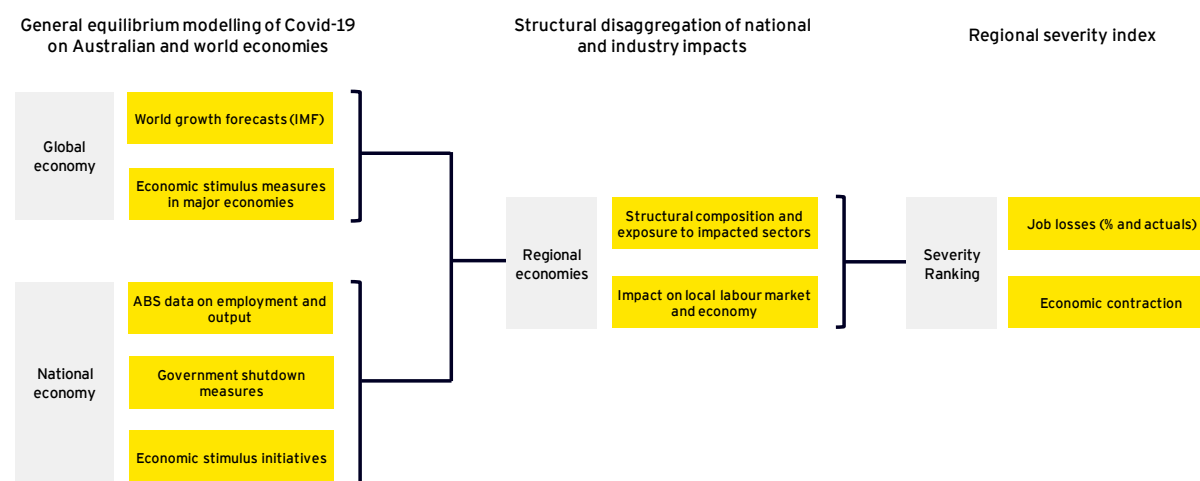
5.1 Regional impacts of Covid-19

Regional analysis was conducted across all state and territories at the LGA level in order to examine the degree of impact caused by Covid-19. The data, sourced largely from the latest ABS releases, reflects the state of regional economies and labour markets before and after the pandemic. Our analysis utilised macroeconomic modelling of the national economy and incorporates the form and timing of government measures to limit the spread of the virus (including closing international borders and enforcing social distancing), government support for businesses and workers (e.g. Job Keeper) and world growth forecasts (e.g. IMF World Economic Outlook April 2020).

EY developed a severity index (see Figure 11 below) of regions in each state and territory to produce a ranking based on the deterioration of jobs and economic activity over the previous two months. The results closely mirrored those estimated by the Centre for Conservation Geography/Bankwest Curtin Economics Centre.

The most heavily impacted regions were identified by the extent of both job and economic losses on a percentage and absolute basis. A number of heavily affected LGAs, such as Coomalie in the Northern Territory, were excluded on the basis that their labour force is very small (Coomalie's labour force comprises of just over 400 workers). Key underlying factors which underpinned the results included the regions' exposure to sectors most affected by the shutdown (e.g. tourism, retail and hospitality, air transport, hotels, personal services etc.).

Figure 11: Severity index



5.2 National overview

The impact of Covid-19 has been felt throughout Australia's regions and towns. Modelling indicates that the states and territories have been affected significantly, losing an average of 6-9% of economic output and relative employment across the board. According to our regional analysis, Queensland, Tasmania, Victoria and New South Wales experienced slightly higher impacts, whilst the Australian Capital Territory was the least impacted for both measures. Many remote districts have experienced substantial blows and for some, this economic damage is in conjunction with issues brought on by the recent bushfires. The relative regional impact of both Covid-19 and the

bushfires should be factored into the prioritisation framework when deciding the location of program activities.

Areas with a strong reliance on tourism were particularly affected. Port Douglas, Tasman, Snowy Monaro Regional and Whitsunday were amongst the local areas greatest impacted by Covid-19 - tellingly, all have heavily tourism dependent economies. Dependence on the tourism industry acts as a multiplier for the economic loss caused by the pandemic. The entire tourism supply chain - encompassing transport (particularly air), food and hospitality, arts, accommodation and retail - has been affected by the business restrictions and social distancing requirements.

The seasonal nature of much of Australia's tourism industry means that the timing of the virus is particularly damaging. For example, many of Queensland's regions may have nullified impacts as they were just coming off their high season, so a decrease in the economic output and employment was already present before Covid-19 hit. Other tourist areas with seasonal influxes include wine regions, ski regions, and areas impacted by tropical weather patterns.

Sectors which contribute to the larger losses felt in more populated areas include personal and recreational services, entertainment and retail. These industries have a large reliance on casual hires. They were also directly affected by enforced restrictions and were amongst the first businesses to shut down, before any government support or stimulus packages had been put in place.

The below figure offers a snapshot of some of the most affected regions in Australia, charted by their predicted full-time employment size after Covid-19. The graph illustrates the vulnerability of tourism-dependent economies to the pandemic.

Figure 12: Snapshot of 20 most impacted Local Government Areas nation-wide



Source: EY Analysis, based on ABS and profile.id data.

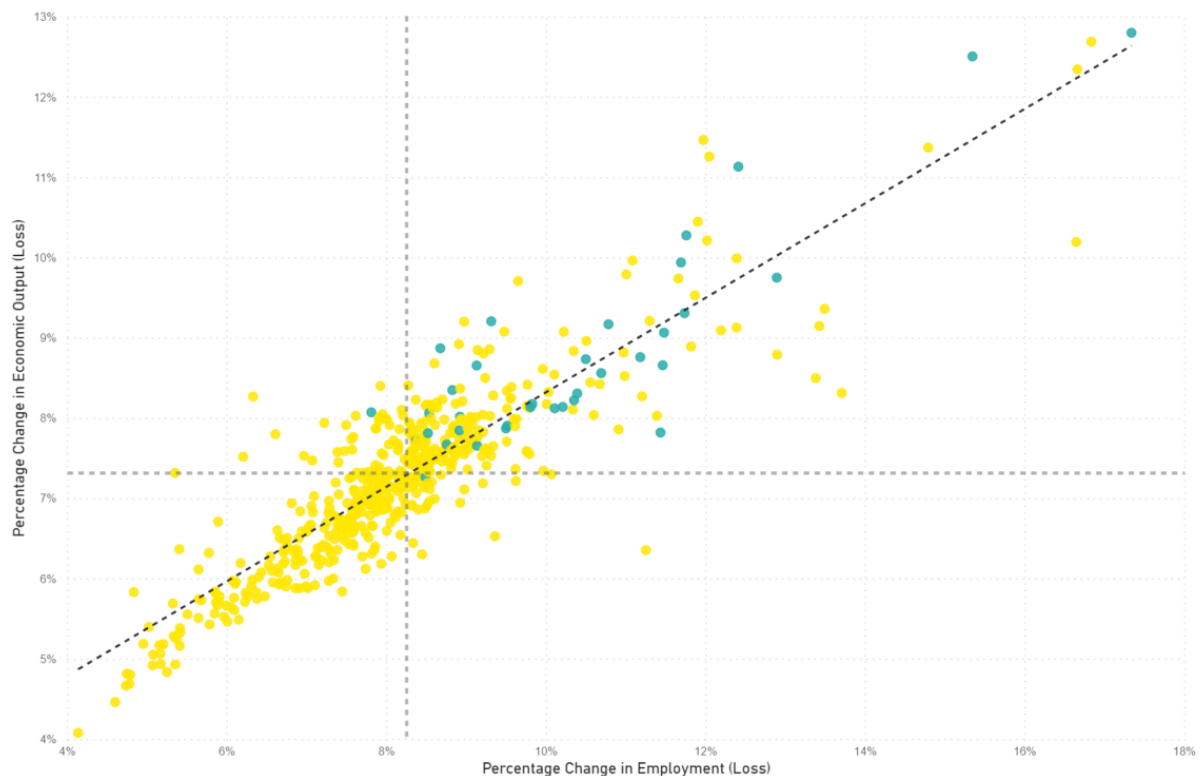
Note: Datapoints referencing Unincorporated Vic, Unincorporated NSW and Migratory - Offshore - Shipping Vic LGAs were excluded

Note: Size of respective markers represent the LGA's total full-time employment post reduction

Modelling shows that economic output and employment has fallen in Australia’s Local Government Areas (LGAs) following Covid-19. As indicated by the positive trendline in the graph below, LGAs which experienced larger losses in economic output also had higher reductions in their employment. It is likely that these LGAs have a larger percentage of their workforce dedicated to the tourism industry.

While all regions would benefit from an economic stimulus, a good focus point for eligible LGAs might be those located in the upper right-hand quadrant of the graph. This is because this quadrant represents those LGAs that experienced impacts greater than the national average. Most of the LGAs highlighted in our state and territory analysis (displayed as a teal marker) are in this location. Thus, these LGAs would be strong candidates for a conservation and land management program, to help stimulate the local economy and create jobs.

Figure 13: Overall correlation of national LGA employment and economic loss



Source: EY Analysis, based on ABS and profile.id data.

Note: Datapoint referencing Unincorporated Vic LGA was excluded as an outlier to better focus on the data cluster

Note: Teal coloured markers reference LGAs highlighted in our analysis, seen in State and Territory tables

X-Axis Line: 8.25% reflecting national average

5.3 State and Territory summaries

For each State and Territory, we have identified the five regional areas most significantly affected by the Covid-19 pandemic. The magnitude and proportion of these impacts should be considered when prioritising program locations. However, program activities should not be limited to the locations listed below.

5.3.1 New South Wales

The analysis found Snowy Monaro Regional was the most heavily impacted LGA in NSW due to Covid-19. In general, the regions most affected in the State are highly dependent on tourism and encompass major tourist drawcards such as the Hunter Valley, Snowy Mountains, Blue Mountains and Byron Bay.

New South Wales was already dealing with economic stresses caused by the 2019-20 bushfires, leaving it in an especially vulnerable position prior to the pandemic. Approximately 37% of the state's national park estate has been affected by fire, with the World Heritage listed sites of the Gondwana Rainforests of Australia and Greater Blue Mountains Area impacted by 54% and 81% respectively.¹⁸ In addition to these areas, there are a number of heavily impacted, but much smaller regions. These include Bega Valley, Balranald, Broken Hill and some other Mid-Western Regional LGAs.

Table 7: NSW snapshot of highest impacted regions

Severely affected regions due to Covid-19		Job losses by LGA			Lost economic output
SA3	LGA	Percentage change in FTE employment	Pre-Covid FTE jobs	Change in FTE jobs	Percentage change in GVA
Snowy Mountains	Snowy Monaro Regional	-15%	8,194	-1,090	-13%
Upper Murray	Murray River	-12%	4,160	-459	-11%
Richmond Valley - Coastal	Byron	-12%	9,692	-1,019	-10%
Kiama -Shellharbour	Kiama	-12%	3,606	-377	-10%
Lower Hunter	Singleton	-9%	14,505	-1,157	-9%

Source: EY Analysis, based on ABS and profile.id data.

5.3.2 Victoria

Surf Coast was found to be the most affected LGA in Victoria. Along with the areas depicted in the below table, a number of rural LGAs have also been significantly affected, including Hepburn, Queenscliffe, Alpine, Murrindindi and Mansfield.

Victoria's impacts largely stem from it being an arts and culture centre for the country, with many of the affected areas being close to the inner city. The restrictions on large events, public gatherings and border closures have had major impacts on these industries and hence the regions that play host to them. Other heavily affected areas again surround tourism dependent regions, including attractions around the Great Ocean Road, Mornington Peninsula and the beloved penguins at Phillip Island.

¹⁸ NSW Department of Planning, Industry and Environment, Understanding the effects of the 2019-20 fires, <https://www.environment.nsw.gov.au/topics/parks-reserves-and-protected-areas/fire/park-recovery-and-rehabilitation/recovering-from-2019-20-fires/understanding-the-impact-of-the-2019-20-fires>

Table 8: VIC snapshot of highest impacted regions

Severely affected regions due to Covid-19		Job losses by LGA			Lost economic output
SA3	LGA	Percentage change in FTE employment	Pre-Covid FTE jobs	Change in FTE jobs	Percentage change in GVA
Barwon - West	Surf Coast	-12%	6,257	-657	-9%
Gippsland - South West	Bass Coast	-10%	8,234	-782	-9%
Stonnington - East	Stonnington	-10%	47,228	-4,216	-8%
Yarra	Yarra	-9%	77,206	-6,321	-8%
Tullamarine - Broadmeadows	Hume	-9%	85,689	-7,167	-9%

Source: EY Analysis, based on ABS and profile.id data.

5.3.3 Queensland

The Douglas LGA was among the hit hardest in Queensland. Other regions highlighted as having experienced a significant impact are located within the Great Barrier Reef tourism centre and in Rockhampton's major transport hub.

Queensland observes a greater spread of impact in comparison to the rest of Australia, due to tourism being a key source of employment and economic activity for many regions across the state. Unlike Victoria, and most of the other states, Queensland's capital, Brisbane, is not subject to the majority of the economic and employment lost. Whilst Brisbane, like any highly populated area, would have felt the effects resulting from business restrictions, the highest impacts occur where regions have a significant tourism presence. The analysis also indicates several smaller areas were significantly affected. These include the Diamantina, Noosa, Burke, Etheridge, Weipa and Bulloo LGAs.

Table 9: QLD snapshot of highest impacted regions

Severely affected regions due to Covid-19		Job losses by LGA			Lost economic output
SA3	LGA	Percentage change in FTE employment	Pre-Covid FTE jobs	Change in FTE jobs	Percentage change in GVA
Port Douglas - Daintree	Port Douglas	-17%	4,886	-722	-13%
Bowen Basin - North	Whitsunday	-13%	14,054	-1,604	-10%
Innisfail - Cassowary Coast	Cairns	-10%	63,461	-5,677	-8%
Rockhampton	Livingstone	-10%	6,812	-592	-8%
Bowen Basin - North	Isaac	-9%	20,419	-1,739	-9%

Source: EY Analysis, based on ABS and profile.id data.

5.3.4 Western Australia

Like many of the states, Western Australia saw much of the impact affecting the regions in close proximity to its capital city, Perth. However, many other smaller, more rural areas were substantially affected by the pandemic. These include Denmark through to Augusta-Margaret River in the Southern region, as well as areas along the coast ranging from Shark Bay to Exmouth. Other drivers contributing to the downturn include the freeze on FIFO (Fly In Fly Out) workers in Western Australia's mines. Several Northern regions also experienced significant downturns as a result of Covid-19, including Broome and Wyndham-East Kimberley.

Table 10: WA snapshot of highest impacted regions

Severely affected regions due to Covid-19		Job losses by LGA			Lost economic output
SA3	LGA	Percentage change in FTE employment	Pre-Covid FTE jobs	Change in FTE jobs	Percentage change in GVA
Albany	Denmark	-11%	1,226	-126	-9%
Augusta - Margaret River - Busselton	Augusta-Margaret River	-11%	4,599	-462	-9%
Kimberley	Broome	-11%	5,879	-572	-9%
Kimberley	Wyndham-East Kimberley	-10%	3,026	-285	-8%
Augusta - Margaret River - Busselton	Busselton	-10%	11,257	-1,056	-8%

Source: EY Analysis, based on ABS and profile.id data.

5.3.5 South Australia

Adelaide and the capital's surrounding regions experienced the highest impact from the pandemic, in addition to the Fleurieu Peninsula and Kangaroo Island, whose economies are more conditional on tourism. The famous winery regions of the Barossa and Clare Valley were also greatly affected. These areas would have been significantly affected by the government enforced shutdowns and travel bans.

In addition to the areas listed in the below table, several smaller regions have been severely impacted by the pandemic. These LGAs include Coober Pedy, Flinders Ranges, Robe, Copper Coast, Peterborough and Franklin Harbour.

Table 11: SA snapshot of highest impacted regions

Severely affected regions due to Covid-19		Job losses by LGA			Lost economic output
SA3	LGA	Percentage change in FTE employment	Pre-Covid FTE jobs	Change in FTE jobs	Percentage change in GVA
Fleurieu - Kangaroo Island	Yankalilla	-11%	793	-82	-9%
Fleurieu - Kangaroo Island	Kangaroo Island	-11%	1,418	-137	-9%
Fleurieu - Kangaroo Island	Victor Harbor	-9%	2,834	-246	-8%
Adelaide Hills	Mount Barker	-9%	7,917	-663	-8%
Eyre Peninsula and South West	Whyalla	-9%	5,692	-458	-8%

Source: EY Analysis, based on ABS and profile.id data.

5.3.6 Tasmania

Analysis indicates that Hobart and its neighbouring South East Coast regions were the most severely impacted LGAs in Tasmania due to the pandemic. Our analysis also highlighted the significant effect on the West Coast area, adjacent to Queenstown, in addition to George Town, North of Launceston, and Waratah/Wynyard in the North West of the state. The large spread of economic and employment loss can be contributed to the wide array of tourist attractions across the state of Tasmania. A number of these ecotourism sites rely on casual employment and were significantly impacted by the imposed restrictions.

There are several small areas that have also been greatly affected by Covid-19, including Tasman, Kentish, Glamorgan/Spring Bay, Central Highlands and Meander Valley LGAs.

Table 12: TAS snapshot of highest impacted regions

Severely affected regions due to Covid-19		Job losses by LGA			Lost economic output
SA3	LGA	Percentage change in FTE employment	Pre-Covid FTE jobs	Change in FTE jobs	Percentage change in GVA
West Coast	West Coast	-10%	1,467	-136	-8%
West Coast	Waratah/ Wynyard	-9%	2,622	-215	-8%
North East	George Town	-9%	1,988	-161	-8%
Hobart - North East	Clarence	-9%	12,729	-1,001	-8%
Hobart - North West	Glenorchy	-9%	16,052	-1,260	-8%

Source: EY Analysis, based on ABS and profile.id data.

5.3.7 Northern Territory

The impacts observed in the Northern Territory were greatest in tourism reliant areas. Namely, on the Top End, surrounding the capital and stretching from Litchfield to West Arnhem, as well as closer to its Southern border, encompassing the sites in the Central Desert and Alice Springs.

Given the already high prevalence of unemployment in the Northern Territory, as well as the large population of high-risk Indigenous communities, the pandemic created an additional strain and acted as the tipping point for many who were living on the poverty line prior to Covid-19. Remote regions were disadvantaged due to the intensive isolation measures and increased difficulty to sustain support and trading with their proximate larger towns.

Table 13: NT snapshot of highest impacted regions

Severely affected regions due to Covid-19		Job losses by LGA			Lost economic output
SA3	LGA	Percentage change in FTE employment	Pre-Covid FTE jobs	Change in FTE jobs	Percentage change in GVA
Daly - Tiwi - West Arnhem	Unincorporated NT	-11%	5,923	-608	-8%
Daly - Tiwi - West Arnhem	West Arnhem	-10%	1,449	-133	-8%
East Arnhem	East Arnhem	-8%	2,183	-158	-8%
Katherine	Roper Gulf	-8%	1,465	-113	-8%
Darwin Suburbs	Darwin	-8%	40,255	-3,148	-7%

Source: EY Analysis, based on ABS and profile.id data.

6. Actioning the program

The proposed program can be rapidly mobilised to support Australia's recovery from Covid-19 but will need to manage key coordination and governance challenges. Existing mechanisms and structures used by conservation and land management bodies can expedite delivery, with an optimal implementation strategy ultimately depending on the program's scale, target locations and timeframes.

The economic analysis demonstrates the potential of a conservation and land management stimulus program to drive benefits for Australia's economy, particularly to support the immediate recovery from the Covid-19 recession. But the experience with recent stimulus initiatives has reinforced that the capacity to realise program benefits depends greatly on good program design and implementation. Indeed, the Commonwealth Government has reiterated that stimulus measures need to be capable of quick mobilisation, targeted to areas of need, leverage existing delivery mechanisms where possible, and not lock-in public spending beyond the crisis period.

This chapter sets out some issues which are important for actioning the stimulus program and managing risks.

6.1 Implementation issues

A stimulus program of this size will require careful consideration of implementation issues. Indeed, the ability of the program to be rolled out quickly is at the heart of its potential community and economic benefits.

Due to the program's scale and reach, the involvement of many delivery organisations and different governments, the program will have pressing coordination and governance challenges. Of particular importance will be the division of authority between multiple stakeholders and a requirement to utilise existing mechanisms and structures where possible to expedite delivery. Certainly, the complexity of coordination can quickly overwhelm the policy intent of the program and frustrate delivery.

While the optimal implementation structure will depend ultimately on the scale of the program and whether it has a national or regional footprint, a centrally coordinated and governed program appears to have major advantages. Delivery under this structure could occur through a Commonwealth Government agency, potentially supported by a dedicated project management office. There is potential for the Commonwealth to distribute funds through three mechanisms, which are both established and complementary:

- ▶ **Regional partnerships** – there could be one regional partnership per priority region. This would build upon existing agreements between the Commonwealth Government and Natural Resource Management bodies, allowing funding to be provided through work orders.
- ▶ **Direct funding to state agencies** – this would enable state-based services to deliver important work in their region. For example, state-based national park services could implement work in national parks and other public lands.
- ▶ **Competitive grant rounds** – there is the potential to encourage broader participation through competitive grant rounds in early 2021 to enable more transparent targeting of the funds.

Some key implementation issues for the program include:

- ▶ Balancing the short-term stimulus priorities with longer term strategic priorities for conservation and land management at the national, state and regional level (see prioritisation framework below).
- ▶ Identifying and managing program risks across multiple levels. Critical risks will include worker health and safety, the selection of capable and work-ready delivery organisations, the availability and costing of equipment and training, securing regulatory approvals, and the rapid recruitment of a large number of workers in different regions. A robust risk management framework will need to be developed as part of program design.

6.2 Prioritisation framework

Perhaps the most important decision in implementing the program involves selecting the specific conservation and land management activities that would be delivered and their location. The regional analysis presented in Chapter 5 showed that almost every region in Australia, as is the widespread damage from Covid-19, has experienced a steep increase in unemployment and severe economic contraction over the last few months.

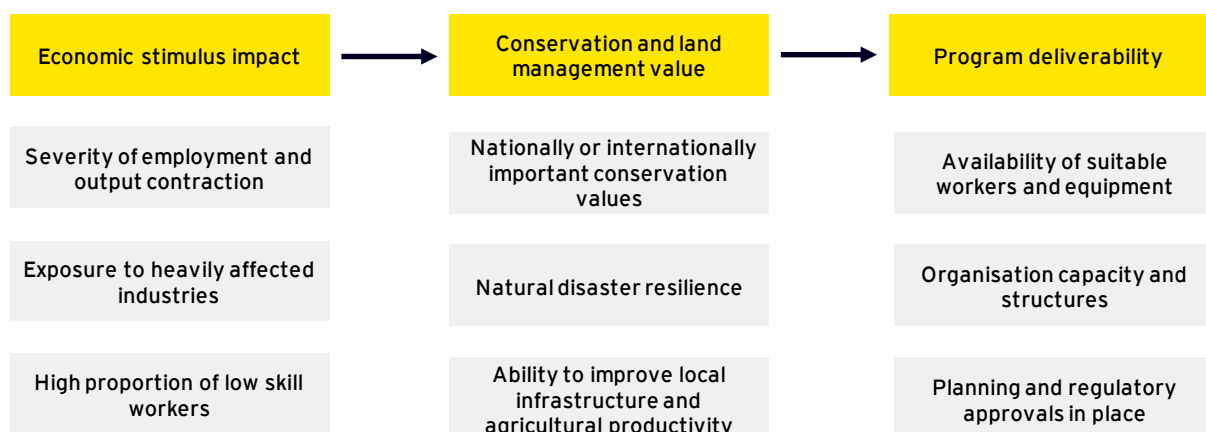
However, some regions have been more comparatively harmed by the pandemic and the economic lockdown than others. These tend to be regions with outsized exposures to the tourism, hospitality and retail sectors, and which may have entered the crisis in a weak condition.

To maximise the potential of the program to deliver much needed economic stimulus, a strong framework is needed to prioritise candidate regions where projects can be delivered. This will ensure the program aligns with established principles for stimulus policy design, as well as promote good governance and transparency in making these decisions.

A potential framework for prioritising regions is set out in Figure 14 below.

The framework has three core pillars which covers the core elements of the program: the ability to provide a short term economic boost to the most severely affected regions; the potential to yield meaningful longer term dividends from improving land and the environment; and the ability to stand up the program quickly and confidently.

Figure 14: Potential prioritisation framework



The framework could operate as a three-step process. Each pillar (going left to right in the figure) would represent a screening process in which to shortlist a list of suitable regions, which could be larger or smaller depending on the scale of the program investment being considered by governments.

Step 1: Identify threshold regions based on economic stimulus criteria

The first step would identify a threshold list of candidate regions based on the severity of the Covid-19 economic shock, a region's exposure to highly impacted sectors, and those with a relatively large base of low skill workers who are most at risks of entrenched disadvantage from unemployment.

Step 2: Prioritise regions based on conservation and land management values

The second step would prioritise threshold regions based on a range of conservation and land management criteria. The criteria would establish those regions that have the most potential to deliver environmental dividends and improve the productivity of farming land and regional infrastructure.

Step 3: Identify those regions which can well-support program delivery

The third step would screen out regions that are unsuitable for hosting a short term and rapidly delivered program. This screening would be based on having a necessary pool of suitable workers (in proximity to good projects) and equipment, sufficient capacity within relevant delivery organisations and securing relevant approvals.

There are a couple of important issues in designing a prioritisation framework. First, while the prioritisation should be transparent and robust, there should be a concerted emphasis on getting the program underway quickly and identifying where local projects can be delivered confidently. The program has some inherent safeguards which make it ideal as a stimulus vehicle – it can be targeted and scaled as needed. In this regard, achieving confidence that projects can be mobilised with little lead time and stimulus spending can actually 'hit the ground' can be more important than seeking a finely tuned assessment of regions.

Second, the risks of the program are more about individual project delivery than choosing a sub-optimal region. Almost all regions in Australia have been badly impacted and will likely benefit from hosting a project. The proposed framework is intended to act as a guide to decision making rather than provide a highly mechanistic evaluation process. Judgement, in the context of a crisis environment, is needed.

Appendix A References

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Appendix B Summary of evidence on conservation and land management initiatives

The following table summarises relevant literature on the effects of undertaking selected conservation and land management program activities.

Table 14: Summary of literature on conservation and land management initiatives

Source	Activity	Effectiveness	Time horizon	Issues/Comments
Managing environmental threats				
Hafi, A., Spring, D., Croft, L., Kompas, T., & Morey, K. (2014). Cost-effectiveness of biosecurity response options to red imported fire ants in South East Queensland. Australian Bureau of Agricultural and Resource Economics and Sciences, Department of Agriculture, Canberra	Specific invasive species management	<ul style="list-style-type: none"> ▶ BCR of 25 ▶ Total costs amounted to \$0.217 billion ▶ Total benefits amounted to \$5.467 billion and predominantly considered market impacts ▶ Market impacts were classified as either an impact on dwellings, impact on public infrastructure and utilities, impact on recreation, tourism and commercial businesses or as an impact on agriculture, and were quantified as avoided losses 	Benefits begun accruing immediately and at different rates depending on the technologies used	▶ Highly specific to Red Fire Ants
Sumner, D. A., Brunke, H., & Kreith, M. (2006). Aggregate costs and benefits of government invasive species control activities in California. In The International Conference on the Future of Agriculture: Science, Stewardship, and Sustainability (pp. 1-22)	Invasive animal management	<ul style="list-style-type: none"> ▶ BCR of 2.4 to 5.3 ▶ Total costs were defined at \$449 million for agricultural exotic pest and disease control ▶ Benefits were calculated on an avoided cost basis, based on a reduction of supply, domestic demand and international demand, due to more severe pest or disease infestations ▶ The change in producer benefits was approximately \$1,311 million and the change in consumer benefits was about \$1,049 million 	Long-run benefits were considered, over approximately 30 years	▶ The central scenario (scenario 2) was defined here and assumed a 5% change in supply and demand
Vere, D. T., Jones, R. E., & Dowling, P. (2004). An Economic Evaluation of Research into the Improved Management of the Annual Grass Weed <i>Vulpia</i> in Temperate Pastures in South-Eastern Australia	Specific weed management	<ul style="list-style-type: none"> ▶ BCR of 22.2 ▶ Estimated the change in consumer and producer surplus ▶ An NPV of \$196.9 million was defined and this was derived from an increase in wool production 	Benefits were immediate from implementation	▶ The net benefit was based on research of weed control, rather than the program activity
King, P. (2018). Fishing for litter: A cost-benefit analysis of how to abate ocean pollution	Ocean plastic collection and management	<ul style="list-style-type: none"> ▶ Total cost benefit ratio was defined at 2.78 ▶ Annual costs were defined at \$36.1 million plus a variable cost, and including initial capital expenditure ▶ Annual benefits were defined as avoided costs of lost fish stock of \$340 million, avoided costs of clean-ups \$293 million and financial benefits of \$50.9 million 	Benefits were assumed to accrue immediately, due to immediate use	▶ The study relied on data from previous feasibility studies
Habitat restoration				
Karanja, F., Reid, N. & Cacho, O. (2008). Economic valuation of ecosystem services from environmental flow provision in the	Environmental flow provision	<ul style="list-style-type: none"> ▶ BCR of 6.4 - 19.1 ▶ Present value of costs amounted to \$14.81 million 	Grazing benefits were assumed to accrue over a 30-year period	▶ Non-market benefits for BCR of 6.4 was attributed to NSW, while a BCR of 19.1 was attributed to all of Australia

Source	Activity	Effectiveness	Time horizon	Issues/Comments
Gwydir catchment, north-western NSW, Australia		<ul style="list-style-type: none"> ▶ Present value of benefits amounted to \$94.14 million (NSW based), with producer benefits amounting to \$1.1m from improved grazing from wetlands area and \$27.95 million from habitat provision function ▶ Non-market benefits were accounted for at \$44.67 million for waterbird breeding events and a further \$20.42 million associated with biodiversity benefits 		
Mill, C. (2004). Economic benefits and costs of tree planting for salinity control. Department of Infrastructure, Planning and Natural Resources	Tree planting for reduced salinity	<ul style="list-style-type: none"> ▶ BCR of 1.6 - 1.9 for tree planting with no fencing ▶ Total costs incurred by landholders included the costs of planting trees, including tree guards, ripping and ongoing weeding costs and gross margins foregone from the area planted to trees ▶ Landholder benefits included increased gross margins from wind shelter, gross margins of grazing three years after planting, benefits from timber (sales and on farm use) and half of the recharge benefits of reduced land salinised ▶ Community benefits included half the benefits from avoided land salinisation and sequestration benefits (valued at \$10 a ton) 	For grazing, benefits were assumed to accrue 3 years after planting	<ul style="list-style-type: none"> ▶ Extra costs associated with fencing brought the BCR down ▶ Sensitivity analysis was conducted and BCRs were sensitive to increases in the value of salinisation and to different recharge assumptions
Port Phillip and Westernport Catchment Management Authority, Cost-benefit analysis and priority setting	Revegetation and salinity management	<ul style="list-style-type: none"> ▶ BCR of 2.61 ▶ Total costs were \$15.37 million and -\$3.5 million due to land retirement (for revegetation) ▶ Total benefits accrued due to agricultural losses avoided of \$16.7 million, extra gross margin due to an increase in productivity of \$2.93 million, land use change of \$3.84m and infrastructure benefits (i.e. through less salinity damage) of \$20.13 million 	No time horizon was offered	<ul style="list-style-type: none"> ▶ Activities included agriculture and drainage, environmental management, salinity monitoring, R&D, education and program support
Bright, M. & Trengrove, G. (2007). Upper South East Dryland Salinity and Flood Management Program - REFLOWS Project: Background paper, Economic Analysis, September 2007, Department of Primary Industries and Resources SA	Wetland rehabilitation	<ul style="list-style-type: none"> ▶ BCR of 2.2 ▶ Present value of costs amounted to \$39.9 million ▶ Present value of benefits was split between \$14.5 million of production benefits, from reduction in flooding and other avoided costs, and \$25.4 million of non-market benefits predominantly from biodiversity 	Benefits were assumed to accrue over a 5-year period	<ul style="list-style-type: none"> ▶ Choice modelling methods (i.e. non-market valuation methods) were used in the study
Infrastructure, buildings and maintenance				
Deloitte Access Economics (2014). Scoping study on a cost benefit analysis of bushfire mitigation. Australia Forest Products Association	Fuel load reduction for fire management	<ul style="list-style-type: none"> ▶ BCR defined as 6.0 ▶ Incremental cost of enacting the policy defined at \$6.8 million ▶ Incremental benefit of enacting policy defined as \$40.6 million 	Benefits were assumed to accrue immediately	<ul style="list-style-type: none"> ▶ Alternative policy solution cost benefit analysis (e.g. the difference between action and no action)

Source	Activity	Effectiveness	Time horizon	Issues/Comments
Social Ventures Australia (2016), Social Return on Investment analysis of the Warddeken Indigenous Protected Area and associated Indigenous ranger programme, Department of the Prime Minister & Cabinet	Warddeken Indigenous Protected Area and Indigenous ranger programme	<ul style="list-style-type: none"> ▶ The Warddeken Indigenous Protected Area and Indigenous ranger programme delivered a social return on investment of 3.4 between FY09-15 ▶ The social, economic, cultural and environmental benefit was estimated to be \$55.4 million for the period ▶ \$16.6 million was invested during the FY09-15 period 	The study looked at the FY09-15 period	<ul style="list-style-type: none"> ▶ This is a social return on investment, as opposed to a benefit cost ratio
Hardner, J. & McKenney, B. (2006). The U.S. National Park System, An Economic Asset at Risk. Hardner & Gullison	National benefits of national parks relative to taxpayer cost	<ul style="list-style-type: none"> ▶ BCR defined as being greater than 3.9 ▶ The U.S National Park System generated a value of \$10.1 billion (in 2004 USD), relative to the cost to taxpayers of \$2.6 billion (2004 USD) 	A one-year period was considered	<ul style="list-style-type: none"> ▶ This study is dated and is international (i.e. it is from 2006 and is looking at the US National Park System)
Reed, D., Beck, T., Woodard, T. (1982). Methods of Reducing Deer-Vehicle Accidents: Benefit-Cost Analysis. Wildlife Society. Vol. 10, no. 4, pp.349-354	Fence construction to reduce vehicle-deer accidents	<ul style="list-style-type: none"> ▶ BCR ranged between 2.59 and 12.37 for the construction of 2.4 metre fences to reduce deer-vehicle collisions ▶ Benefits varied depending on fence size and the number of deer-vehicle collisions 	A one-year period was considered	<ul style="list-style-type: none"> ▶ This study is theoretical, based on US information and is extremely dated

Appendix C Our modelling framework

EYGEM is a multi-commodity, multi-region, dynamic model of the world economy. Like all economic models, EYGEM is based on a range of assumptions, parameters and data that constitute an approximation to the working structure of an economy. Its construction has drawn on the key features of other economic models such as the global economic framework underpinning models such as GTAP and GTEM, with state and regional modelling frameworks such as Monash-MMRF and TERM.

Labour, capital, land and a natural resource comprise the four factors of production. On a year-by-year basis, capital and labour are mobile between sectors, while land is mobile across agriculture. The natural resource is specific to mining and is not mobile. A representative household in each region owns all factors of production. This representative household receives all factor payments, tax revenue and interregional transfers. The household also determines the allocation of income between household consumption, government consumption and savings.

Capital in each region of the model accumulates by investment less depreciation in each period. Capital is mobile internationally in EYGEM where global investment equals global savings. Global savings are made available to invest across regions. Rates of return can differ to reflect region specific differences in risk premiums.

The model assumes labour markets operate in a model where employment and wages adjust in each year so that, for example, in the case of an increase in the demand for labour, the real wage rate increases in proportion to the increase in employment from its base case forecast level.

EYGEM determines regional supplies and demands of commodities through optimising behaviour of agents in perfectly competitive markets using constant returns to scale technologies. Under these assumptions, prices are set to cover costs and firms earn zero pure profits, with all returns paid to primary factors. This implies that changes in output prices are determined by changes in input prices of materials and primary factors.

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