

Draft Individual Review Form

Proposal number: 2001-B200-3

Short Proposal Title: Mitten Crab management: recruitment dynamics

1a) Are the objectives and hypotheses clearly stated?

Yes. The proposed project would investigate the recruitment dynamics of Chinese mitten crabs to inform the development of a scientifically-based management strategy. Specifically, the applicants propose to evaluate several hypotheses regarding larval settlement patterns, reproductive events, and age at maturity, which they consider critical to developing any future management strategy for mitten crabs. The data needed to test these hypotheses are clearly identified, and should be effectively obtained by the proposed research. While an “effective and efficient theoretically based removal strategy” (p. 3) is apparently the underlying goal of this work, it is not clear from the proposal whether the development of such a strategy will be one of the “products” of this research, or if that will be left to later projects, drawing on the results of this one.

1b1) Does the conceptual model clearly explain the underlying basis for the proposed work?

Yes. The conceptual model is presented both in (rather detailed) text form, and diagrammatically. Both versions of the model clearly identify the four areas of proposed investigation and their relevance for developing a management strategy for mitten crabs: in particular, identifying exactly when and where removals should be focused and for how long they would be necessary. The model is usefully compared to a fisheries management model, with its focus on identifying vulnerabilities in the population, specifically regarding recruitment dynamics, which could be exploited to maximally reduce the population size. The model details the ecological relationships among physical factors such as salinity, temperature, flow conditions, and the hydraulics of the estuary as a whole, and the timing and location of reproductive events and larval settlement patterns, identifying the specific unknown elements to be investigated.

1b2) Is the approach well designed and appropriate for meeting the objectives of the project?

Yes. The experimental design and methods are well-described, generally backed by ample citations where necessary, and appear appropriate and highly likely to result in obtaining the desired data. I was particularly impressed with the applicants’ extensive plans for collaboration with other mitten crab researchers and organizations that regularly trawl the bay and estuary, which should hold down costs and avoid duplication of efforts. My only question was regarding the method of determining whether females can produce more than one brood (p. 6): the applicants do not address the possibility that maintaining females in aquaria might affect their likelihood of extruding additional broods, and hence might not be an adequate test of whether multiple broods occur in the wild. Citations regarding captive breeding/brooding in these or related crabs, or additional information on the applicants’ experience with mitten crabs in aquaria, would have been helpful here.

1c1) Has the applicant justified the selection of research, pilot or demonstration project, or a full-scale implementation project?

Yes. The applicants clearly demonstrate that the research proposed will be necessary to inform the development of any future management strategy for mitten crabs. Their research is clearly focused and targeted toward those future management efforts, rather than being a general information-gathering exercise.

1c2) Is the project likely to generate information that can be used to inform future decision making?

Yes. If a removal-based strategy is chosen for the control of mitten crabs, the proposed research will be critical to deciding how to direct those efforts: when, where, and how long to carry out crab removals. Further, though the applicants do not make this point directly, their research should help determine how feasible such a removal-based strategy is likely to be.

2a) Are the monitoring and information assessment plans adequate to assess the outcome of the project?

Yes. The entire purpose of the project is targeted research; see above for its adequacy.

2b) Are data collection, data management, data analysis, and reporting plans well-described, scientifically sound and adequate to meet the proposed objectives?

Plans for data collection are thoroughly described and scientifically sound (see 1b2 above). The applicants will develop a MS Access database for data storage and make this available through the IEP website. Plans for data analysis are not very detailed, but where they are described (the use of correlation statistics to examine larval settlement patterns, Hiatt growth diagrams to assess age at maturity) they are appropriate and scientifically sound. Reporting plans, including the database, presentations at IEP and CALFED meetings, and publications in both the IEP newsletter and a peer-reviewed journal, seem thorough and appropriate.

3) Is the proposed work likely to be technically feasible?

Yes. Though the proposed project is quite ambitious and has a challenging schedule, it is feasible for a well-qualified and energetic team, which this appears to be. They will be greatly aided by their collaboration with other mitten crab researchers and organizations trawling SFB.

4) Is the proposed project team qualified to efficiently and effectively implement the proposed project?

Yes. Both co-applicants and their collaborator have extensive experience in similar research, and all three have been involved in mitten crab research previously. They appear to have a good balance of field and laboratory expertise with invasive species and crustacean biology. The applicants both have doctoral degrees and their collaborator, a DWR employee, is apparently working on her master’s degree.

Miscellaneous comments

It seems that this project could be more efficiently and inexpensively conducted by researchers based in the Bay Area; however, the proposal is of high quality and the applicants perhaps uniquely qualified to carry it out.

My biggest hesitation about this proposal is that I question whether its ultimate goal (a removal-based management strategy for Chinese mitten crab) is realistic. Successful control of invasive aquatic species is rare, particularly in a large, open system like the SF Bay. However, if such a strategy is being contemplated, the proposed research is definitely crucial to maximize its effectiveness. Indeed, if any management actions are being or will be considered for mitten crabs, the life history data gathered in this research will be indispensable in directing those efforts.

Overall Evaluation

Summary Rating	Provide a brief explanation of your summary rating
<input checked="" type="checkbox"/> Excellent <input type="checkbox"/> Very Good <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	This is a detailed, well-thought-out, and clearly presented proposal from researchers who are highly qualified to do the work described. The problem is an important one, and their approach will be a major contribution at the least to greater understanding of mitten crab life history in the SF Bay-Delta, and at best to directing future control efforts for this non-native invasive crab.