

Applicant: McCallum Bros Limited

Site: Te Ākau Bream Bay
(Coastal Marine Area),
Northland

Report Title: Addendum Amending
the Application for
Wildlife Approval to
Include *Culicia*
Rubeola

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1. Introduction

- 1.1 This Addendum amends the current substantive application by McCallum Brothers Limited (**MBL**) for a Wildlife Approval, seeking a further approval for *Culicia rubeola* in addition to the approvals for *Kionotrochus suteri* and *Sphenotrochus ralphae* already sought. This Addendum is to be read alongside the current Te Ākau Bream Bay Sand Extract Project (**Project**) which includes the existing wildlife approval application documentation. For completeness, this further approval does not change or alter the location, scope or nature of the Project.
- 1.2 MBL is authorised to seek wildlife approvals under s 42(4)(h) of the Fast-track Approvals Act 2024 (**FTAA**). By way of this amendment MBL seeks a further a wildlife approval under the Wildlife Act 1953 (as amended by the Wildlife (Authorisations) Amendment Act 2025) (**Wildlife Act**) for the following activities at the Te Ākau Bream Bay Sand Extraction Site (during both monitoring and sand extraction) and associated control areas (during monitoring only):
 - a) During monitoring – Collect both dead and alive *Culicia rubeola*.
 - b) During monitoring – When identified on site during monitoring, return to the coastal marine area the dead and alive *Culicia rubeola*.
 - c) During monitoring - For those dead and alive *Culicia rubeola* not identified and returned to the coastal marine area while on site, incidental killing by being preserved in a solution of 5% glyoxal, 70% ethanol sea water solution as part of the storage and transportation of sand samples to a laboratory.
 - d) During sand extraction – Incidental collection of both dead and alive *Culicia rubeola* and return to the coastal marine area.
 - e) During monitoring and sand extraction – Disturbance and incidental killing of *Culicia rubeola*.
- 1.3 In addition to the two species of cup coral known to be present within the proposed sand extraction area (*Kionotrochus suteri* and *Sphenotrochus ralphae*) dead specimens of a small colonial stony coral (*Culicia rubeola*) have now been identified in samples from the proposed sand extraction area. *Culicia rubeola* was also recently identified in the former Pākiri Sand Extraction Site and Wildlife Authority AUTH125516-FUA has been granted for this site which covers *Culicia rubeola*.
- 1.4 The substantive application for the Project includes an application for wildlife approval for *Kionotrochus suteri* and *Sphenotrochus ralphae*. At the time the substantive application was lodged, the presence of *Culicia rubeola* within the proposed sand extraction area was unknown.
- 1.5 This report is the supporting documentation to amend the substantive application to include *Culicia rubeola* in the current wildlife approval application. This Addendum amending the substantive application is supported by a report prepared by Earth Sciences New Zealand on *Culicia rubeola* at Te Ākau Bream Bay,¹ and a further report addressing Wildlife Act considerations in the context of the FTAA.² In addition, the draft Coral Management Plan (**CMP**), which forms part of the substantive application, has been amended to address *Culicia rubeola* and has been included as part of this Addendum documentation³.
- 1.6 Included as **Attachment 1** to this report is an updated table of information requirements for the wildlife approval.
- 1.7 The text below includes summarised relevant details drawn from the Earth Sciences reports.

¹ The scleractinian coral *Culicia rubeola* at Te Ākau Bream Bay, Literature review and distribution of *Culicia rubeola* identified within the proposed sand extraction area (Earth Sciences New Zealand, June 2026) (Attachment Thirty-Six)

² *Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024 (Earth Sciences New Zealand, July 2026) (Attachment Thirty-Seven)

³ Attachment Thirty - Coral Management Plan v5

- 1.8 *Culicia rubeola* is a species of ahermatypic (non-reef building) Scleractinian coral (*Kionotrochus suteri* and *Sphenotrochus ralpae* are also Scleractinian corals). *Culicia rubeola* live attached to a hard substrate such as a bivalve shell with a depth range of 0-82 m. They are not endemic to New Zealand and have been documented in India and Hong Kong and the Ocean Biodiversity Information System OBIS includes records from the central and south-west and eastern Pacific⁴.



Figure One: *Culicia rubeola* (from *Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024)

- 1.9 Schedule 7A of the Wildlife Act identifies “Stony corals – all species in the order Scleractinia” as a marine species declared to be an animal and therefore protected under s 3. Approval under ss 53, 53A and 54 of the Wildlife Act is required for the catching, release, possession and incidental killing of *Culicia rubeola* as part of the monitoring and sand extraction process. Although the intent is to immediately release captured *Culicia rubeola*, it is recognised that in some instances, *Culicia rubeola* could be inadvertently retained and incidentally killed through the monitoring and sand extraction processes.
- 1.10 The report, “The scleractinian coral *Culicia rubeola* at Te Ākau Bream Bay” (Earth Sciences New Zealand, June 2026) (Attachment Thirty-Six), summarises existing knowledge of *Culicia rubeola* found within the proposed Te Ākau Bream Bay extraction area and elsewhere around New Zealand. The report further describes *Culicia rubeola* and makes an assessment, based on the available information, of the potential impact the proposed sand extraction may have on the populations of *Culicia rubeola*.
- 1.11 The report, “*Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024” (Earth Sciences New Zealand, July 2026) (Attachment Thirty-Seven), summarises the “The scleractinian coral *Culicia rubeola* at Te Ākau Bream Bay” report and addresses clauses c, d, e, j and k of Schedule 7(2)(1) FTAA in relation to *Culicia rubeola*.
- 1.12 The CMP (Attachment Thirty) (formerly referred to as the “Cup Coral Management Plan” or “CCMP”) has been updated to include specific reference to *Culicia rubeola* and forms part of the information being submitted with this Addendum. The objective of the CMP is to avoid or minimise the risk of disturbance, possessing and incidental killing of coral during both monitoring and sand extraction.
- 1.13 The CMP outlines the standard operating procedures proposed to minimise the capture and incidental killing of protected corals during monitoring and sand extraction and the process to be followed to handle and release any captured and identified cup corals during monitoring. It also outlines the requirement to send retained coral to Earth Sciences New Zealand.
- 1.14 The additional wildlife approval is being sought to cover both the monitoring and sand extraction phases.

⁴ Section 2.2 *Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024 (Attachment Thirty-Seven)

- 1.15 *Culicia rubeola* may be disturbed, collected and incidentally killed as part of sediment and benthic sampling during both the pre-sand extraction monitoring and sand extraction monitoring undertaken at the extraction site and the three control areas during the life of the resource consent for the sand extraction.
- 1.16 During the sand extraction process, sand is fluidised into a slurry at the draghead via an electric pump pulling sand and water through the draghead at the seabed. Any *Culicia rubeola* within the immediate area of the draghead is likely to be sucked up in the sand slurry. The sand slurry then moves up the draghead pipe, through a pump and onto the vessel where it is discharged onto a screen deck that utilises a 2 mm screen mesh to prevent larger material going into the load of the hopper. Oversized material (> 2 mm) (which would include *Culicia rubeola*) passes across the top of the screen and drops, via a pipe, into the forward port side moon pool where it drops through the vessel and exits, at keel height, under the vessel to return to the seabed.
- 1.17 It is expected that just about all *Culicia rubeola* will be caught by the sieve and immediately returned to the sea via the moon pools.
- 1.18 Screened sand passes through the screen deck and into two pipes that run along the sides of the hopper. As the sand slurry drops into the hopper, the water velocity slows, and the sand settles out. The water and any finer suspended micro-sediments will pass out of the hopper and into one of the six moon pools (three on each side of the hopper) which discharges any oversized or suspended sediments under the vessel's keel.
- 1.19 Passage through the draghead and across the screens is not without some risk and there is the potential that organisms, including the protected corals, could be damaged or incidentally killed during this process (and therefore the requirement for approval under the Wildlife Act). Given the nature of *Culicia rubeola* and the extraction process, it is not possible to identify if a specific *Culicia rubeola* has been killed during the sand extraction process or was already dead when extraction into the draghead.
- 1.20 The Sand Extraction Operation Plan (**SEOP**) (Attachment Twenty-Seven) outlines the operational requirements for the *William Fraser* and the sand extraction process. This is being recommended as a required management plan for the resource consent, but it is not considered that it is required to be a management plan required under the wildlife approval. This plan does not require any specific amendments with reference to *Culicia rubeola*.
- 1.21 The sand extraction rotation methodology, as outlined in Section 2.5.2 of the SEOP, will result in the same extraction tracks generally not being reused for up to 1 year. This would maximise the time available for damaged/fragmented corals to regenerate between disturbance events.
- 1.22 A 35-year period is being sought for the wildlife approval for *Culicia rubeola*. This aligns with the 35-year consent period being sought for *Kionotrochus suteri* and *Sphenotrochus ralphae* and for the sand extraction. The wildlife approval will be given effect to at the same time as the resource consent is commenced.
- 1.23 It is confirmed that approval is not being sought for an ineligible activity.
- 1.24 It is considered that granting the approval would not breach obligations relating to treaty settlements or recognised customary rights.

2. Decision Making Framework and Information Requirements

- 2.1 It is considered that granting the approval would not breach obligations relating to treaty settlements or recognised customary rights.
- 2.2 This Addendum is to be read alongside the current wildlife approval application and substantive application documentation.
- 2.3 Schedule 7 of the FTAA sets out the information requirements for a wildlife approval application. The report "*Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024" (Attachment Thirty-Seven) provides the supporting technical information for this Addendum to amend the current Wildlife Approval application.
- 2.4 **Criteria for Assessment of Application**
- 2.5 Clause 5 of Schedule 7 to the FTAA provides that when considering an application for a wildlife approval, including conditions under clause 6, the Panel must take into account, giving the greatest weight to paragraph (a):
- a) The purpose of the Act;
 - b) The purpose of the Wildlife Act and the effects of the project on the protected wildlife that is to be covered by the approval; and
 - c) Information and requirements relating to the protected wildlife that is to be covered by the approval (including, as the case may be, in the New Zealand Threat Classification System or any relevant international conservation agreement).
- 2.6 **Proposed Conditions**
- 2.7 Clause 6 of Schedule 7 provides that a Panel may set any conditions on a wildlife approval that the Panel considers necessary to manage the effects of the activity on protected wildlife. In setting any condition under subclause (1), the Panel must:
- a) Consider whether the condition would avoid, minimise, or remedy any impacts on protected wildlife that is to be covered by the approval; and
 - b) Where more than minor residual impacts on protected wildlife cannot be avoided, or remedied, ensure that they are offset or compensated for where possible and appropriate; and
 - c) Take into account, as the case may be, the New Zealand Threat Classification System or any relevant international conservation agreement that may apply in respect of the protected wildlife that is to be covered by the approval.
- 2.8 Notwithstanding the Panel's discretion to impose conditions on a wildlife approval under clause 6(1), this discretion is not unfettered, as prescribed in s 83 of the FTAA.
- 2.9 The recommended conditions for the wildlife approval are included in Attachment Thirty-Five with an updated version submitted with the package of information responding to comments.
- 2.10 Any future amendments to the CMP will need to be approved separately through the processes outlined in the resource consent and the wildlife approval.

3. Information Required Under Clause 2 Of Schedule 7

- 3.1 The following sections provide the information that is required under Clause 2 of Schedule 7 with respect to *Culicia rubeola*.

Purpose of the Proposed Activity (Clause 2(1)(a))

- 3.2 MBL is seeking a coastal permit under the FTAA for the extraction of sand from the coastal marine area from an area approximately 15.4 km² in size in Te Ākau Bream Bay. This is further described in Section Five of the original application.
- 3.3 A 35-year consent period is requested.
- 3.4 The Project is proposed to be staged as follows:
- a) Stage 1 will provide for an annual sand extraction volume of up to 150,000 m³ for at least the first three years from the commencement of the consent.
 - b) Stage 2 will provide for an annual sand extraction volume of up to 250,000 m³ for the remaining period of the consent after the change from Stage 1 to Stage 2 is certified (through the Year 4 or any subsequent SEMR when this change is sought).
- 3.5 The purpose of the wildlife approval amendment is:
- a) To authorise the disturbance, capture, incidental killing and possession of *Culicia rubeola* during monitoring associated with the sand extraction.
 - b) To authorise the disturbance, capture and incidental killing of live *Culicia rubeola* during sand extraction, and to return to the coastal marine area both live and dead cup coral during the sand extraction process.
- 3.6 All Scleractinia are protected under the Wildlife Act.

Actions the Applicant Wishes to Carry Out Involving Protected Wildlife and Where They Will Be Carried Out (Clause 2(1)(b))

- 3.7 Schedule 5 attached to the proposed wildlife approval conditions includes a map showing the extraction area and the 3 control areas where monitoring will also be undertaken.
- 3.8 The process that are proposed to be implemented through the CMP are:
- a) Monitoring – The disturbance and capture of live and dead protected corals may occur during monitoring at the sand extraction site and the control areas. Sand samples are undertaken by a grab sample. Section 5 of the CMP outlines the processes undertaken to minimise the disturbance and incidental killing of protected coral during monitoring. Those coral that are retained are to be sent to Earth Sciences New Zealand for their specimen collection.
 - b) Extraction – The disturbance and capture of live and dead protected corals (and potential incidental killing) may occur during the sand extraction process. Section 4 of the CMP outlines the processes undertaken to minimise the disturbance and incidental killing of protected coral during sand extraction.

Assessment of the Activity and its Impacts Against the Purpose of the Wildlife Act (Clause 2(1)(c))

- 3.9 The overarching purpose of the Wildlife Act is to protect animals classed as wildlife and manage game bird hunting in New Zealand. *Culicia rubeola* are therefore to be protected under the Wildlife

Act. The interpretation of the purpose of the Wildlife Act is considered to have widened as a result of the Wildlife (Authorisations) Amendment Act 2025 which provides further legal certainty around s 53 of the Wildlife Act. The Wildlife Act clarifies (under s 53A) that the Director-General of Conservation can authorise under this Act the disturbance and killing of wildlife incidentally to an otherwise lawful activity.

- 3.10 Although it is recognised that *Culicia rubeola* are present in the sand extraction area and can be sucked up during the sand extraction process only dead *Culicia rubeola* have been identified to date. Given the size and nature of *Culicia rubeola* it will not be practical to identify if any particular *Culicia rubeola* has been killed during a sand extraction operation or operations. Any such killing would be inadvertent and incidental to the lawful activity. For this reason, wildlife approval is being sought.
- 3.11 Owing to the size and distribution of *Culicia rubeola*, their location within the extraction and control areas cannot be identified prior to the commencement of monitoring and sand extraction.
- 3.12 During the sand extraction process, sand is fluidised into a slurry at the draghead via an electric pump pulling sand and water through the draghead at the seabed. Any *Culicia rubeola* within the immediate area of the drag-head is likely to be sucked up in the sand slurry. The sand slurry then moves up the draghead pipe, through a pump and onto the vessel where it is discharged onto a screen deck that utilises a 2 mm screen mesh to prevent larger material going into the load of the hopper. Oversized material (> 2 mm and which would include just about all *Culicia rubeola*) passes across the top of the screen and drops, via a pipe, into the forward port side moon pool where it drops through the vessel and exits, at keel height, under the vessel to return to the seabed.
- 3.13 *Culicia rubeola* are expected to be returned to the seafloor as oversized material.
- 3.14 Screened sand passes through the screen deck and into two pipes that run along the sides of the hopper. As the sand slurry drops into the hopper, the water velocity slows, and the sand settles out. The water and any finer suspended micro-sediments will pass out of the hopper and into one of the six moon pools (three on each side of the hopper) which discharges any oversized or suspended sediments under the vessel's keel.
- 3.15 Passage through the draghead and across the screens is not without some risk and there is the potential that organisms, including *Culicia rubeola*, could be damaged or accidentally killed during this process.
- 3.16 The CMP has been prepared to outline the operational measures to minimise the risk of protected coral being captured during both monitoring and sand extraction and the process to release them. These measures will be implemented to ensure that, as far as practical, coral are protected, consistent with the purpose of the Wildlife Act.
- 3.17 In summary, any incidental killing of *Culicia rubeola* is incidental to the monitoring and sand extraction process. It is not directly intended but is unavoidable and foreseeable as a consequence of carrying out monitoring and the sand extraction.
- 3.18 Populations of wildlife are unlikely to be threatened or materially affected by the activities enabled by the authority. Any threat to individual wildlife is incidental, has been avoided, minimised and mitigated to the extent possible through the reasonable steps adopted by the applicant (s 53B (4)), and any individual incidental act of killing viewed in isolation does not need to be consistent with the protection of wildlife (s 53B (5))⁵.

Protected Wildlife Species Known or Predicted to be in the Area, Where Possible, the Number of Wildlife Present and Numbers Likely to be Impacted (Clause 2(1)(d))

- 3.19 The protected *Culicia rubeola* has been identified within the proposed sand extraction area although only dead specimens have been identified to date.

⁵ Pages 9 and 10, *Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024 (Attachment Thirty-Seven)

- 3.20 The overall dead population of *Culicia rubeola* within the 15.4 km² proposed sand extraction area could be in the order of 1.6 million ($\pm$ 1.2 million). It is expected that up to 5.6 km² of seabed will be extracted per year. While the proportion of any live *Culicia rubeola* that will be damaged or killed as they pass through the sand extraction process is unknown, some corals are expected to survive the disturbance⁶.
- 3.21 The proposed sand extraction area is less than 0.4% of the identified potential suitable habitat in NZ waters for *Culicia rubeola* ⁷.

Impact on Threatened, Data Deficient, and At-Risk Wildlife Species (clause 2(1)(e))

- 3.22 *Culicia rubeola* has not been assessed by the New Zealand Threat Classification System (“NZTCS”) and, therefore, are not deemed to be ‘Threatened’, ‘Data Deficient’ or ‘At Risk’ wildlife (as defined in the NZTCS)⁸.

Methods Proposed to be Used to Conduct the Actions to Ensure Best Practice Standards are Met (Clause 2(1)(f))

- 3.23 The methods outline in the CMP are considered to meet best practice standards and have been prepared in consultation with staff from Earth Sciences New Zealand and Bioresarches (who undertake the benthic monitoring for MBL). No previous CMP are known to exist, and this may be the first CMP implemented in New Zealand.
- 3.24 Section 4 of the CMP outlines the methodology used during the sand extraction process to minimise the disturbance, capture and incidental killing of protected corals.
- 3.25 Section 5 of the CMP outlines the methodology used during monitoring to minimise the disturbance, capture, possession and incidental killing of protected corals.

Methods to be Used to Safely, Efficiently, and Humanely Catch, Hold or Kill the Animals and Relevant Animal Ethics Processes (Clause 2(1)(g))

- 3.26 As outlined in the CMP, it is intended that captured protected corals are returned to the coastal marine area. For those live protected corals captured during monitoring and not identified on board the *William Fraser* (and therefore not returned to the coastal marine area), they will be killed when the sand sample they are in is preserved and sent to a laboratory. Retained coral will be sent to Earth Sciences New Zealand.
- 3.27 There are no known animal ethics processes for *Culicia rubeola*.

Location or Locations in Which the Activity will be Carried Out (Clause 2(1)(h))

- 3.28 The map of the sand extraction site and control areas (for monitoring) is included as Schedule 5 to the recommended conditions (Attachment Thirty-Five). For the purpose of this wildlife approval application, it is considered that *Culicia rubeola* could be present anywhere within the extraction area and control areas.

Authorisation to Temporarily Hold or Relocate Wildlife (Clause 2(1)(i))

- 3.29 The majority of protected coral captured during monitoring will be held temporarily on board the sampling vessel while they are identified. It has been agreed with DOC, that any protected coral accidentally retained during monitoring are to be sent to the Earth Sciences New Zealand specimen collection. Earth Sciences New Zealand has the appropriate authorisation to possess the coral.

⁶ Page 12, *Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024 (Attachment Thirty-Seven)

⁷ Page 5 *Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024 (Attachment Thirty-Seven)

⁸ Page 13, *Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024 (Attachment Thirty-Seven)

- 3.30 For those corals captured during sand extraction, any exceeding 2 mm in size will be temporarily held as they pass through the sand extraction process before being discharged via the moon pools back into the coastal marine area. Based on section 4 of the Earth Science report⁹, most if not all of the *Culicia rubeola* will be caught by the screen and returned to the sea. Again, due to the passage of the *William Fraser* during this period they will be deposited back into the coastal marine area in a different location than where they were captured.

Actual and Potential Wildlife Effects (Adverse or Positive) of the Proposed Activity, including Effects on the Target Species, Other Indigenous Species, and the Ecosystems at the Site (Clause 2(1)(j))

- 3.31 This has been addressed in detail in the *Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act Report (Attachment Thirty-Seven). This report finds¹⁰:

“The proposed sand extraction area at Te Ākau Bream Bay is less than 0.04% of the identified potential suitable habitat for Culicia rubeola, respectively (Beaumont and Anderson 2026) and so it is considered likely that the proposed sand extraction activity within Te Ākau Bream Bay will have a minor to negligible impact on the population of Culicia rubeola within the Aotearoa New Zealand region.”

Methods to avoid and minimise adverse effects, including any offsetting or compensation to address unmitigated adverse effects (clause 2(1)(k))

- 3.32 The methods outlined in the CMP are considered sufficient to avoid or minimise the adverse effects of the project on *Culicia rubeola*. In summary these are:

- 3.33 During Monitoring:

- a) Limitation on sand samples taking during monitoring.
- b) Using sieves with seawater, separation of biota from sediment immediately after collection. Biota retained on the 2 mm sieve will be visually inspected. Identified *Culicia rubeola* will be recorded then returned immediately to the coastal marine area.

- 3.34 During Sand Extraction:

- a) Implementation of a Sand Extraction Rotation Methodology (to ensure that there is generally more than a 12-month period between sand extraction in a specific area).
- b) A draghead designed to minimise seabed disturbance and take a wider and shallower extraction furrow. The extraction track is an average of 100 mm deep and 1600 mm wide.
- c) A Dutch-designed screening deck, rather than flume pipes, which reduces damage to live animals passing through the draghead and increases the screening efficiency.
- d) Moon pools to deliver the over-size material (including *Culicia rubeola*) and sediment discharges below the water line to minimise turbidity.
- e) The moon pool system also reduces the aeration of the sediment and/or biota, which decreases their settling time, and therefore the time they may be vulnerable to predation, compared to the flume pipe and discharge over the side of the boat method.

⁹ **The scleractinian coral *Culicia rubeola* at Te Ākau Bream Bay** Literature review and distribution of *Culicia rubeola* identified within the proposed sand extraction area *Prepared for McCallum Bros Limited June 2026*

¹⁰ Page 5, *Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024 (Attachment Thirty-Seven)

Convictions for any offence under the Wildlife Act (clause 2(1)(l))

- 3.35 MBL and all associated entities have no history of convictions under the Wildlife Act.

Current Criminal Charges under the Wildlife Act (clause 2(1)(m))

- 3.36 No current criminal charges under the Wildlife Act exist against MBL or any affiliated parties.

Consultation on the application specific to wildlife impacts, including with hapū or iwi (clause 1A(1)(n))

- 3.37 Consultation was undertaken in respect to the initial Wildlife Approval application. No specific consultation has been undertaken in respect to this addendum to amend the application to include *Culicia rubeola*. Invitations to comment will be issued by the Panel, including to hapū and iwi.

Additional written expert views, advice, or opinions obtained concerning the proposal (clause 1A(1)(o))

- 3.38 Earth Sciences New Zealand prepared the following reports:
- a) The scleractinian coral *Culicia rubeola* at Te Ākau Bream Bay (Attachment Thirty-Six)
 - b) *Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024 (Attachment Thirty-Seven)
- 3.39 The CMP (and its subsequent update) was prepared by MBL in consultation with Dr Jennifer Beaumont (Earth Sciences New Zealand) and Mr Simon West (Bioresearches).

4. Decisions On Wildlife Approval – Section 81 Of The FTAA

Schedule 7, Clause 5

- 4.1 This provides an assessment of this addendum to the wildlife approval application against the statutory framework.

Purpose of the Act

- 4.2 The purpose of the FTAA is set out in s 3 as follows:

The purpose of this Act is to facilitate the delivery of infrastructure and development projects with significant regional or national benefits.

- 4.3 The project achieves the purpose of the FTAA as it will secure a significant volume of marine sand for high-strength concrete manufacturing in Auckland. High-strength concrete is the key material used in just about all major infrastructure and development projects. Marine sand is therefore a fundamental resource required to facilitate the delivery of infrastructure and development projects in New Zealand (and in Auckland in particular) that provide significant regional and national benefits.
- 4.4 Overall, the project fulfils the intent and purpose of the FTAA in that it will allow for the establishment of an environmentally sound sand extraction operation, which will secure a future supply of marine sand suitable for high-strength concrete production in Auckland, to enable and support infrastructure and development projects with significant regional and/or national benefits.
- 4.5 It is not possible to undertake the sand extraction or the required monitoring without the disturbance, capture, possession or incidental killing of *Culicia rubeola* if present within the sand extraction area and control areas.

The Purpose of The Wildlife Act 1953 And The Effects Of The Project On The Protected Wildlife That Is To Be Covered By The Approval

- 4.6 The purpose of the Wildlife Act is to protect animals classed as wildlife and manage game bird hunting in New Zealand. *Culicia rubeola* are therefore to be protected under the Act. The interpretation of the purpose of the Wildlife Act is considered to have widened as a result of the Wildlife (Authorisations) Amendment Act 2025 which provides further legal certainty around s 53 of the Wildlife Act. The Act clarifies (under s 53A) that the Director-General of Conservation can authorise under this Act the killing of wildlife incidentally to an otherwise lawful activity.
- 4.7 Although it is recognised that dead (and potentially live) *Culicia rubeola* are present in the sand extraction and control areas and can be disturbed and captured during the monitoring and sand extraction process. Given the size and nature of *Culicia rubeola* it is not practical to identify if any *Culicia rubeola* will be killed during monitoring or the sand extraction operation and any such killing will be incidental to the lawful activity. For this reason, the wildlife approval is being sought.
- 4.8 An assessment of the potential wildlife effects of the project on *Culicia rubeola* has been undertaken by Earth Sciences New Zealand. In summary, they have determined that it is likely that any adverse effects of the proposed sand extraction activity within Te Ākau Bream Bay will have a minor to negligible impact on the populations of *Culicia rubeola* within the Aotearoa New Zealand region¹¹.
- 4.9 In summary, the disturbance and any killing of *Culicia rubeola* is incidental to the sand extraction process. It is not directly intended but is unavoidable and foreseeable as a consequence of carrying out the monitoring and the sand extraction.

Information And Requirements Relating to the Protected Wildlife That Is To Be Covered By The Approval

¹¹ Page 5, *Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024 (Attachment Thirty-Seven)

- 4.10 The methods and processes outlined in the CMP are considered to be consistent with best practice and will ensure impacts on cup coral and the cup coral population are minimised as far as practical.

Recommended Conditions

- 4.11 The updated recommended conditions (Attachment Thirty-Five) were provided in the package of information response to comments.

Appendix 1: Updated Information Requirements for the Wildlife Act Approval

These are the updated Tables from the original application outlining where the information requirements are found. Unless stated otherwise, the references are to the original Application/AEE.

Table 1: Information Requirements under S43

S43	Information	Comment/AEE Section
1(a)	EPA Form	Completed on-line.
1(b)	must— (i) explain how the project to which the application relates is consistent with the purpose of this Act; or (ii) for a project referred under section 22A(1)(a),— (A) explain how both the stage to which the application relates and the whole project are consistent with the purpose of this Act; and (B) contain information relating to the likelihood that any later stages of the project will be completed; and	(i) – Refer to sections 9 and 19 of the AEE. The additional wildlife approval for <i>Culicia rubeola</i> is consistent with the purpose of the FTAA for the reasons already addressed and as set out in the amendment. (ii) - Not Applicable
1(c)	must demonstrate that the project does not involve any ineligible activities; and	Refer to section 2 of the AEE. The additional wildlife approval does not involve any ineligible activities.
1(d)	must, if the application is lodged by more than 1 authorised person, state the proposed approval to be held by each person.	Not applicable.
1(e)	(i) any information requirements specified by the Minister under section 23(3)(b)(ii) (ii) the requirements listed in subsection (3) that apply to the approvals sought	There are no specific information requirements stated. Refer to Table 3 below.
1(f)	must, if the authorised person has applied under section 39 for a determination under section 23 or 24, include a copy of the notice under section 39(4)	Not applicable.
1(g)	must, if the application seeks an approval for an activity that is the subject of a determination under section 23, set out the steps taken to secure the agreement referred to in section 5(1)(a); and	Not applicable.
1(h)	must state whether the application relates to a priority project and, if so, include confirmation	Not applicable.

	that, to the best of the applicant's knowledge, there are no competing applications; and	
1(i)	must be made by the deadline specified under section 28(3)(d).	The specified deadline for the substantive application is 23 December 2026.
1(j)	must not lodge a substantive application unless any fee, charge, or levy payable under regulations in respect of the application is paid.	The required deposit fee has been paid at the time of the lodgement of the application.
2	If a substantive application is for a listed project, it must also contain the information required by section 13(4) (other than section 13(4)(b), (f)(ii) and (iii), and (g)), which applies— (a) as if the reference in section 13(4)(k) to section 11 were a reference to section 29; and (b) as if the reference in clause 2 of Schedule 11 to section 12(2) were a reference to section 29; and (c) with any other necessary modifications.	Refer to Table 2 below.
3	The requirements referred to in subsection (1)(e)(ii) are those set out in,— (h) for an approval described in section 42(4)(h) (wildlife approval), clause 2 of Schedule 7:	Refer to Table 3 below.

Table 2: Information Requirements under s13(4)

S13(4)	Information	AEE Section	Attachment(s)
(a)	a description of the project and the activities it involves.	A description of the Project and the activities it involves Sections 5, 6 and 17. The addition of the further wildlife approval does not alter the description and activities in any material way other than by inclusion of the specific species.	27
(b)	an explanation of how the project meets the criteria in section 22A.	Refer to sections 9, 19 and 20 of the AEE. The addition of the further	

		wildlife approval does not alter the assessment of how the Project meets the relevant criteria.	
(c)	information to demonstrate that the project does not involve any ineligible activities (other than activities that may be the subject of a determination under sections 23 or 24).	Refer to sections 5 and 17. The further wildlife approval sought does not involve any ineligible activities.	
(d)	a description or map of the whole project area that identifies its boundaries in sufficient detail to enable consideration of the referral application:	Refer to section 5 of the AEE. The further wildlife approval does not result in any change or alteration to the location of the Project area or its boundaries.	6
(e)	the anticipated commencement and completion dates for construction activities (where relevant):	Refer to section 5 of the AEE. The further wildlife approval does not alter the anticipated commencement and completion dates for construction activities.	
(f)	a statement of whether the project is planned to proceed in stages and, if so, (i) an outline of the nature and timing of the stages; and (ii) a statement of whether a separate substantive application is to be lodged for each of the stages; and (iii) an explanation of how each stage meets the criteria in section 22.	Refer to section 5 of the AEE. No change to the Project's timing or staging will occur as a result of the additional wildlife approval.	
(g)	a statement of whether a part of the project is proposed as an alternative project in itself and, if so,— (i) a description of that part of the project; and	Not applicable.	

	(ii) an explanation of how that part of the project meets the criteria in section 22.		
(h)	a description of the anticipated and known adverse effects of the project on the environment:	Refer to section 19 of the AEE and Section 3 of the Addendum . The effect on populations of wildlife (<i>Culicia rubeloa</i>) are unlikely to be threatened or materially affected by the activities enabled by the authority. Any threat to individual wildlife is incidental, has been avoided, minimised and mitigated to the extent possible through the reasonable steps adopted by MBL.	15 and 37
(i)	a statement of any activities involved in the project that are prohibited activities under the Resource Management Act 1991:	Not applicable	
(j)	a list of the persons the applicant considers are likely to be affected by the project, including— (i) relevant local authorities: (ii) iwi authorities and groups that represent hapū that are parties to relevant Mana Whakahono ā Rohe or joint management agreements: (iii) other relevant iwi authorities: (iv) relevant Treaty settlement entities: (v) relevant protected customary rights groups and customary marine title groups: (vi) ngā hapū o Ngāti Porou, if the project area is within or adjacent to, or the project would directly affect, ngā rohe moana o ngā hapū o Ngāti Porou: (vii) relevant applicant groups under the Marine and Coastal Area (Takutai Moana) Act 2011: (viii) persons with a registered interest in land that may need to be acquired under the Public Works Act 1981:	Refer to section 19 of the AEE. The application for the further wildlife approval does not alter the assessment of persons considered likely to be affected by the Project as they have already been identified as part of the substantive application.	5

(k)	a summary of— (i) the consultation undertaken for the purposes of section 11 and any other consultation undertaken on the project with the persons and groups referred to in paragraph (j); and (ii) how the consultation has informed the project:	Refer to section 19 of the AEE. Consultation was undertaken in respect to the initial Wildlife Approval application. No specific consultation has been undertaken in respect to this addendum to amend the application to include <i>Culicia rubeola</i>. Invitations to comment will be issued by the Panel, including to hapū and iwi.	5
(l)	a list of any Treaty settlements that apply to the project area, and a summary of the relevant principles and provisions in those settlements:	Not applicable.	
(m)	a description of any processes already undertaken under the Public Works Act 1981 in relation to the project	Not applicable.	
(n)	A statement of any relevant principles or provisions in the Ngā Rohe Moana o Ngā Hapū o Ngāti Porou Act 2019:	Not applicable.	
(o)	information identifying the parcels of Māori land, marae, and identified wāhi tapu within the project area:	Not applicable.	
(p) to (r)	Information relating to activity that may be subject of determination under section 23 or 24.	Not applicable.	
(s)	a description of the applicant's legal interest (if any), or if the referral application is lodged by more than 1 person, the legal interest of any of those persons (if any), in the land on which the project will occur, including a statement of how that affects the applicant's ability to undertake the work:	Not applicable.	
(t)	an outline of the types of consents, certificates, designations, concessions, and other legal authorisations (other than contractual authorisations or the proposed approvals) that the applicant considers are needed to authorise the project, including any that the applicant considers	Refer to section 2 of the AEE. No further consents or authorisations of the type described in this	

	may be needed by someone other than the applicant:	clause are required.	
(u)	whether any activities that are involved in the project, or are substantially the same as those involved in the project, have been the subject of an application or a decision under a specified Act and,— (h) if an application has been made, details of the application: (i) if a decision has been made, the outcome of the decision and the reasons for it:	This is the first application for sand extraction at the Te Ākau Bream Bay Extraction Area.	
(v)	a description of whether and how the project would be affected by climate change and natural hazards:	Refer to section 11 of the AEE. The further wildlife approval does not alter the description in the substantive application.	8, 14, 17
(w)	if the referral application is lodged by more than 1 person, a statement of each proposed approval to be held by each of those persons:	Not applicable.	
(x)	a summary of compliance or enforcement actions (if any), and the outcome of those actions, taken against the applicant (or if the referral application is lodged by more than 1 person, any of those persons) under a specified Act.	The applicant nor its directors have been subject to compliance or enforcement actions.	

Table 3 – Schedule 7 Information Requirements

Requirement	AEE Section	Attachment(s)
(a) specify the purpose of the proposed activity:	Section 19.	
(b) identify the actions the applicant wishes to carry out involving protected wildlife and where they will be carried out (whether on or off public conservation land):	Section 19 and Section 1 of the Addendum amending the application. The further wildlife approval involves the same actions and same location as those identified in the substantive application. The only difference is that the proposed actions involve an	15 and 37

	additional coral species previously not identified within the proposed sand extraction area.	
(c) include an assessment of the activity and its impacts against the purpose of the Wildlife Act:	Section 19 and Section 3 of the Addendum amending the application. The impacts of the further wildlife approval against the purpose of the Wildlife Act are set out in paragraphs 3.10 – 3.19 of the Addendum.	15 and 37
(d) list protected wildlife species known or predicted to be in the area and, where possible, the numbers of wildlife present and numbers likely to be impacted:	Section 19 and Section 3 of the Addendum amending the application. This information has been updated as a result of the identification of <i>Culicia rubeola</i> in the proposed sand extraction area.	15 and 37
(e) outline impacts on threatened, data deficient, and at-risk wildlife species (as defined in the New Zealand Threat Classification System):	Section 19 and Section 3 of the Addendum amending the application.	15 and 37
(f) state how the methods proposed to be used to conduct the actions specified under paragraph (b) will ensure that best practice standards are met:	Section 19 and Section 3 of the Addendum amending the application. The proposed CMP has been updated to include specific reference to <i>Culicia rubeola</i> .	15 and 37
(g) describe the methods to be used to safely, efficiently, and humanely catch, hold, or kill the animals and identify relevant animal ethics processes:	Section 19 and Section 3 of the Addendum amending the application. The proposed CMP has been updated to include specific	15 and 37

	reference to <i>Culicia rubeola</i> .	
(h) state the location or locations in which the activity will be carried out, including a map (and GPS co-ordinates if available):	Sections 5 and 19 and Section 3 of the Addendum amending the application. The location of the activity has not changed.	6
(i) state whether authorisation is sought to temporarily hold or relocate wildlife:	Section 19 and Section 3 of the Addendum amending the application.	
(j) list all actual and potential wildlife effects (adverse or positive) of the proposed activity, including effects on the target species, other indigenous species, and the ecosystems at the site:	Section 19 and Section 3 of the Addendum amending the application. These effects are assessed in detail with specific reference to <i>Culicia rubeola</i> in Attachment 37.	15 and 37
(k) where adverse effects are identified, state what methods will be used to avoid and minimise those effects, and any offsetting or compensation proposed to address unmitigated adverse effects (including steps taken before the project begins, such as surveying, salvaging, and relocating protected wildlife):	Section 19 and Section 3 of the Addendum amending the application. The proposed CMP has been updated to include specific reference to <i>Culicia rubeola</i> .	15 and 37
(l) state whether the applicant or any company director, trustee, partner, or anyone else involved with the application has been convicted of any offence under the Wildlife Act:	Section 19 and Section 3 of the Addendum amending the application.	
(m) state whether the applicant or any of the company director, trustee, partner, or anyone else involved with the application has any current criminal charges under the Wildlife Act pending before a court:	Section 19 and Section 3 of the Addendum amending the application.	
(n) provide proof and details of all consultation, including with hapū or iwi, on the application specific to wildlife impacts:	Section 19. No consultation has been undertaken in respect to the Amendment to the Wildlife	5

	Approval application. Consultation was undertaken in respect to the initial Wildlife Approval application. No specific consultation has been undertaken in respect to this addendum to amend the application to include <i>Culicia rubeola</i>. Invitations to comment will be issued by the Panel, including to hapū and iwi.	
(o) provide any additional written expert views, advice, or opinions the applicant has obtained concerning their proposal.	Section 19 and Section 3 of the Addendum amending the application.	15, 21, 36 and 37

**Attachment Thirty-Six: The Scleractinian Coral *Culicia rubeola* at Te
Ākau Bream Bay**

The scleractinian coral *Culicia rubeola* at Te Ākau Bream Bay

Literature review and distribution of *Culicia rubeola* identified within the proposed sand extraction area

Prepared for McCallum Bros Limited

June 2026

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Report date: June 2026
Project No: MBL25301

Earth Sciences NZ Conflict of Interest: Earth Sciences NZ, and other associated parties, have extensive and many tens of millions of dollars investment in major aquaculture facilities all relying on continuous access to 4 M³ per sec of high quality seawater from offshore water intakes (3 intake, 3 outfall x 2.4m diameter) in Te Ākau Te Ākau Bream Bay proximal to the proposed sand extraction area. Thus, Earth Sciences NZ may oppose the extraction.

Revision	Description	Date
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Executive summary

McCallum Bros Limited (MBL) is seeking resource consent to extract sand from an area within Te Ākau Bream Bay, Northland. The proposed sand extraction area forms a rectangle extending approximately northwest to southeast, roughly parallel with the central Te Ākau Bream Bay shoreline, in water between approximately 20 and 30 m deep and at least 4.7 km offshore. MBL have previously extracted sand from the Mangawhai-Pākiri embayment to the south of Te Ākau Bream Bay until August 2025 when the consent was surrendered.

Benthic environmental surveys conducted by MBL at Te Ākau Bream Bay identified two species of scleractinian solitary cup coral (*Sphenotrochus* sp. and *Kionotrochus suteri*). These are both small (cup diameter < 10 mm) non-branching corals that live in mobile sediments such as sand, and are of importance to the sand extraction operation as all Scleractinia are protected under the Wildlife Act 1953. A summary of knowledge was prepared for these cup corals as part of MBL's substantive application under the Fast Track Approvals Act 2024. Following the lodgement of this application, a third species of scleractinian coral was confirmed from both Te Ākau Bream Bay and Pākiri, from samples previously mis-identified as *Kionotrochus suteri*. This additional species (*Culicia rubeola*) is similarly small but differs from the two other corals in that it is colonial rather than solitary and is placed within a different family. All recorded specimens of *Culicia rubeola* from both Te Ākau Bream Bay and Pākiri have been dead on collection.

The aim of this report is to summarise existing knowledge of the scleractinian coral *Culicia rubeola* found within the proposed Te Ākau Bream Bay extraction area and elsewhere in Aotearoa New Zealand, and to make an assessment, based on available information, of the potential impact the proposed extraction may have on the populations of this coral.

There is little known about the ecology and reproduction strategies of *Culicia rubeola*, although some information is available for a closely related species where polyp sexes are separate and that it is a broadcast spawner with an annual reproductive cycle and spawning occurring in summer. Reproductive strategies are not always consistent within coral families, but this may give an indication of the most likely strategy for *Culicia rubeola*. There is also little information on the resilience of this species to physical disturbance though there is evidence in the literature that many corals, including some with similar life histories to *Culicia rubeola*, have the potential to regenerate both soft and skeletal tissues following damage and/or fragmentation.

There is no evidence to suggest that the proposed sand extraction area at Te Ākau Bream Bay is particularly unique with respect to the habitat of *Culicia rubeola*. In addition, the proposed extraction area has a small footprint (< 0.04%) compared with that of the estimated suitable habitat for the species.

Should there be live specimens of *Culicia rubeola* within the proposed sand extraction area at Te Ākau Bream Bay then some mortality could be expected. However, considering all ecological and distributional factors, the impact of the proposed Te Ākau Bream Bay sand extraction on the population of this coral within Aotearoa New Zealand is considered likely to be minor to negligible.

1 Background

McCallum Bros Limited (MBL) is seeking resource consent to extract sand from an area within Te Ākau Bream Bay, Northland (Figure 1-1). The proposed sand extraction area forms a rectangle extending approximately northwest to southeast, roughly parallel with the central Te Ākau Bream Bay shoreline, in water between approximately 20 and 30 m deep and approximately 4.7 km offshore. MBL have previously extracted sand from Mangawhai-Pākiri embayment (hereafter referred to as Pākiri), to the south of Te Ākau Bream Bay.

During environmental surveys MBL identified two species of scleractinian solitary cup coral (*Sphenotrochus* sp. and *Kionotrochus suteri*) at Te Ākau Bream Bay. All Scleractinia (stony corals) are protected under the Wildlife Act 1953 and activities that affect such corals require application to Department of Conservation (DOC) for a Wildlife permit. With a permit therefore necessary for *Sphenotrochus ralphae* and *Kionotrochus suteri*, a report was commissioned to summarise existing knowledge of these cup corals within the proposed Te Ākau Bream Bay extraction area and elsewhere in Aotearoa New Zealand, and to make an assessment of the potential impact the proposed extraction may have on the populations of these corals (Beaumont et al. 2025).

On 8 May 2026, following the completion of this report and submission of MBL's substantive application under the Fast Track Approvals Act, a third species of scleractinian coral was confirmed from within both the previously extracted Pākiri site and the proposed Te Ākau Bream Bay sand extraction area. These samples had been previously mis-identified as *Kionotrochus suteri*. This additional species (*Culicia rubeola*) differs from the two other corals in that it is classified within a different family and is a colonial form rather than a solitary cup coral; definitions for both stony coral and cup coral are provided in the glossary below.

The aim of this report is to summarise existing knowledge of *Culicia rubeola*, found within the proposed Te Ākau Bream Bay extraction area and elsewhere in Aotearoa New Zealand, to complement the reports provided for the two cup corals in Beaumont et al. (2025) and inform an additional or revised application for a Wildlife Act authorisation. An assessment is also made, based on available information, of the potential impact the proposed extraction may have on the populations of this coral species.

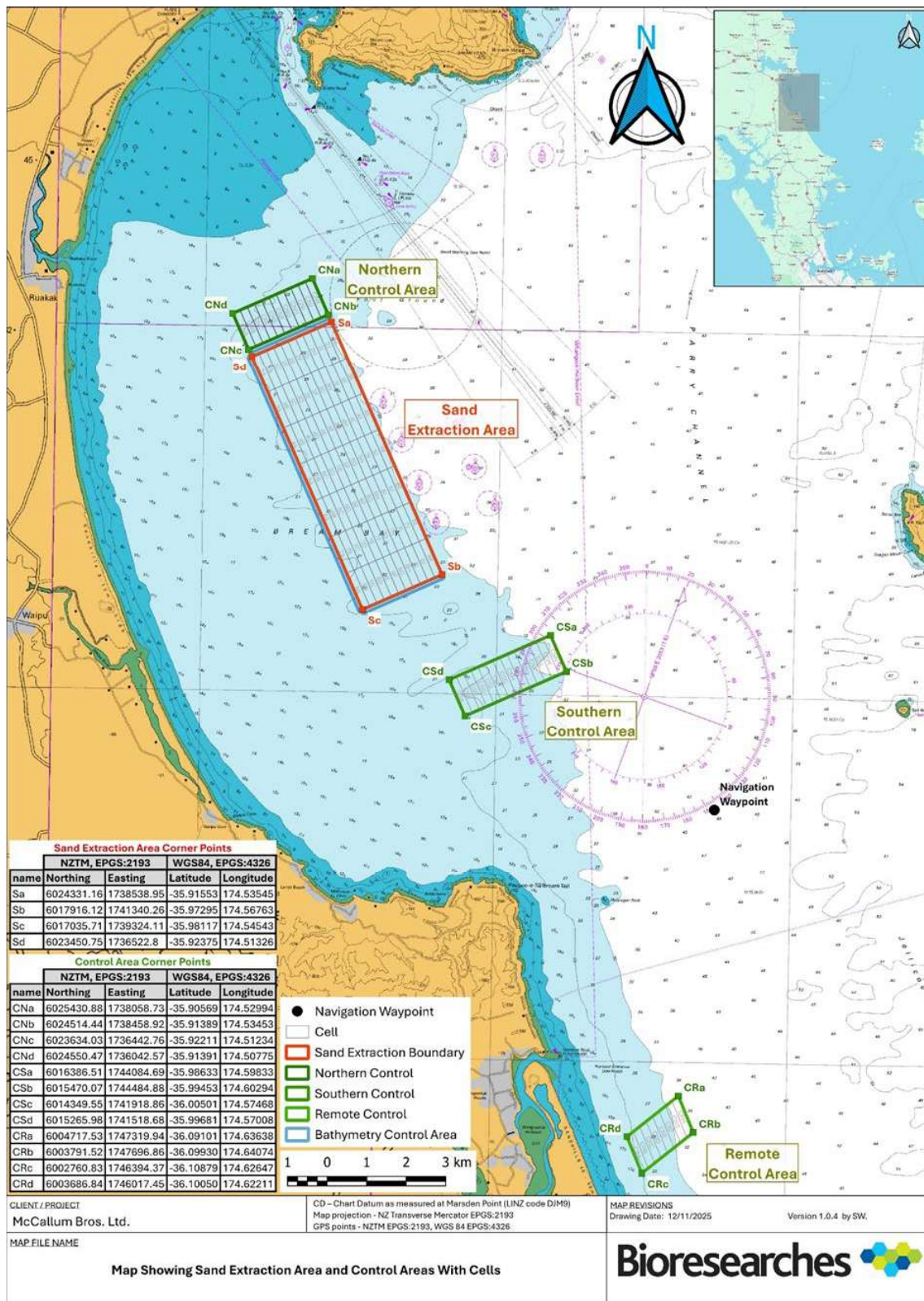


Figure 1-1: Map showing the location of the proposed sand extraction area within Te Ākau Bream Bay. Three proposed control areas are also shown, together with an inset box placing Te Ākau Bream Bay within a wider, regional context.

2 Methods

2.1 Taxonomy

Following reporting of the *Sphenotrochus* and *Kionotrochus* cup coral findings by BioResearches to DOC, all samples of these species collected by MBL during monitoring studies were prepared for transfer to the Earth Sciences NZ invertebrate collection for long-term storage. During this process it was noticed that the samples contained a third species, all dead at the time of sampling. These were tentatively identified as *Culicia rubeola* by BioResearches, with this identification later confirmed on the 8 May 2026 by Earth Science NZ experts in consultation with an overseas coral taxonomist (Dr Marcelo Kitahara (University of Sao Paulo, Brazil).

2.2 Species location records

The abundance of stony corals (both live and dead) was recorded in a survey of MBL project areas in March 2024. Samples were collected using a PONAR grab which sampled an area of 250 x 285 mm of seabed (0.071 m²).

Previous surveys within MBL survey areas were sampled using a smaller PONAR grab (229 x 280 mm, 0.064 m²). Within these pre-2024 surveys, live stony corals were recorded by site/grab sample. However, dead coral skeletons were only recorded as a total across the 2023 survey with no detailed spatial information. No information was available on the abundance of dead coral skeletons in the pre-2023 surveys.

To provide regional and/or national context to the observations of *Culicia rubeola* within the proposed extraction area in Te Ākau Bream Bay, the specimen databases described in Table 2-1 were interrogated for species location records of this coral species from within Aotearoa Territorial Sea (TS) and New Zealand's Exclusive Economic Zone (EEZ), as well as any records from the wider Pacific region. Many of the occurrence records held in the OBIS database were either sourced from Earth Sciences NZ, Auckland Museum, present also in iNaturalist observations, or their positions were duplicated in OBIS. For this assessment, all duplicated records were removed so that only one record per location was retained for describing their distribution and habitat.

2.3 Estimated species distribution

Incidental data recorded with coral observations were used, along with existing spatial environmental data layers, to characterise the habitats/environments that these species are associated with and to estimate the extent of suitable habitat.

Thirty-three spatial layers of environmental variables were available within Aotearoa New Zealand's Territorial Sea (out to 12 nautical miles) (Stephenson et al. 2023 and see Appendix A). Values of these variables at each location record were determined and from these the range of each variable (minimum and maximum) was calculated as an estimate of the species tolerance. Note that, due to limited observations of *Culicia rubeola*, the tolerance ranges for some of these variables may be conservative.

Bean plots were then produced to illustrate the distribution of *Culicia rubeola* across the range of each variable, shown separately for Te Ākau Bream Bay/ Pākiri sites (combined for this analysis as there were too few records from Bream Bay alone) and all other sites combined to identify any unique characteristics of the Te Ākau Bream Bay/ Pākiri habitat.

Each spatial environmental layer was masked to exclude areas outside of the observed range of values for *Culicia rubeola*. These masked environmental layers were then combined into a single layer to identify the most suitable habitat based on available environmental data for sample locations. This was done by simple addition of all 33 layers after setting the value in each remaining cell to 1. In this way cells with the highest number (33) represent the most suitable habitat and those with the lowest (0) represent the least suitable habitat. The estimated area of the most suitable habitat for *Culicia rubeola* (where all 33 environmental variables were in range) was calculated using geoprocessing tools in ArcGIS Pro 3.4.2. Note that environmental variable data layers were only available from within the 12 nautical mile Territorial Sea (TS). Therefore, the limited sampling and resulting approximate tolerance ranges for environmental variables, together with the exclusion of any possible habitat outside of the TS may result in a conservative estimate of potential habitat. However, it should be noted that there are uncertainties in these estimates due to the effect of environmental parameters for which data were not available.

This is a simple and effective method for estimating suitable habitat but is not as sophisticated as a formal species distribution model, which typically identifies and uses only the most informative environmental predictors and incorporates their actual values at each presence location, as well as considering environmental conditions at absence locations. However, the generated plots provide a useful characterisation of the known habitat of *Culicia rubeola* within Aotearoa New Zealand's Territorial Sea, based on its tolerance to this set of environmental parameters given the available sample location data.

2.4 Literature review

A literature review was conducted on available information on the life histories and anticipated impacts of the disturbance on *Culicia rubeola*. Where possible, qualifying statements as to the anticipated impact of MBL's proposed activities on this protected coral species has been included.

Table 2-1: Data sources interrogated for *Culicia rubeola* records. Note that most museum collection specimens would have been live on collection.

Source	Details
Earth Sciences NZ National Invertebrate Collection (NIC)	This specimen collection (NIC) is located at the Earth Sciences New Zealand Greta Point campus in Wellington and is Earth Sciences NZ's repository for marine invertebrates from almost all phyla found in the Aotearoa New Zealand region, including the wider southwest Pacific Ocean and Ross Sea. It houses an estimated 350,000 sample lots that have been collected over half a century of biological research (Schnabel et al. 2014). Collection records for <i>Culicia rubeola</i> were extracted on 18 May 2026 from the NIC specimen database niwainvert. Note that these records include all specimens of <i>Culicia rubeola</i> provided to Earth Sciences NZ by MBL.
Museum of New Zealand Te Papa Tongarewa Natural Environment collection (Te Papa)	The Te Papa natural history collections (hereafter referred to as Te Papa) are in two collection facilities in Wellington (located at Cable and Tory streets) and contain the national collection of plant and animal specimens housing more than one million collection lots. It is the largest, most comprehensive collection of Aotearoa New Zealand fauna and flora, with most major taxonomic groups of plants and animals represented. The database management software KEmu was queried to extract all records of <i>Culicia rubeola</i> , provided by Te Papa on 19 May 2026.
Auckland War Memorial Museum Tāmaki Paenga Hira (Auckland Museum).	The Auckland Museum and collections are located in the Auckland Domain. The natural sciences collections cover terrestrial and aquatic botany, entomology, land vertebrates, marine fauna, geology and palaeontology specimens from across the Pacific region. The marine collection numbers an estimated 200,000 specimens and includes fish and invertebrates. The focus of the herbarium collection is on wild plants (native and naturalised) in all plant groups principally from northern Aotearoa New Zealand and its offshore islands. Some of the earliest specimens date from James Cook's voyages. Records of <i>Culicia rubeola</i> were extracted from the Auckland Museum online database on 18 May 2026.
Ocean Biogeographic Information System, Southwestern Pacific Node (OBIS-NZ)	This is an online database that provides species occurrences for a wide range of taxa within Aotearoa New Zealand's EEZ and the wider south Pacific region and has the highest number of invertebrate records for Aotearoa New Zealand waters of any database. Most biogenic habitats and their key habitat-forming species are represented to some level in this database. OBIS records for <i>Culicia rubeola</i> within Aotearoa New Zealand and wider southwest Pacific were extracted on 18 May 2026 from their online portal (https://obis.org/).
iNaturalist	iNaturalist is an online social network of people sharing biodiversity information to help each other learn about nature. It is also a crowdsourced species identification system and an organism occurrence recording tool. iNaturalist was interrogated for "Research Grade" records (those confirmed by other users) of <i>Culicia rubeola</i> on 18 May 2026 using their online search tool at www.inaturalist.org .

3 Results

3.1 Available data on the distribution and habitat associations of *Culicia rubeola* are presented in this section. MBL survey data

Records of *Culicia rubeola* were only present in the 2024 data onwards (Table 3-1, Figure 3-1, Figure 3-2), perhaps because dead corals (of any species) were not quantified in previous surveys. All specimens recorded of *Culicia rubeola* were dead on collection. The specimens recorded in 2024 had been previously mis-identified and were treated as *Kionotrochus suteri* in Beaumont et al. (2025).

Table 3-1: *Culicia rubeola* specimens recorded in MBL data. Data from 2024 and 2025 surveys only. The five specimens recorded in 2024 had previously been mis-identified as *Kionotrochus suteri*. pSEA = proposed Sand Extraction Area, RCA = Remote Control Area (Figure 3 1). No sampling occurred at Te Akau Bream Bay in 2025.

Survey	Year	Area	Dead <i>C. rubeola</i> specimens
Pākiri	2024	All	2
Pākiri	2025	All	20
Te Ākau Bream Bay	2024	pSEA	2

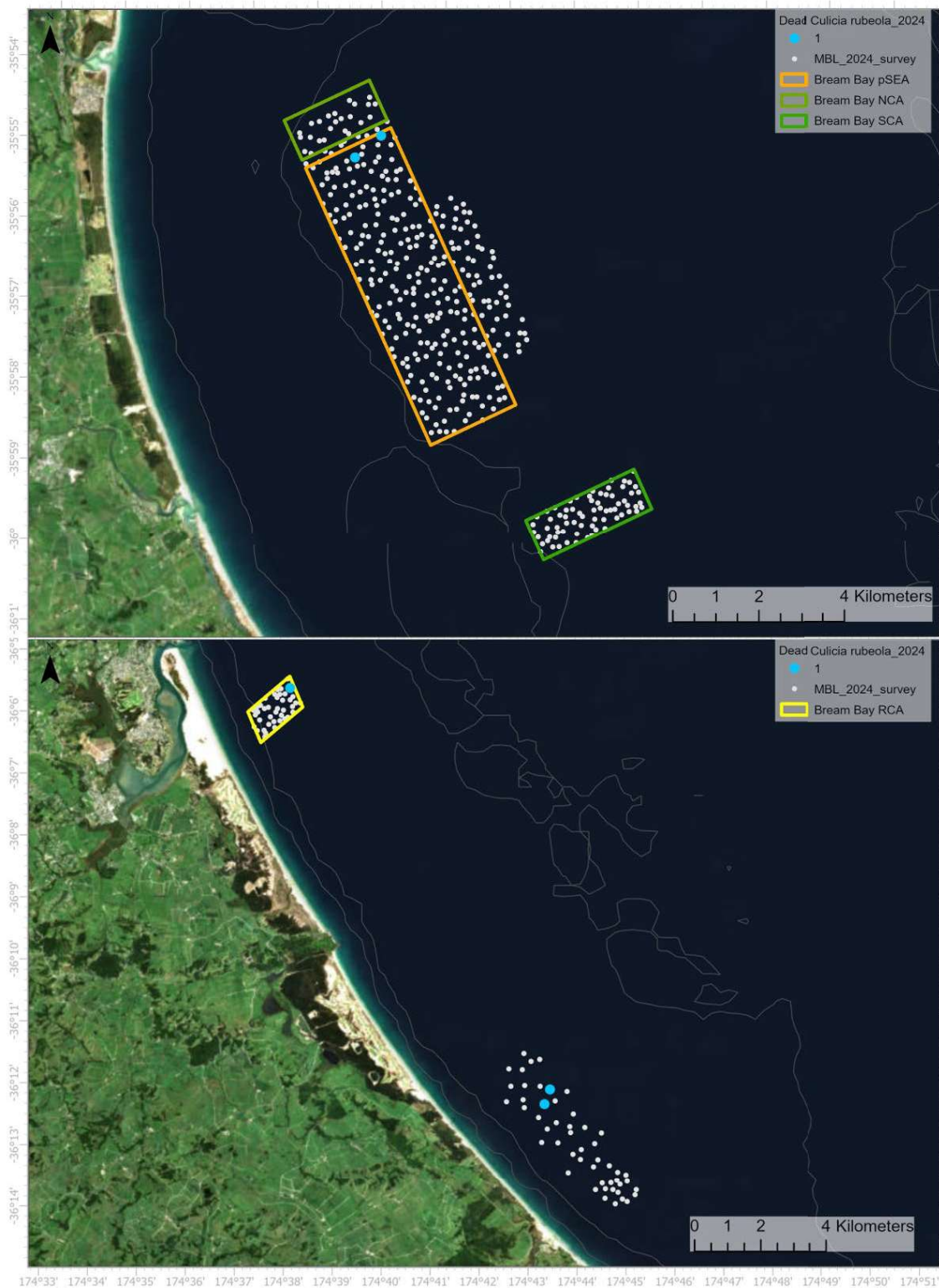


Figure 3-1: Dead *Culicia rubeola* specimens recorded within MBL's 2024 survey data. These records were originally mis-identified as *Kionotrochus suteri*. This plot is of the 2024 sample data only - dead corals were not quantified in previous surveys.

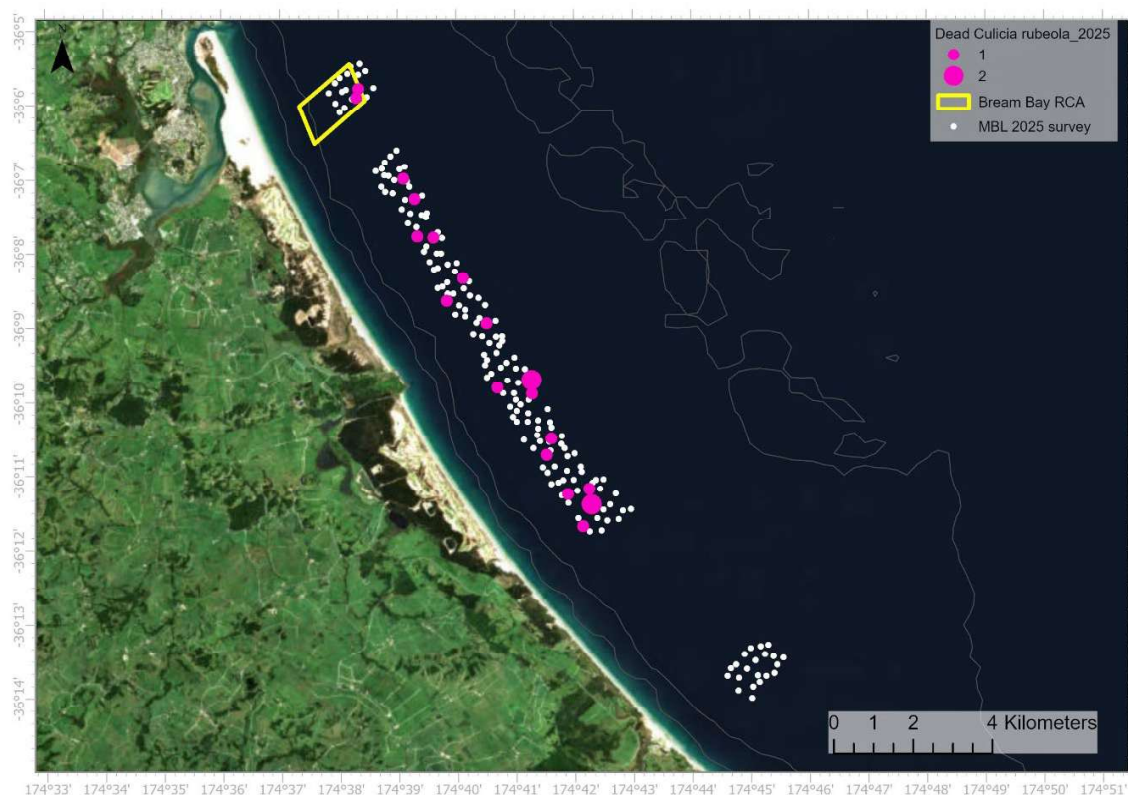


Figure 3-2: Dead *Culicia rubeola* specimens recorded within MBL’s 2025 survey data. The 2025 survey data were not available for inclusion in the Beaumont et al. (2025) report on cup corals and so these are new data. No sampling occurred at Te Ākau Bream Bay in 2025.

3.1.1 Te Ākau Bream Bay proposed Sand Extraction Area (pSEA)

Two specimens of *Culicia rubeola* were recorded from within the pSEA at Te Ākau Bream Bay. They were all deemed dead on collection.

The PONAR grab used in the 2024 Te Ākau Bream Bay survey sampled an area of 250 x 285 mm (or 0.07 m²) of seabed. Specimens recorded per grab ranged from zero to 1 colony (up to 4 polyps per specimen). The average density of *Culicia rubeola* within the proposed sand extraction area, standardised to individuals per m², is estimated to be 0.11 ± 0.08 inds./m².

3.2 Wider distribution of *Culicia rubeola* within Aotearoa New Zealand

Culicia rubeola is known to occur both within Aotearoa New Zealand and in the central and south-west and eastern Pacific including India and Hong Kong (see section 4). This section focuses on the distribution of *Culicia rubeola* within Aotearoa New Zealand.

All specimens of *Culicia rubeola* collected by MBL at Te Ākau Bream Bay and Pākiri comprised dead skeletal material. The life status of specimens from all other sources is uncertain but most of these are expected to have been alive at the time of capture/observation.

The largest contributor of occurrence records was iNaturalist, providing almost half of the 192 records (Table 3-2).

Table 3-2: Summary of available occurrence records of *Culicia rubeola* by source. Excludes duplicate records. Note that the number of records is given (not abundances). NIC = National Invertebrate Collection (Previously NIWA Invertebrate Collection), OBIS = Ocean Biogeographic Information System, MITs =Marine Invasives Taxonomic Service database.

Data source	Number of records
Auckland museum	34
iNaturalist	94
MBL/Earth Sciences NZ NIC	23
OBIS	41
MITs	15
Total	192

Depth of capture wasn't recorded for the iNaturalist observations and was also missing for several records from other sources, but where it was recorded most locations (over 80%) were less than 100 m deep and two-thirds were less than 40 m. This coral species also appears to have been recorded from intertidal habitat with some depths given as 0 or 1 m, and several records collected by scuba, snorkel, and even by hand. However, some of the OBIS records are from much deeper water (e.g., those from east of the Colville Ridge in the north), over 1000 m, and it may be that these have been mis-identified or the locality data incorrectly recorded. Further examination of the specimens would be required to confirm any misidentification.

Incidental records of habitat descriptions were available for some records obtained from the Auckland Museum and iNaturalist datasets. Habitats were mostly recorded as on or under rocks or rock crevices, in caves, on rock walls, under overhangs and kelp canopies, on low-tide rocks, or in one case "embedded in a sponge". These records are likely mostly of live specimens (or at least are from the location of the specimen when it was living) and strongly indicate a preference for hard rocky substrate in shaded locations, rather than mobile soft-sediment sandy, or muddy habitat. Some *Culicia rubeola* have also been observed attached to shells or shell fragments (including MBL samples) but those confirmed as coming from soft-sediment substrates have all been dead specimens.

3.2.1 Recorded distribution and predicted habitat of *Culicia rubeola*

Recorded occurrences indicate that *Culicia rubeola* is widespread around New Zealand, including most of the coastline of the North Island (excluding the southeast), the top of the South Island including Marlborough Sounds and Cook Strait, and Fiordland in the southwest of the South Island. Notably, there are no occurrence records from the east coast of New Zealand between Hawkes Bay and the southwest corner of the South Island. This coral has also been recorded from as far north as the Kermadec Islands, with some deeper records further west nearer the Colville Ridge (Figure 3-3.)

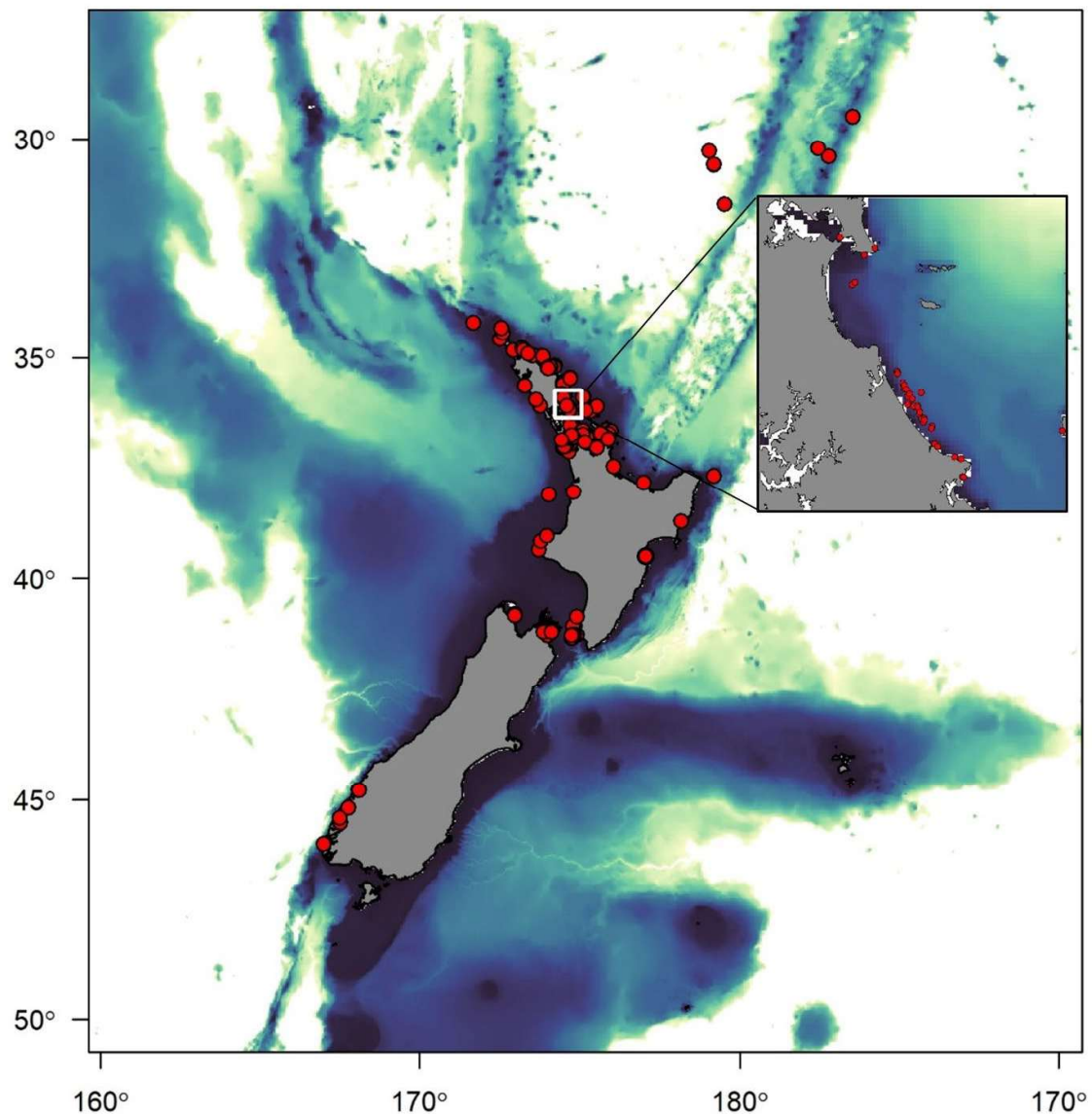


Figure 3-3: *Culicia rubeola* records from all sources within Aotearoa New Zealand. Inset shows the Te Ākau Bream Bay and Pākiri region. Colour gradient indicates bathymetry.

Thirty-three environmental data layers, with a spatial extent from the shoreline to the 12 nautical mile Territorial Sea boundary, were used to predict the suitability of habitat for *Culicia rubeola*. The observed range and frequency of a subset of these environmental layers for sites at Te Ākau Bream Bay (including Pākiri) and for all other sites are given in Figure 3-4. While there are differences between the regions (notably a higher mean percentage of sand in Bream Bay/Pākiri compared to other sites), the range of the environmental variables at Te Ākau Bream Bay/Pākiri sites were within the range of values at other sites.

The spatial plots in Figure 3-5 show that the potential suitable habitat (within the range of most environmental predictors) for *Culicia rubeola* within Aotearoa New Zealand's Territorial Sea, as determined by environmental data layers, includes the entire coastline of both main islands, as well as Stewart Island and the Chatham Islands. Regions in range of all 33 variables are more restricted, however, but still include almost all the North Island coastline as well as large parts of the South Island western and northern coastlines. The South Island south and east coasts are excluded. Based on this distribution, the proposed sand extraction area at Te Ākau Bream Bay (15.4 km²) is less than 0.04% of the identified potential suitable habitat for *Culicia rubeola* (43,070.9 km²) within Aotearoa New Zealand (and likely a much smaller percentage of the complete distribution, including beyond Aotearoa New Zealand).

This estimate is only approximate for various reasons, including: 1) several of the *Culicia rubeola* observations were from outside of the spatial range of the environmental variable layers used and would likely increase the breadth of environmental conditions suitable for this coral if data were available, 2) all of the MBL observations were of dead specimens which may have been transported to the sandy substrate sample locations by wave and current actions and therefore may artificially expand the breadth of environmental conditions used to delimit suitable habitat, 3) the inherent error and low spatial resolution of the environmental predictors, or missing key predictors, and 4) the absence of abundance/density information in the observational data records.

However, there is a level of conservatism in the method used to estimate extent of suitable habitat in that it included only areas where *Culicia rubeola* has been found within the range of all 33 environmental parameters. Taking all these factors into consideration, the estimated percentages of sand extraction area relative to areas of suitable habitat are at the very least unlikely to be substantively overestimated.

Note that, as environmental data layers were only available between the Territorial Sea boundary and the nominal shoreline, in some places (e.g., Fiordland and off East Cape) records were either too close or too far from shore to be within the range of the environmental layers and therefore appear to be outside of suitable habitat. This adds a level of conservatism to the predicted extent of habitat suitability shown in red in the right-hand plot of Figure 3-5, as suitable habitat is known to occur at the location of these observations.

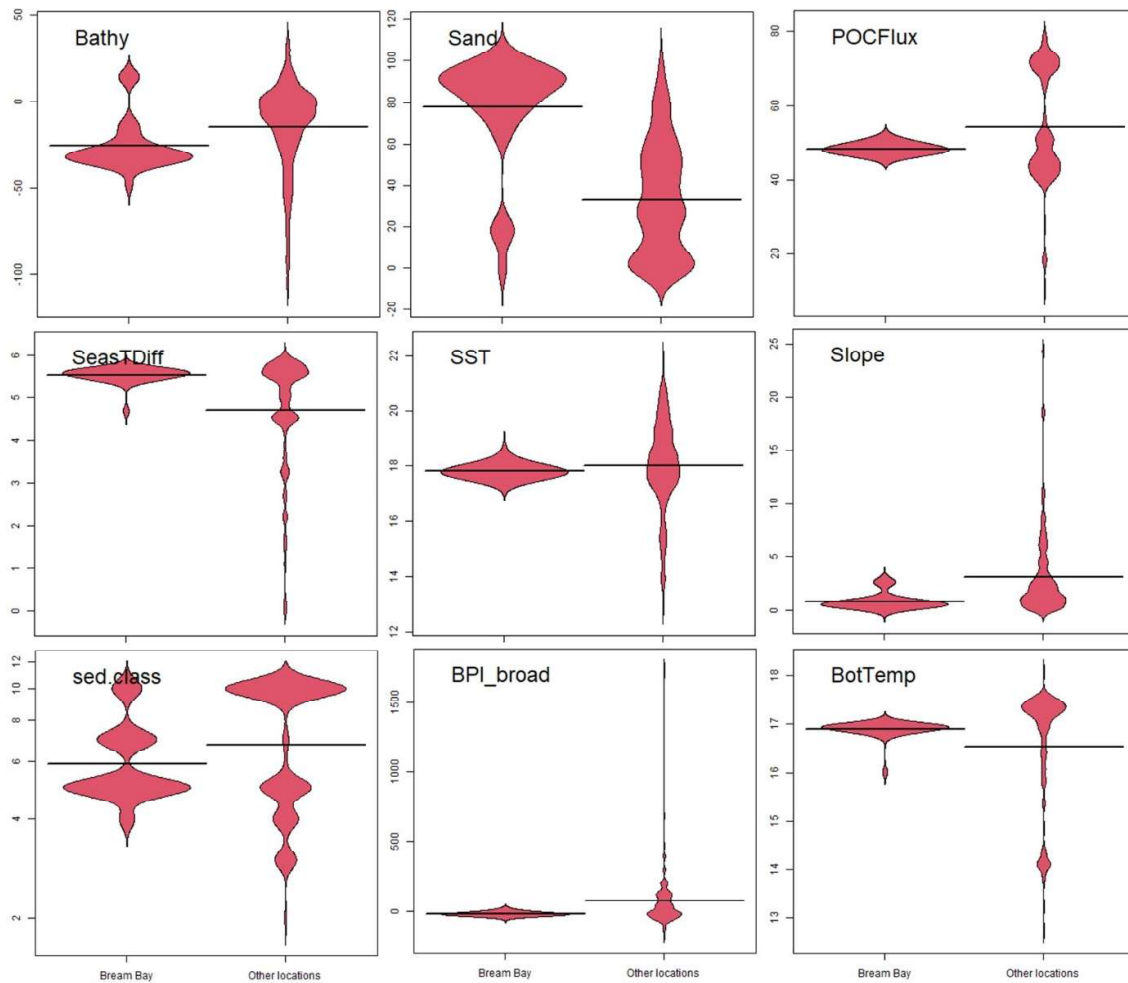


Figure 3-4: Bean plots show the spread of environmental variables extracted from locations of *Culicia rubeola* records at Te Ākau Bream Bay (including Pākiri) and all other sites. Within each plot, the left graph is Te Ākau Bream Bay (including Pākiri) data and the right graph is data from all other sites. The black horizontal bar shows the mean value. Bathy = bathymetric depth; Sand = percent sand; POCFlux = particulate organic carbon flux to the seafloor; SeasTDiff = seasonal sea surface temperature difference; SST = Sea Surface Temperature; Slope = angle/steepness of seabed; Sed.class = sediment classification; BPI broad = Benthic Position Index; BotTemp = Bottom (seabed) temperature. See Appendix A for details of each variable.

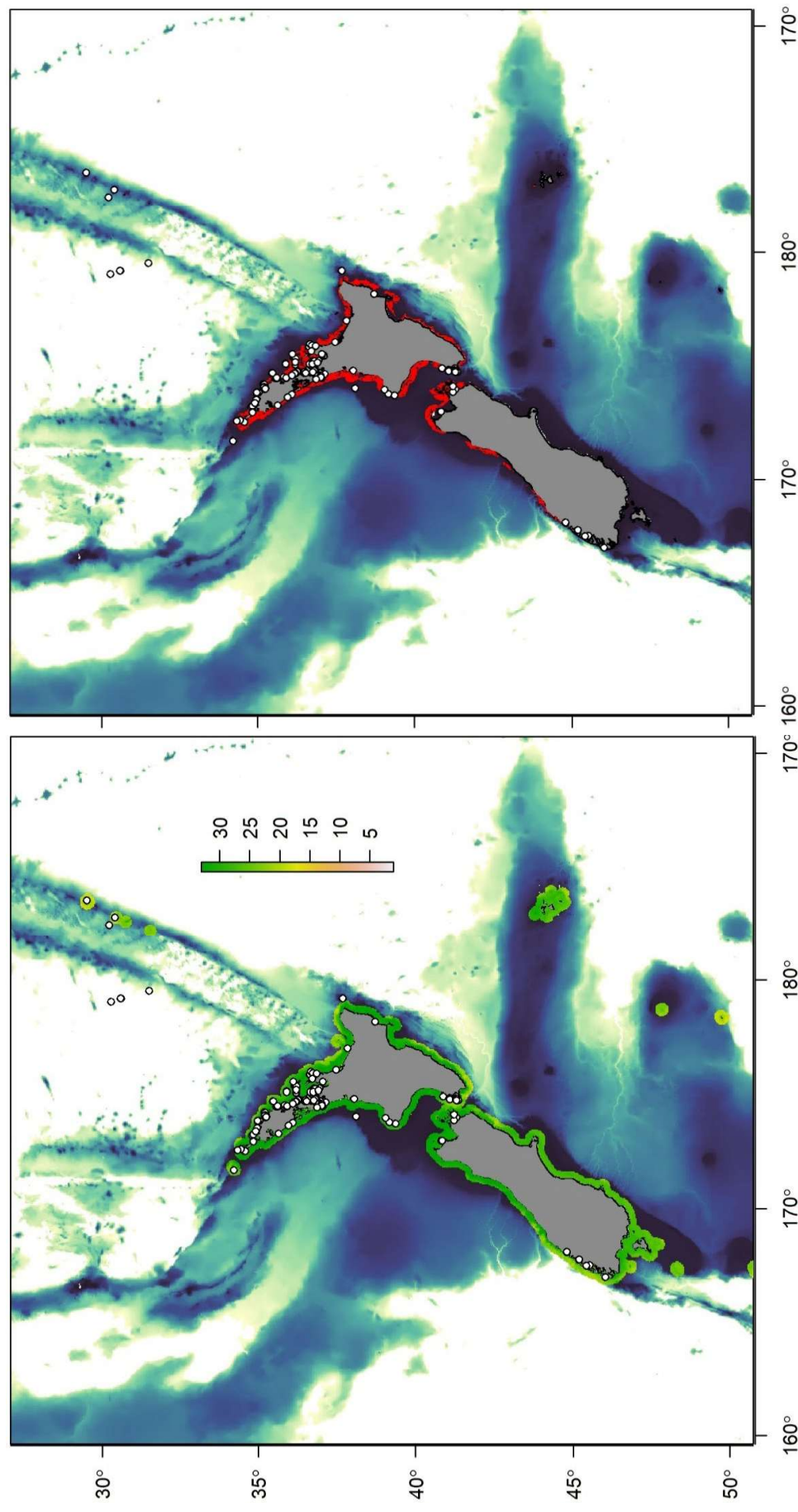


Figure 3-5: Potential suitable habitat for *Culicia rubeola* determined from environmental data layers. Left: Gradient of suitability based on the number of environmental variables within the species tolerance. Right: Potential suitable habitat where all 33 environmental layers were within the range of values recorded at known *Culicia rubeola* locations. Environmental data layers (Appendix A) were only available between the Territorial Sea boundary and the nominal shoreline. In some places (e.g., Fiordland and off East Cape) records were too close or too far from shore to be within the range of the environmental layers and therefore appear to be outside of suitable habitat.

4 Ecology of *Culicia rubeola*

Culicia rubeola (Quoy and Gaimard 1833) is a species of ahermatypic (non-reef-building) scleractinian coral in the family Rhizangiidae. Species within this family are characterized by small, encrusting colonies of corallites (the outer skeletal part of individual polyps) that are interconnected at their bases (Cairns 1995; Viswambharan et al. 2021; Viswambharan and Sreenath 2024). Despite their wide distribution, the Rhizangiidae are among the least studied groups of azooxanthellate corals (those which do not rely on symbiotic algae for nutrition), this being attributed to their small size, challenges in morphological identification, and lack of information on their ecological preferences (Viswambharan and Sreenath 2024).

Culicia rubeola (Figure 4-1 and Figure 4-2) was one of the first reported species of Scleractinia reported from the New Zealand region (Cairns 1995). Although Cairns (1995) concluded this species was probably endemic to Aotearoa New Zealand, it has since been documented in India (Viswambharan and Sreenath 2024) and Hong Kong (Lam et al. 2008) and OBIS includes records from the Central and south-west and eastern Pacific, in the littoral zone (to 55 m).

Within Aotearoa New Zealand, published accounts and the observations we have assembled show *Culicia rubeola* has been recorded from all coasts of the North Island and off Fiordland (Cairns 1995), the Kermadecs (Richards and Liggins 2015), Rakitu Island (off Great Barrier Island, Brook 1982), the Whanganui shelf (Squires 1960), and Pelorus Sound (Watts et al. 2015).

Culicia rubeola was originally placed in a different genus, as *Dendrophyllia rubeola* after it was collected in the early 1800 during the voyage of the French *Astrolabe*. The original collection locality is listed as ‘Tamise’ (=Thames) River, depth unknown. Later distribution records were provided by Squires and Keyes (1967, from various locations around the North Island) and Cairns (1995). It was described by Cairns (1995) as having “colonies low and encrusting, formed by reptoid budding from short, flat stolons.” with the largest colonies up to approximately 60 mm in diameter and consisting of about 200 corallites. Calices are circular and mostly 3.5-4.5 mm in diameter (Cairns 1995), but can be up to 6.0 mm in sheltered environments (Brook 1982).

This species lives attached to hard substrates such as bivalve shell with a depth range of 0–82 m (Figure 4-3, Cairns 1995). Brook (1982) described *Culicia rubeola* as living on vertical to horizontal rock surfaces below 15 m and in crevices in shallower water off Great Barrier Island, Viswambharan and Sreenath (2024) on natural substances like rocks of dead corals in the Indian region, and Watts et al. (2015) described *Culicia rubeola* attached to rope long-line droppers on mussel farms in Pelorus Sound, Marlborough Sounds.



Figure 4-1: *Culicia rubeola*. Images taken from (NIWA 2022).

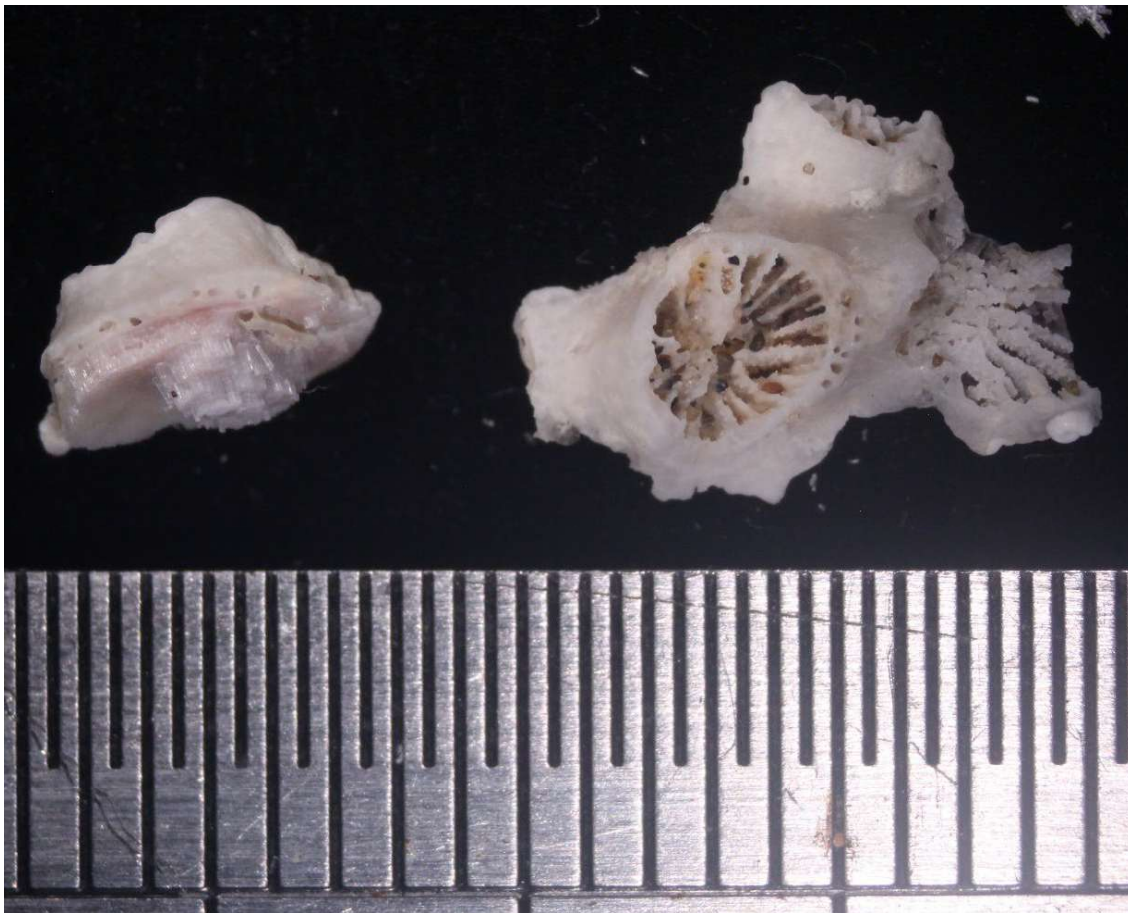


Figure 4-2: Two specimens of *Culicia rubeola* from a sample collected at Pākiri. Image of NIC specimen 183334 taken by Diana Macpherson (Earth Sciences NZ) with a ruler as a scale bar. The left hand specimen has layers of mollusc shell underneath showing that this was previously attached to a shell.

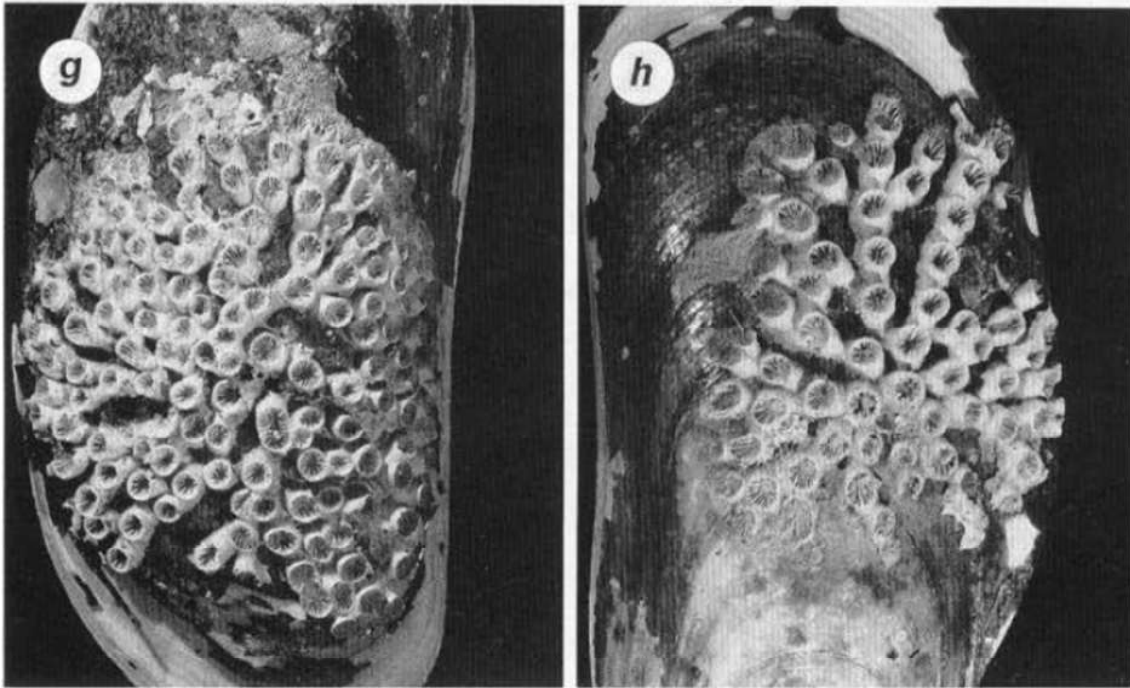


Figure 4-3: *Culicia rubeola* attached to a bivalve shell (the green-lipped mussel *Perna canaliculus*). Images taken from Cairns (1995).

4.1 Reproduction

The importance of reproduction in the population dynamics and distribution of benthic animals, together with a general overview of coral reproduction, was described in Beaumont et al. (2025). However, information on the reproduction of scleractinian solitary corals and those living in temperate zones is notably scant (Goffredo et al. 2005).

There was no information found on any aspect of the reproduction of *Culicia rubeola* specifically, however Szmant-Froelich et al. (1980) conducted an 18-month study of reproduction on *Astrangia danae*, a species within the same family, on the east coast of the US. This species is similar to *Culicia rubeola* in that it is also a small encrusting coral, with polyps 3–5 mm in diameter, and attaches to rocky surfaces and shells. Although, unlike *Culicia rubeola*, this species is found both with and without endosymbiotic dinoflagellates (zooxanthellae). Szmant-Froelich et al. (1980) concluded that *A. danae* is dioecious (polyps are either male or female and all polyps within a colony were the same sex) and a broadcast spawner. It has an annual reproductive cycle with spawning occurring during August (in Narragansett Bay where the study was conducted). Egg production was estimated at up to 6000 eggs per polyp. The smallest colonies used in this experiment (from 6 to 9 polyps) had an estimated age of 1 to 3 years and were reproductively mature. Reproductive strategies are not always consistent within coral families, but this may give an indication of the most likely strategy for *Culicia rubeola*.

4.2 Growth rates and longevity

The importance of metrics such as growth rates and/or longevity when considering the vulnerability of a species to anthropogenic disturbance were described in Beaumont et al. (2025), together with a summary of available information on the growth and longevity of solitary cup corals. Reported longevitys were in the range of approximately 7–12 years and reported growth rates ranged from 0.3 mm to 3.1 mm per year, with the exception of *Flabellum rubrum* with possible growth rates of up to 0.5 cm per month.

While there is no information on the growth rates or longevity of *Culicia rubeola* in the available literature, Brook (1982) suggested that this species may produce larger coralla in habitats sheltered from wave action than it does in more exposed habitats, though they noted there were insufficient data to verify this.

There was little information in the literature on the linear growth rates of small colonial temperate scleractinians, but Szmant-Froelich et al. (1980) noted that small colonies (from 6 to 9 polyps) of *Astrangia danae* had an estimated age of 1 to 3 years and were reproductively mature. Another species that may provide some insight is *Astroides calycularis*, an azooxanthellate coral in the Dendrophylliidae family. This coral is native to the western Mediterranean Sea and is also found in the Atlantic Ocean where it inhabits shallow rocky substrates down to approximately 50 m water depth. Like *Culicia rubeola*, *A. calycularis* is colonial, forming colonies up to approximately 20–30 cm in diameter and about 10 cm in height. While no information was found on linear growth, Carbonne et al. (2021) recorded calcification rates, during a six-month laboratory experiment looking at the response of corals to low pH, of between $1.0 \pm 0.2 \text{ mg CaCO}_3 \text{ cm}^{-2} \text{ day}^{-1}$ and $0.2 \pm 0.1 \text{ mg CaCO}_3 \text{ cm}^{-2} \text{ day}^{-1}$. Carbonne et al. (2024) recorded calcification rates for *A. calycularis* to be in the region of $0.2 - 0.3 \text{ mg CaCO}_3 \text{ cm}^{-2} \text{ day}^{-1}$ during a three-month study into the effects of heat waves and ocean warming on temperate scleractinian corals.

4.3 Resilience of *Culicia rubeola* to disturbance

MBL's sand extraction process was described in detail in Beaumont et al. (2025). In summary, the sand slurry is fluidised at the draghead via suction, pulling sand and water through the draghead at the seabed. The sand slurry then moves up the draghead pipe, through a pump and onto the vessel where it is discharged onto a screen deck that utilises a 2 mm screen mesh to prevent larger material going into the load of the hopper. Oversized material ($> 2 \text{ mm}$) passes across the top of the screen and drops, via a pipe, into the forward port side moon pool where it drops through the vessel and exits, at keel height, under the vessel to return to the seabed. However, passage through the sand dredge and across the screens is not without some risk to the larger macrofauna and there is the potential that organisms could be damaged or destroyed by passage through the dredge (West 2022).

West (2022) also noted that the primary cause of suspended solids is the sediment extracted from the seabed, some of which either passes over the weir boards from the sand hopper or is entrained in the water passing across the screening deck and then out of the moon pool discharge points under the vessel. Furthermore, West (2022) noted that the plume of elevated suspended solids created behind the sand dredge is weak in concentration ($< 10 \text{ mg/L}$), localised and short lived. In addition, plume sampling during sand extraction at Pākiri showed total suspended solids (turbidity) was returned to ambient conditions after approximately 26 minutes (Jacobs 2020).

4.3.1 Available information on resilience of *Culicia rubeola* to disturbance

The proposed sand extraction activities at Te Ākau Bream Bay will necessarily cause periods of elevated suspended sediments and sediment movement/deposition to at least the immediate area of dredging. As described in Beaumont et al. (2025), there is ample evidence in the literature to show that elevated sedimentation (suspended or deposited) can negatively impact on the health of corals. However, scleractinian corals employ a variety of mechanisms to remove deposited sediment particles including passive removal (e.g., use of water currents) or active removal such as polyp inflation (Riegl 1995; Bongaerts et al. 2012) and mucus production (Sheridan et al. 2014).

In a study in the Indian region, Viswambharan and Sreenath (2024) concluded that *Culicia* is resilient to high turbidity (suspended sediments). However, their study was on *Culicia stellata* rather than *Culicia rubeola*. No further information was found on the resilience of *Culicia rubeola* to disturbance.

However, as discussed in Beaumont et al. (2025) with respect to *Sphenotrochus ralphae* and *Kionotrochus suteri*, many coral species are known to have some regenerative potential following physical disturbance. In addition, Luz et al. (2021) described the regenerative capacity of cnidarians as having an essential role in the maintenance and restoration of coral reef ecosystems by allowing faster recovery from disturbances and more efficient small-scale dispersal (by fragmentation combined with regeneration).

Luz et al. (2018) describes the “extreme regeneration” capacity of two sun corals within the family Dendrophylliidae (*Tubastraea coccinea* and *T. tagusensis*) that inhabit shallow rocky reefs in the Atlantic region. Colonies of both species were broken into 120 fragments (skeleton and tissue) devoid of differentiated tissue (e.g. mesenteries, mouth or tentacles). The fragments had high survival rates (83%) with tissue fragments developing complete polyps in approximately 25 days (Figure 4-4).

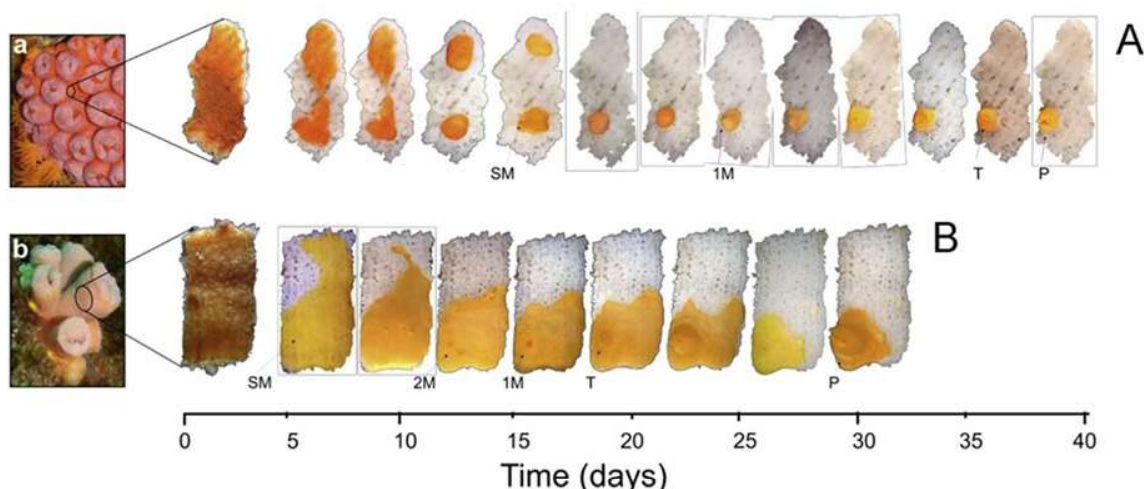


Figure 4-4: Regeneration process in fragments of A) *Tubastraea coccinea* and B) *T. taguensis*. A) *Tubastraea coccinea* (24°C) and B) *T. taguensis* (30°C), showing the formation of two mouth rudiments that may either lead to the development of two separate polyps or to further reorganisation with the loss of one of the openings and the development of a larger polyp. Both fragments were fed. “SM” : Starting mouth formation. “1M” and “2 M”: 1 or 2 mouth rudiments, respectively. “T” tentacles. “P”: Full formed polyp. Scale bar 5.0 mm. Figure reproduced from Luz et al. (2018).

Luz et al. (2021) assessed the regenerative capacity of four colonial species of the family Dendrophylliidae and showed that all dendrophylliids displayed regenerative ability. This study included *Tubastraea coccinea* which is a small azooxanthellate colonial coral. The first complete and viable dendrophylliid polyps were noticeable 14 days post fragmentation. Of the 192 coral fragments, 43 % had undergone complete regeneration (growth of a new polyp) by day 31 and by day 77 an additional 90 % of fragments had undergone complete regeneration, of which 17 % also had secreted skeletons. The high survival rates were independent of whether or not food was supplied or fragment size. However, regeneration rates varied between species and were influenced by fragment size with smaller fragments taking longer to regenerate.

While the species studied by Luz et al. (2018) and Luz et al. (2021) were all in the family Dendrophylliidae (*Culicia rubeola* is in the family Rhizangiidae, though was originally named *Dendrophyllia rubeola*), *Tubastraea coccinea* has some similarities to *Culicia rubeola* in that they are both small azooxanthellate colonial scleractinians which inhabit shallow reef environments. Given these similarities, it is considered likely that *Culicia rubeola* may also have the ability to regenerate following physical damage or fragmentation. However, it is considered unlikely that these corals have the ability to burrow or move through sediments and so any corals that become detached from their substrate (e.g. shells) would likely suffer mortality if buried by sediments/mobile sands.

However, at this stage there have been no live *Culicia rubeola* found within the proposed sand extraction area at Te Ākau Bream Bay. It is not known whether *Culicia rubeola* live within the proposed sand extraction area attached to bivalve shells (there are no known rocky reefs within this area) or whether the dead skeletons originated from nearby reefs and have been moved into the area once dead.

4.3.2 MBL’s proposed environmental monitoring

MBL will conduct environmental monitoring in both the proposed sand extraction areas and control areas of Te Ākau Bream Bay in order to identify benthic ecological or bathymetric changes arising from sand extraction. This monitoring is detailed in MBL’s Environmental Monitoring Management Plan (EMMP). Monitoring will be conducted in years 2–7 (inclusive), then every 3rd year for the remainder of the consent duration.

Three aspects of the environmental monitoring have the potential for disturbance to cup corals through contact with the seafloor: drop camera, PONAR grab, and benthic dredge tows. This is discussed in more detail in Beaumont et al. (2025). As no live *Culicia rubeola* have been recorded within the proposed sand extraction and control areas within Te Ākau Bream Bay it is not possible to provide an estimate of live corals that might be disturbed. However, the estimated abundance of potentially disturbed dead coral skeletons is given in Table 4-1.

Table 4-1: Average densities of dead *Culicia rubeola* within Te Ākau Bream Bay and estimated population of corals for each monitoring gear type. Average density of corals was determined from pre-consent monitoring within Te Ākau Bream Bay. The area provided is the estimated contact area of the seabed for each gear type. The estimated abundance of corals does not allow for the expected patchiness in the distribution of the corals within Te Ākau Bream Bay but is the best estimate available.

Taxon	Status	Average density (inds./ m ² ± SE)	Estimated abundance of dead corals (inds./ m ² ± SE)		
			Drop camera (19.8 m ²)	Grab sampling (28.1 m ²)	Epibenthic dredge (8,250 m ²)
<i>Culicia rubeola</i>	Dead	0.11 ± 0.08	2.2 ± 1.6	3.1 ± 2.2	937.2 ± 681.6

5 Summary

The local distribution of *Culicia rubeola* appears to comprise the coastlines of much of Aotearoa New Zealand, including Te Ākau Bream Bay, with a concentration of observations in the northern half of the North Island. This conclusion is based on a combination of spatial plots of species location records from a range of sources and from an analytical assessment of potential suitable habitat using available environmental data layers encompassing the Territorial Sea. There is no evidence from these analyses to suggest that the proposed sand extraction area at Te Ākau Bream Bay is unique with respect to the habitat of *Culicia rubeola* or that it represents any hotspot of its distribution. In fact, given that no live specimens of this coral have been recorded from the proposed sand extraction area, and its apparent preference for attachment to hard substrates, the opposite is probably true. The main areas of uncertainty in the assessment of distribution stem from the spatial limitations and inherent error in the environmental variables used in the analysis and the absence of species density information in the observations, and while the area of most suitable habitat has been estimated for the Territorial Sea, the wider distribution in New Zealand's EEZ remains unknown. Note that this species is not endemic and is also present in the central, south-west and eastern Pacific.

Based on the analytical assessment of distribution, the proposed extraction area represents less than 0.04% of the predicted suitable habitat of *Culicia rubeola* in the New Zealand region.

The Rhizangiidae family is among the least studied groups of azooxanthellate corals (Viswambharan and Sreenath 2024) and as a result there was little information in the literature about the life history (reproduction, growth rates etc.) of *Culicia rubeola*. However, evidence in the literature suggests that many scleractinians, including members of the family Dendrophylliidae of which *Culicia rubeola* was originally attributed to, are capable of regenerating both soft tissue and skeletal tissues following damage or fragmentation. This is true of even relatively small fragments.

At this stage no live specimens of *Culicia rubeola* have been recorded from within the proposed sand extraction area at Te Ākau Bream Bay. This species requires a hard substrate to attach to and there are no rocky reefs present within the proposed extraction area. However, as this species is known to attach to bivalve shells it is possible that live specimens exist within the area. It is also possible that the live specimens live on reefs outside of the proposed extraction area and that the dead skeletons have been brought in through processes such as the movement of currents and storm events.

MBL's sand extraction process has the potential to cause mortality and/or damage to benthic faunal species as they pass through the draghead and screening deck. However, items larger than 2 mm (such as *Culicia rubeola*) would be returned to the seabed. This would have little to no impact on dead coral skeletons, except perhaps further fragmentation. However, should there be live specimens within the proposed extraction area the probability of survival is probably less than for *Sphenotrochus ralphae* and *Kionotrochus suteri* due to the assumed lack of ability to move within sediments and/or return to an upright position as *Culicia rubeola* is considered less adapted for life in mobile sediments.

Given the relatively wide distribution and the absence of live specimens recorded (to date), the impact of the proposed Te Ākau Bream Bay sand extraction and monitoring on the population of these corals within Aotearoa NZ is considered likely to be minor to negligible.

This assessment was made using the table provided in Appendix B, adapted from Fletcher (2005). While the proportion of affected habitat would fall within the “negligible” consequence level, our assessment is that the impact is likely to be minor to negligible. This is due to the lack of population data for these corals outside of the proposed extraction area together with assumptions made about the resilience of this species using published research on other corals with similar morphology and or habitat preferences.

6 Acknowledgements

We thank Dr Marcelo Kitahara (University of Sao Paulo, Brazil) for confirmation of the identification of *Culicia rubeola*, Simon West (Bioresarches) for providing information on coral specimens collected during MBL surveys, Belinda Glasby (Te Papa Tongarewa) for providing museum specimen locality information, Clinton Duffy (Auckland Museum) for data-use permission, Sadie Mills and Diana Macpherson (Earth Sciences NZ) for assistance with identification, photography, and databasing of specimens, Kareen Schnabel (Earth Sciences NZ) for the internal review of this report and Victoria McIntyre for formatting checks. MITS data was collected under biosecurity contracts funded by Biosecurity New Zealand (MPI).

7 Glossary of abbreviations and terms

Coralla	The skeletal "cups" of the cup coral
Corallite	The cuplike calcareous skeleton of a single coral polyp
Cup corals	Cup corals are a form of non-reef building (solitary) stony corals (Order Scleractinia). They can occur as solitary individuals or they can clump. Some cup coral species live attached to hard substrates, other species live in or on mobile or soft sediments. (See Tracey and Hjørvarðsdóttir 2019).
Draghead	The heavy steel component at the end of the suction pipe used to remove sand from the seabed
EEZ	Exclusive Economic Zone
Endemic	Only found in Aotearoa New Zealand
Earth Sciences NZ (ESNZ)	The New Zealand Institute for Earth Science, formerly NIWA
MBL	McCallum Brothers Limited
MITs	Marine Invasives Taxonomic Service
NIC	Earth Sciences NZ National Invertebrate Collection
NIWA	National Institute of Water and Atmospheric Research, now Earth Sciences NZ
OBIS	Ocean Biogeographic Information System
pSEA	proposed Sand Extraction Area at Te Ākau Bream Bay
Stony corals	All corals within the taxonomic order Scleractinia. Stony corals are marine animals in the phylum Cnidaria that have a hard skeleton made from calcium carbonate. Stony corals can be either solitary (e.g., cup corals) or colonial (e.g., branching habitat-forming corals). All stony corals are protected under the Wildlife Act 1953.
Te Papa	Museum of New Zealand Te Papa Tongarewa
TS	Territorial Sea

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Appendix A Environmental data layers

Table A-1: Description of key spatial environmental predictor variables (n=20) collated for species distribution models. Description of key spatial environmental predictor variables (n=20) collated for species distribution models. Table copied from Stephenson et al. (2023) (table modified from Stephenson et al. (2022)). See Stephenson et al (2022) for references cited here.

Abbreviation	Full name	Description	Source
Bathy	Bathymetry	Depth at the seafloor was interpolated from contours generated from various sources, including multi-beam and single-beam echo sounders, satellite gravimetric inversion, and others (Mitchell et al., 2012).	Mitchell et al. (2012)
Beddist	Benthic sediment disturbance	One-year mean value of friction velocity derived from (1) hourly estimates of surface wave statistics (significant wave height, peak wave period) from outputs of the NZWAVE_NZLAM wave forecast, at 8-km resolution, (2) median grain size (d50), at 250 m resolution, (3) water depth, at 25-m resolution. Benthic sediment disturbance from wave action was assumed to be zero where depth ≥ 200 m.	Swart (1974); updated in 2019
BotNi	Bottom nitrate	Annual average water nitrate concentration at the seafloor (using Aotearoa New Zealand bathymetry layer) based on methods from Dunn et al. (2002). The oceanographic data used to generate these climatological maps were computed by objective analysis of all scientifically quality-controlled historical data from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Atlas of Regional Seas database (CARS2009 2009) .	NIWA, unpublished
BotOxy	Dissolved oxygen at depth	Annual average water oxygen concentration at the seafloor (using Aotearoa New Zealand bathymetry layer) based on methods from (Dunn and Ridgway 2002) . Oceanographic data from CARS2009 (2009).	ESNZ, unpublished
BotPhos	Bottom phosphate	Annual average water phosphate concentration at the seafloor (using Aotearoa New Zealand bathymetry layer) based on methods from Dunn et al. (2002). Oceanographic data from CARS2009 (2009).	ESNZ, unpublished
BotSal	Salinity at depth	Annual average water salinity concentration at the seafloor (using Aotearoa New Zealand bathymetry layer) based on methods from Dunn et al. (2002). Oceanographic data from CARS2009 (2009).	ESNZ, unpublished

Abbreviation	Full name	Description	Source
BotSil	Bottom silicate	Annual average water silicate concentration at the seafloor (using Aotearoa New Zealand bathymetry layer) based on methods from Dunn et al. (2002). Oceanographic data from CARS2009 (2009).	ESNZ, unpublished
BotTemp	Temperature at depth	Annual average water temperature at the seafloor (using Aotearoa New Zealand bathymetry layer) based on methods from (Ridgway et al. 2002). Oceanographic data from (Cars2009, 2009).	ESNZ, unpublished
BPI_broad	BPI_broad	Terrain metrics were calculated using an inner annulus of 12 km and a radius of 62 km using the NIWA bathymetry layer in the Benthic Terrain Modeler in ArcGIS 10.3.1.1 (Wright et al., 2012). Bathymetric Position Index (BPI) is a measure of where a referenced location is relative to the locations surrounding it.	ESNZ, unpublished
BPI_fine	BPI_fine	Terrain metrics were calculated using an inner annulus of 2 km and a radius of 12 km using the NIWA bathymetry layer in the Benthic Terrain Modeler in ArcGIS 10.3.1.1 (Wright et al. 2012). Bathymetric Position Index (BPI) is a measure of where a referenced location is relative to the locations surrounding it.	ESNZ, unpublished
Chl a	Chlorophyll-a concentration	A proxy for the biomass of phytoplankton present in the surface ocean (to ~30 m). Blended from a coastal Chl-a estimate (quasi-analytic algorithm (QAA), local aph*(555)) and the default open-ocean chl-a value from MODIS-Aqua (v2018.0).	ESNZ unpublished; Based on processing described in Pinkerton et al. (2018) and updated in Pinkerton et al. (2020).
Chl-a.Grad	Chlorophyll-a concentration spatial gradient	Smoothed magnitude of the spatial gradient of annual mean chlorophyll-a concentration. Derived from Chl-a described above.	ESNZ unpublished, updated in 2020; Based on processing described in (Pinkerton et al., 2018)

Abbreviation	Full name	Description	Source
Detrital absorption	Total detrital absorption coefficient at 443 nm, including due to coloured dissolved organic matter (CDOM) and particulate detrital absorption. Estimated using quasi-analytic algorithm (QAA) applied to MODIS-Aqua data, blended with adg_443_giop ocean product (Werdell, 2019).	NIWA unpublished, updated in 2020; Based on processing described in (Pinkerton et al., 2018). Processing for adg_443_giop ocean product described in Werdell (2019).	Detrital absorption
Seabed incident irradiance	Broadband (400–700 nm) incident irradiance (E m ⁻² d ⁻¹) at the seabed, averaged over a whole year. Estimated by combining incident irradiance at the sea surface ((Frouin et al., 2012); this table), diffuse downwelling irradiance attenuation (KPAR; this table) and bathymetric depth at monthly resolution. Derived from blended coastal (QAA) and open-ocean attenuation products.	NIWA unpublished, updated in 2020, based on processing described in Pinkerton et al. (2018)	Seabed incident irradiance
POCFlux	Downward vertical flux of particulate organic matter at the seabed	Net primary production in the surface mixed layer estimated as the VGPM model ((Behrenfeld and Falkowski 1997); this table). Export fraction and flux attenuation factor with depth estimated by refitting sediment trap and thorium-based measurements to environmental data (VGPM, SST) as Lutz et al. (2002), Pinkerton et al. (2016) and using data from Cael et al. (2018).	ESNZ unpublished, updated in 2020. Based on processing described in Pinkerton et al. (2016) with new data from Cael et al. (2018).

Abbreviation	Full name	Description	Source
PB555nm	Particulate backscatter at 555 nm (previously used to generate 'turbidity')	Optical particulate backscatter at 555 nm estimated using blended coastal and ocean products. Coastal: QAA v5 product bbp555 from MODIS-Aqua data. Ocean: bbp_555_giop ocean product (Werdell, 2019). Result calculated as long-term (2002–2017) average.	ESNZ unpublished, updated in 2020; Based on processing described in Pinkerton et al. (2018). Processing for bbp_555_giop ocean product described in Werdell (2019).
Annual amplitude of sea floor temperature	Smoothed difference in seafloor temperature between the three warmest and coldest months. Providing a measure of temperature amplitude through the year.	NIWA, unpublished data, updated in 2018	Annual amplitude of sea floor temperature
Sed.class	Sediment classification	Classification of Mud, Sand and Gravel layers (this table) using the well-established (Folk et al. 1970) classification. Subtidal rocky reefs (this table) were incorporated. This classification provides a broad measure of hardness Mud – Rock.	ESNZ unpublished, updated in 2020
Slope	Slope	Bathymetric slope was calculated from water depth and is the degree change from one depth value to the next.	ESNZ , unpublished, updated in 2019
SSTGrad	Sea surface temperature gradient	Smoothed magnitude of the spatial gradient of annual mean SST. This indicates locations in which frontal mixing of different water bodies is occurring (Leathwick et al. 2006). Derived from SST described above at two resolutions and merged.	ESNZ unpublished, updated in 2020
TC	Tidal Current speed	Maximum depth-averaged (NZ bathymetry) flows from tidal currents calculated from a tidal model for New Zealand waters (Walters et al. 2001). Tidal constituents (magnitude A and phase phi, represented as real and imaginary parts $X + iY = A * \exp(i * \phi)$) for sea surface height and currents (8 components) were taken from the EEZ tidal model, on an unstructured mesh at variable spatial resolution. The complex components were bilinearly interpolated to the output grid.	Walters et al., 2001; ESNZ unpublished, updated in 2020

Appendix B Consequence levels for the intensity of the activity

Table B-1: Consequence levels for the intensity of the activity. Summary descriptions of the six sets of consequence levels for the proportion of the habitat affected, the impact on the population, community or habitat, and the likely recovery period. Adapted from Fletcher (2005).

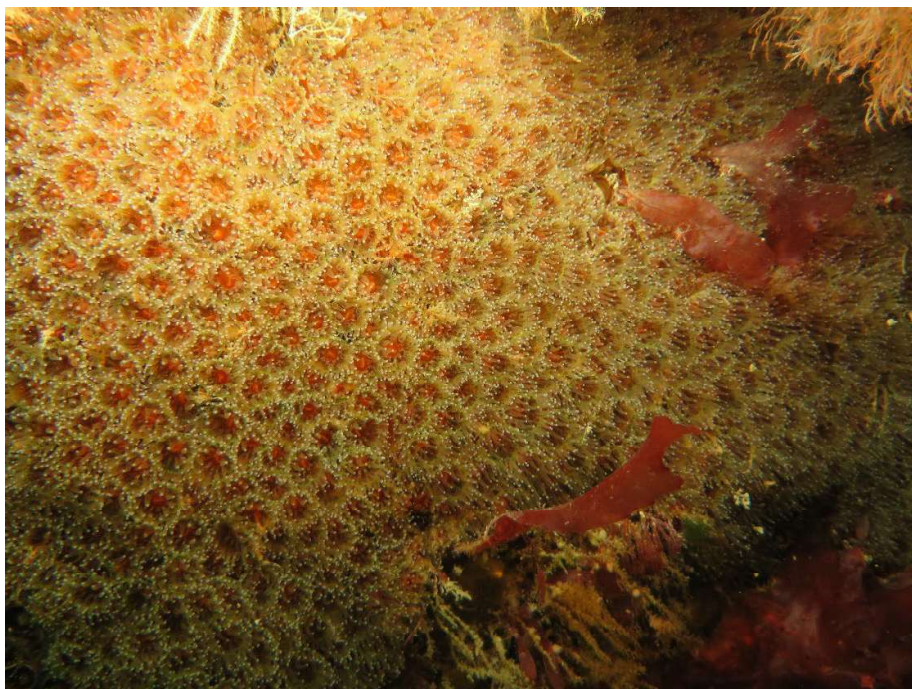
Consequence level	Proportion of habitat affected	Population/community/habitat impact	Recovery Period
1 - Negligible	Affecting <1% of area of original habitat area	Interactions may be occurring but unlikely to be ecologically significant (<1% changes in abundance, biomass, or composition) or be detectable at the scale of the population, habitat or community	No recovery time required
2 - Minor	Measurable but localized; affects 1-5% of total habitat area	Possibly detectable with 1-5% change in population size or community composition and no detectable impact on dynamics of specific populations	Rapid recovery would occur if activity stopped – less than 8 weeks
3 - Moderate	Impacts more common; 6-20% of habitat area is affected	Measurable with 6-20% changes to the population, habitat or community components without there being a major change in function	Recovery in >2 months to 1-2 years if activity stopped
4 - Major	Impacts very widespread; 21-50% of habitat is affected/removed	Populations, habitats or communities substantially altered (21-50%) and some function or components are missing/declining/increasing well outside historical ranges. Some new species appear in the affected environment	Recovery occurs in 2-10 years if activity stopped
5 - Severe	Impact extensive; 51-90% affected	Likely to cause local extinctions of vulnerable species if impact continues, with a 51-90% change to habitat and community structure and function. Different population dynamics now occur with different species or groups now affected	Recovery period 1-2 decades if activity stopped
6 - Catastrophic	Entire habitat in region is in danger of being affected; >90% affected/removed	Local extinctions of a variety of species are imminent/immediate. Total collapse of habitat, community or ecosystem processes. The abundance, biomass or diversity of most groups is drastically reduced (by 90% or greater) and most original ecological functional groups (primary producers, grazers etc.) have disappeared	Long term recovery to former levels will be greater than 1-2 decades or never, even if activity stopped

Attachment Thirty-Seven: Culicia rubeola and Schedule 7 of the Fast-track Approvals Act 2024

***Culicia rubeola* and Schedule 7 of the Fast-track Approvals Act 2024**

Prepared for McCallum Bros Limited

July 2026



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Executive summary

McCallum Brothers Limited (MBL) is seeking resource consent to dredge sand from a 15.4 km² area within Te Ākau Bream Bay, Northland. The proposed sand extraction area forms a rectangle extending approximately northwest to southeast, roughly parallel with the central Te Ākau Bream Bay shoreline, in water between approximately 20 and 30 m deep and approximately 4.7 km offshore. MBL have previously extracted sand from Mangawhai-Pākiri embayment (hereafter referred to as Pākiri), to the south of Te Ākau Bream Bay.

During environmental surveys MBL identified live and dead specimens of two species of scleractinian solitary cup coral (*Sphenotrochus ralphae* and *Kionotrochus suteri*) and dead specimens of a small colonial stony coral (*Culicia rubeola*) at Te Ākau Bream Bay. All Scleractinia are protected under the Wildlife Act 1953. This report focusses only on *Culicia rubeola*. Previous reports for MBL discussed the cup corals in relation to Schedule 7 of the Fast-track Approvals Act (FTAA) 2024 (Beaumont and Thompson 2025) and summarised the known distribution and life history of *Culicia rubeola* (Beaumont and Anderson 2026).

MBL is seeking an exemption to the Wildlife Act 1953, with respect to *Culicia rubeola*, and has asked Earth Sciences New Zealand (formally NIWA) to write a report to assist MBL with compiling a report for Wildlife Act approval as defined in Schedule 7 of the FTAA.

This report addresses points c, d, e, j and k within Schedule 7 FTAA in relation to *Culicia rubeola*:

- (c) Include an assessment of the activity and its impacts against the purpose of the Wildlife Act:
- (d) List protected wildlife species known or predicted to be in the area and, where possible, the numbers of wildlife present and numbers likely to be impacted:
- (e) Outline impacts on threatened, data deficient, and at-risk wildlife species (as defined in the New Zealand Threat Classification System):
- (j) List all actual and potential wildlife effects (adverse or positive) of the proposed activity, including effects on the target species, other indigenous species, and the ecosystems at the site (Note that this is only in relation to *Culicia rubeola*):
- (k) Where adverse effects are identified, state what methods will be used to avoid and minimise those effects, and any offsetting or compensation proposed to address unmitigated adverse effects (including steps taken before the project begins, such as surveying, salvaging, and relocating protected wildlife).

Proposed sand extraction will employ a trailing suction hopper dredge (TSHD) vessel. During the extraction process, sand is fluidised into a slurry via suction pulling sand and water through the draghead at the seabed. The sand slurry then moves up the draghead pipe, through a pump and onto the vessel where it is discharged onto a screen deck that utilises a 2 mm screen mesh to prevent larger material going into the load of the hopper. Oversized material (> 2 mm) passes across the top of the screen and drops, via a pipe, into the forward port side moon pool where it drops through the vessel and exits, at keel height, under the vessel to return to the seabed.

Culicia rubeola are expected to be returned to the seafloor as oversized material, and will be returned to the water almost immediately after being extracted. However, passage through the sand dredge and across the screens is not without some risk and there is the potential that organisms, including the protected corals, could be damaged or destroyed during this process. There is also the potential for disturbance of organisms remaining on or returned to the seabed such as burial by deposited sediments, increased predation, or increased suspended sediments.

The following actual or potential wildlife effects of the proposed activity have been identified:

- Physical damage or mortality from passage through the TSHD
- Burial by sediments
- Stress/mortality from elevated suspended sediments

While there is little available information on the behaviour or life history of *Culicia rubeola*, from evidence in the literature (see Beaumont and Anderson 2026) it is considered likely that *Culicia rubeola* has the ability to regenerate following physical damage or fragmentation. However, it is considered unlikely that this coral is able to burrow or move through sediments and so any corals buried by sediments/mobile sands would likely suffer mortality.

However, at this stage there have been no live *Culicia rubeola* found within the proposed sand extraction area at Te Ākau Bream Bay. It is not known whether *Culicia rubeola* live within the proposed sand extraction area attached to bivalve shells (there are no known rocky reefs within this area) or whether the dead skeletons originated from nearby reefs and have been moved into the area once dead.

The proposed sand extraction area at Te Ākau Bream Bay is less than 0.04% of the identified potential suitable habitat for *Culicia rubeola*, respectively (Beaumont and Anderson 2026) and so it is considered likely that the proposed sand extraction activity within Te Ākau Bream Bay will have a minor to negligible impact on the population of *Culicia rubeola* within the Aotearoa New Zealand region.

Culicia rubeola has not been assessed by the New Zealand Threat Classification System (NZTCS) and, therefore, is not deemed to be 'Threatened', 'Data Deficient' or 'At Risk' wildlife (as defined in the NZTCS).

1 Background

McCallum Brothers Limited (MBL) is seeking resource consent to dredge sand from a 15.4 km² area within Te Ākau Bream Bay, Northland. The proposed sand extraction area forms a rectangle extending approximately northwest to southeast, roughly parallel with the central Te Ākau Bream Bay shoreline, in water between approximately 20 and 30 m deep and approximately 4.7 km offshore (Figure 1-1). MBL have previously extracted sand from Mangawhai-Pākiri embayment (hereafter referred to as Pākiri), to the south of Te Ākau Bream Bay.

During environmental surveys MBL identified live and dead specimens of two species of scleractinian solitary cup coral (*Sphenotrochus ralphae* and *Kionotrochus suteri*) and dead specimens of a small colonial stony coral (*Culicia rubeola*) at Te Ākau Bream Bay. All Scleractinia are protected under the Wildlife Act 1953. This report focusses only on *Culicia rubeola*. Previous reports for MBL discussed the cup corals in relation to Schedule 7 of the Fast-track Approvals Act (FTAA) 2024 (Beaumont and Thompson 2025) and summarised the known distribution and life history of *Culicia rubeola* (Beaumont and Anderson 2026).

MBL is seeking an exemption to the Wildlife Act 1953, with respect to *Culicia rubeola*, and has asked Earth Sciences New Zealand (formally NIWA) to write a report to assist MBL with compiling a report for Wildlife Act approval as defined in Schedule 7 of the FTAA.

This report addresses points c, d, e, j and k within Schedule 7 FTAA in relation to *Culicia rubeola*:

- (c) Include an assessment of the activity and its impacts against the purpose of the Wildlife Act:
- (d) List protected wildlife species known or predicted to be in the area and, where possible, the numbers of wildlife present and numbers likely to be impacted:
- (e) Outline impacts on threatened, data deficient, and at-risk wildlife species (as defined in the New Zealand Threat Classification System):
- (j) List all actual and potential wildlife effects (adverse or positive) of the proposed activity, including effects on the target species, other indigenous species, and the ecosystems at the site (Note that this is only in relation to *Culicia rubeola*):
- (k) Where adverse effects are identified, state what methods will be used to avoid and minimise those effects, and any offsetting or compensation proposed to address unmitigated adverse effects (including steps taken before the project begins, such as surveying, salvaging, and relocating protected wildlife).

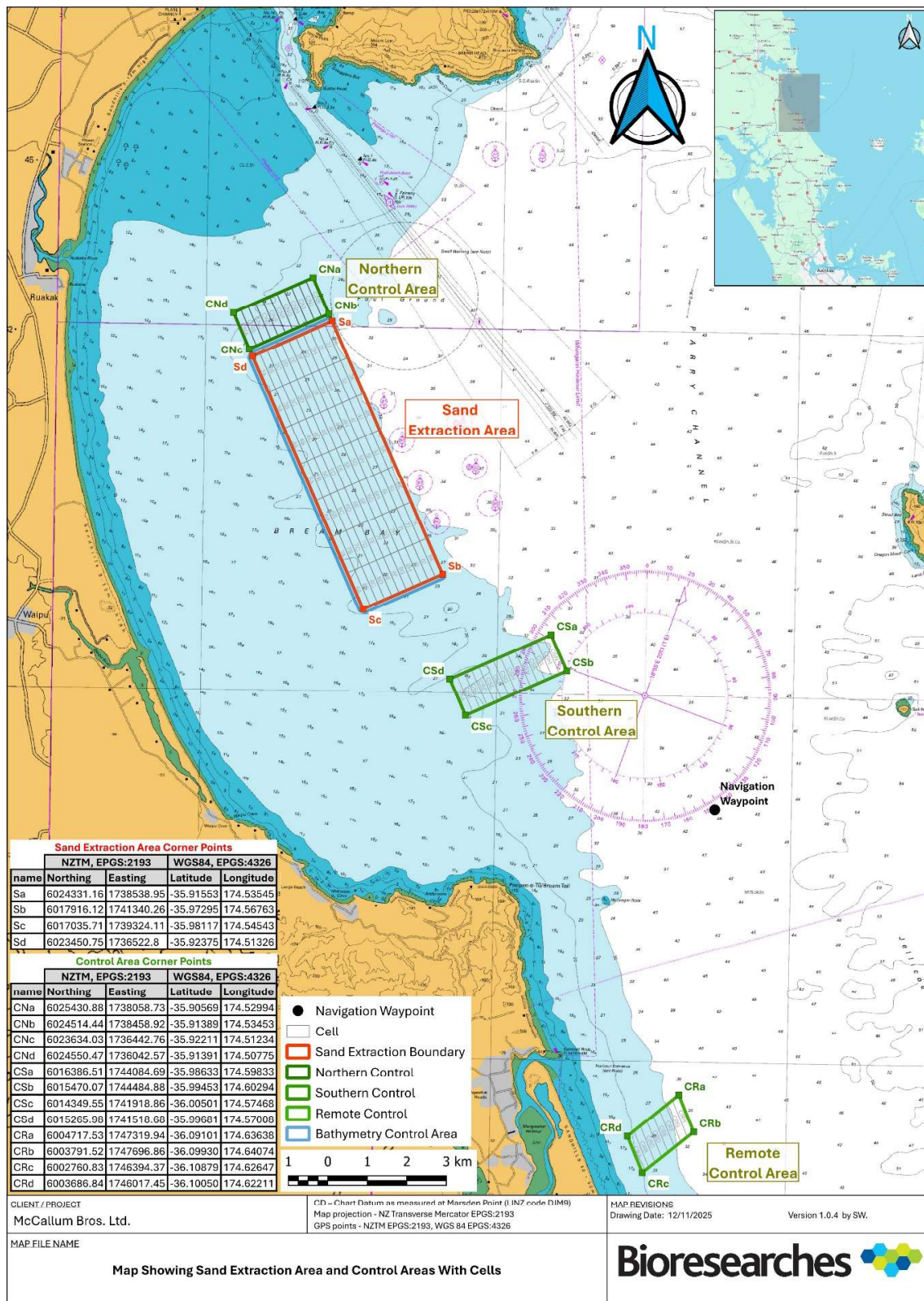


Figure 1-1: Map showing the location of the proposed sand extraction area within Te Ākau Bream Bay. Three proposed control areas are shown together with an inset box placing Te Ākau Bream Bay within a wider, regional, context.

2 Informing MBL's report to address Schedule 7 FTAA

This report specifically and only considers *Culicia rubeola*, a colonial stony coral known to occur in Te Ākau Bream Bay and the proposed sand extraction area. We consider each of the points noted above (c, d, e, j and k within Schedule 7 FTAA) separately. Remaining relevant provisions of Schedule 7 are addressed by other means and are not repeated here.

The Wildlife Act 1953 was amended as of 14 May 2025 through the insertion of sections 53A, B and C. MBL's legal advice is that these amendments are relevant to authorities seeking to kill wildlife incidentally under the FTAA and whether the granting of such an authority is consistent with the protection of wildlife (and thus consistent with the purpose of the Wildlife Act). Accordingly, our assessment below takes account of those amended provisions in the context of assessing the activity and its impacts against the purpose of the Wildlife Act.

2.1 Schedule 7 (2)(1)(c): include an assessment of the activity and its impacts against the purpose of the Wildlife Act

Proposed sand extraction will employ a trailing suction hopper dredge (TSHD) vessel (the "*William Fraser*"), which was purpose built and includes technologies to improve performance and reduce environmental impact (McCallum 2022).

A comprehensive description of the purpose of the proposed activity (Schedule 7 (2)(1)(a)) and the actions MBL wishes to carry out involving protected wildlife and where they will be carried out (Schedule 7 (2)(1)(b)) is set out in Section 2.4. We rely on those descriptions.

In brief, during the extraction process, sand is fluidised into a slurry via suction pulling sand and water through the draghead at the seabed. The sand slurry then moves up the draghead pipe, through a pump and onto the vessel where it is discharged onto a screen deck that utilises a 2 mm screen mesh to prevent larger material going into the load of the hopper. Oversized material (> 2 mm) passes across the top of the screen and drops, via a pipe, into the forward port side moon pool where it drops through the vessel and exits, at keel height, under the vessel to return to the seabed (McCallum 2022).

By this procedure *Culicia rubeola* are expected to be returned to the seafloor as oversized material and will be returned to the water almost immediately after being extracted. However, passage through the sand dredge and across the screens is not without some risk and there is the potential that organisms, including the protected corals, could be damaged or destroyed during this process. There is also the potential for disturbance of organisms remaining on or returned to the seabed such as burial by deposited sediments, increased predation, or increased suspended sediments.

Relevant to an assessment of impacts under this heading is the list of actual and potential wildlife effects under Schedule 7(2)(1)(j) below.

Our assessment of impacts against the purpose of the Wildlife Act takes into account the amended legislation in s53A and 53B.

When any coral is entrained from the seabed during the extraction process and moved via suction up the drag head pipe it fulfils the definition of the term "hunt" as defined in the Wildlife Act because that term encompasses taking, catching alive or capturing relevant wildlife. Our analysis pursuant to Schedule 7 of the Wildlife Act also identifies the potential for mortality of

some coral specimens. Therefore, an authorisation for taking or killing of wildlife under s53 of the Wildlife Act is required.

With respect to s53A, we recognise that the purpose of the proposed activity is sand extraction and that any adverse effects on *Culicia rubeola* (including killing) are incidental to carrying out that activity.

In terms of taking, catching alive or capturing relevant wildlife, the return to the environment is almost immediate. For dead coral skeletons, there are no effects to consider. For those live corals which pass through and are returned to the water without damage, the impacts are limited to landing in a slightly different position on the seafloor from where they were extracted, partial or complete burial, landing upside-down, and increased exposure to predation. However, it is considered unlikely that *Culicia rubeola* has any ability to burrow or move through sediments and so would likely suffer mortality if buried by sediments/mobile sands.

For those live corals which pass through and are returned to the water with some damage, as explained below in the context of Schedule 7 (2)(1)(j) it is considered likely that *Culicia rubeola* may have the ability to regenerate following physical damage or fragmentation. However, it is considered unlikely that this coral has the ability to burrow or move through sediments and so any corals that become detached from their substrate (e.g. shells) would likely suffer mortality if buried by sediments/mobile sands.

However, at this stage there have been no live *Culicia rubeola* found within the proposed sand extraction area at Te Ākau Bream Bay. It is not known whether *Culicia rubeola* live within the proposed sand extraction area attached to hard substrate such as small stones or bivalve shells (there are no known rocky reefs within this area) or whether the dead skeletons recorded in the area originated from nearby reefs and have been moved by tides, currents, storms etc. into the area once dead.

The potential death of some *Culicia rubeola* corals due to the sand extraction process cannot be ruled out. As already noted, any such death would be incidental to the purpose of the proposed activity.

We understand that with reference to s53B an authority to kill wildlife incidentally must still be “consistent with the protection of wildlife”. Our assessment under Schedule 7 of the FTAA illustrates with respect to s53B:

- (a) In the context of s53B (3):
 - (i) The authority sought relating to *Culicia rubeola* is unlikely to result in any material adverse effects on the population of this coral, or the viability of this coral species (refer below to our assessment under Schedule 7 (2)(1)(d)).
 - (ii) The extraction process and methodology offered (secured as necessary by conditions on the authority) described in the application material and our assessment of Schedule 7 (2)(1)(c) mitigates to the extent possible (while enabling the extraction activity) potential adverse effects.
- (b) Having regard to those matters above identified in s53B (3), then by reference to s53B (2) in our opinion the decision-maker may be satisfied that the overall effect of the authority

is likely consistent with the protection of populations of wildlife and individual wildlife. That is because:

- (i) Populations of wildlife are unlikely to be threatened or materially affected by the activities enabled by the authority.
- (ii) Any threat to individual wildlife is incidental, has been avoided, minimised and mitigated to the extent possible through the reasonable steps adopted by the applicant (s53B (4)), and any individual incidental act of killing viewed in isolation does not need to be consistent with the protection of wildlife (s53B (5)).

2.2 Schedule 7 (2)(1)(d): list protected wildlife species known or predicted to be in the area and, where possible, the numbers of wildlife present and numbers likely to be impacted

The protected scleractinian coral *Culicia rubeola* has been identified within the proposed sand extraction area at Te Ākau Bream Bay.

Culicia rubeola is a species of ahermatypic (non-reef-building) scleractinian coral in the family Rhizangiidae. Species within this family are characterized by small, encrusting colonies of corallites (the outer skeletal part of individual polyps) that are interconnected at their bases (Cairns 1995; Viswambharan et al. 2021; Viswambharan and Sreenath 2024). Despite their wide distribution, the Rhizangiidae are among the least studied groups of azooxanthellate corals (those which do not rely on symbiotic algae for nutrition), this being attributed to their small size, challenges in morphological identification, and lack of information on their ecological preferences (Viswambharan and Sreenath 2024).

Culicia rubeola (Figure 2-1 and Figure 2-2) was one of the first species of Scleractinia to be reported from the Aotearoa New Zealand region (Cairns 1995). Although Cairns (1995) concluded this species was probably endemic to Aotearoa New Zealand, it has since been documented in India (Viswambharan and Sreenath 2024) and Hong Kong (Lam et al. 2008) and the Ocean Biodiversity Information System OBIS includes records from the central and south-west and eastern Pacific, in the littoral zone (to 55 m).

This species lives attached to hard substrates such as bivalve shell with a depth range of 0–82 m (Figure 2-3, Cairns 1995). Brook (1982) described *Culicia rubeola* as living on vertical to horizontal rock surfaces below 15 m and in crevices in shallower water off Great Barrier Island, Viswambharan and Sreenath (2024) on natural substances like rocks or dead corals in the Indian region, and Watts et al. (2015) described *Culicia rubeola* attached to rope long-line droppers on mussel farms in Pelorus Sound, Marlborough Sounds.



Figure 2-1: *Culicia rubeola*. Images taken from (NIWA 2022).

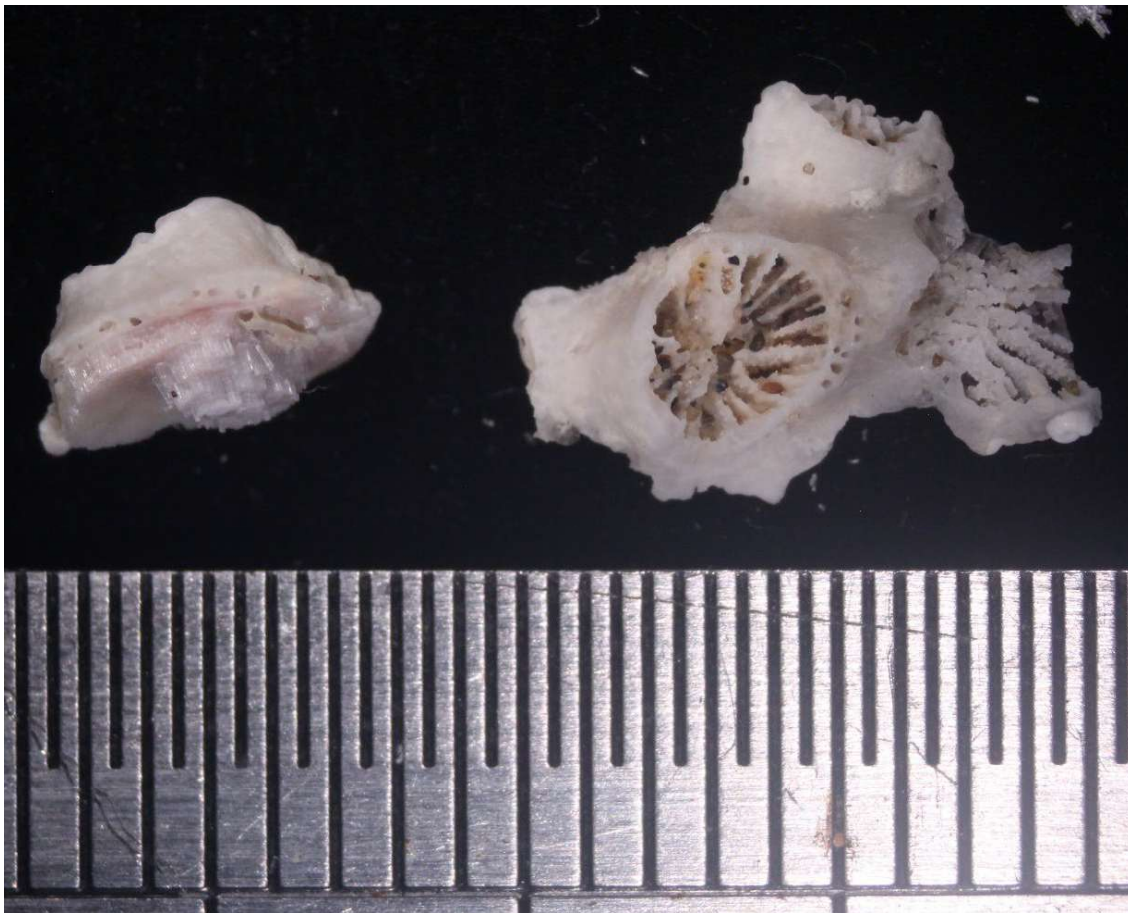


Figure 2-2: Two specimens of *Culicia rubeola* from a sample collected at Pākiri. Image of NIC specimen 183334 taken by Diana Macpherson (Earth Sciences New Zealand) with a ruler as a scale bar. The left hand specimen has layers of mollusc shell underneath showing that this was previously attached to a shell.

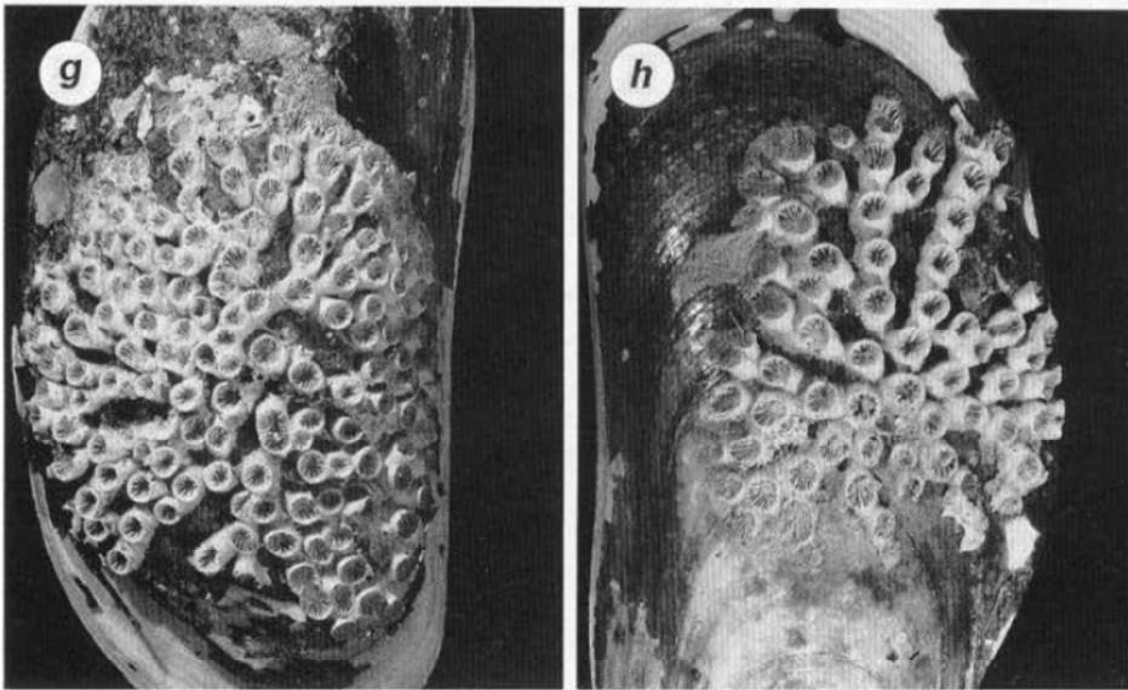


Figure 2-3: *Culicia rubeola* attached to a bivalve shell (the green-lipped mussel *Perna canaliculus*). Images taken from Cairns (1995).

Survey work conducted in 2024 for MBL recorded 225 coral specimens from 264 grab samples within the proposed sand extraction area at Te Ākau Bream Bay. Of these, two were subsequently identified as dead skeletons of *Culicia rubeola*, the remainder were cup corals.

The ponar grab used in the 2024 Te Ākau Bream Bay survey sampled an area of 250 x 285 mm (or 0.07 m²) of seabed per deployment. The average density of dead *Culicia rubeola* within the proposed sand extraction area, standardised to individuals per m², is estimated to be 0.11 ± 0.08 inds./m² with an estimated population across the proposed sand extraction area at Te Ākau Bream Bay (15.4 km²) being 1.6 million (± 1.2 m).

No live specimens of *Culicia rubeola* have been recorded. However, dead specimens have been included here for completeness as they are also protected by the Wildlife Act. All material greater than 2 mm (which would include both live and dead corals and most fragments) will be returned to the seafloor during the sand extraction process. As dead coral skeletons will be returned to the seafloor, and they are already dead, we have focussed on the effects of the proposed operation on live corals, should they be present within the proposed sand extraction area.

2.3 Schedule 7 (2)(1)(e): outline impacts on threatened, data deficient, and at-risk wildlife species (as defined in the New Zealand Threat Classification System)

Culicia rubeola has not been assessed by the New Zealand Threat Classification System (NZTCS) and, therefore, is not deemed to be 'Threatened', 'Data Deficient' or 'At Risk' wildlife (as defined in the NZTCS).

2.4 Schedule 7 (2)(1)(j): list all actual and potential wildlife effects (adverse or positive) of the proposed activity, including effects on the target species, other indigenous species, and the ecosystems at the site

The following actual or potential wildlife effects of the proposed activity have been identified:

- Physical damage or mortality from passage through the TSHD
- Burial by sediments
- Stress/mortality from elevated suspended sediments

In terms of taking, catching alive or capturing relevant wildlife, the return to the environment during the sand extraction process is almost immediate. Although coral specimens are expected to be returned to the seafloor as oversized material, MBL's sand extraction process has the potential to cause mortality and/or damage to benthic faunal species as they pass through the draghead and screening deck. Survivability studies by West (2022) concluded that many benthic faunal species, particularly those smaller than approximately 20 mm, are able to survive MBL's extraction process, at least as far as being returned to the seafloor. However, corals were not included in these studies.

In addition, the proposed sand extraction activities at Te Ākau Bream Bay will necessarily cause periods of elevated suspended sediments and sediment movement/deposition to at least the immediate area of extraction which may have the potential to bury or smother these small corals.

While there is little available information on the behaviour or life history of *Culicia rubeola*, from evidence in the literature (see Beaumont and Anderson 2026) it is considered likely that *Culicia rubeola* has the ability to regenerate following physical damage or fragmentation. However, it is considered unlikely that this coral is able to burrow or move through sediments and so any corals buried by sediments/mobile sands would likely suffer mortality.

However, at this stage there have been no live *Culicia rubeola* found within the proposed sand extraction area at Te Ākau Bream Bay. It is not known whether *Culicia rubeola* live within the proposed sand extraction area attached to bivalve shells (there are no known rocky reefs within this area) or whether the dead skeletons originated from nearby reefs and have been moved into the area once dead.

The proposed sand extraction area at Te Ākau Bream Bay is less than 0.04% of the identified potential suitable habitat for *Culicia rubeola*, respectively (Beaumont and Anderson 2026) and so it is considered likely that the proposed sand extraction activity within Te Ākau Bream Bay will

have a minor to negligible impact on the population of *Culicia rubeola* within the Aotearoa New Zealand region.

Summarising potential effects, as recorded above under our assessment of Schedule 7 (2)(1)(c),

- (a) the purpose of the proposed activity is sand extraction and any adverse effects on the *Culicia rubeola* (including killing) are incidental to carrying out that activity.
- (b) In terms of taking, catching alive or capturing relevant wildlife, the return to the environment is almost immediate.
- (c) For dead coral skeletons, there is no effect.
- (d) For those live corals which pass through and are returned to the water without damage, the impact is limited to landing in a slightly different position on the seafloor from where they were extracted, complete or partial burial, and increased exposure to predation. However, it is considered unlikely that these corals are able to burrow or move through sediments and so any corals buried by sediments/mobile sands would likely suffer mortality.
- (e) For those live corals which pass through and are returned to the water with some damage, as explained below in the context of Schedule 7 (2)(1)(j) it is considered likely that *Culicia rubeola* may have the ability to regenerate following physical damage or fragmentation. However, it is considered unlikely that this coral has the ability to burrow or move through sediments and so any corals that become detached from their substrate (e.g. shells) would likely suffer mortality if buried by sediments/mobile sands.
- (f) However, at this stage there have been no live *Culicia rubeola* found within the proposed sand extraction area at Te Ākau Bream Bay. It is not known whether *Culicia rubeola* live within the proposed sand extraction area attached to bivalve shells (there are no known rocky reefs within this area) or whether the dead skeletons originated from nearby reefs and have been moved into the area once dead.
- (g) The potential death of some corals cannot be ruled out. As already noted, any such death would be incidental.
- (h) The authority sought relating to *Culicia rubeola* is unlikely to result in any material adverse effects on the populations of these corals, or the viability of this coral species.
- (i) The extraction process and methodology offered (secured as necessary by conditions on the authority) described in the application material and our assessment of Schedule 7 mitigates to the extent possible (while enabling the extraction activity) potential adverse effects.
- (j) Populations of *Culicia rubeola* are not likely to be threatened or materially affected by the activities enabled by the authority.

2.5 Schedule 7 (2)(1)(k): where adverse effects are identified, state what methods will be used to avoid and minimise those effects, and any offsetting or compensation proposed to address unmitigated adverse effects (including steps taken before the project begins, such as surveying, salvaging, and relocating protected wildlife).

As described above, should adverse effects be considered on the Aotearoa New Zealand population scale, it is considered likely that any adverse effects of the proposed sand extraction activity within Te Ākau Bream Bay will have a minor to negligible impact on the populations of *Culicia rubeola* within the Aotearoa New Zealand region.

With respect to minimising any adverse effects, the salvaging and relocating of these corals is not possible due to their small size and difficulty in collecting them. However, the sand extraction vessel *William Fraser* incorporates technologies to improve performance and reduce environmental impact (McCallum 2022). These include:

- A Dutch-designed screening deck, rather than flume pipes, which reduces damage to live animals passing through the drag head and increases the screening efficiency.
- Moon pools to deliver the over-size material and sediment discharge below the water line to minimise turbidity.
- The moon pool system also reduces the aeration of the sediment and/or biota, which decreases their settling time, and therefore the time they may be vulnerable to predation, compared to the flume pipe and discharge over the side of the boat method.

3 Acknowledgements

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4 Glossary of abbreviations and terms

MBL	McCallum Brothers Limited
NZTCS	New Zealand Threat Classification System
TSHD	Trailing Suction Hopper Dredge

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