

EVALUATION OF ALTERNATIVE APPROACHES (J. Kinzelman and H. Wirick)

- d) **By 2010, “good water quality” (as defined by USEPA standards for bathing water quality) will be achieved 90 to 95% of available bathing or swimming days within a given bathing season (USEPA Great Lakes Strategy 2010) by reducing bacterial contamination of Great Lakes surface water through detection and remediation of contamination sources and the inception of basin-wide best management practices.**

- w) **Assist USEPA in revising its monitoring guidelines to improve protection of public health.**

Alternatives to reduce bathing water quality failures:

ALTERNATIVE 1 – CONDUCT SANITARY SURVEYS

Description of alternative:

Comprehensive sanitary surveys should be conducted at all Great Lakes beaches so that best management practices based on relative inputs unique to each site can be developed and implemented. A sanitary survey provides a tool for municipalities to systematically assess the beach environment. It generally includes an assessment of facilities and usage (frequency and type) but also quantifies beach areas with regard to their physical characteristics. A systematic assessment of areas immediate to and surrounding the beach will aid in determining what conditions exist that may adversely impact surface water quality. Identification of contamination sources will aid in the development of targeted remediation efforts.

Cost/Feasibility Considerations:

- In order to assess the impact of such a tool a standardized form would need to be developed. There are several examples of this type of tool that could be used as a reference [USEPA #815-R-99-016 (4/99), WHO, and some local Great Lakes communities].
- Staff would need to be secured and/or trained.
- Sanitary surveys may need to be repeated to assess environmental changes – maybe annually.

Advantages/Disadvantages:

- A standardized assessment tool would allow for the determination of relative inputs of contamination basin-wide. This information could be used to assess common factors impacting a majority of beach areas within the Great Lakes as well as providing knowledge into unique factors impacting specific locations. This information could then be used to standardize best management practices relating to beaches.

- Uniformity in assessing conditions would need to take place in order for this tool to provide usable results. This could involve some costs as a workshop may be necessary to uniformly train personnel.

ALTERNATIVE 2: IMPLEMENT PILOT PROJECTS

Description of alternative:

Implement pilot projects to identify pollution sources at Great Lakes beaches which will allow managers to develop plans for the reduction or elimination of these sources of contamination.

Cost/Feasibility Considerations:

- Funding for source identification pilot projects.
- Funding for remediation projects.
- Costs to train staff to conduct source identification and remediation projects.

Advantages/Disadvantages:

- Will provide information on pollution sources that are contributing to water quality standards exceedances at beaches and steps needed to provide better protection of public health.
- Findings/solutions may be applicable at other Great Lakes beaches.
- There are several source identification projects going on along the Great Lakes; can collaborate with other beach managers for ideas on what works.
- Workshops are available to train staff on identifying beach contamination sources.
- Can use information to develop a predictive model for high bacteria counts at beaches.
- Need to secure funding sources to implement source identification and remediation projects as well as to train staff.
- Difficulty in pin-pointing contributing sources.
- Resource intensive.

ALTERNATIVE 3 - CONDUCT PUBLIC EDUCATION CAMPAIGNS

Description of alternative:

Encourage the public to become stakeholders in the improvement of Great Lakes water quality. Poor personal practices at the homeowner and small business level can contribute to the overall chemical and bacterial contamination of the Great Lakes. Water quality would be improved through educational initiatives encouraging proper waste disposal (including pet waste), disconnection of downspouts to the sewer system, reducing or eliminating the application of fertilizers and pesticides to lawns, the use of native plants, and the use of environmentally friendly household products.

Cost/Feasibility Considerations:

- Development and distribution of educational multilingual brochures, holding community workshops, issuing press releases or other media pieces would require a funding source.
- Would need to provide incentives to local grocery and hardware stores to supply environmentally-sound products.

Advantages/Disadvantages:

- Activities would require citizens to “buy in” to the idea in order to commit to lifestyle changes.
- Materials would be transferable.

ALTERNATIVE 4– USE OF A BEACH CLASSIFICATION SCHEME

Description of alternative:

In 1999, the USEPA and WHO jointly hosted a meeting in Annapolis, Maryland, to develop a health –risk based approach to monitoring recreational waters. The approach includes employment of a beach classification scheme in addition to compliance monitoring based on bacterial indicators to assess health risk (EU, Australia/New Zealand, WHO). In a classification scheme, a beach is assigned to a class (very poor, poor, fair, good, excellent) based upon health risk. The regulation of recreational waters in this manner would better reflect health risk and provide enhanced scope for effective management intervention. By enabling beach managers to respond to sporadic or limited areas of pollution, and to upgrade a beach’s classification, it provides a significant incentive to local management actions as well as to pollution abatement. A large number of factors can influence the condition of a given beach. A classification system reflects this, and allows regulators to invoke mitigating approaches for beach management.

Cost/Feasibility Considerations:

- Costs to study the relationships between factors that affect beach water quality and the ability of monitoring schemes to detect these changes.
- Funding pilot studies to evaluate the approach.

Advantages/Disadvantages:

- The approach requires substantial testing.
- Field testing would need to be amended to take into account local circumstances.
- Information concerning the existence of sources of contamination and their likely influence upon recreational water quality could provide a robust and rapid means to increase the reliability of the overall assessment.

- e) **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

- n) **Public education: By 2006 encourage public bathing beach managers to post informational signage describing the dangers to human health that shedding from bathers can have as well as ways to protect against these dangers.**

By 2006, states and local government agencies will collaborate with the CDC on the development and distribution of educational materials for beachgoers that illustrate what individuals can do to minimize the risk of waterborne disease when they swim in the Great Lakes (e.g. CDC public education for swimming pools)

ALTERNATIVE 1 –CONDUCT EDUCATIONAL CAMPAIGNS

Description of alternative:

Increase public awareness about bathing water quality. State agencies have worked with local public health departments to design uniform signs to be placed at public bathing beaches to inform beachgoers about bathing water quality. In addition to the signs posted at the beach, many states and municipalities have web sites, hot lines, and printed materials in several languages. These materials allow the public to make an informed decision with regards to bathing water quality. Similar tactics could be used to design materials informing beachgoers of the risk of transmissible disease from bather to bather and measures they should take to reduce the risk of spreading – or contracting – waterborne illnesses (e.g., don't swim if you have diarrhea). Such signs exist at public swimming pools. These signs are important especially at beaches with a high bather density or those lacking bathroom facilities where the likelihood of human fecal contamination is greatest.

Cost/Feasibility Considerations:

- State/municipal staff responsible for the design and implementation of warning signs at public bathing beaches could take the lead on designing these materials eliminating the formation of new work groups.
- The CDC may be interested in this project as an expansion to their existing initiative regarding swimming pools (i.e. six pleas for protection against recreational water illnesses).
- Federal or state funding might be needed for the manufacture of the signs and printing/distribution of the brochures.

Advantages/Disadvantages:

- Bathers would become more educated on the risks associated with swimming in contaminated waters and would use better judgment with regard to personal practices.
- A uniform document would ensure that all people utilizing Great Lakes beaches would have access to the same information. This information may reduce public health concerns regarding the person-to-person spread of disease from bathing water encounters.
- Materials would be transferable.
- If there are no funding sources, this information would only be available to those municipalities who could afford to self-finance the project.

Chstrategybeachalts (Kinzelman and Wirick)

- 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.

Chstrategybeachalts (Kinzelman)