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# Locating social perspectives relevant to genomically-enhanced bioremediation strategies

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# Locating social perspectives relevant to genomically-enhanced bioremediation strategies

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## 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<sub>3</sub>LS 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   |
|-----------------------|--|
| <b>Ethics</b>         | Discussion of ethics/values/ideologies/philosophies, of any stakeholder, as they apply to genetic enhancement.   |
| <b>Acceptance</b>     | Positive or negative perceptions/perspectives of any stakeholder in relation to genetic enhancement and acceptance in bioremediation applications.     |
| <b>Behaviour</b>      | Behaviour of any stakeholder in situations involving genetically enhanced organisms. I.e., farmers refusing to work with GMO's.                        |
| <b>Interview</b>      | Interview/survey/polls of any stakeholder in relation to genetic enhancement.  |
| <b>General social</b> | General relevance to social aspects; humanities, economics, psychology, art, history, legality, etc.   |
| <b>Culture</b>        | Specifically relating to indigenous cultural opinions or impacts of genetically enhanced technologies.   |
| <b>Politics</b>       | Policies/legislature/governance relating to genetically enhanced technologies.   |
| <b>Education</b>      | Provision of education relating to genetically enhanced technologies to any stakeholder.   |
| <b>Stakeholders</b>   | Inclusion of perspectives or collaboration with external (non-academic) stakeholders such as indigenous peoples, farmers, local citizens, governments. |

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

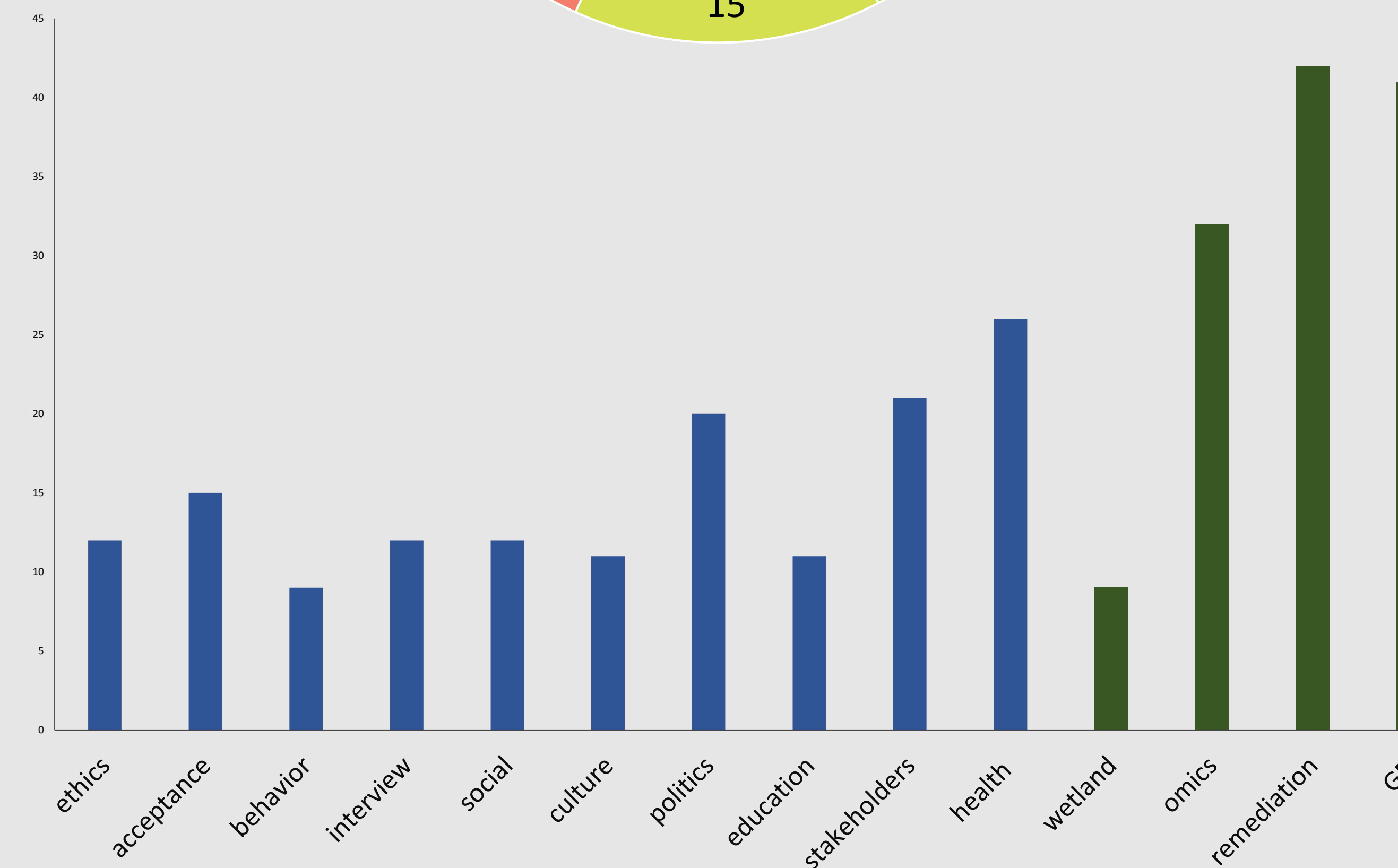
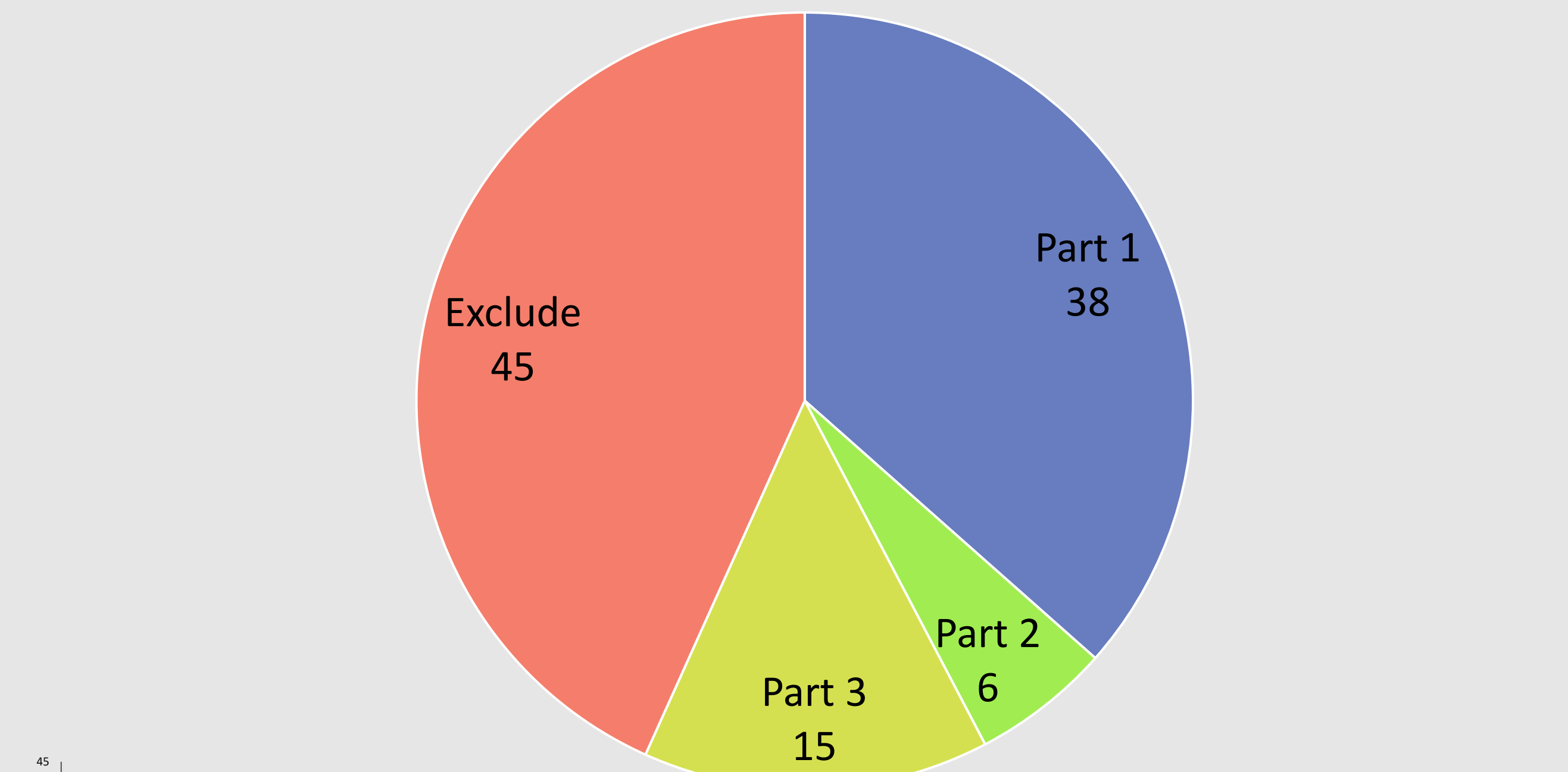
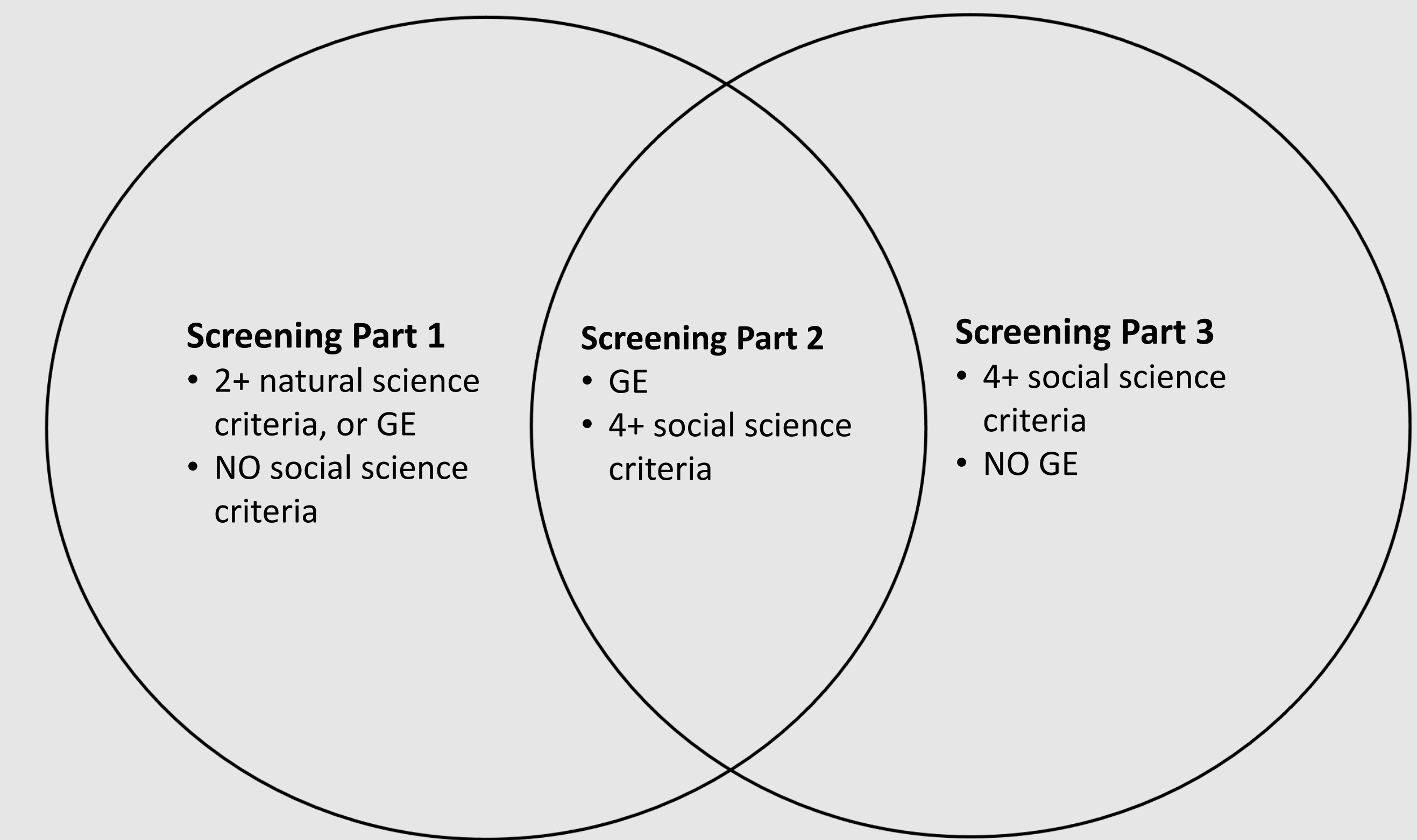


Figure 1. Plot of criteria occurrence.



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