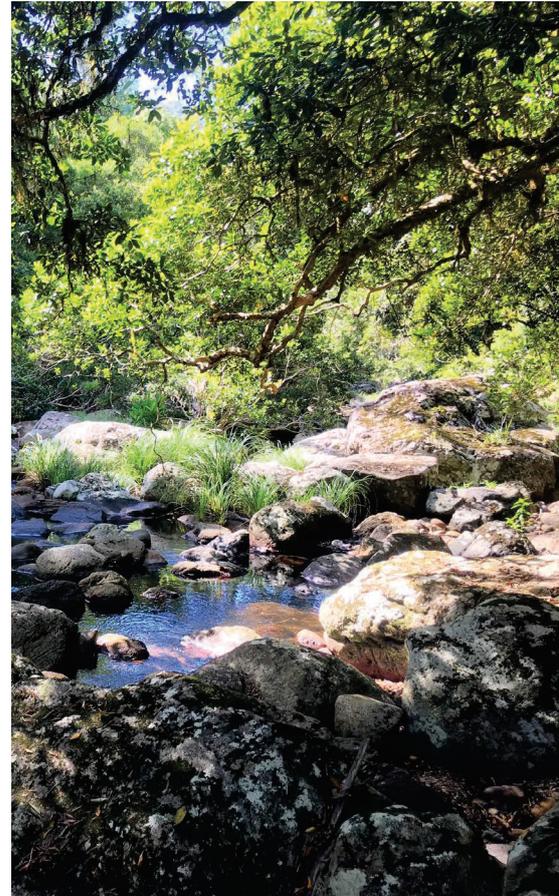




Natural Resources Commission

NSW Coastal Integrated Forestry Operations Approval Monitoring Program

Annual Progress Report August 2023



This document has been prepared by the NSW Natural Resources Commission on behalf of the **NSW Forest Monitoring Steering Committee**.



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Acknowledgement of Country

The Natural Resources Commission acknowledges and pays respect to traditional owners and Aboriginal peoples. The Commission recognises and acknowledges that traditional owners have a deep cultural, social, environmental, spiritual and economic connection to their lands and waters. We value and respect their knowledge in natural resource management and the contributions of many generations, including Elders, to this understanding and connection.

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Acronyms

DPE	Department of Planning and Environment
DPI	Department of Primary Industries
EPA	Environment Protection Authority
FCNSW	Forestry Corporation of NSW
IFOA	Integrated Forestry Operations Approval
LiDAR	Light Detection and Ranging (remote sensing method)
NPWS	National Parks and Wildlife Service
NSW	New South Wales

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Executive summary

The Coastal Integrated Forestry Operations Approval (Coastal IFOA) Monitoring Program has been underway since March 2020, generating data and information to support evidence-based decision making for forest management in NSW coastal state forests.

The program continues to deliver key projects addressing Coastal IFOA monitoring priorities, including:

- **rolling out full fauna species occupancy monitoring program** on state forests in the north and south coast regions of the Coastal IFOA using latest technology and modelling
- **collecting and analysing high-density LiDAR spatial data** to explore forest regeneration and structure, assisted by leading experts and academics
- **assessing water quality issues** by investigating performance of riparian zone protections and reviewing the use of temporary log crossings in NSW coastal state forests
- **progressing research and evaluation** on issues such as tree hollows, damage to retained trees, and the use of novel and remote sensing technologies – for example, drones and e-DNA analysis – to detect key species.

The program demonstrates the value of expert and agency collaboration in refining and improving monitoring approaches, generating new knowledge and building trust between participants. Examples of effective engagement and collaboration include:

- staff from the Environment Protection Authority, Forestry Corporation of NSW and the Department of Primary Industries agreeing to research priorities during annual health checks
- leading academics teaming up with Forestry Corporation of NSW (FCNSW) to improve hollow-bearing tree simulation modelling
- forestry operators, regulators and independent experts developing a shared understanding of key forestry issues through research projects and field visits.

Initial program funding of \$2 million provided by the NSW Environment Protection Authority (EPA) for design and initial implementation ended in FY2022-23. The Commission welcomes further funding provided by the EPA for FY2023-24.

In the coming year, the Commission will deliver key program outcomes including:

- spatial analysis of forest structure and regeneration
- species occupancy monitoring findings from field surveys
- improved hollow-bearing tree mortality and recruitment modelling
- review of the effectiveness of exclusion zone conditions for Class 1 drainage lines.

In addition, the Commission is focused on delivering the first five-yearly formal review of the Coastal IFOA Monitoring Program and its findings, in line with the program's adaptive management arrangements. The outcomes of this review process are expected to inform the upcoming formal five-yearly review of the Coastal IFOA.

1 Introduction

The [Coastal Integrated Forestry Operations Approval](#) (Coastal IFOA) sets out the rules for native timber harvesting in New South Wales (NSW) coastal state forests and establishes environmental outcomes that must be achieved under the approval. The Coastal IFOA requires that the approval conditions are monitored to ensure they are effective in achieving the required objectives and outcome statements.¹

The Environment Protection Authority (EPA) and Department of Primary Industries (DPI) have jointly approved the [Coastal IFOA Monitoring Program](#) proposed by the NSW Forest Monitoring Steering Committee (see **Section 0**). The program sets out the broad framework to evaluate the effectiveness of priority conditions in meeting the Coastal IFOA objectives and outcomes. It centres on strategies to monitor and research forest health, biodiversity, water quality and aquatic habitat, and wood supply. A set of detailed [monitoring plans](#) support the program.

This is the **third** annual progress report on the Coastal IFOA Monitoring Program.

1.1 Cross-agency collaboration and independent oversight

The design and implementation of the Coastal IFOA Monitoring Program is overseen by the NSW Forest Monitoring Steering Committee (the Steering Committee), which is independently chaired by the Natural Resources Commission (the Commission).

The Coastal IFOA requires that the Steering Committee include independent experts and agency representatives. **Table 1** sets out the agencies and experts involved, including:

- NSW agencies with responsibilities for natural resource and environmental policy, regulation, science and monitoring, and forest management
- five independent experts providing advice on biodiversity, forestry, soil and water, Aboriginal natural resource management and ecological sustainable forest management.

Table 1: NSW Forest Monitoring Steering Committee

NSW Government agencies	Independent experts
<ul style="list-style-type: none">▪ Natural Resources Commission (Chair)▪ Forestry Corporation of NSW (FCNSW)▪ Environment Protection Authority (EPA)▪ Department of Planning and Environment (DPE)▪ Department of Primary Industries (DPI)▪ Aboriginal Affairs▪ National Parks and Wildlife Service (NPWS)▪ Local Land Services	<ul style="list-style-type: none">▪ Professor Patrick Baker▪ Professor Phillip Gibbons▪ Dr Peter Hairsine▪ Associate Professor Jacki Schirmer²▪ Mr Bhiemie Williamson²

¹ [Coastal IFOA Conditions](#) (Chapter 8) and [Coastal IFOA Protocols](#) (Protocol 38).

² Expert stepped down at end of FY2022-23. New member(s) will be appointed in line with Coastal IFOA Protocol 38.

2 Progress and achievements in 2022-23

Table 2 outlines the status of the program delivery since its inception in 2019. The remainder of this section details the projects completed or commenced in 2022-23.

Table 2: Progress dashboard

PROGRESS DASHBOARD			
Research and evaluation projects			
1	Implications of changing fire intensity and regimes	Completed (2021-22)	✓
2	Koala response to selective harvesting ³	Completed (2019-22) ^a Commenced (2023-25) ^b	✓ »»
3	Koala and habitat response after the 2019-20 wildfires in north east NSW ⁴	Completed	✓
4	Coastal IFOA koala browse tree review	Commenced	»»
5	Hollow-bearing tree mortality and recruitment modelling	Commenced	»»
6	Novel techniques to detect and monitor Hastings River Mouse	Completed	✓
7	Drones to detect cryptic species	Commenced	»»
8	eDNA to detect and monitor Giant Burrowing Frog	Commenced	»»
9	Burnt area harvesting	Commenced	»»
10	Strengthening the evidence base to assess damaged trees	Commenced	»»
11	Post-fire erosion mapping in southern NSW	Completed	✓
12	Reviewing the use of temporary log crossings in NSW coastal state forests	Completed	✓
13	Evaluating forest road network to protect forest waterways	Completed	✓
14	Monitoring class 1 drainage lines and exclusion zones	Commenced	»»
15	Evaluation of species and habitat surveys	Commenced	»»
16	Compliance evaluation	Commenced	»»
Baseline and trend monitoring			
17	Monitoring plans	Completed (2020-21)	✓
18	Forest regeneration and health – spatial data capture and analysis	Data captured Analysis commenced	✓ »»
19	Biodiversity – species occupancy monitoring	Pilot evaluation completed Data captured Analysis commenced	✓ ✓ »»

³ Part of the Commission's [Koala Research Program](#), funded under the [NSW Koala Strategy](#) ((a) funded under the [2018-21](#) strategy and (b) funded under the [2021-26](#) strategy)

⁴ Funded under the [NSW Forest Monitoring and Improvement Program](#)

PROGRESS DASHBOARD			
20	Landscape baselines and trends for forest extent and health	Completed (2021-22)	✓
21	Landscape baselines and trends for biodiversity	Completed (2021-22)	✓
22	Landscape baselines and trends for water quantity and quality ⁵	Completed (2021-22)	✓
23	Wood supply baselines and trends – Stage 1	Completed (2021-22)	✓
	Wood supply baselines and trends – Stage 2	Commenced	»»
Reporting and adaptive management			
24	Community forums and webinars	Ongoing	»»
		Completed (2019-22)	✓
25	Annual health check	Completed	✓
26	Annual report	Completed	✓
27	Species management plan reviews ⁶	4 Completed (2020-22)	✓
		1 Commenced	»»

2.1 Research and evaluation projects

2.1.1 Koala response to harvesting and fire

Protocol 38 of the Coastal IFOA requires the program to monitor the effectiveness of koala conditions in the Coastal IFOA. The monitoring plot network (described further in **Section 2.2.1**) has commenced ongoing monitoring of fauna occupancy in the region, including koala occupancy. Initial results are expected towards the end of 2023.

In addition to the CIFOA monitoring program, the Commission has delivered independent research to help better understand how koalas respond to selective harvesting in north east NSW.

The Commission's first [Koala Research Program](#) was delivered between 2019-22 and was funded by DPE under the previous [NSW Koala Strategy](#) (2018-21). Advice was initially provided to NSW Government in September 2021 including research findings for koala density and habitat nutrition and recommendations. The research found koala density was not reduced by selective harvesting at the research sites. In addition, harvesting did not significantly change canopy tree species composition at the treatment sites.

This advice was updated in December 2022 to include additional research findings based on DNA koala diet analysis, including:

- individual koalas have different dietary preferences, which may be influenced by the available food resources and local conditions
- the koalas in the study consumed a range of tree species including blackbutt (*E. pilularis*), although they did show a preference for certain species (**Figure 1**)

⁵ Note – insufficient data to determine reliable baselines and trends for water quality

⁶ 1 review completed in 2020-21 (yellow-bellied glider), 3 reviews completed in 2021-22 (Southern Brown Bandicoot, Milky Silkpod and Rusty Plum), 1 review underway (Giant burrowing frog).

- important diet species included tallowwood (*Eucalyptus microcorys*) and small-fruited grey gum (*E. propinqua*), which are already known to be important food resources for koalas and protected accordingly
- koalas also preferentially browsed on other species such as spotted gum (*Corymbia maculata*) and ironbarks (*E. paniculata*, *E. siderophloia*), which are not currently protected as a koala food source during timber harvesting operations
- koalas were often feeding on a different set of trees than those in which they were most often observed during radio-tracking.

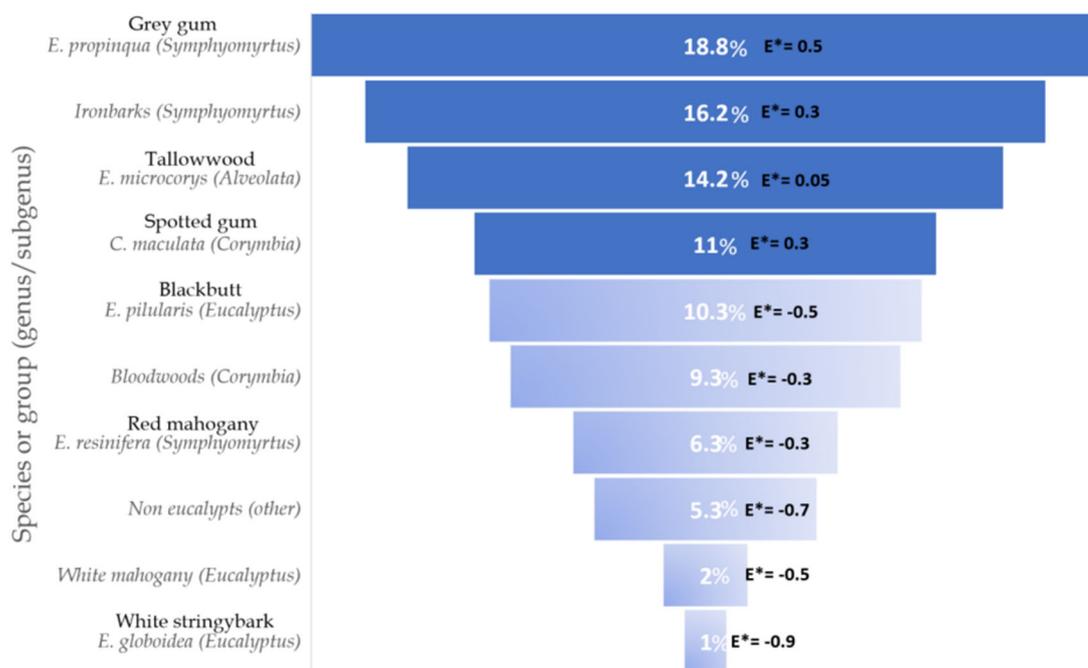


Figure 1: Overall contribution (%) of food tree species or species groups to koala diets.

Note: Darker shading indicates a positive index of electivity, E^* , which represents species that are preferred by koalas

Additional advice on implications for management and recommendations suggested that the Coastal IFOA tree retention guidelines should be reviewed, namely, to determine whether certain species should be added or removed from the Coastal IFOA koala browse tree list. Work on this review will commence as part of the Coastal IFOA Monitoring Program in the latter half of 2023.

In November 2022 a summary paper was also developed capturing findings from [research](#) into the impact of the 2019-20 wildfires on koalas and their habitat. This work was funded under the Forest Monitoring and Improvement Program and carried out by researchers from the Australian National University and the NSW Department of Primary Industries. It leveraged existing Koala Research Program research in a cost-effective way to provide priority information for decision making and community.

The researchers reported that koala occupancy remained stable in north-east NSW after the 2019-20 wildfires (as measured across 50 sites). They found areas with a greater extent of medium or high fire severity experienced larger declines in koala density than areas with only low severity fire. Monitoring showed koalas were temporarily absent in some areas where high fire severity dominated the landscape, but had begun to return after a year. In addition, the epicormic post-fire growth of some tree species was found to have higher nutritional quality for koalas than mature leaves from the same trees pre-fire.

The Commission is currently overseeing another [Koala Research Program](#) in 2023-25 that is funded under DPE's updated [NSW Koala Strategy](#) (2021-26), building on the previous research program. A request for proposals process closed on 30 June and the Commission team are in the process of evaluating the proposals received with assistance from an evaluation panel that includes independent experts.

2.1.2 Hollow-bearing tree mortality and recruitment modelling

The Coastal IFOA Monitoring Program initially engaged Associate Professor Ross Goldingay, Southern Cross University, to review the scientific literature on managing, monitoring and researching hollow bearing trees in NSW forests. This review, delivered in 2021, identified understanding how den trees either persist or are lost in a harvested landscape, particularly following fire, as a significant knowledge gap.

Building on this initial review, independent researchers from the Australian National University (ANU) are working closely with FCNSW to model⁷ hollow-bearing tree retention and recruitment, and identify the ongoing data collection that is required to support this modelling. Field trials are occurring in the Coffs Harbour management zone.

The modelling is drawing on the best available data and on-ground expertise. ANU researchers, FCNSW and the EPA have collaborated to source additional field data to improve model inputs and hollow simulation modelling. The team has also been exploring how recent LiDAR data collected across 250,000 hectares of state forests can be used to improve the modelling.

This hollow-bearing tree simulation modelling will help determine the effectiveness of the conditions and protocols of the Coastal IFOA at maintaining habitat resources over the long-term. This work will significantly advance knowledge on hollow-bearing trees, a critical habitat feature for many hollow-dependent fauna. Draft outputs are expected in August 2023.

2.1.3 Post-fire erosion mapping in southern NSW

The Commission engaged Jacobs to map post-fire debris flows (a form of sedimentation) in the fire-affected Tumut (Blowering Dam) and Tuross catchments in southern NSW. This project capitalised on the large rainfall events in 2020 following the severe 2019-20 wildfires, which provided an opportunity to address knowledge gaps and advance our understanding of large episodic erosion events following fire.

Jacobs used a model developed by the University of Melbourne previously used in Victoria to assess and predict the impact of bushfire on sediment delivery into waterways. The project analysed aerial imagery before and after the fires to measure channelised erosion in headwaters and debris flow occurrence (see **Figure 2** for an example). This is the first time that debris flows have been systematically mapped in NSW and linked to fire severity and other landscape features.

Jacobs found fire severity, terrain and forest types are key factors influencing the amount and frequency of debris flows. The analysis showed areas within the catchments classified as softwood plantations did not have higher debris flow frequency than native forest. Factors such as slope, and fire severity appear to be more important at the scale of the fire footprint. The study could not draw definitive conclusions with regards to the role of forest roads on post-fire erosion.

⁷ Through FRAMES (Forest Resource Assessment and Management Evaluation System) modelling used by FCNSW for long-term strategic level planning of sustainable forest management in NSW state forests



Figure 2: (a) and (b) show mapping of debris flow (depositional) fans (as green dots) and channel initiation points (as red dots) (figure (b) includes a 1km² grid)

2.1.4 Reviewing the use of temporary log crossings

The 2021 Coastal IFOA Monitoring Program annual health check initiated an assessment of the effectiveness of temporary log crossings in State Forests to address knowledge gaps around how well their potential impacts on waterways are being managed.

Jacobs were engaged to review the use of temporary log crossings in NSW coastal hardwood state forests and the effectiveness of the current conditions for their design and rehabilitation in reducing their impacts on waterways.

Jacobs delivered a final report in April 2023 advising that temporary log crossings can reduce biophysical impacts compared to traditional causeway crossings in certain forest circumstances, thus improving outcomes for water quality and aquatic habitat. Jacobs identified potential amendments to the relevant protocol that would bring a range of temporary log crossing requirements into alignment with those applied to traditional causeway crossings.

The project was informed by multiple field visits and extensive collaboration with FCNSW, EPA, the Commission and independent expert Dr Peter Hairsine. **Figure 4** and **Figure 4** show some example images of temporary log crossings observed in the field.



Figure 3: Temporary log crossing following use, Wauchope region, NSW. Source: NSW Forestry Corporation



Figure 4: Temporary log crossing with water in ephemeral stream below crossing, Wauchope region, NSW. Source: NSW Forestry Corporation

2.1.5 Monitoring class 1 drainage lines and exclusion zones

The program has engaged experts to assess whether the exclusion zone conditions for Class 1 drainage lines as codified under the Coastal IFOA are effective in minimising the impact of harvesting activities on waterway condition.

A draft field survey methodology and assessment framework has been developed and is currently being applied in field surveys to report on the performance of riparian exclusion zones and ground protection zones for Class 1 drainage lines.

The NSW Forest Monitoring Steering Committee independent expert Dr. Peter Hairsine is providing independent review and oversight of the methods and findings of this project. A final report is expected in October 2023.

2.1.6 Compliance evaluation

The Commission has commenced work on evaluating whether non-compliances are compromising the outcomes or the ability to monitor the effectiveness of the Coastal IFOA conditions. This is one of four primary evaluation questions established under the Coastal IFOA monitoring program.

The Commission is working with Technical Forest Services to finalise an evaluation framework for the compliance evaluation. The evaluation will take place in the second half of 2023 and will be delivered in time to inform the five yearly review of the Coastal IFOA.

2.1.7 Other research and evaluation projects

The Coastal IFOA Monitoring Program has commenced several other research and evaluation projects that respond to existing and emerging issues, details of which are provided in **Table 3**.

Table 3: Ongoing research and evaluation projects

Project	Overview	Status
Koala response to harvesting	Work under the Koala Research Program (Section 2.1.1) has been extended to further investigate koala response to selective harvesting in state forests on the NSW North Coast.	<ul style="list-style-type: none"> Research plan expected by August 2023
Drones to detect cryptic species	<p>NSW DPE are investigating the use of drones to improve detection for the cryptic koala and greater glider. Surveys will be undertaken in winter 2022.</p> <p>Drones will be fitted with thermal imaging cameras to provide information on the population density and distribution of koalas. These results will be compared to acoustic detection surveys being undertaken in the same area.</p> <p>Working with FCNSW, thermal imaging cameras will also be used in areas subject to spotlight surveys for the greater glider, with comparison of density estimates using the two techniques and ground validation in real time.</p>	<ul style="list-style-type: none"> Draft report received June 2023 Final report expected by August 2023
eDNA to detect and monitor Giant Burrowing Frog	eDNA review in progress for Giant Burrowing Frog. A targeted species assay is being developed for the Giant Burrowing Frog, including a target species assessment pilot study to validate the assay and test sampling approach. It is anticipated that eDNA samples will be taken at known Giant Burrowing Frog habitat sites within the state forests as part of the pilot study.	<ul style="list-style-type: none"> Final report expected September 2023
Burnt area harvesting	FCNSW is collaborating with the University of Melbourne to develop revised monitoring approach for burnt area harvesting. Field visits to Batemans Bay and a workshop was held 6 and 7 March 2023. Follow-up workshop held 27 April 2023.	<ul style="list-style-type: none"> Timeline for delivery of final report to be confirmed
Evaluating the forest road network	<p>Alluvium have developed a cost-effective method to evaluate the effectiveness of forest road networks in maintaining water quality. Their risk-based model provides a consistent and cost-effective means of assessing the NSW forest road network and improving the strategic allocation of resources and to improve road design and management through time.</p> <p>The modelling framework is based on published research regarding forest road impacts on sediment delivery across different tenures and road types in NSW.</p>	<ul style="list-style-type: none"> Final report delivered in November 2022
Strengthening the evidence base to assess damaged trees	Western Sydney University has been engaged to review the scientific literature covering current knowledge about the response mechanisms of trees to physical injuries to the stem and crown. The researchers have proposed an evidence-based method for setting objective injury thresholds for each category of retained trees.	<ul style="list-style-type: none"> Draft report received July 2023 Final report expected August 2023

Project	Overview	Status
Species and habitat surveys evaluation	The program has engaged a team from the University of Tasmania and Biodiversity Maintenance Australia to evaluate the effectiveness of species and habitat survey and modelling conditions and practices used in the Coastal IFOA. This evaluation will determine the effectiveness of practices used in the coastal native hardwood state forest in NSW to identify and protect species and habitat of importance.	<ul style="list-style-type: none">Final report expected July 2023

2.2 Baseline and trend monitoring

The Coastal IFOA requires the monitoring program to establish scientifically valid environmental and wood supply baselines to evaluate the effectiveness or impacts of the approval on environmental values and wood supply. In addition, the program must monitor trends in forest regeneration, biodiversity and water quality at the landscape scale.

Significant progress has been made in 2022-23 on key trend and effectiveness monitoring activities under the Coastal IFOA Monitoring Program, specifically:

- commencing fauna species occupancy monitoring
- collecting and analysing spatial data to explore forest health and structure
- understanding actual wood supply under the Coastal IFOA Conditions and protocols.

2.2.1 Monitoring fauna species occupancy

Fauna species occupancy monitoring is underway for priority native animal species in state forests in the north and south coast regions of the Coastal IFOA by FCNSW and DPI. Data will be used to estimate trends in species occupancy and to evaluate the effectiveness of the Coastal IFOA protections and conditions in maintaining species occupancy.

The monitoring targets species such as koalas and other arboreal mammals, hollow-dependant bats, nectivores, ground-dwelling mammals and forest owls. Data is collected using remote sensing technologies such as cameras, sound recorders for species emitting audible calls and ultrasonic sound recorders for echo-locating bats.

To inform the acoustic data analysis, call recognisers have been developed for the glossy black cockatoo and selected priority nocturnal species, including owls, gliders and the grey headed flying fox. This has been a collaborative effort by the NSW Department of Primary Industries, in collaboration with Queensland University of Technology, FCNSW and Victorian University of Wellington.

The Commission worked with FCNSW and other agencies to pilot the fauna monitoring, with an evaluation of the pilot completed in January 2023. Based on the pilot, the monitoring sampling strategy was improved and the methods updated, including the production of an operational manual and equipment instruction sheets to ensure consistency in data collection and management.

Key milestones to date include the first season of surveys in spring 2022 and autumn surveys in 2023 (see **Figure 5** for examples of camera trap data from the spring 2022 surveys). Camera and acoustic data collected have been shared with DPI Forest Science to identify species. Data have been scanned and validated for koalas, powerful owl, sooty owl, masked owl and sugar gliders for the south coast region.



Figure 5: Example camera trap data from surveys in spring 2022 showing (a) long-nosed bandicoot (*Perameles nasuta*) and (b) spotted-tail quoll (*Dasyurus maculatus*) (Source: FCNSW)

Final results from the first year of fauna monitoring are expected towards the end of 2023.

Looking ahead, ongoing fauna monitoring will take place in spring and autumn across 300 sites (and 600 subplots) in state forests across coastal NSW (**Figure 6**), with half of the sites monitored annually and the other half once every five years. This will provide valuable information on species' occupancy and distribution and allow for seasonal variation in detectability of the species.

As well as providing vital evidence around focal native species, this monitoring is also likely to provide insights into pest animals in these areas, for example via data about pest animals captured via camera traps.

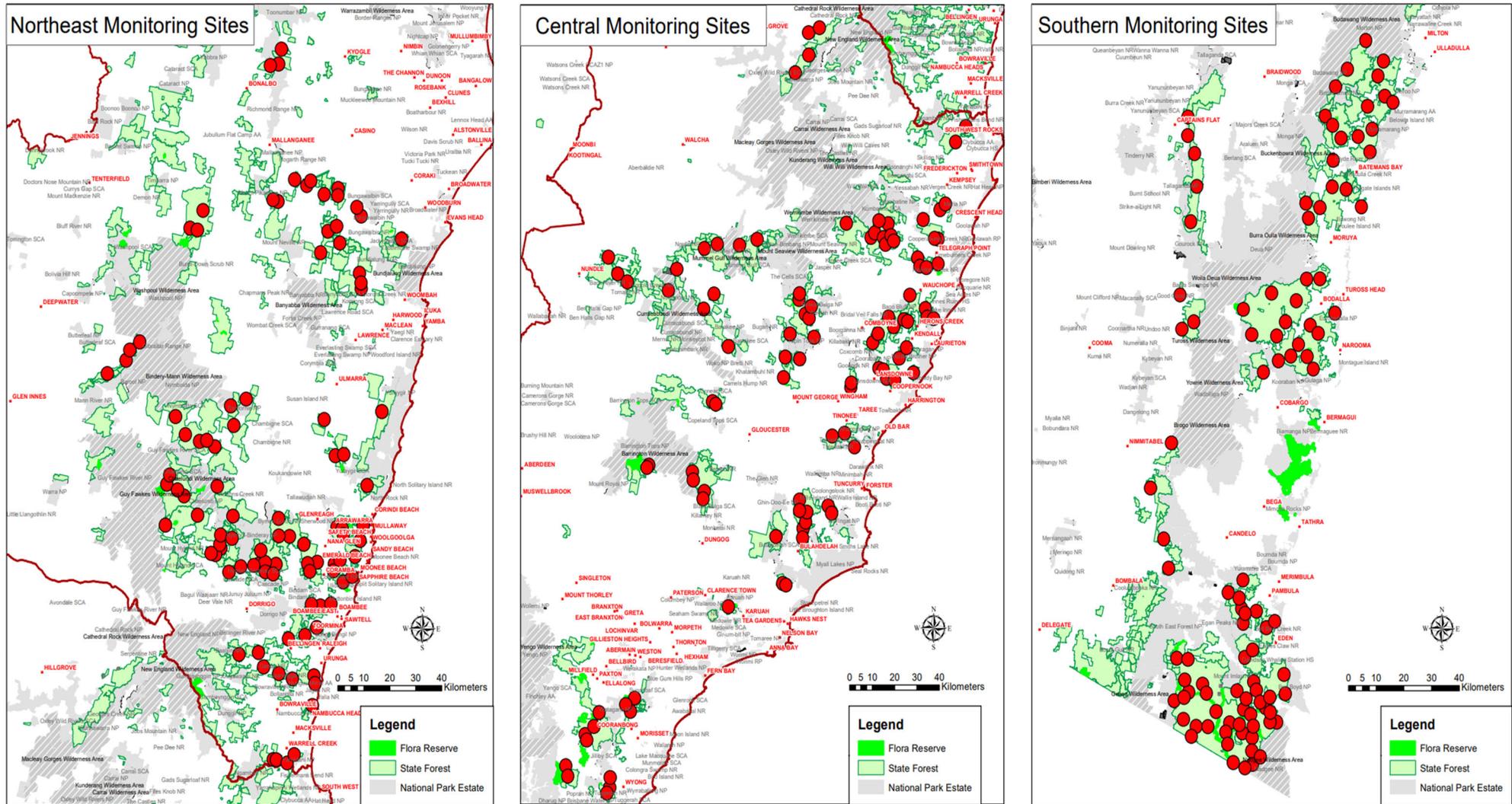


Figure 6: Locations of fauna monitoring sites (including both annual and 5-yearly monitoring sites)

2.2.2 Exploring forest health and structure

Forest structural data has been collected using airborne LiDAR (light detection and ranging) covering 250,000 hectares over 47 state forests. Sites across seven priority areas (**Figure 7**) were selected to cover the range of forest types, areas burnt and unburnt during the 2019-20 wildfires, fauna monitoring sites, forest inventory plots, completed and proposed harvesting areas, and areas managed for conservation.

The LiDAR data was collected between June 2022 and May 2023 and is being processed to generate forest structural metrics that will be used to analyse forest connectivity and heterogeneity across the landscape. Leading spatial and modelling experts have participated in a spatial data analysis working group to identify an effective scope and approach for the collection and analysis of this data.

Analysis of outputs is expected to be completed by the end of 2023. The raw LiDAR data and data for selected forest structural metrics will be made publicly available through a data portal once analysis has been completed.

FCNSW has trialled high-density LiDAR capture using helicopter-mounted equipment as well as ground-based Hovermap LiDAR to capture forest structural data which is being analysed using virtual reality technology. These new methods should increase the safety and efficiency of forest plot data collection, and substantially increase the level of knowledge about forest structure.

FCNSW also completed on-ground fire damage and recovery assessments for over 300 sites in the Coastal IFOA region across the Fire Extent and Severity Mapping (FESM) classes, and including areas covered by recent LiDAR data. These data will be used to support analysis of forest recovery following the 2019-20 wildfires and the update of long-term sustainable yield.

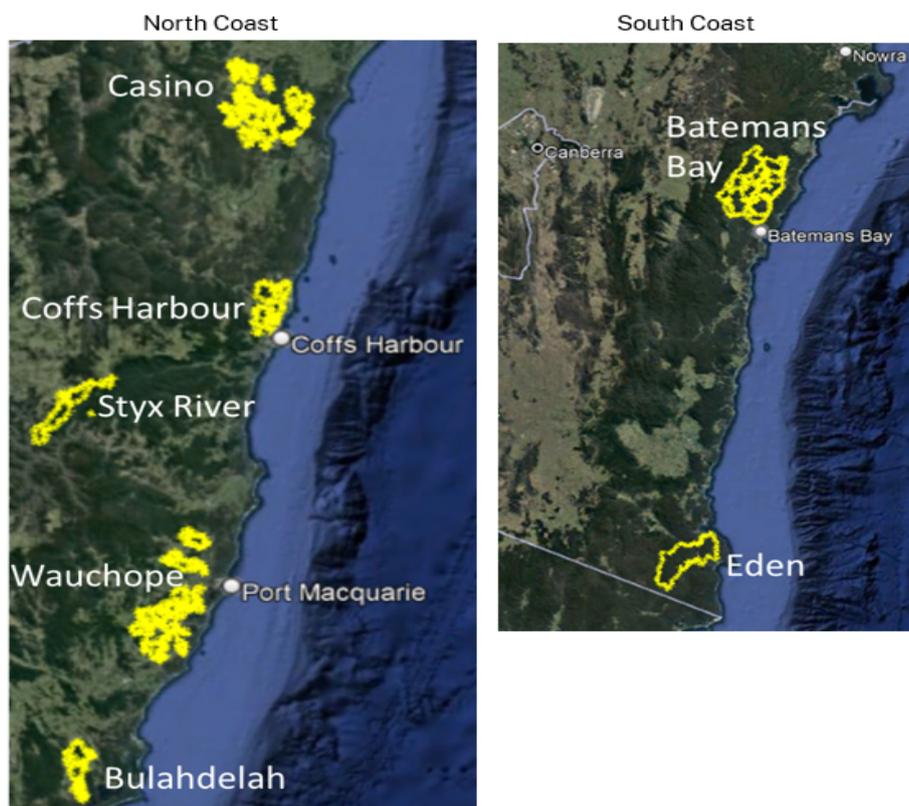


Figure 7: Locations of LiDAR data collection

2.2.3 Wood supply

Building on recent work assessing baselines and historical trends in wood supply between 2003-2019, Indufor have been engaged to review:

- the actual quantity and quality of wood supplied from harvesting operations conducted under the Coastal IFOA Conditions and protocols
- how the implementation of the Coastal IFOA has influenced wood supply at the operational and landscape scales.

A draft report is expected in August 2023. Additionally, updated long-term wood supply projections are being prepared by the Forestry Corporation of NSW for the five-yearly review of the NSW Regional Forest Agreements.

2.3 Reporting and adaptive management

2.3.1 2022-23 Annual health check

The Coastal IFOA Monitoring Program commits to an annual review of the program, referred to as the 'annual health check'. The annual health check:

- considers the results of the monitoring program
- identifies any implications for the IFOA conditions
- considers the adequacy of the program and identifies priorities for further monitoring or research.

This process informs advice from the Commission, on behalf of the Steering Committee, to the EPA and DPI on how the Coastal IFOA can better meet its objectives and outcomes.

The Commission team hosted the annual Coastal IFOA health check in October 2022 with the EPA, FCNSW and DPI. The 2022-23 annual health check initiated a project to address knowledge gaps and uncertainties in the application and interpretation of the Coastal IFOA definition of damage to trees (as listed in **Table 3**, final report expected August 2023).

Other priority issues will continue to be addressed and resolved by FCNSW and EPA in advance of the formal review of the Coastal IFOA in 2023-24.

2.3.2 Annual stakeholder forums and webinars

In late 2022 the Commission hosted a series of webinars providing an opportunity for people to learn, ask questions and provide feedback about recent work relating to forestry and forest management (**Table 4**).

Much of this work was carried out under the broader Forest Monitoring and Improvement Program but is also relevant for the Coastal IFOA Monitoring Program. All webinar materials including recordings of the presentations and panel discussions can be found on the [Commission's website](#).

2.3.3 Species management plans

The Commission continues to oversee the reviews of species management plans. A review for the Giant Burrowing Frog in the Eden management zone is currently in progress.

Table 4: Webinars and community forums

Project	Overview
<p>Webinar 1 - Baselines, drivers and trends for species occupancy and distribution October 2022</p>	<p>Prof. Nick Reid, Dr. Rod Kavanagh and Dr. Brad Law presented their recent work to develop baselines, drivers and trends for species occupancy and distribution in forests across NSW Regional Forest Agreement regions. Prof. Phil Gibbons joined the researchers on the panel to discuss the work.</p> <p>This work was undertaken by a team of scientists from leading universities, NSW agencies and the private sector.</p>
<p>Webinar 2 - Carbon balance of NSW forests October 2022</p>	<p>This webinar focused on the program's recent work to quantify the carbon balance of NSW forests.</p> <p>The analysis was undertaken by a team from The Mullion Group, NSW Department of Primary Industries and CSIRO. During the webinar the lead researchers, including Geoff Roberts and Dr Fabiano Ximenes presented findings and insights. Professor Patrick Baker, University of Melbourne joined a panel to discuss the work.</p>
<p>Webinar 3 - Baselines, drivers and trends for forest water catchments November 2022</p>	<p>At this webinar, Dr Danlu Gou from the University of Melbourne presented her research team's work on baselines, drivers and trends for water quality and quantity for NSW forested catchments. A/Prof Angus Webb and Prof Andrew Western, both from the University of Melbourne also contributed to the work. Researchers applied new and novel statistical approaches to identify the flow responses to climate variability and impacts from catchment disturbance, including fire.</p> <p>Dr Peter Hairsine, Australian National University joined the webinar panel to discuss the work.</p>
<p>Webinar 4 - Baselines and trends for forests extent, condition and loss November 2022</p>	<p>This webinar focused on the methods to measure forest extent, condition and loss of forests across the NSW Regional Forest Agreement regions between 1995 and 2019. The methods leverage existing data from an extensive set of existing and historical forest monitoring programs.</p> <p>The work was presented by the Data Scientist and Senior Geospatial Analyst Harmen Romeijn at Spatial Vision. Professor Patrick Baker also joined the panel to discuss the work.</p>
<p>Webinar 5 - Future forest scenarios December 2022</p>	<p>Eminent experts in forest management, resilience, and future thinking have worked with agency representatives in developing scenarios representing different plausible futures for NSW forests to 2050.</p> <p>Professor Peter Kanowski and futurist Adjunct Professor Steve Cork presented their work including an outline of possible NSW forest futures scenarios. Dr. Peter Hairsine, Australian National University and Scott Matter, NSW Dept. Premier and Cabinet also joined the panel to discuss the work.</p>

3 Priority next steps

3.1 Advancing research and analysis

The program is focused on wrapping up key projects including:

- **forest regeneration and health** – spatial analysis of forest structure and health
- **biodiversity** – delivery of findings from first year of species occupancy monitoring
- **key habitat features** – finalising hollow-bearing tree mortality and recruitment modelling
- **waterway protections** – delivering outcomes of field surveys to report on the performance of riparian exclusion zones and ground protection zones for Class 1 drainage lines.

3.2 Reviewing five-year program findings

The Coastal IFOA Monitoring Program's adaptive management process includes five-yearly formal reviews of the program and its findings, with the first expected to be delivered in 2024. The five-yearly formal review provides an opportunity to:

- assess detailed results from the program, including key findings, insights and trends
- recommend opportunities for improvement for the monitoring program and Coastal IFOA (if any).

The Commission team will work to deliver the five-yearly formal review of the program over the next 12 months, with opportunities for input from the NSW Forest Monitoring Steering Committee and Technical Working Groups. The team is currently focused on collating the evidence from the monitoring program and elsewhere that will be used to answer the monitoring questions in the monitoring program. The outcomes of this review process are expected to inform the formal five-yearly review of the Coastal IFOA.