An tIonad Náisiúnta Sonraí Bithéagsúlachta
National Biodiversity Data Centre

Request for quote for the assessment of the risk, spread and management for Chinese mitten crab (*Eriocheir sinensis*) on the island of Ireland

Introduction

The National Biodiversity Data Centre was established as a company limited by guarantee in December 2022, following a decision of Government to put the initiative on a more secure footing, to empower and better resource the Centre to support Ireland's collective national effort to reverse biodiversity loss and contribute to nature restoration. The primary role of the Centre is to contribute to building the knowledge base on biodiversity and track how it is changing in Ireland. It works to ensure that data and information on Ireland's biodiversity is more freely available and accessible for use in research, conservation management and decision-making. A priority of the Centre is to ensure that data and information is easily accessible for local communities and individuals to promote a better understanding and appreciation of biodiversity at the local level.

The National Biodiversity Data Centre manages thematic work programmes and plans to support the implementation of aspects of biodiversity policy. One of the key work programmes is around Invasive Alien Species. This programme includes the development of biosecurity campaigns including one on aquatic biosecurity.

Background to this RfQ

The EU Regulation no. 1143/2014 on the prevention and management of the introduction and spread of Invasive Alien Species (IAS) (EU 2014; hereinafter referred to as the IAS Regulation), gives priority at European level to a subset of IAS, named as IAS of Union concern (Art. 4 "the Union list", hereinafter referred to as IAS of Union concern). Regulation (EU) No 1143/2014 applies in NI under Annex 2 of the Windsor Framework.

Species are included in this list because they can cause such a significant damage in Member States (MS), justifying the adoption of dedicated measures at Union level. The Union list has a dynamic character, focusing on species whose inclusion in the list would effectively prevent, minimise or mitigate their adverse impact in a cost-efficient manner (EU 2014). The Union list currently consists of 114 species covering plants, algae and animals in freshwater, terrestrial and marine environments.

Under the IAS Regulation, Member States must prevent the introduction and spread of the listed species, enforce effective early detection and rapid eradication mechanisms for new introductions, and adopt management measures for species already widely spread.

As part of the Shared Island Biosecurity and Invasive Species Initiative, the National Biodiversity Data Centre is currently reviewing Ireland's response to Chinese mitten crab (*Eriocheir sinensis*) with a view to establishing a 5-year strategic management approach.

Further information on the known history of Chinese mitten crab on the island of Ireland is provided in **Annex 1**.

Purpose and Aims

One key current data gap is an understanding of the risk that this species poses to the island of Ireland. Therefore, the purpose of this RfQ is to commission a desk-based study to better understand the risk Chinese mitten crab poses to the island of Ireland and potential mitigating and risk management measures.

Our specific aims are:

- **Aim 1:** Understand which river catchments and their associated habitats and species are most at risk to new introductions and spread events by Chinese mitten crabs.
- **Aim 2:** Understand the factors that will support or mitigate against future incursions of Chinese mitten crabs around the island of Ireland.
- **Aim 3*:*** Assess the risk to the island of Ireland of significant impacts associated with Chinese mitten crab.
- **Aim 4:** Develop a prioritised toolkit of potential long term management options including an assessment of their suitability and lessons from other jurisdictions for the island of Ireland.

Expansion of our Aims

Aim 1: Understand which river catchments are most at risk to new introductions and spread events by Chinese mitten crabs.

To help us improve understanding of the risk and assess the biotic, abiotic, and human-mediated factors that will support or mitigate against future incursions of Chinese mitten crabs in Irish marine, estuarine, and freshwater environments. This includes evaluating habitat suitability, climate and hydrological conditions, pathways of introduction and dispersal, natural and anthropogenic barriers to establishment, and the effectiveness of current biosecurity measures, in order to predict invasion risk and support evidence-based management of this invasive species for the island of Ireland.

Habitat suitability

- Estuaries and river systems available for migration
- Availability of food and shelter in different areas
- Potential spawning and nursery habitat
- Water temperature and salinity (gradient so we can pinpoint areas suitable for different developmental stages).

The following are examples of similar initiatives:

Reference	Commentary
Eberhardt, A., J. Pederson and B. Bisson. 2016. Rapid Response Plan For Management And Control Of The Chinese Mitten Crab: Northeast United States And Atlantic Canada. New Hampshire, MIT and Maine Sea Grant Programs.	This report details habitat suitability for Gulf of Maine waterbodies. Table 4, pg 22 provides a colour coded assessment whether the given criterion is suitable for growth within the estuary. The overall rankings are classified as High, Moderate, and Low suitability habitats based on four or more currently available criteria. The overall ranking is classified as Unknown for sites that lack data in three or more criteria.
Zhang Zhixin; Capinha César; Weterings Robbie; McLay Colin L; Xi Dan; Lü Hongjian; Yu Lingyun; 2019. Ensemble forecasting of the global potential distribution of the invasive Chinese mitten crab, Eriocheir sinensis. Hydrobiologia 826(1): 367-377. DOI:10.1007/s10750-018-3749-y	This reference indicates that the island of Ireland is within the temperature range for Chinese mitten crab, but the model was not designed to account for local factors such as watershed range, estuary size, salt water intrusion, freshwater flushing rate and salinity for larvae suitability. As indicated by Eberhardt, et al (2016), these factors are likely to play a role in the risk that Chinese mitten crab might represent to river and estuarine systems.
Taylor, P., Kitson, E., May, L., Zaja, E., MacSporran, A., Gagkas, Z., Trojahn, S. and Glendell, M. (2025) Investigating the Likelihood of a Lough Neagh Bloom Scenario Happening in Ireland. EPA Research Evidence Synthesis Report 7. Wexford: Environmental Protection Agency.	This is not directly relevant to Chinese mitten crab. However, this study reviewed the factors that contributed to the harmful algal bloom (HAB) events during 2023 and assessed the potential for similar events in other nutrient-enriched and nationally important lakes in Ireland. Gaining a better understanding of how all these factors are likely to affect the risks of lakes in Ireland developing the type of prolonged HAB event that has been witnessed at Lough Neagh is vital for protecting habitats and water security into the future. The study concludes that 20% of the lakes in this study (7 of 35) face a high potential threat of serious HAB events due to a combination of factors like those implicated in the Lough Neagh bloom. Lakes with both a high potential threat score and a high potential public and nature amenity value may be of greatest concern.

Aim 2: Understand the factors that will support or mitigate against future incursions of Chinese mitten crabs around the island of Ireland.

In addition to habitat suitability discussed above, the spread of Chinese mitten crab will be associated with various pathways.

Focusing on pathways of introduction such as:

- Commercial shipping and ballast water
- Biofouling on vessels
- Movement from established populations in Great Britain or continental Europe

- Accidental transport through fishing, aquaculture, or recreational boating activities
- Food source (illegal but not impossible)
- Dredged spoil, also residue spoil in dredger
- Other relevant and priority pathways

Future drivers that could support incursions, specifically factors that may make invasion more likely:

- Climate change and warmer waters
- Increasing maritime trade and vessel movements
- Expansion of populations in nearby regions
- Lack of awareness or monitoring

Factors that could mitigate against incursions include:

- Ballast water regulations
- Biosecurity measures at ports and marinas
- Biosecurity requirements on aquaculture movements
- Movement restrictions on specific activities
- Surveillance and early detection programmes
- Rapid response and eradication measures
- Public reporting and stakeholder awareness
- An estimate of the likelihood of future incursions
- Identification of high-risk areas around Ireland
- Recommendations for monitoring and management
- Knowledge gaps requiring further research

Aim 3: Assess the risk to the island of Ireland of significant impacts associated with Chinese mitten crab.

This may require expert judgement based on the evidence collated during this study and the appointed contractor's own knowledge and expertise of Chinese mitten crab ecology. It may also be possible to invite other experts to offer opinions about the risk for the island of Ireland, forming a consensus of the most likely impact scenarios and effective policy or management response options.

The output would be a narrative within the final report concluding if those risks posed by Chinese mitten crab to the island of Ireland are high, moderate or low, clearly setting out the rationale. Uncertainty can also be considered in your methods.

We envisage a narrative in the main body of the report, accompanied by a list or table identifying the habitats and species at risk due to expected spread of Chinese mitten crab. Consideration of the

magnitude of the threat posed would be beneficial. For example, threats to Atlantic salmon, pearl mussel, native crayfish and transmission of disease or parasites to native species.

Furthermore, this should include an assessment of the likelihood for Ireland and Northern Ireland to experience a scenario of a significant increase in mitten crab numbers in individual river catchments as seen in other geographic regions.

We also consider that an assessment of likely economic costs and identification of key sectors impacted would be beneficial (e.g. erosion on banks, impacts on fisheries or angling, impacts on water abstraction or power production or other relevant socioeconomic impacts as identified in other jurisdictions).

Aim 4: Develop a prioritised toolkit of potential long term management options including an assessment of their suitability and lessons from other jurisdictions for the island of Ireland.
There are no known examples of successful eradication of Chinese mitten crab. Therefore, as part of a long-term approach for this species, we would like to understand the most effective management methods that could be deployed.

Our priority methods currently under consideration are:

1. Risk management options, including the identification of effective biosecurity measures for relevant stakeholder groups such as industry.
2. Understanding of how currently used and proposed methods (referencing but not limited to those developed by the Clancy Project | Interreg North Sea) could be rolled out in Ireland and Northern Ireland contexts, including compliance with prevailing legislation with an estimate of likely costs.
3. It is noted that Chinese mitten crab are traded internally in the Netherlands (Products - Live Seafood). It would be beneficial to understand the regulatory and/or policy process applied in the Netherlands in light of obligations under the EU IAS Regulation.
4. Propose a sufficiently robust draft standard operating procedure for the humane dispatch of individual mitten crabs in compliance with relevant legislation in both Ireland and Northern Ireland.
5. Options for disposal of large numbers of Chinese mitten crabs should significant numbers be captured in Ireland. This may include a review of what other jurisdictions in Europe have done to manage large numbers of mitten crabs.
6. Other methods that might support a long-term management/prevention approach.
7. Identification of priority research areas that could help Ireland and Northern Ireland respond to this species.

This should also include identification of the optimal time of year for deployment of any methods recommended and prioritised.

Expected outputs

Output 1: A synthesis report detailing the results of the analysis and research carried out as part of the project.

Output 2: Any data, models or supplementary material collated as part of the project.

Support group

This project will be supported by invasive species experts from the National Biodiversity Data Centre, National Parks and Wildlife Service and the Marine Institute. The appointed contractor should expect to meet with this group (online) early in the project and as required to gain input from the group.

Furthermore, draft reports will be shared with this group for their review and consultation. The final project outputs will be approved by this group.

Similar initiatives

The below references do not directly cover the risks for the island of Ireland and therefore do not provide an optimal evidence base to inform an effective response here, especially in the light of the slow rate of invasion following the initial incursion identified in 2006. However, they highlight that a significant body of work has already been completed relevant to this species. We therefore do not require a detailed or lengthy literature review as part of this project.

- A risk analysis of the Chinese mitten crab in The Netherlands Soes, Menno. (2010).
- Monitoring of Chinese Mitten Crabs (Eriocheir sinensis) on the River Dee and the Invasive Non-native Species Action Plan for Wales: Chinese Mitten Crab (Eriocheir sinensis).
- Chinese Mitten Crab (Eriocheir sinensis) – Aquatic Invasive Species Risk Screening Summary
- Ecological Risk Screening Summary - Chinese mitten crab (Eriocheir sinensis) - Uncertain Risk | FWS.gov
- Risk assessment for Chinese mitten crab (Eriocheir sinensis) in Canadian waters. (Therriault et al 2008).
- Pest Risk Assessment for Mitten Crabs in Oregon. (Draheim 2008).

Furthermore, a risk assessment was prepared for the island of Great Britain. This was subsequently used to support European Union regulation listing of Chinese mitten crab. While this provides invaluable information, at this time we are not seeking a similar exercise for the island of Ireland. Our

priority is to better understand and inform the long term response and effective risk management for this species across the two jurisdictions.

This risk assessment indicated that all of the rivers in the UK could be vulnerable. At the time of its publication, the most northerly distribution to date is the River Tyne. It was also unknown whether northern Scotland would be too cold for Chinese mitten crab. The summary risk of impact was given as MAJOR but with a LOW level of confidence.

a. GB Non-Native Organism Risk Assessment Scheme: Eriocheir sinensis - Chinese Mitten Crab (H. Milne Edwards, 1853). 23/03/11: RA_Eriocheir sinensis_(Chinese_Mitten-crab)

At this time, we are not requesting a repeat or similar risk assessment process for the island of Ireland. The species is already regulated at the EU level. https://circabc.europa.eu/sd/a/95cd1ad3-a893-4484-a2fd-e25710abb77d/Eriocheir sinensis - GBNNRA.pdf

Your proposal

In your response, you should clearly set out:

a. Your relevant experience as a company, partnership or individual to deliver the outputs.

b. Your understanding of our of Purpose and Aims

c. Your methodology, identified tasks and associated costs.

d. In the form of a Gantt chart, your timeline.

e. Any “added value” associated with your proposal.

Your nominated team

We expect tenderers to nominate a single lead as point of contact and identify all team members proposed to work on the project. This information should be provided in a short CV (two page max) detailing the teams experience in delivering similar projects or research outputs.

For the successful contractor, any changes to the proposed team must be done so only with the prior agreement of the National Biodiversity Data Centre. A general principle is that the National Biodiversity Data Centre will seek similar experience for any changes in team members.

Alternative proposal to achieve our Purpose and Aims

We recognise that specialist contractors may wish to present alternative or novel ways to achieve the outcomes we envisage as outlined above.

We will consider these as part of your tender submission but please detail how your approach will aid the further development of a strategic approach to Chinese mitten crabs in Ireland and Northern Ireland as opposed to our outlined approach (i.e., the benefits and risks of your proposed approach versus our outlined approach).

If you wish to present an alternative approach, please refer to our Purpose and Aims in drafting your proposal, providing a clear rationale for your alterative approach.

Format of written outputs

Where appropriate, written outputs should be submitted in both MS Word and PDF format. The general principle is that outputs should be delivered to allow continued use by the National Biodiversity Data Centre as the project develops further.

Acknowledgements and branding of outputs

The National Biodiversity Data Centre and the funders of this work (Shared Island Initiative, National Parks and Wildlife Service; and the Northern Ireland Environment Agency) must be clearly acknowledged in all outputs. It is also key that the public facing outputs and reports that arise from this project should include the project partners logos.

Proposal

Submissions should contain the following:

1. The overall cost. All prices should be stated excluding VAT with the rate of VAT payable (where applicable) clearly stated separately.
2. All prices quoted should be fully inclusive of any travel, subsistence, or other costs necessary to effectively discharge the role.
3. The proposed methodology and approach in providing the services,
4. Demonstrate experience of recent and similar work.

Available budget

We have currently allocated a budget of €15,000 plus VAT for this project.

Award Criteria

The contract will be awarded from tenders evaluated on the basis of the most economically advantageous tender consistent with the following award criteria:

Criteria	Max. Marks Available	Min Mark
Price	300	N/A
Methodology and approach in providing the service	350	250
Experience of recent and similar work	350	250

General Terms

Information Supplied

The National Biodiversity Data Centre reserves the right to seek clarification or verification of any information supplied.

Confidentiality

The National Biodiversity Data Centre undertakes to use its best endeavours to hold confidential any information provided in quotations submitted, subject to the National Biodiversity Data Centre's obligations under law, including the Freedom of Information Act 2014. Should any of the information supplied in the tender not be disclosed because of its sensitivity, then this should be stated, with the reasons for its sensitivity. The National Biodiversity Data Centre will then consult with the Proposer about sensitive information before deciding on any Freedom of Information request received.

All information provided by the National Biodiversity Data Centre within this document, or in the course of preparing tenders, or subsequent to a successful tender being adopted, is provided in the strictest confidence, and must not be passed to third parties, except bona-fide partners of the proposer to enable the preparation of the tender requested. If there is any doubt, prior permission should be obtained from the National Biodiversity Data Centre.

Conflict of Interest

Any conflicts of interest involving a contractor must be fully disclosed.

Tax Clearance

It will be a condition of any Goods/Service Contract pursuant to this Competition that the successful supplier shall, for the term of such contract(s), comply with all EU and domestic tax laws. Prior to the award of any Goods/Service Contract arising out of this Competition, the successful Tenderer shall be required to provide evidence of tax compliance.

Insurance

The successful tenderer will be obliged to satisfy to the National Biodiversity Data Centre that they have adequate insurance in place. The successful suppliers will be required to provide copies of all relevant Insurance Policy documents. The following levels of cover are required.

Insurance	**Level required**
Public Liability	€6,500,000
Professional Indemnity	€1,000,000

If appropriate the following will also be required.

Insurance	**Level required**
Employers Liability	€13,000,000

Payment

Payment for all services covered by this Request for Quotations will be on foot of appropriate invoices. Invoicing arrangements will be agreed with the successful supplier following the award of contract.

Under the Finance Act 1987, withholding tax must be deducted from payments for professional services.

The National Biodiversity Data Centre reserves the right to withhold payment where a contractor has failed to meet contractual obligations in relation to the provision of goods or services to an acceptable level of quality.

Submissions

Submissions should be marked "***RFQ for assessment of Chinese mitten crab***" and sent via e-mail to: Invasives invasives@biodiversityireland.ie with John Kelly jkelly@biodiversityireland.ie in cc.

Submissions should be received no later than **5.00 p.m. Irish Standard time on Tuesday the 24th of November 2026.**

This submission deadline was extended by seven days on Monday the 2nd of November due to potential difficulties accessing our website during the ongoing PHP security alert, which began on 22 October.

Late Submissions will not be considered.

The Request for Quotations contains no contractual offer of any kind. Any quotation will be regarded as an offer by the contractor and not as an acceptance by the applicant of an offer made by the National Biodiversity Data Centre. No contractual relationship will exist except pursuant to a written agreement signed by a representative of the National Biodiversity Data Centre and any successful contractor for the specified services.

Please note that the National Biodiversity Data Centre is subject to the Freedom of Information Act.

Annex 1: Chinese mitten crab in Ireland

Inland Fisheries Ireland 2006

Purpose: Follow-up to first confirmed sighting to determine if any more Chinese mitten crab were present in the area (estuary and upriver). Cover area: Three sisters estuary and possibly up-steam Rivers Barrow, Nore and Suir.

Outcome: No verified Chinese mitten crab. However, a crab highly likely to be a Chinese mitten crab had been caught during survey but escaped overboard from bucket on deck before verified by the expert (A. Cullagh, pers comm 2009).

BIM October 2020

Purpose: Chinese mitten crab was detected in the Moorecambe Bay area in July 2020. As there were two mussel seed movement from Moorecambe Bay and laid in Carlingford Lough (one site) on the 11th and 13th July 2020 each of approximately 50 tonne, BIM commissioned a survey of areas in Carlingford Lough and Newry estuary (Baars et al., 2020).

Preliminary study in Carlingford Lough and the Newry estuary.

Outcome: No indications the Chinese mitten crab were present.

BIM December 2020 to Jan 2021

Purpose: More extensive study of Carlingford Lough, and four other areas, using varied entrapment methods, appearances of cast carapaces and use of eDNA.

Most of the effort was applied to Carlingford Lough but following the report of a berried female Chinese mitten crab from the Waterford Harbour, a more intensive study of this region took place.

Outcome: No Chinese mitten crab found from targeted survey effort but fishermen caught a berried female in December 2020 and in January 2021 and reported them to JR Baars. Both crabs berried. 'Individuals encountered had eggs and the laboratory rearing confirmed that the eggs were developing and appeared to have structures consistent with described stages in the development of Chinese mitten crab. The presence of females with viable eggs clearly indicates that there are currently sufficient numbers of each sex to encounter each other, even though at a low population number.'

Summary noted – probably established but in lag phase in Waterford Harbour (Baars et al., 2021).

National Biodiversity Data Centre with Funding from NPWS

Purpose: Following November 2022 Chinese mitten crab detection, the National Biodiversity Data Centre commissioned a survey aiming to determine if more adult individuals occurred in the lower estuary (following the expected migration into the more marine parts of the estuary) in order to inform further management and to search in strategic areas with the view to detect juveniles (>2yrs) under refugia and burrows along the exposed banks in the upper tidal reach.

Cover area: Lower and upper Rivers Suir and Barrow estuary.

Outcome: No Chinese mitten crab or evidence of their presence (adults or juveniles) detected through survey efforts.

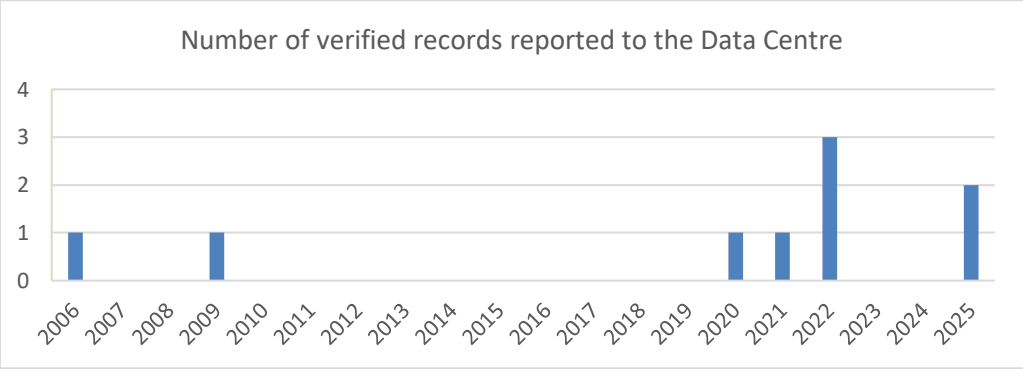
However, through call for sightings with fishermen contacts, a berried female was detected in December 2022 and retained in University College Dublin (UCD). Crab dropped eggs before it could be determined if eggs were fertilised (Baars, 2022).

Outcome: The survey effort completed in 2022 suggests that the Chinese mitten crab population is likely to be at a very low density. The repeated detection of Chinese mitten crab and the detection of gravid females periodically suggest that there is a viable population in the estuary. Gaps between detections suggest the population is likely to have persisted at least since the first official detection in 2006. However, if a population is established there would be an expectation to find juvenile individuals during the timed searches of refugia and some burrows would have been detected along the exposed banks in the upper reaches. It could be possible that a small population is being maintained around Cheekpoint, County Waterford, and that freshwaters near there are providing refuge for the juveniles. These areas need to be explored in more detail and targeted in future surveys.

An alternative hypothesis would be that there has been a sporadic/periodic introduction of individuals possibly via ships and that the conditions do not favour the establishment of the juveniles. Adults may persist for a few years at a time and periodically be captured. This seems unlikely because of the frequency of the catches over the years and it is unlikely that the conditions in the Barrow and Suir estuary are unlike any of the estuaries in Europe where Chinese mitten crab has already established.

Our recommendation would be that a concerted effort is made to sample the estuary during the summer and autumn when juveniles are expected to settle and migrate upstream and when adults are expected to migrate downstream to reproduce and mature the eggs in more marine conditions. During the warmer months visual surveys of the refugia exposed at low tide may prove more reliable as juveniles are expected to be more mobile. Individuals may use subtidal banks to avoid exposure to winter temperatures. This may have reduced the detection at very low burrow densities.

Timeline of verified records of Chinese mitten crab



i. One individual male was detected on 21 January 2006 (Minchin, 2006).
ii. 16 crabs detected on 4 November 2009 (A. Cullagh, pers comm. circa 2009). Original material from 2009 was subsequently sequenced by UCD (in early 2020s) and confirmed as *E. sinensis.*
iii. One crab detected 25 December 2020 of a gravid female (Baars et., 2021).
iv. One berried female detected 25 January 2021. Specimen deposited with marine lab in UCD and maintained for 7 weeks. Laboratory rearing confirmed that the eggs were developing and appeared to have structures consistent with described stages in the development of Chinese mitten crab (Baars et al., 2021).
v. Detection of a single female crab on 10 November 2022 during fish impingement survey. https://maps.biodiversityireland.ie/Species/22443).
vi. One female crab in berry detected 3 December 2022 entangled in fish net near power station. The crab collected in December was kept in a tank in UCD but shed the eggs before they could be verified as fertilized. The individual remained alive until mid-January 2023 (Baars, 2022). Correction on date of sighting via email to COF 25 February 2025).
vii. One berried female detected on 15 January 2025 by ecologists undertaking fish impingement survey. This live berried specimen was held in UCD until late April 2025 when the crab was transferred to the Marine Institute (MI). Testing showed negative for Crayfish plague DNA. Water samples used to develop an improved eDNA assay by MI adjusted to maximise the chances of detecting limited Chinese mitten crab DNA. The water from the tank that the crab was housed in was also used to explore shedding rates or berried females. The results showed increased chance of detection of berried females or larvae. MI uses eDNA assays used in Denmark and Canada on samples from Waterford Harbour, Cheekpoint and Great Island Power station since 2018 but so far no positive detection of Chinese mitten crab. Crab developed eggs to larvae stage ready to emerge.
viii. The 2006 and 2009 sightings were first detected by fishermen highlighting the valuable role of citizen scientists is early detection. In 2006, Mr. James McCartan reeled the crab in when angling for cod in the winter. He photographed it and returned it to the water (not knowing what it was) but sent photographs to the authorities which triggered rapid response to catch specimens (J. McCartan, pers comm. 30th May 2020). In 2009, Chinese mitten crabs were caught and reported by eel fishermen (A. Cullagh, pers comm. 2009). Fishermen also detected Chinese mitten crab in December 2020, January 2021 and December 2022 and reported to Jan-Robert Baars who was undertaking surveys at the time and engaging with local fishermen.

There have been additional anecdotal reports of Chinese mitten crab from upriver of the Three Sisters estuary but they are not confirmed.