Program of activities to confirm the eradication of feral pigs from Kangaroo Island



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Introduction

In 2019-20 bushfires devastated extensive areas of western Kangaroo Island (KI), including most of the habitat occupied by the island's feral pigs (Figure 1). Before the fires, the feral pig population was estimated to be around 5,000-10,000 animals; around 90% of that population was thought to have perished in the fires. The surviving feral pigs aggregated in small unburnt vegetation patches, with limited food and cover, where they put intense pressure on recovering habitats and wildlife. With relatively low numbers remaining in vegetated areas that were opened-up by the fires, the opportunity arose to target feral pigs for control and to eradicate them from KI.

Feral pigs can harbour and spread animal diseases to animals and humans; they are potential vectors of serious livestock diseases including foot-and-mouth disease (FMD) and African swine fever (ASF). An outbreak of FMD would be catastrophic for the \$5.3 billion SA livestock industry; contagion among the feral pig population would spread and amplify the impacts. Feral pigs can also spread Japanese encephalitis (JE) and Q fever to humans. JE is a serious human health risk, and was recently declared a 'Communicable Disease Incident of National Significance'.

In addition to their disease risks, feral pigs have direct negative impacts on agricultural production by degrading crops and pastures, spreading weeds, and preying on livestock, including lambs. They also destroy native wildlife and natural habitats, spread weeds, and muddy streams; additionally, they spread the root-rot fungus *Phytophthora*, which has devastating impacts on natural vegetation and grapevines. Prior to the bushfires, the cost of feral pigs to Kangaroo Island (KI) producers and their communities was estimated to be \$1 million annually.



Figure 1. The 2019-20 bushfire scar; the area was infested with feral pigs before the bushfires.

In 2020, the 3-year KI Feral Pig Eradication Program was launched as part of the 'Local Economic Recovery' initiative, which was jointly funded by the Commonwealth and South Australian governments under the 'National Disaster Recovery Funding Arrangements'. Eradication activities have been delivered in partnership with the KI Landscape Board (KILB), National Parks and Wildlife Service (NPWS), and other agencies. The team have deployed multiple control tools over 200,000 hectares of western KI.

Program management and delivery

The eradication program is overseen by the KI Feral Pig Eradication Steering Committee, which has a membership comprising farmers, land managers, and other stakeholders. The committee advises the program sponsor (Executive Director, PIRSA Biosecurity), who oversees reporting on the program to the Minister for Primary Industries and Regional Development and the Minister for Environment and Water (as shown in diagram below). The Kangaroo Island Feral Pig Eradication contains two phases the 'eradication phase' and the 'confirmation phase'. The eradication phase conducted from 2019 to 2023 was the primary control phase where the feral pig infestation was removed. The confirmation phase uses multiple monitoring activities to ensure the eradication was successful as well as detect and remove any remaining feral pigs that may remain. The eradication committee will continue to function during the 'post-eradication confirmation' phase to ensure accurate advice is provided to the program delivery team, the program sponsor, other stakeholders, and the relevant ministers.

The objectives of the committee are to:

- 1. provide strategic direction for the program to eradicate feral pigs by June 2023
- 2. provide strategic direction for the program to complete 'proof of freedom' by June 2024
- 3. ensure local stakeholders and community have the resources to keep KI feral pig free.
- 4. ensure good welfare outcomes for feral pigs, wildlife, and other animals.

Program management structure and stakeholder partnerships



Kangaroo Island Feral Pig Steering Committee members:

- Kangaroo Island Landscape Board
- Department of Primary Industries and Regions South Australia
- RSPCA
- Kangaroo Island Land for Wildlife
- Australian Pork Limited (National Feral Pig Coordinator)
- Kangaroo Island National Parks and Wildlife Service
- KILAND
- Agriculture Kangaroo Island
- Kangaroo Island Council
- Livestock SA

Program logic

Program goal

The successful eradication of feral pigs on Kangaroo Island

Outcomes

To ensure the impacts from feral pigs on KI producers and the community are removed

Immediate activities

Coordinate landscape scale monitoring activities, detect and remove any remaining feral pigs, and continue to monitor for their presence/absence

↥

Foundational activities

Engage field staff, landholders, community networks and stakeholder organisations to continue to assist in monitoring of feral pigs during the post-eradication monitoring phase.

Deploy response plans and outreach plans for organisations to respond to feral pig incursions if they occur.

Compile data confirming the successful eradication of feral pigs from KI

Eradication phase (2020 – 2023)

The eradication of feral pigs from KI began in September 2020, with core eradication activities completed by June 2023. The program area was divided into five management zones (Figure 2) and all staff operated across all management zones. During this eradication phase feral pigs were tracked and culled using a suite of different control tools (see detail below). Figure 2. Five management zones were used to divide the feral pig infested area.



Feral pigs were culled across all zones seen in Figure 2, with the majority of feral pigs culled across Zone 3, the Northern half of Zone 5 and the Eastern side of Zone 2 (Figure 3). Control activities resulted in a steep decline in the feral pig population (Figure 4), with fewer feral pigs killed per month as the program progressed (Figure 5). By July 2023, 875 feral pigs had been culled from KI during the eradication phase with total eradication approaching fruition. Just two boars were known to remain on the island as of 1 July 2023.



Figure 3. Heat map of locations of feral pigs killed during the KI eradication operations, yellow indicates high densities of culled feral pigs.



Figure 4. The population decline of feral pigs over time (with estimated 2 pigs remaining as of July 2023)



Figure 5. The number of feral pigs culled per month during the eradication phase.

Culling methods during eradication phase

The following methods were used to cull feral pigs during the eradication:

- Thermal ground shooting
 - Appropriative caliber rifles with thermal clip-on scopes were used to shoot feral pigs after they aggregated to an area using food attractants.
- HogGone poison baiting
 - Highly effective and humane poison bait with sodium nitrite as the active toxic component. Delivered in bait boxes with hinged lids that require a mimicked movement of feral pigs digging to open the box, preventing offtargets from accessing the bait. The bait box contained a placebo whilst the pigs became accustomed to opening the box; the placebo was then replaced with the poison.
- Remote-triggered traps
 - Trap panels were slowly introduced to a site with free feed until the trap enclosed the area. A drop-down panel trap door was added with a motion camera that is remotely triggered via SMS by the operator.
- Thermally Assisted Aerial Culling
 - See page 11.

Monitoring methods during eradication phase

Monitoring activities were used to inform culling activities, particularly as the feral pig population declined and feral pigs became hard to detect. Using monitoring tools during the eradication phase when feral pigs are still present in the landscape ensures the tools correctly function and are reliable for the confirmation phase. Early introduction of monitoring also allows a baseline of detected feral pig data before transiting to the confirmation phase. Monitoring tools include:

- Artificially intelligent cellular (4G) camera network (Page 19)
 - Strategically placed motion sensing cameras that send images via cellular reception to an artificially intelligent web-based platform (eVorta). eVorta searches the images for any animals including feral pigs; if the software is 70% confident there is a feral pig in the image it will send the image via SMS to all control staff in real time.
- Standard camera network (Page 20)
 - Strategically placed motion sensing cameras in areas of no cellular reception. There cameras are checked by staff manually for feral pig presence.
- eDNA water sampling (page 18)
 - Water samples are taken along creeks, rivers, river mouths and large dams and are tested for the presence of feral pig DNA. This allows landscape-scale monitoring along the whole western end of the island.

- Community reporting (page 17)
 - Staff worked closely with landholders on the western end of Kangaroo Island through the eradication phase to gain access to the land or through seeking approvals for TAAC. Maintaining these relationships will ensure a flow of information from landholders to control staff if feral pig sign or sightings are observed.
- Watercourse surveys (page 16)
 - During the warmer and drier months of the year (January March) staff walk along watercourses in the feral pig infested area to check for feral pig sign. Feral pigs are reliant on water and will naturally aggregate to water during hot periods. Manually checking for feral pig sign along watercourses is an effective way to see if feral pigs exist in an area.

Thermally Assisted Aerial Culling

Thermally assisted aerial culling (TAAC) is a powerful control and monitoring tool, distinguished from traditional aerial culling program because it uses a larger helicopter and an extra crew member. The extra person operates a thermal camera that scans the landscape searching for the thermal signatures of feral pigs; if a pig is detected, the marksmen use thermal equipment to locate and humanely cull the animal.



Figure 6. Tracks from all 5 TAAC operations conducted. 2021 creek line cull (blue), 2021 transect cull (red), 2022 creek line cull (green), 2022 transect cull (cyan), 2023 transect cull – layer 1 (purple), 2023 transect cull – layer 2 (yellow), 2023 transect cull – layer 3 (orange)

The enhanced detectability of animals within inaccessible and densely vegetated terrain is the greatest benefit of using a helicopter with thermal capability. Repeated searching of western KI via TAAC over the duration of the eradication phase has provided great confidence in its effectiveness in detecting and culling feral pigs because of the extensive search intensity at both landscape (Figure 6) and fine (Figure 7) scales.



Figure 7. Zoomed in map of Figure 6 showing the intensity of track data from all TAAC operations over Breakneck River in Flinders Chase National Park

Five TAAC operations were completed across western KI since 2021 (Figure 6). Two operations (Autumn 2021 and Autumn 2022) were hotspot culls; they only searched creek lines where feral pigs congregated in dry conditions. Three intensive culls, completed in 2021, 2022 and 2023, were transect-style culls, where the entire area was searched systematically. A total of 407 feral pigs were culled during the five TAAC operations (Figure 8).



Figure 8. Feral pigs culled from five TAAC operations completed across western Kangaroo Island

The final TAAC operation occurred from April to June 2023; it culled three pigs and was the first component of the proof of freedom activities. The focus of the operation was to conduct an intensive and extensive search of all areas of historic feral pig infestation. The operation removed the three pigs, but also demonstrated the absence of feral pigs in many areas.

The 2023 TAAC operation used two helicopters simultaneously, allowing more area to be covered and reducing the likelihood of feral pigs moving in behind the helicopter as areas are thermally scanned. Both helicopters flew different search layers (north to south or east to west) across the feral pig infested area, a total of three search layers were achieved:

- The first search layer (Figure 9) flew 11,305.8 kilometres over an area of 157,630 hectares. This operation covered the entire historic feral pig infested area. The search layer was east-west lines at 500-metre spacings. To minimise disturbance to livestock, flight-lines were only flown over the creek lines within paddocks, and not over the whole paddock.
- 2. The second search layer (Figure 10) covered high priority areas where feral pigs were most likely to remain undetected because of limited ground access. A total of 7,335.2 kilometres along east-west lines at 400-metre spacings over 66,170 hectares was surveyed.
- 3. The third search layer (Figure 11) targeted areas where feral pigs could remain undetected. A total of 5,059.9 kilometres over 48,050 hectares was covered. To improve detectability, flights were conducted north-south lines at 400-metre spacings.

The three feral pigs detected during the 2023 cull were all known to operation staff prior to the cull; no new feral pigs were detected from these extensive efforts.



Figure 9. Tracks of the first search layer from the 2023 TAAC operation of east-west 500m-spaced transects.



Figure 10. Tracks of the second search layer from the 2023 TAAC operation of east-west 400m-spaced transects.



Figure 11. Tracks of the third search layer from the 2023 TAAC operation of north-south, 400m-spaced transects.

All TAAC operations conducted across western KI covered areas where feral pigs were thought to have been successfully eradicated; revisiting and surveying these areas ensured a consistent search effort was delivered across the entire historic feral pig infestation area. The data collected from all five aerial culls will complement other monitoring methods and provide high confidence for proof of freedom assessments.

Confirmation phase activities (2023 – 2024)

All activities of the eradication phase finished on 30 June 2023. To provide confidence in the outcomes, the next step is to confirm the success of the eradication activities via an assessment of 'proof of freedom'. Proof of freedom is an essential component of an eradication program; it is the point at which activities pivot from control activities to monitoring the outcomes to sustain the eradication. It provides evidence that the eradication program was successful.

The 'post-eradication confirmation phase' will use multiple monitoring tools to ensure the highest possible level of confidence that feral pigs have been eradicated from KI. The following activities will be delivered during the 2023-2024 financial year to provide a proof of freedom for the eradication. Most of the activities commenced during the eradication phase.

Monitoring activities (page 10) started during the eradication phase to establish the methods and baseline data. The monitoring tools were used to record feral pig presence, which then informed ground and aerial operations. Because feral pig presence has been monitored since the beginning of the eradication program and the decline of the population tracked over this time (Figure 4), monitoring can continue to be used to track the sustained decline, eradication of feral pigs, and their sustained absence.

The monitoring activities include:

- Inspection sites
- Detection of physical signs across water networks
- Community reporting
- eDNA water sampling
- 4G artificial intelligence-assisted camera network
- Standard camera network
- Thermal aerial transects.

Inspection sites

Inspection sites (Figure 12) were selected due to being prime feral pig habitat, with good vegetation, palatable feed and a reliable water source. The location of these sites was determined from data collected during the eradication program and included 'hotspots' where high numbers of feral pigs were culled (Figure 3).



Figure 12. Inspection sites for confirmation phase. Sites are labelled A to S and are described in Appendix A

In the confirmation phase, control staff will routinely inspect these sites to check for physical evidence of feral pigs (such as diggings, tracks or scats). Sites have been prioritised by the likelihood of feral pigs appearing at each site (Appendix A). Additional inspections will also occur during the summer of 2023/24 when any remaining feral pigs will likely aggregate at water sources. During 2023/24 staff will record visitation and log signs of feral pigs (presence) as well as absence of feral pigs. Data collected will assist in determining proof of freedom.

Watercourse surveys

During the 2023-24 summer season (December 2023 to February 2024), ground surveys will occur across waterways in the operation area (Figure 13). Feral pigs are dependent on water for hydration and regulation of their body temperature via wallowing. The simplest way to detect the presence of feral pigs is to survey water points during hot conditions when there is less ground water available. Typically, pigs will leave tracks, diggings, and wallows, which are readily identified as being made by feral pigs.



Figure 13. Transect lines for watercourse surveys across western Kangaroo Island

Community engagement

The support and assistance of the KI community is critical and a highly valued component of the monitoring phase in the confirmation program. The eradication team, including steering committee members, have been involved in widespread community engagement activities since 2020, including public events, online and print media. These efforts have established a trusted network and beneficial working relationship within the program.

Widespread adoption of the 'Squeal on a pig' community reporting program greatly assisted control staff to target feral pigs over a large area. Continuation of this community engagement initiative will allow the 'eyes-and-ears-everywhere' approach to continue.

The program will continue to be advertised through fridge magnets, local media (i.e., The Islander), and other media. All staff will continue to attend community events and engage with local producers and the community. All reports of feral pigs (sighting or signs) from the community will continue to be recorded in an ArcGIS map, which overlaps with all other data collection activities and enables staff to detect patterns and respond as required.

eDNA water course sampling

eDNA (environmental deoxyribonucleic acid) is a cutting-edge scientific monitoring tool that can be used to detect the presence of feral pigs within the environment by testing for miniscule amounts of their DNA. Water samples for eDNA analysis are taken at strategic locations, such as dams or rivers where feral pigs could wallow and leave behind physical evidence of their visit, such as skin cells and hair. The water samples are processed and analysed for the presence of feral pig DNA. Existing research shows that feral pig DNA will persist in the environment for around 75 days before breaking down to undetectable volumes.

Samples were collected during the eradication phase and will continue to be collected during the confirmation phase. A total of 50 sites (Figure 14 and Appendix B) will continue to be sampled by control staff each month, which will ensure an extensive coverage of pig habitat is included in the assessment. The aim of this component of the monitoring program is to demonstrate that all water systems within priority catchment areas are free of feral pigs – and that they remain free of feral pigs during the confirmation phase.

Samples will be analysed from most recently collected samples. If significant positive results occur, it can direct control staff to areas where feral pig eDNA detection occurred, allowing increased investigation in the area in case there are feral pigs present.



Figure 14. Locations of the eDNA samples sites listed in Appendix B across Western KI.

4G Artificial intelligence-assisted camera network (eVorta)

Monitoring cameras are a powerful tool that has been used to detect feral pigs in remote areas of KI. Recent advancements in technology enables motion-triggered images from the cameras to be sent directly to staff mobile phones. The latest technology incorporates artificial-intelligence assisted software, which auto-analyses images and distinguishes and prioritises species (Figure 15) for reporting. This system also continues to 'learn' and improve detection accuracy with time. The technological breakthrough is useful for big programs with many cameras that may generate too many images for human operators to process effectively.



Figure 15. An image taken from a 4G cellular camera of a feral pig; the green square around the pig indicates the eVorta software has made a detection.

The program currently operates a network of 300 cameras (Figure 16) – it is the largest network of 4G AI cameras used for invasive species monitoring in Australia and auto-processes 20,000 images per day. The cameras will continue to be used for the confirmation phase, operating from the same locations since their deployment to ensure consistent monitoring over the life of the program. If a feral pig is detected by a camera, staff are automatically alerted, enabling them to respond immediately. The network will also provide evidence of the absence of feral pigs at each location.



Figure 16. The 4G monitoring camera network on Kangaroo Island

Standard camera network

Some areas in western KI do not have cellular reception and require deployment of standard cameras (i.e., without 4G connectivity and eVorta software to auto-monitor the area). These cameras function in the same way as the 4G network but require manual checking of the cameras at regular intervals. Standard cameras are an important tool because they allow ground staff to monitor areas without cellular reception; these areas are typically remote and overlap with ideal feral pig habitat (see Figure 17). From June 2023, 91 standard cameras have been deployed across western KI, but this can be increased to 176 cameras if needed. The cameras currently in place will stay at the same location for the next 12 months to ensure consistent monitoring of the sites.



Figure 17. The 91 standard cameras deployed over Western Kangaroo Island.

Incursion response framework

The 12-month period following eradication is the time of greatest risk for new incursions. Incursion sources include feral pigs that have avoided eradication activities, new pigs that have become feral after escaping from a domestic population, or feral pigs that are released 'maliciously' (on purpose to undermine the program or provide a hunting source). The extensive monitoring program of the confirmation should detect whether any feral pig is present. If an incursion is detected, it is important that staff have the capacity to respond promptly, remove all feral pigs effectively, and maintain the proof of freedom operations.

Public reports flowchart

If the public contact staff or stakeholders to report signs or sightings of feral pigs it is important that the response is immediate and effective. The framework for any public report is outlined in Figure 18.



Figure 18. Steps to ensure reports are logged in the feral pig mapping app and to ensure that the person who made the report is given feedback to ensure positive community engagement.

Incursion response flowchart

If a feral pig is detected, a decision support tool (Figure 19) is used to determine the most efficient and humane way to destroy it.



Figure 19. Decision support tool for the control of detected feral pigs.

Control tools and methods

Multiple control tools are available for deployment during the post-eradication monitoring program (Table 1). Different tools are available for different seasons and scenarios. All tools are most effective when used in combination with other control methods. Not all available tools in Table 1 are recommended for incursion response (refer to Figure 19) such as trapping, which may not be a reliable tool at that time.

Method	Control Tool - Type	Non-target impacts
Shooting	Ground shooting	Nil
	Theramlly assisted aerial culling	Nil
Baiting	HOG-GONE, with bait-box	Nil
Trapping	Remote triggered drop down trap	Nil

Table 1. Control methods and tools, with breakdown of non-target impacts and humaneness.

Standard operating procedures for feral pig control are available on the PestSmart website. These procedures will guide the control operations of the post-eradication monitoring program. More information about the control tools include:

- Aerial shooting of feral pigs, available here
- Ground shooting of feral pigs, available here
- Poison baiting of feral pigs with sodium nitrite, available here

See also the Code of Practice for the humane control of feral pigs, available here

Agency response and allocated resources

The Department of Primary Industries and Regions SA (PIRSA), Kangaroo Island Landscape Board (KI LB) and KI National Parks & Wildlife Service (NPWS) are delivery partners for the eradication and confirmation phases. Livestock SA is delivery partner for the 2023/2024 FY through investment via the Sheep Industry Fund to ensure Kangaroo Island procures remain protected from feral pig impacts. Each partner will invest resources to ensure successful eradication outcomes:

- The KI LB will invest staff time and associated tools to continue monitoring and respond to incursions on private and public land.
- The NPWS will invest resources and staff time to continue monitoring and respond to incursions on private and public land.
- PIRSA staff will assist both agencies in response during the 12-month confirmation phase, including the capacity to deliver a small thermally assisted aerial cull if the decision support tool (Figure 19) determines it is the most appropriate incursion response.

Program timeline

Timeline of activities for the eradication program The program timeline from 2020 to 2024; timeline broken into quarters (Q) with the confirmation phase component beginning in September 2023.

Year	20)20		20	21		2022			202	2024					
Quarter	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Eradication program: preliminary activities July 2020 – December 2020																
Culling phase: strategic control of feral pigs across western KI September 2020 – July 2023																
eDNA sampling																
4G camera network																
Thermally assisted aerial culls			Creek line cull		Trans ect cull			Creek line cull	Trans ect cull			Trans ect cull				
Monitoring Phase: Create and deliver Eradication Confirmation Monitoring Plan, Deliver Eradication 'Proof of Freedom'																

Timeline of work activities for staff in 2023 and 2024.

Responsibilities and tasks required during confirmation phase by eradication team members.

	2023																							
Objectives		Ju	ıly			Aug	gust			Septe	mber			Oct	ober			Nove	mber			Dece	mber	
Objectives	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Feral pig digging present																								
Feral pig aggregated to water																								
Eradication team discussion																								
eDNA sampling																								
Incursion response framework																								
Inspection sites (high)																								
Inspection sites (medium)																								
Inspection sites (low)																								
4G camera network inspection																								
Update of vermin fence mapping																								
Reporting																								
					-							20	24											
Objectives		Jan	uary		February				March			April				Мау				June				
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Feral pig digging present																								
Feral pig aggregated to water																								
Eradication team discussion																								
eDNA sampling																								
Incursion response framework																								
Inspection sites (high)																								
Inspection sites (medium)																								
Inspection sites (low)																								
4G camera network inspection																								
Reporting																								

Working areas for each member of the eradication team.

Working areas for staff during the eradication confirmation phase. Red: PIRSA – Senior Biosecurity Operations Officer – Feral Pigs, Blue: PIRSA - Biosecurity Operations Officer - Feral Pigs, Yellow: KILB - Feral Animal Project Officer



Plan for 2024/25

Continued monitoring beyond June 2024 would provide increased confidence of successful eradication. Dependent on the results of 2023/24 monitoring period, reduced monitoring requirements would be required in 2024/25. Continued advocacy for the protection of KI from feral pigs is a priority for all stakeholders, with prevention the most cost effective and efficient activity. The following activities may need to continue:

- eDNA water sampling (reduced frequency from monthly to quarterly)
- Public report response inspections
- Water course surveys over the 2024/25 summer

The above incursion response framework can be activated if required.

Plan for 2025/26 and beyond

In response to an incursion the Kangaroo Island partners (Kangaroo Island Landscape Board and Kangaroo Island National Parks and Wildlife Service) may call upon eradication delivery partners to allocate resources to manage a feral pig incursion. Equipment used during the eradication may be available if required.

Appendices

Appendix A.

Location of inspection sites mapped in Figure 12. Each site is prioritised according to the number of feral pigs culled at the location between 2020-2023.

Site location	Site label	Priority	Inspection Frequency
Lower Breakneck crossing	А	High	Weekly
Middle Breakneck crossing	В	High	Weekly
Upper Breakneck crossing	С	High	Weekly
Honey Hole	D	High	Weekly
Bullock Spring	E	High	Weekly
Ravine crossing	F	Medium	Fortnightly
West Bay crossings (North + South)	G	Medium	Fortnightly
Rocky River Tourist Precinct	Н	Low	Monthly
Karatta Dam	I	Medium	Fortnightly
Stun'Sail Boom	J	Medium	Fortnightly
'A' wedge	K	Medium	Fortnightly
DeMole River	L	Low	Monthly
Ravine system (Borda Road)	М	High	Weekly
Condemned Block dam	Ν	Low	Monthly
Pontifex	0	Medium	Fortnightly
Reedy Track	Р	Low	Monthly
Pentelow Plantation	Q	Low	Monthly
Rustic Property	R	Medium	Fortnightly
Anderson Plantation	S	Low	Monthly

Appendix B.

List of eDNA samples sites, including location and water system type.

SITE ID	Name	South	East	Water system			
1	Harriet River	35.970616	137.176048	River			
2	Stun Sail Boom	36.004716	137.019837	River			
3	Duke Lagoon	35.977007	137.054877	Lagoon			
4	Grassdale	35.9941	136.86001	Creek			
5	Church Road (Hammat)	35.904806	136.912012	Creek			
6	Aroona Dam	35.925938	136.611561	Dammed creek			
7	Shackle Rd	35.915554	136.723358	Creek			
8	Rocky River crossing	35.951581	136.708507	Creek			
9	Snake Lagoon crossing	35.946265	136.638083	Creek			
10	Lower Breakneck	35.925938	136.611561	Creek			
11	West Bay South	35.887632	136.575684	Creek			
12	West Bay North	35.878557	136.573968	Creek			
13	Ravine lower	35.802264	136.614566	Creek			
14	Kelly Hill caves dam	35.979025	136.904172	Dam			
15	Middle Breakneck	35.869064	136.703229	Creek			
16	Upper Breakneck	35.831861	136.762472	Creek			
17	Ravine Upper	35.7655	136.687951	Creek			
18	Cape Torrens	35.736836	136.752324	Creek			
19	Condemned Block dam	35.773753	136.882915	Dam			
20	Billy goat falls	35.694872	136.909439	Creek			
21	Western River Beach	35.679757	136.971278	Creek/river			
22	Above Allandale	35.748018	137.032518	Creek			
23	Upper Stunsail	35.953434	136.996039	Creek			
24	Walsh Track	35.90251	136.930634	Creek			
25	Stun Sail - S Coast Hwy	35.982838	137.005312	Creek			
26	Rocky River Precinct dam	35.947285	136.739068	Dam			
27	Nobles dam crossing	35.880259	136.8422	Dammed creek			
28	Nobles dam	35.881729	136.848193	Dam			
29	Top of Mt Taylor Road	35.790427	137.012174	Creek			
30	E W one crossing	35.862826	137.071511	Creek			
31	E W two crossing	35.898787	137.089597	Creek			
32	Birdsville track	35.84138	136.895078	Creek			
33	Reedy Track	35.857644	136.933492	Creek			
34	Karatta Dam	35.977704	136.935693	Dam			
35	East Melrose Track	35.922561	136.724959	Creek			
36	Baxters Road	35.92709	136.84781	Creek			
37	South-East Gosselands	35.895134	137.009532	Creek			
38	Western River (South)	35.757743	136.958606	Creek			
39	DeMole	35.730998	136.804064	Creek			
40	Anderson D	05 005040	407 005047	Demonstration 1			
41	Anderson Dam	35.835313	137.005847	Dammed creek			
42	Anderson Dam East two - middle	35.835313 35.53152	137.005847 137.9412	Dammed creek Creek			
43	Anderson Dam East two - middle Rainy Creek	35.835313 35.53152 35.5748	137.005847 137.9412 137.12559	Dammed creek Creek Creek			
A A	Anderson Dam East two - middle Rainy Creek Johncock Road	35.835313 35.53152 35.5748 35.4431	137.005847 137.9412 137.12559 137.699	Dammed creek Creek Creek Creek			
44	Anderson Dam East two - middle Rainy Creek Johncock Road Magills	35.835313 35.53152 35.5748 35.4431 35.4538	137.005847 137.9412 137.12559 137.699 137.749	Dammed creek Creek Creek Creek Creek			
44 45	Anderson Dam East two - middle Rainy Creek Johncock Road Magills McHughes Road	35.835313 35.53152 35.5748 35.4431 35.4538 35.4931	137.005847 137.9412 137.12559 137.699 137.749 137.11488	Dammed creek Creek Creek Creek Creek Creek			
44 45 46	Anderson Dam East two - middle Rainy Creek Johncock Road Magills McHughes Road Kelly hill plantation	35.835313 35.53152 35.5748 35.4431 35.4538 35.4931 35.58141	137.005847 137.9412 137.12559 137.699 137.749 137.11488 136.53481	Dammed creek Creek Creek Creek Creek Creek Dam Dam			
44 45 46 47	Anderson Dam East two - middle Rainy Creek Johncock Road Magills McHughes Road Kelly hill plantation Jarmins	35.835313 35.53152 35.5748 35.4431 35.4538 35.4931 35.58141 35.5534	137.005847 137.9412 137.12559 137.699 137.749 137.11488 136.53481 136.48225	Dammed creek Creek Creek Creek Creek Creek Dam Dam			
44 45 46 47 48	Anderson Dam East two - middle Rainy Creek Johncock Road Magills McHughes Road Kelly hill plantation Jarmins Kangari East	35.835313 35.53152 35.5748 35.4431 35.4538 35.4931 35.58141 35.5534 35.49312 25.59474	137.005847 137.9412 137.12559 137.699 137.749 137.11488 136.53481 136.48225 137.248	Dammed creek Creek Creek Creek Creek Dam Dam Dammed creek			