

By 2010 achieve a 90 – 95% reduction in bacterial and chemical contamination of Great Lakes near shore water resulting from the establishment of standards pertaining to the care and treatment of near shore beach sand and land areas at all public bathing beaches.

ALTERNATIVE 1 – DEVELOP BEACH MANAGEMENT PRACTICES BASED ON THE REDUCTION OF BACTERIAL OR CHEMICAL CONTAMINATION FROM BEACH SANDS

Description of alternative:

Employ techniques to reduce *E. coli* content in beach sands. Beach sands have been proven to harbor bacterial indicators of bathing water quality and potentially human pathogens with the possibility of replication. When beach sands are located in the vicinity of storm drains or receive large amounts of water from other sources, such as run-off, there is the potential for chemical contaminants to be deposited. For example, improper disposal of spent oil and leaching from impervious surfaces may contribute to the deposition of oils and greases in beach sands. Some studies have been conducted that look at beach management practices, such as mechanically grooming beaches, changing the grade/slope of the beach, constructing bio-retention basins or wetland areas or employing other techniques to reduce *E. coli* content in beach sands. Other studies have looked at the association between beach width and the number of waterfowl attracted to bathing beaches. Pilot studies have used bio-retention basins and wetland areas as a means of managing storm water. These studies could be replicated at other beaches to determine a set of best management practices that could be applied throughout the Great Lakes.

Cost/Feasibility Considerations:

- It could be costly to conduct these studies on a large scale; however, representative beaches depicting a variety of conditions could be chosen as surrogates rather than conducting a study at each Great Lakes beach.
- Alternatively, prior studies could be validated at additional sites.
- Baseline levels would need to be determined in order to calculate reductions.

Advantages/Disadvantages:

- A comprehensive study of the behavior of bacterial indicators and pathogens in beach sands would allow for best management practices to be developed.
- Comprehensive studies regarding the relative contribution of chemical contaminants would aid in the fine-tuning of existing storm water management plans.
- Using bio-retention basins and wetlands to filter bacterial and chemical contaminants from storm water and surface run-off would have the added benefit of restoring habitat.
- Extrapolating the results of focused studies to non-participant beaches would not take into account local variability.

- The cost of reproducing sediment studies may be prohibitive for some municipalities without an external source of funding
- h) By 2010 achieve a 90 – 95% reduction in bacterial contamination of Great Lakes near shore waters resulting from non-human fecal contamination through the establishment and enforcement of state or municipal ordinances which deter the attraction of nuisance animals to the near shore area or the development of management practices which result in habitat modification.**

ALTERNATIVE 1 – ESTABLISH AND ENFORCE ORDINANCES

Description of alternative:

Empirical evidence, in some instances validated by microbial source tracking studies, indicates that a percentage of Great Lakes bathing water quality failures can be attributed to non-human sources of fecal contamination such as migratory waterfowl and domesticated animals. There is also a potential risk of disease transmission. The establishment and enforcement of ordinances prohibiting practices which attract or allow animals in near shore areas could significantly reduce the fecal burden from these sources.

Cost/Feasibility Considerations:

- State and municipal departments of public health could assist in the development and enforcement of ordinances such prohibiting dogs on the beach or the feeding of waterfowl
- Information would need to be disseminated and ordinances would need to be visibly posted

Advantages/Disadvantages:

- In order to achieve a 90 – 95% reduction some assessment of the current contribution would need to be made. This may prove difficult.
- Host source studies would need to be funded in order to determine to what extent near shore waters are being impacted by non-human fecal contamination.
- Ordinances would need to be adopted.
- Ordinances would need to be enforced.
- Would need support of beach managers and law enforcement officials
- Ordinances designed to prohibit certain practices at the beach would not impact outlying areas, i.e. waterfowl could feed elsewhere and return to the beach.

ALTERNATIVE 2 – DEVELOP AND IMPLEMENT BEST MANAGEMENT PRACTICES RESULTING IN HABITAT MODIFICATION

Description of alternative:

In rural areas best management practices have been developed to decrease the impact of agricultural run-off on surface waters. Management practices which reduce the burden of non-human fecal contamination in near shore areas will assist in the improvement of recreational water quality.

Cost/Feasibility Considerations:

- With regard to resident or roosting waterfowl, rookeries may need to be identified and multiple deterrent techniques may need to be tested in order to assess their efficacy. This would require funding for controlled studies.
- Significant costs could be incurred to make some beach sites less attractive to wildlife
- There may be significant concern from pet owners and alternatives may need to be identified, i.e. dog parks.

Advantages/Disadvantages:

- Not all techniques may be feasible in all locations.
- Any management practices developed would need to conform to existing USEPA, DNR, or other agency guidelines regarding the handling of domestic, resident or migratory wildfowl and animals.
- The relative contribution from wild vs. domestic inputs may need to be determined prior to implementing any management practices. This may prove difficult.

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