Australia's National
Science Agency

GISERA | Gas Industry Social and Environmental Research Alliance

Project Order

Short Project Title

Cooper Creek flood modelling scenarios

Long Project Title	Cooper Creek flood modelling scenarios (development and future climate) developed through stakeholder engagement workshops
GISERA Project Number	W.31
Start Date	06/06/2022
End Date	31/03/2024
Project Leader	Kate Holland and Jai Vaze

GISERA State/Territory

- [x] Queensland
- [ ] New South Wales
- [ ] Northern Territory
- [ ] South Australia
- [ ] Western Australia
- [ ] Victoria
- [ ] National scale project

Basin(s)

- [ ] Adavale
- [ ] Amadeus
- [ ] Beetaloo
- [ ] Canning
- [ ] Western Australia
- [ ] Carnarvon
- [ ] Clarence-Morton
- [x] Cooper
- [ ] Eromanga
- [ ] Galilee
- [ ] Gippsland
- [ ] Gloucester
- [ ] Gunnedah
- [ ] Maryborough
- [ ] McArthur
- [ ] North Bowen
- [ ] Otway
- [ ] Perth
- [ ] South Nicholson
- [ ] Surat
- [ ] Other (please specify)

GISERA Research Program

- [x] Water Research
- [ ] Health Research
- [ ] Biodiversity Research
- [ ] Social & Economic Research
- [ ] Greenhouse Gas Research
- [ ] Agricultural Land Management Research
- [ ] Other (please specify)

1. Project summary

Conservationists, graziers and traditional owners are deeply concerned that future unconventional gas resource development could impede flows and contaminate water in Cooper Creek, part of one of the world's last major free-flowing desert river systems. The calibrated flood inundation models developed for Cooper Creek will be used to evaluate how flood characteristics in the complex Cooper Creek floodplain may change under future development and climate change scenarios. Flood modelling scenarios will be developed through engagement and advice received from stakeholders, including members of the regional community, traditional owners, industry, and various levels of government. This project will leverage the significant investment made by the Geological and Bioregional Assessment (GBA) Program to better understand flooding (and changes to it under development and climate change scenarios) in Cooper Creek. The GBA Program funded collection of detailed elevation data over approximately 32,000 km^2, and the development and calibration of state-of-the-art hydrodynamic flood inundation models of Cooper Creek floodplain in Queensland and South Australia. The flood modelling was driven by advice from the user panel for the Cooper GBA region about the importance of better understanding of flood inundation patterns and management by the community, industry, and government. The relationships developed with stakeholders in the region through the user panel will be strengthened and renewed through stakeholder engagement workshops to develop future flood modelling scenarios. The flood modelling scenarios will be designed with stakeholders to provide scientific advice for decision makers to better understand potential impacts of future climate and development on flooding.

2. Project description

Introduction

Flooding can be catastrophic for agricultural production in terms of loss of stock, fodder, topsoil, and crops, as well as damage to surface infrastructure. However, flooding is also essential for riparian and wetland ecosystems, with flood pulses replenishing instream waterholes, and connecting wetlands with main river channels.

Detailed flood modelling to better understand how resource development and climate change could impact on Cooper Creek and its floodplain is a high priority for the user panel for the Cooper GBA region (Holland et al., 2021). Detailed flood modelling enables careful design of roads and other infrastructure on the floodplain to minimise flow obstructions, impoundments, and damage to infrastructure. Flood modelling scenarios can also explore potential changes to water availability and persistence of critical waterholes associated with changes to catchment inflows and losses from floodplain ecosystems under future climate scenarios.

The user panel for the Cooper GBA region included representatives from Santos, Origin Energy, Queensland Department of Resources, PIRSA, SA Department of Environment and Water, SA Department of Energy and Mining, Desert Channels NRM, Barcoo, Bulloo and Quilpie Shire Councils, Mithaka and Wonkumarra Traditional Owners. The user panel for the Cooper GBA region noted that careful management to protect the unique environmental and cultural values

associated with the floodplains and Great Artesian Basin is needed. They also noted the positive economic and social contribution made by the existing petroleum and gas industry to the region and local communities.

Prior Research

In 2019, the Geological and Bioregional Assessment (GBA) Program conducted light detection and ranging (LiDAR) aerial surveys covering an area of 31,780 km^2 across the Cooper Creek floodplain, and the Thompson and Barcoo river systems. The digital elevation model developed from the LiDAR dataset has been used to build a hydrodynamic flood inundation model to better understand how and where to manage potential impacts on the floodplains of the Cooper GBA region.

The size and complexity of Cooper Creek floodplain mean that separate flood inundation models were developed in Queensland (23,000 km^2 with 7,420,953 mesh elements) and South Australia (9,000 km^2 with 4,754,440 mesh elements) (Geological and Bioregional Assessment Program, 2021a).

There is good agreement between the calibrated model and Landsat and MODIS satellite data for historical floods in an area characterised by extremely complex terrain, extremely low gradients, and sparse water level observations. The calibrated hydrodynamic flood inundation models developed by the GBA Program represent an opportunity to evaluate changes to flood characteristics that are important to regional communities, industry, and governments.

Outputs from the hydrodynamic flood inundation models include daily estimates of spatial flood extents across the modelling domain, and water depth and velocities for each mesh element for all the historical flood events used (Geological and Bioregional Assessment Program, 2021b).

Relevant State/Territory Government independent reviews

Use of the calibrated flood inundation model was identified as an opportunity by Holland et al., 2021).

> ‘At a local scale, the calibrated hydrodynamic flood inundation model can evaluate how flood characteristics may change under future development and climate change scenarios.
>
> Design of civil works – such as a watercourse crossing, road, dam or a diversion – that could change flow paths on the floodplain and in small flood runners can be avoided through compliance with state and regional regulations at the design stage.’

Need & Scope

The calibrated hydrodynamic flood inundation models developed for Cooper Creek can evaluate how flood characteristics may change under future development and climate change scenarios in the complex Cooper Creek floodplain. The user panel for the Cooper GBA region identified a need for detailed flood modelling to better understand how resource development could impact the floodplains of Cooper Creek. Members of the regional communities, industry and government

have expressed an interest in using the calibrated flood inundation models to better understand how future gas industry development and climate change could impact on flood characteristics.

This interest is demonstrated by the on-going requests for access to the underlying LiDAR digital elevation model data that was officially released in 2020 before the remaining Stage 2 reports and data were officially released. There was a similar level of interest in the publication of the flood inundation model datasets at the completion of Stage 3 of the GBA Program. There is high interest from the GBA Program stakeholders in model predictions by the calibrated flood inundation model for future development and climate change scenarios to inform floodplain and infrastructure management planning. While the model and supporting data are publicly accessible, the size and complexity of the flood inundation models mean that many stakeholders are unable to access the necessary computing resources to run their own scenarios. Potential flood modelling scenarios include floodplain infrastructure, extraction, or diversions needed for gas industry development.

Objective

This project aims to deliver outputs from targeted flood modelling scenarios developed in response to on-going engagement with stakeholders in the Cooper GBA region, such as changes to:

1. Flood risk and flood characteristics under future climate scenarios
2. Flood characteristics due to floodplain infrastructure, extraction, or diversions needed for future gas industry development.

Methodology

Changes to overland flows may affect in-stream water levels, the natural movement of sediment, the bed and banks of the watercourse or lake, riparian vegetation, habitats for native plants and animals, and movement of fish and other aquatic species, cultural and ecological values of watercourses, waterholes, lakes, or springs. Effects of overland flow obstruction can be assessed at a local scale (as well as how it will propagate downstream) using the hydrodynamic flood inundation model developed by the Geological and Bioregional Assessment Program. The flood inundation model could assess changes to the land surface associated with future development (e.g. road, well pad) and the predicted changes in flows.

However, the size and complexity of the flood inundation models mean that many stakeholders are unable to access the necessary computing resources to run their own scenarios. The stakeholder workshops seek to better understand community concerns related to future development on Cooper Creek floodplain by defining scenarios that are relevant to the people who live and work in the region.

Task 1 will define scenarios through stakeholder engagement.

The first workshop will leverage existing relationships developed in the region through the user panel for the Cooper GBA region. The 2-3 flood modelling scenarios will be developed through engagement and advice received from stakeholders, including members of the regional community, traditional owners, industry, and various levels of government. The flood modelling

scenarios will be designed with stakeholders to provide scientific advice for decision makers to better understand potential impacts of future climate and development on flooding. The stakeholder workshops will also clarify what the flood inundation model can and cannot predict and how the model outputs can best inform future environmental monitoring and reporting in the region.

Understanding what matters to the people who live and work in the region is critical for this project. The project will work closely with the CSIRO GISERA Communications and Stakeholder Engagement Manager to assist with design and implementation of the stakeholder workshops. Formal ethics approval for stakeholder workshops will also be obtained from the CSIRO Social Science Human Research Ethics Committee (CSSHREC).

Task 2 will develop, run, and assess the 2-3 flood modelling scenarios.

The calibrated hydrodynamic flood inundation models developed for Cooper Creek will be modified to represent the flood modelling scenarios agreed in Task 1 and used to evaluate how flood characteristics in the complex Cooper Creek floodplain may change under future development and climate change scenarios. Outputs from the hydrodynamic flood inundation modelling include estimates of spatial flood extents across the modelling domain, and water depth and velocities for each mesh element for each scenario. These outputs will improve knowledge and conceptual understanding of the hydrology of Cooper Creek floodplain, as well as improve capacity to predict environment risks associated with changes to flooding scenarios.

A second stakeholder workshop will be held in early 2023 to finalise flood modelling scenarios. The workshop will provide stakeholders with an opportunity to discuss and give feedback on what matters to them and for the team to finesse the model outputs and key messages.

Task 3 will report results of the 2-3 flood modelling scenarios.

Flood modelling scenarios will be published as a comprehensive dataset, including supporting methods report to document model set up and validation results of a 2D hydrodynamic model (MIKE21FM). The methods report will document model setup used for 2-3 flood modelling scenarios, including model mesh and all related setup files (e.g., rainfall, potential evapotranspiration, LiDAR DEM, river and waterhole bathymetry, classified Landsat images for the flood events used, soil characteristics, vegetation characteristics, observed streamflow at the upstream gauges and ungauged inflows along the model domain boundaries estimated using a regionally calibrated rainfall-runoff model), and validation statistics for each scenario. Project reports and datasets will be internally peer reviewed.

In addition, the research proponent will work with the CSIRO GISERA Communications team to develop a two-page fact sheet summary in plain English with links to visualisation and modelling dataset(s) will be prepared. The flood modelling scenarios will enhance understanding of changes to flood risk and flood characteristics associated with future climate and development scenarios.

Task 4 will communicate project objectives, progress, and findings to stakeholders.

A third workshop in September 2023 will communicate project findings with stakeholders who work and live in the region. This is a critical component of knowledge transfer to enable transparent communication of flood modelling scenario outcomes. The workshop will be supported by a draft of the two-page factsheet. On-going stakeholder engagement is critical to ensuring enhanced understanding of changes to flood risk and flood characteristics associated with future climate and development scenarios. This new knowledge will empower decision makers in communities, industry, and government to better manage flooding on the Cooper Creek floodplain.

Digital technology is creating significant opportunities to change the way research is undertaken, delivered and the impact they generate. The project will leverage external communications and digital capability to develop an innovative and interactive visualisation platform for users to explore flood model outputs that matter to them.

An external contractor will be engaged to develop a digital interactive communication product designed for a technical audience that is also publicly accessible. Questions could demonstrate how flood model outputs can support decisions related to:

1. Sustainability of the Cooper Creek floodplain, including habitats of threatened species and grazing on natural pastures
2. Flooding and infrastructure, including depth and duration of floods, scour from high flows, duration of restricted access
3. Changes to environmental flows, including barriers to flows and flow characteristics near infrastructure
4. Risks to the environment and other infrastructure from floods due to climate change and natural gas infrastructure.

3. Project Inputs

Resources and collaborations

Researcher	Time Commitment (project as a whole)	Principle area of expertise	Years of experience	Organisation
Kate Holland	21 days	Environmental assessments	26	CSIRO Land and Water
Jai Vaze	55 days	Flood modelling	30	CSIRO Land and Water
Cherry Mateo	90 days	Flood modelling	13	CSIRO Land and Water
Steve Marvanek	40 days	Spatial analysis	20	CSIRO Land and Water
Ang Yang	20 days	Visualisation	30	CSIRO Land and Water

Subcontractors (clause 9.5(a)(i))	Time Commitment (project as a whole)	Principle area of expertise	Years of experience	Organisation
TBA - to develop interactive communication materials	$130k	Communication and visualisation	5+ years	

Technical Reference Group

Potential experts to invite to stakeholder workshops who contributed to the user panel for the Cooper GBA region:

- Santos – Andrew Stannard
- Origin Energy – Matt Kernke/Paul Cymer
- Queensland government – Dieter Kluger (Department of Resources)
- Queensland government – TBA (Department of Environment of Sciences)
- Desert Channels Queensland NRM - Simon Wiggins, Andrew Drysdale
- Local government officials - Barcoo Shire Council, Quilpie Shire Council, Bulloo Shire Council
- Traditional Owners - Mithaka Aboriginal Corporation, Wonkumarra People Native Title Claim
- Francis Chiew – Lake Eyre Basin Scientific Advisory Panel and CSIRO Hydrology
- LEB fish expert – David Schmarr (SARDI)

Budget Summary

Source of Cash Contributions	2021/22	2022/23	2023/24	2024/25	2025/26	% of Contribution	Total
GISERA	$10,798	$217,849	$135,837	$0	$0	70.02%	$364,485
- Federal Government	$10,798	$217,849	$135,837	$0	$0	70.02%	$364,485
Total Cash Contributions	**$10,798**	**$217,849**	**$135,837**	**$0**	**$0**	**70.02%**	**$364,485**

Source of In-Kind Contribution	2021/22	2022/23	2023/24	2024/25	2025/26	% of Contribution	Total
CSIRO	$4,624	$93,275	$58,161	$0	$0	29.98%	$156,059
Total In-Kind Contribution	**$4,624**	**$93,275**	**$58,161**	**$0**	**$0**	**29.98%**	**$156,059**

TOTAL PROJECT BUDGET	2021/22	2022/23	2023/24	2024/25	2025/26	-	TOTAL
All contributions	$15,422	$311,124	$193,998	$0	$0	-	$520,544
TOTAL PROJECT BUDGET	**$15,422**	**$311,124**	**$193,998**	**$0**	**$0**	-	**$520,544**

4. Communications Plan

Stakeholder	Objective	Channel (e.g. meetings/media/factsheets)	Timeframe (Before, during at completion)
Regional community / wider public	To communicate project objectives and key messages from the research	Fact sheets (including development of one at commencement of project which will explain in plain English the objective of the project and one at the end of the project – these may be updated periodically as project progresses). Project progress reported on GISERA website to ensure transparency for all stakeholders including regional communities. Media release (optional) Digital innovative and interactive flood model visualisation platform	From commencement of project and with updates as they come to hand. As required At completion At completion
Government	To report on research being undertaken	Factsheets, newsletters, website, or webcast	During
Gas Industry	Industry adopts methods to improve flood risk and development approvals	Presentation of findings at joint Gas Industry/Government Knowledge Transfer Session	At completion
Government	Advice provided to policy makers and scientists to support decision making for development approvals and floodplain environmental flows	Presentation of findings at joint Gas Industry/Government Knowledge Transfer Session	At completion
Community stakeholders	Presentation of research findings through user panels	Presentation of findings through community forums or briefings	At completion
Regional community/wider public, government, scientific community, and industry	To report on key findings	Public release of flood model scenario dataset with supporting methods report to document model set up and validation results of a 2D hydrodynamic model (MIKE21FM) Two-page fact sheet summary in plain English with links to visualisation and modelling dataset(s). An interactive digital product to illustrate the modelling results	At project completion

Stakeholder	Objective	Channel (e.g. meetings/media/factsheets)	Timeframe (Before, during at completion)
Traditional Owner communities	To explore collaboration opportunities for information exchange.	Engagement with representatives of relevant land councils where appropriate to determine interest/availability in making information available to communities	Ongoing

5. Project Impact Pathway

Activities	Outputs	Short term Outcomes	Long term outcomes	Impact
1. Define scenarios through stakeholder engagement	Refined work plan and 2-3 flood modelling scenarios	Better understanding of community concerns for future development on Cooper Creek floodplain	More efficient, less disruptive placement and operation of gas infrastructure Improved capacity to forecast and negate environmental risks Improvements in industry practice and decision making to maximize benefits and minimize costs	- Improved land and surface water quality under coexistence between gas and agriculture - Improved regional ecological function
2. Flood modelling of 2-3 scenarios defined through stakeholder workshops	Modify, run, and assess outputs for 2-3 flood modelling scenarios	Improved knowledge and conceptual understanding of the hydrology of Cooper Creek floodplain		
3. Project reporting and internal review	Publication and review of flood modelling dataset, methods report and peer-reviewed paper (if possible)	Improved capacity to predict environment risks associated with changes to flooding scenarios		
4. Communicate project objectives, progress, and findings to stakeholders	Transparent communication of flood modelling scenario outputs and visualisations.	Enhanced understanding of changes to flood risk and flood characteristics associated with future climate and development scenarios	New knowledge empowers communities to manage current and future issues	

6. Project Plan

Project Schedule

ID	Activities / Task Title	Task Leader	Scheduled Start	Scheduled Finish	Predecessor
Task 1	Define scenarios	Kate Holland	June 2022	Sept 2022	none
Task 2	Flood modelling	Cherry Mateo	July 2022	June 2023	Task 1
Task 3	Project reporting	Jai Vaze	April 2023	March 2024	Task 1,2
Task 4	Communicate findings	Kate Holland	July 2022	March 2024	Task 1,2,3

Task description

Task 1: Define scenarios

OVERALL TIMEFRAME: June 2022 to September 2022

BACKGROUND: The project builds on existing flood inundation model developed for the Geological and Bioregional Assessment Program. The size and complexity of the flood inundation models mean that stakeholders are unable to access the necessary computing resources to run their own scenarios. Prior to any stakeholder workshops, an initial work plan, ethics approval and data management plan will be completed.

TASK OBJECTIVES: The objective of the initial stakeholder workshop is to engage with stakeholders to define 2-3 flood modelling scenarios and test visualisation options.

TASK OUTPUTS AND SPECIFIC DELIVERABLES: Work plan, ethics approval, stakeholder workshop, list of modelling scenarios, visualisation preferences and data management plan.

Task 2: Flood modelling

OVERALL TIMEFRAME: July 2022 to June 2023

BACKGROUND: In this task, the state-of-the-art hydrodynamic flood inundation model will be modified to represent the 2-3 flood modelling scenarios defined in Task 1. A stakeholder workshop in early 2023 will be used to finalise flood modelling scenarios. Outputs from the hydrodynamic modelling include estimates of spatial flood extents across the modelling domain, and water depth and velocities for each mesh element for each scenario.

TASK OBJECTIVES: The objective of this task is to develop, run, and assess flood models which represent the 2 to 3 modelling scenarios defined in Task 1.

TASK OUTPUTS AND SPECIFIC DELIVERABLES: Updated model setup used for 2-3 flood modelling scenarios, including model mesh and all related setup files (e.g., rainfall, potential evapotranspiration, LiDAR DEM, river and water holes bathymetry, classified Landsat images for the selected floods, soil characteristics, vegetation characteristics, observed streamflow at the upstream gauges and ungauged inflows along the model domain boundaries estimated using a regionally calibrated rainfall-runoff model), and validation statistics for each scenario.

Task 3: Project reporting

OVERALL TIMEFRAME: April 2023 to March 2024

BACKGROUND: Information from this project is to be made publicly available after completion of standard CSIRO publication and review processes.

TASK OBJECTIVES: To ensure that the information generated by this project is documented and published after thorough CSIRO Internal review.

TASK OUTPUTS AND SPECIFIC DELIVERABLES:

1) Preparation of flood model scenario dataset with supporting methods report to document model set up and validation results of a 2D hydrodynamic model (MIKE21FM);

2) Following CSIRO ePublish review, the report will be submitted to the GISERA Director for final approval; and

3) Provide 6 monthly progress updates to GISERA office.

Task 4: Communicate project objectives, progress, and findings to stakeholders

OVERALL TIMEFRAME: Full duration of project

BACKGROUND: Communications of GISERA research are an important component of outreach and dissemination of findings to diverse audiences. This project will leverage existing relationships developed with user panel members in the Cooper Basin to ensure broad stakeholder engagement.

TASK OBJECTIVES: Communicate project objectives, progress, and findings to stakeholders through meetings, knowledge transfer session, factsheet, and journal article, in collaboration with GISERA Communications officers. It is anticipated that flood modelling scenarios will be shared with a general audience through a 2-page fact sheet summary in plain English with links to visualisation and modelling dataset(s) and visualisations of modelling scenarios based on user needs. A final stakeholder workshop to communicate outcomes from modelling scenarios is planned for September 2023.

TASK OUTPUTS AND SPECIFIC DELIVERABLES: Communicate project objectives, progress, and results to GISERA stakeholders according to standard GISERA project procedures which may include, but not limited to:

1) Knowledge Transfer session with Government/Gas Industry

2) Presentation of findings to Community members/groups

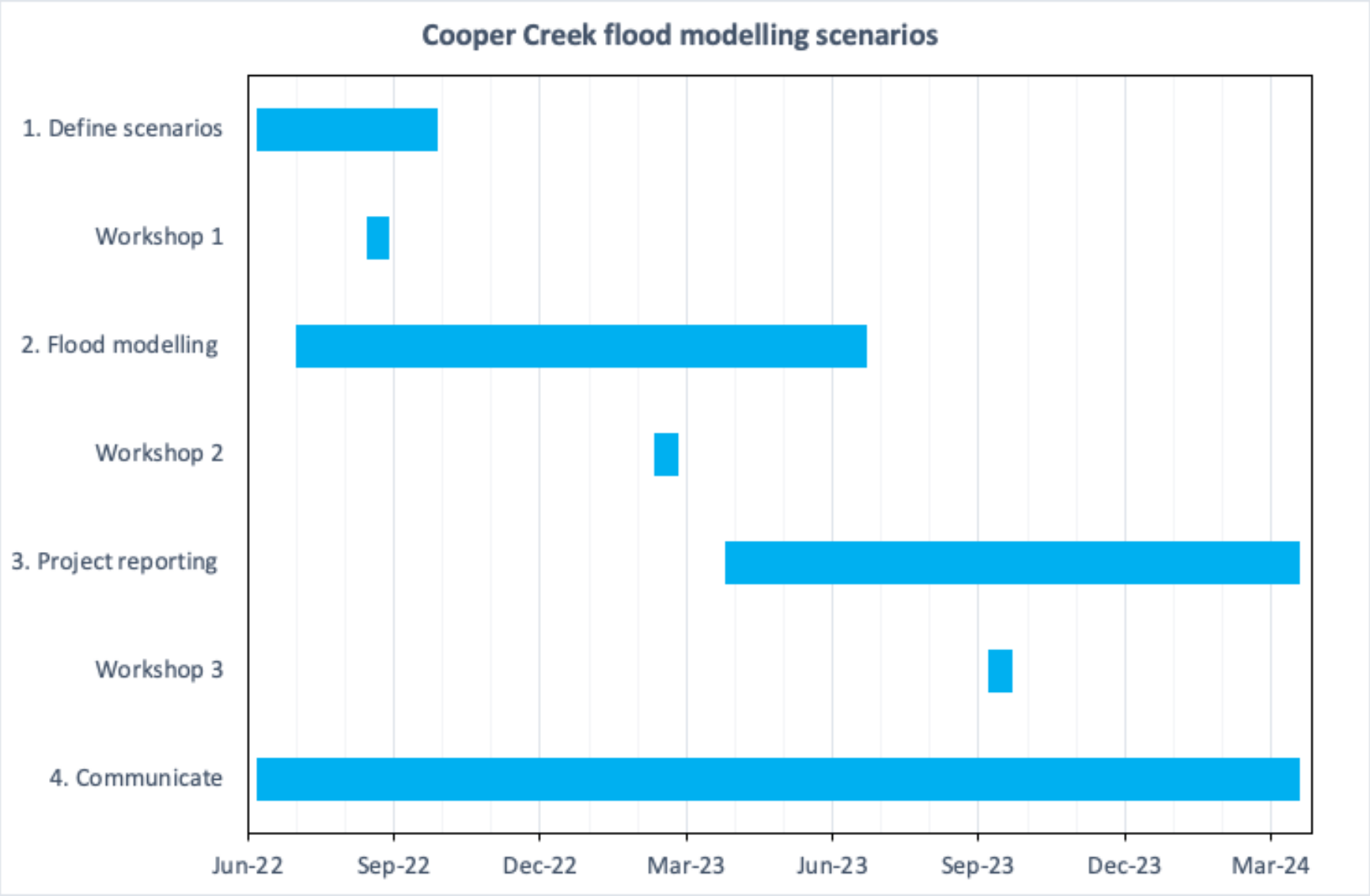
3) Preparation of article for GISERA newsletter and other media outlets e.g. The Conversation

4) Revision of project factsheet to include results (a factsheet is developed at project commencement, and another will be done at completion)

5) Peer reviewed scientific manuscript ready for submission to relevant journal (if possible)

6) Digital innovative and interactive flood model visualisation platform

Project Gantt Chart



7. Budget Summary

Expenditure	2021/22	2022/23	2023/24	2024/25	2025/26	Total
Labour	$15,422	$221,124	$123,998	$0	$0	$360,544
Operating	$0	$25,000	$5,000	$0	$0	$30,000
Subcontractors	$0	$65,000	$65,000	$0	$0	$130,000
Total Expenditure	**$15,422**	**$311,124**	**$193,998**	**$0**	**$0**	**$520,544**

Expenditure per task	2021/22	2022/23	2023/24	2024/25	2025/26	Total
Task 1	$15,422	$3,964	$0	$0	$0	$19,386
Task 2	$0	$167,086	$0	$0	$0	$167,086
Task 3	$0	$44,793	$98,004	$0	$0	$142,797
Task 4	$0	$95,281	$95,994	$0	$0	$191,275
Total Expenditure	**$15,422**	**$311,124**	**$193,998**	**$0**	**$0**	**$520,544**

Source of Cash Contributions	2021/22	2022/23	2023/24	2024/25	2025/26	Total
Federal Govt (70.02%)	$10,798	$217,849	$135,837	$0	$0	$364,485
Total Cash Contributions	**$10,798**	**$217,849**	**$135,837**	**$0**	**$0**	**$364,485**

In-Kind Contributions	2021/22	2022/23	2023/24	2024/25	2025/26	Total
CSIRO (29.98%)	$4,624	$93,275	$58,161	$0	$0	$156,059
Total In-Kind Contributions	**$4,624**	**$93,275**	**$58,161**	**$0**	**$0**	**$156,059**

	Total funding over all years	Percentage of Total Budget
Federal Government investment	$364,485	70.02%
CSIRO investment	$156,059	29.98%
Total Expenditure	**$520,544**	**100%**

Task	Milestone Number	Milestone Description	Funded by	Start Date (mm-yy)	Delivery Date (mm-yy)	Fiscal Year Completed	Payment $ (excluding CSIRO contribution)
Task 1	1.1	Scenarios defined with stakeholders	GISERA	Jun-22	Sep-22	2022/23	$13,574
Task 2	2.1	Flood modelling scenarios developed, run, and assessed	GISERA	Jul-22	Jun-23	2022/23	$116,994
Task 3	3.1	Flood modelling scenarios reported and internally reviewed	GISERA	Apr-23	Mar-24	2023/24	$99,986
Task 4	4.1	Project objectives, progress and findings communicated with stakeholders	GISERA	Jun-22	Mar-24	2023/24	$133,931

8. Intellectual Property and Confidentiality

Background IP (clause 11.1, 11.2)	**Party**	**Description of Background IP**	**Restrictions on use (if any)**	**Value**
	CSIRO	Flood inundation models developed for Cooper Creek floodplain	None, published as CC BY4 under GBA Program agreement	$1,072,177
				$
Ownership of Non-Derivative IP (clause 12.3)	CSIRO			
Confidentiality of Project Results (clause 15.6)	Project Results are not confidential.			
Additional Commercialisation requirements (clause 13.1)	Not Applicable			
Distribution of Commercialisation Income (clause 13.4)	Not applicable			
Commercialisation Interest (clause 13.1)	**Party**		**Commercialisation Interest**	
	CSIRO		N/A	
	Santos		N/A	
	Origin Energy		N/A	

9. References

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Geological and Bioregional Assessment Program (2021a) Fact sheet 13: Floodplain inundation modelling for Cooper Creek floodplain [online document]. Fact sheet for the Geological and Bioregional Assessment Program. https://www.bioregionalassessments.gov.au/sites/default/files/fact_sheet_13_flood_inundation_modelling_for_the_cooper_creek_floodplain_0.pdf

Geological and Bioregional Assessment Program (2021b) Hydrodynamic model of the Cooper Creek floodplain. [text]. Viewed 27 April 2021, https://data.gov.au/data/dataset/e41de0ed-027b-4239-8325-fa6B358d5e96. GBA data repository GUID: E41DE0ED-027B-4239-8325-FA6B358D5E96.