



THE COMMERCIAL EXPLOITATION OF THAMES MITTEN CRABS: A FEASIBILITY STUDY

A report for the Department for Environment, Food and Rural
Affairs
by the
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Pilot Project on the feasibility of commercially exploiting Thames Chinese mitten crabs

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EXECUTIVE SUMMARY

1. A large population of *Eriocheir sinensis* is now well established in the River Thames, with an autumn migration pattern, ovigerous crabs, juveniles and burrowing behaviour. This population continues to expand westwards with a new record (13 October 2007) from Boveney Lock, just upstream of Windsor.
2. In South East Asia mitten crabs are eaten. The ovaries and testes are considered to be a delicacy; consequently mitten crabs are a seasonal product being only consumed during the autumn migration period when the gonads are ripening.
3. One method of controlling the Thames population may be the commercial exploitation of this species. This feasibility study, although limited, considers that the Thames mitten crab population is large enough to support an artisanal fishing industry. This could reduce mitten crab numbers from the catchment and provide additional financial benefits for local fishermen.
4. A major concern of the London Port Health Authority was the suitability of Thames mitten crabs for human consumption with respect to the lung fluke parasite *Paragonimus westermani*, the bacteria *Vibrio parahaemolyticus* and concentrations of trace metals, PAHs and organochlorines.
5. With regard to *Paragonimus westermani*, Stentiford (2005) reported to the London Port Health Authority that the lung fluke parasite is not present in the Chinese mitten crabs from the Thames estuary and therefore, the infection risk for those consuming the raw product is negligible.
6. Levels of *Vibrio parahaemolyticus* in crabmeat peaked during the summer months, in August 2006 with total counts exceeded a median of 10^9 cfu/g. The high levels of total *V. parahaemolyticus* cells found in this small study indicate that sub-populations of clinically significant strains may be present purely by stochastic variation. Thus consumption of the product particularly raw or lightly cooked may pose a public health risk.
7. During the analysis of Thames mitten crabs for concentrations of trace metals, PAHs and organochlorines, concentrations of dioxins and PCBs in the brown meat (hepatopancreas/digestive gland and the confluent ovary/testis) were found to be high. Concentrations were actually above the European mandatory limit in tissues other than crab brown meat which is specifically excluded from the recommendation. This finding raises the question as to whether the brown meat of Thames mitten crabs is safe to eat. It should be borne in mind that the adverse effects of exposure to dioxins and PCBs are chronic, not acute; furthermore, mitten crabs are ripe for harvest only for a limited period of the year – the autumn - and consumption will be restricted to a period of 3 to 4 months annually. Based

on average data, an adult consuming a single 16g portion of mitten crab brown meat per week over a year would have an averaged daily intake of dioxins and dioxin-like PCBs at around the estimated tolerable daily intake (TDI). On the other hand, taking into account the limited season of availability of the crabs, a male or female past child-bearing age could consume several portions per week in this season. With a caveat over excessive partaking of mitten crab brown meat, particularly in the case of children and women of child-bearing age, it does appear that the harvesting of mitten crabs from the Thames for culinary use need not be discouraged.

8. Although this report suggest that commercial exploitation of the mitten crab is possible with a view to reducing the population in the Thames, the final decision and control for such a fishery ultimately must taken by those Government organization with an invested interest including DEFRA, the Environment Agency and the London Port Health Authority.
9. If permission for commercial exploitation is forthcoming, mitten crab fishing on the Thames would be limited to three months of the year starting in September to the end of November, being timed to catch the annual downstream migration. Fishing could start in the River Lee area and possibly down as far as Barking Power Station water outlet point at 51°30.818' N, 000°08.011' E. Then during late September, when the dying off of the previous year's population is complete, mitten crab fishing could move further downstream to include the Dartford crossing area and further east to Tilbury Power Station and possibly beyond.
10. During this feasibility study baited pots and fyke nets were used to trap Thames mitten crabs over a fifteen-month period at four permanent sites along the river. A total of 539 crabs was caught during the present trial. 495 crabs were caught by fyke nets compared to 44 in baited pots; therefore baited pots are not considered to be a suitable trapping method for capturing mitten crabs in the River Thames.
11. During the fifteen-month fishing period a total of 2013 fish was trapped as by-catch including 1397 common eels (*Anguilla anguilla*) being caught in fyke nets.
12. During this extremely limited feasibility study, 308 Thames eels (*Anguilla anguilla*) were caught using fyke nets in the "proposed" fishing season and locality. But a large number of fishermen using fyke nets in the River Lee area to trap mitten crabs would be detrimental to the eel population because this species would be a considerable part of the by-catch. Consequently mitten crab fishing would have to be strictly controlled and probably licensed including possible monitoring of increased eel captures.
13. To avoid large captures of eels during the proposed mitten crab fishing season more research could be undertaken into the trapping of *Eriocheir* including the possible development of pheromone bait in pots. Alternatively the use of fyke nets with openings, 40mm brass ring or a 40 mm mesh size, to release the eels

and retain the crabs could be a cheaper but effective option.

14. This report does not suggest that a mitten crab fishery should be subject to future protective and conservation measures. The rationale behind a Thames mitten crab fishery is to deplete the population.
15. A number of Government Policies and attitudes with regard to contentious invasive species require revisiting with a view to amendment. These measures include the banning of live imports of mitten crabs particularly into Scotland and perhaps generally into the UK.
16. A slowing in the flow rate of the River Thames by water abstraction and, changes in rainfall patterns and land management practices, may have been a contributory factor in allowing the mitten crab population to enter the estuary and migrate westwards. It would be interesting to record whether the mitten crab population would maintain itself if Thames water flows returned to something like normal.