Locating social perspectives relevant to genomically-enhanced bioremediation strategies

Brooke Forbes[1], Gwyneth Kinar[1], Diane Dupont[2], J. MacLean[1], Renata Mont'Alverne[1], Graham Strickert[1], Lori Bradford[1]
[1]University of Saskatchewan
[2] Brock University

Introduction

- Need for extensive remediation of oil sands process- affected water
- Ongoing research into potential of genomically enhanced (GE) microbes for use in treatment wetlands
- Incorporation of GE_3LS concepts into research project
  - Are there existing social perceptions around GE in scientific literature?

Methods

- Literature review to locate existing social perceptions
- Keyword database search: SCOPUS & Web of Science
- Include articles from 2015 – present (July 2022)
- 2068 studies imported for screening in Covidence Application
- 547 duplicates removed
- 1521 studies had their abstract reviewed: 1417 considered irrelevant
- Full text review: 104 articles → screening
- Articles were screened & coded based on criteria present
  - See boxes

Results & Discussion

- 3 main categories were identified
  - See Venn diagram
- Most articles fell into Part 1, discussing relevant natural science criteria but without social criteria
  - ~40% of these identified social acceptance as a hurdle to adoption of GE tech
- 6 articles fell into Part 2, with relevant science & social criteria
  - The public may not be as anti-GE as generally assumed but, transparency and education are important
  - Application as well as techniques used are important for social acceptance
- Overall, there is a lack of social engagement & representation of public perspectives in academic literature related to GE but, the public does want to be informed/involved

Genomic enhancement provides a promising solution to the challenge of large-scale remediation of oil sands process-affected water;
public education & involvement throughout research and experimental trials is likely to increase acceptance.

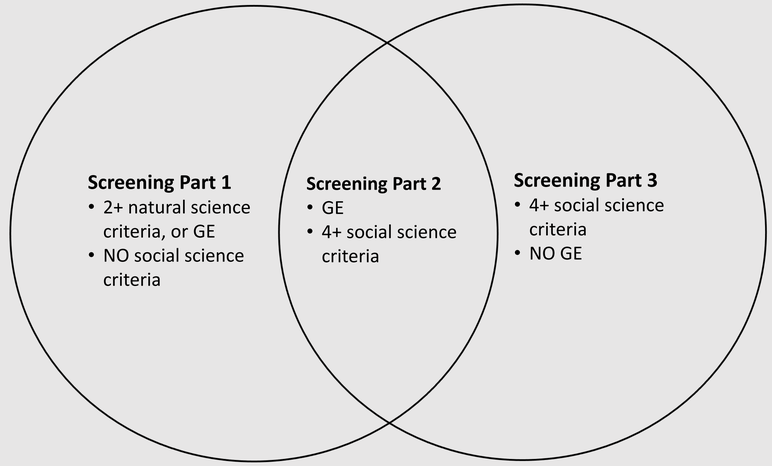
Concept	Definition for positive inclusion criteria
Ethics	Discussion of ethics/values/ideologies/philosophies, of any stakeholder, as they apply to genetic enhancement.
Acceptance	Positive or negative perceptions/perspectives of any stakeholder in relation to genetic enhancement and acceptance in bioremediation applications.
Behaviour	Behaviour of any stakeholder in situations involving genetically enhanced organisms. I.e., farmers refusing to work with GMO's.
Interview	Interview/survey/polls of any stakeholder in relation to genetic enhancement.
General social	General relevance to social aspects; humanities, economics, psychology, art, history, legality, etc.
Culture	Specifically relating to indigenous cultural opinions or impacts of genetically enhanced technologies.
Politics	Policies/legislature/governance relating to genetically enhanced technologies.
Education	Provision of education relating to genetically enhanced technologies to any stakeholder.
Stakeholders	Inclusion of perspectives or collaboration with external (non-academic) stakeholders such as indigenous peoples, farmers, local citizens, governments.

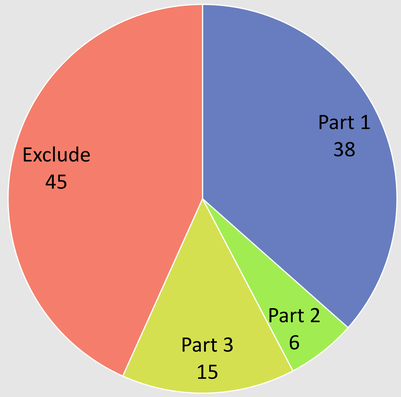
Concept	Definition for positive inclusion criteria
Wetland	Scientific research occurring in a wetland environment, including constructed and natural wetlands.
Omics	Genomics, proteomics, phenomics, transcriptomics, metabolomics, metagenomics.
Remediation	Scientific research involving remediation of natural environments. Includes reclamation, bioremediation, bioattenuation, bioaugmentation, biostimulation.
Genetic enhancement	Scientific research including analysis of genetically modified or engineered organisms, mainly plants or microbes.

UNIVERSITY OF SASKATCHEWAN
School of Environment and Sustainability
SENS.USASK.CA

GenomeCanada

G R W
Genomics Research for Optimization of constructed treatment Wetlands for water remediation





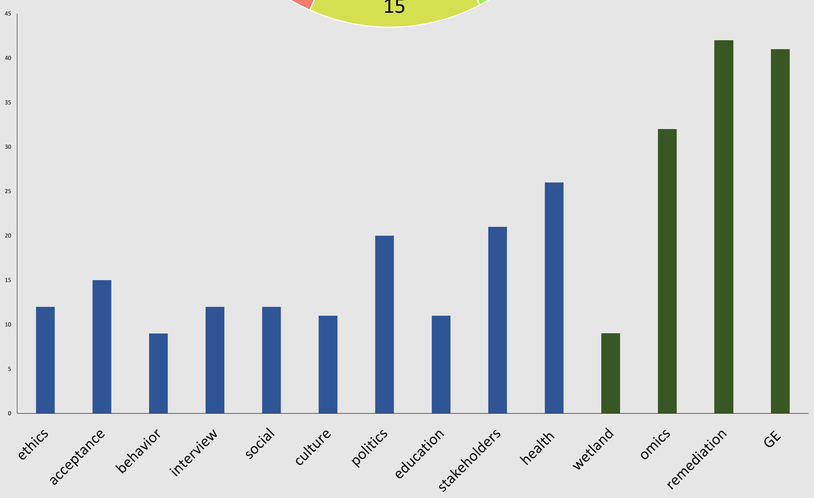


Figure 1. Plot of criteria occurrence.