***To be used in conjunction with ‘Rationale for Criteria and Guidance for Assessors.doc’***

Title: Influence of suspended and off-bottom mussel culture on the sea bottom and benthic habitats: a review

Authors: McKindsey, C. W., P. Archambault, M. D. Callier & F. Olivier

Source: *Canadian Journal of Zoology*, **89**, 622-646. Year: 2011

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| **KEYWORDS** |
| POPULATION | Benthic Community; Hydrology; Biogeochemistry |
| INTERVENTION(S) | Mussel Aquaculture |
| HETEROGENEITY | Physical Structure; Biodeposition |
| OUTCOME METRICS | Species Diversity; Species Richness; Biomass; Abundance; Flow Rate; Organic Matter Content; Redox Potential; Sulphide |
| REGION |  |

*Summary of Review:*

Qualitative review examining the effect of suspended and off-bottom mussel aquaculture on the benthic environment. Examines direct and indirect effects resulting from (i) the physical structure used for mussel culture and (ii) enrichment through biodeposition by mussels. Considers hydrological (flow rates, turbidity) and biogeochemical (organic matter content, redox potential, sulphide content) effects and examines changes in benthic, epibenthic and infaunal communities (richness, biomass, abundance).

***Stated number of studies included in synthesis part of review:***

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|  |  | **Criteria** | **Score** |
| 1 PROTOCOL | 1.1 | Is an *a-priori* protocol available? | **0** |
| 2. SEARCHSTRATEGY | 2.1 | Does the search for literature document the use of a comprehensive range of resources? | **0** |
|  | 2.2 | Are the search strings clearly defined? | **0** |
| 3. INCLUDING STUDIES | 3.1 | Does the review apply clearly documented inclusion criteria to all potentially relevant studies found during the search? | **1** |
|  | 3.2 | Does the review demonstrate that inclusion decisions are repeatable? | **0** |
|  | 3.3 | Are inclusion/exclusion decisions transparent? | **0** |
| 4. CRITICAL  | 4.1 | Does the review critically appraise the methods of each study? | **1** |
| APPRAISAL | 4.2 | Are studies objectively weighted according to methodological quality? | **0** |
| 5. DATA | 5.1 | Is data extraction documented, repeatable and consistent? | **1** |
| EXTRACTION  | 5.2 | Are the extracted data reported for each study? | **1** |
| 6. DATA | 6.1 | Is a quantitative synthesis conducted? | **0** |
| SYNTHESIS | 6.2 | Is heterogeneity in the impact of the intervention investigated statistically? | **0** |
|  | 6.3 | Does the review consider possible publication bias? | **0** |
|  |  | **TOTAL** | **4** |

**GREEN: 3 Points**

**AMBER: 1 Point**

**RED: 0 Points**

**ASSESSMENT**

**1. PROTOCOL**

**1.1 Is an *a-priori* protocol available? If yes, please state the location of the protocol.**

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| No |

**2. SEARCH**

**2.1 Does the search for literature utilise a comprehensive range of resources? Please state the names and dates of any databases used, as well as any other resources (e.g. bibliographies, websites of relevant organisations, other grey literature sources)**

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| Does not document use of databases or bibliography search |

**2.2 Are the search strings clearly defined? Please provide any information stated by the review that is related to the area of the search (e.g. search strings or broad area of search if specific search strings are not given).**

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| Describes question but no documented evidence of a literature search |

**3. STUDY SELECTION**

**3.1 Do the authors systematically apply clearly documented inclusion/exclusion criteria to all potentially relevant studies located during the search? Please provide any information stated in the review that is related to study inclusion/exclusion (e.g. inclusion criteria or objectives of the review if specific inclusion criteria are not given)**

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| Application of specific inclusion/exclusion criteria not documented, but broad scope of review is apparent – impacts of mussel culture on benthic communities, resulting from the physical structure and from biodeposition. Does not consider bottom culture although ‘when pertinent information is only available from non-mussel literature, this is included where appropriate’. |

**3.2 Does the review demonstrate that decisions over which primary research articles are relevant to retain following the search are repeatable (e.g. by >1 person applying inclusion criteria and the use of kappa analysis or similar)? Please provide any relevant information on kappa tests, approaches to resolving disagreements etc.**

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| No test of repeatability of inclusion/exclusion decisions |

**3.3 Are decisions over the inclusion/exclusion of each piece of primary research transparent? Please state any information provided by the review in relation to transparency of inclusion/exclusion decisions (e.g. does the review list all studies included and excluded at the full-text stage and give reasons for each exclusion? does the review explain the reasons for the exclusion of some studies but not all?)**

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| Reasons are not provided for the exclusion of any individual study |

**4. CRITICAL APPRAISAL**

**4.1 Does the review critically appraise the methods of each piece of primary research? Please state what information is provided by the review in relation to the methodological quality of each study (e.g. framework used for critical appraisal, any aspects of methodology that were consistently recorded for each piece of primary research – study design, sampling effort etc.)**

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| No documented critical appraisal but relevant information on methodology of each individual study (level of replication) is provided by Table 1 |

**4.2 Are studies objectively weighted according to methodological quality? Please give details of any weighting system used in meta-analysis (e.g. inverse variance, sampling effort etc.) and/or details of any approach to study exclusions based on methodological quality.**

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| No evidence for objective weighting |

**5. DATA EXTRACTION**

**5.1 Is data extraction documented, repeatable and consistent? Please give details on the metrics extracted to assess the impact of the Intervention (species richness, biomass etc.) and indicate whether the review consistently extracts a defined set of metrics from each study.**

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| No indication that specific Outcome metrics will be consistently extracted. The metrics extracted are variable, but can be determined from Table 1-2 |

**5.2 Are the extracted data documented for each study? Please state whether or not the Population, the Intervention, and the Outcome are given for each study (information may be in the main body of the review, or in any Appendices/Supplements)**

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| Extracted outcome data are qualitatively stated in Table 1-2. The Population can also be determined in Table 1. |

**6. DATA SYNTHESIS**

**6.1 Is a quantitative synthesis conducted? Please indicate whether the review uses a meta-analysis (or similar technique) to synthesise the findings of each study statistically, a quantitative synthesis without statistical analyses (e.g. results are synthesised using descriptive statistics and graphs only) or a qualitative synthesis.**

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| Qualitative synthesis |

**6.2 Is heterogeneity in the effect of the Intervention investigated statistically? If yes, please state what the main effect in the study was (primary question being studied) and what aspects of heterogeneity in this effect were considered (e.g. differences between taxa, regions, types of interventions etc.)**

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| No |

**6.3 Does the review consider possible publication bias? If yes, please describe the approaches used (e.g. Egger test, calculation of failsafe numbers, use of raw data etc.)**

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| No documented attempt to address or evaluate publication bias |