

COASTAL HEALTH

I. Problem Statement

Contact (including external, ingestion, and inhalation)¹ with nearshore waters of the Great Lakes can pose a risk to human health.² As the primary source of drinking water, supplier of fish for both personal and commercial benefit, and recreational outlet for millions of U.S. residents, the nearshore waters of the Great Lakes should pose a *minimum* risk to human health through contact. (The Great Lakes are a natural body of water and hence the achievement of null risk is unrealistic.) To reduce human health risk, Great Lakes nearshore waters should be drinkable (with conventional treatment), swimmable, and the fish harvested should be consumable at all times. The need to close beaches, issue boil water notices, publish fish consumption advisories,³ and mechanically remove stranded algae should be minimized. These factors have led to the following trends and events in the Great Lakes:

- The estimated volume of combined sewer overflow (CSO) discharges in the U.S. is 850 billion gallons per year, with most of these CSOs located in the Great Lakes and Northeast regions.⁴
- With regard to the transmission of waterborne disease via drinking water, the largest outbreak in history occurred in Milwaukee, WI during the spring of 1993, with 403,000 cases of disease and approximately 50 deaths.
- In 2001-2002, 23 States reported 65 waterborne disease outbreaks affecting 2,536 people associated with recreational waters, at least two of these outbreaks occurred when people became ill after swimming in the Great Lakes. These represent the first documented cases of waterborne disease outbreaks associated with Great Lakes recreational waters since reporting began.⁵
- The NRDC's annual survey of water quality monitoring and public notification at U.S. beaches finds that there were 51 percent more beach closings and advisories in 2003 than in 2002. Across the country, pollution caused more than 18,000 days of closings and advisories at ocean and Great Lakes beaches last year – more than ever recorded in the survey's 14-year history.⁶

II. Goals and Milestones

Goal: By 2020⁷ or sooner where possible, eliminate to the extent provided by regulatory actions inputs of untreated or inadequately treated human and industrial waste to Great Lakes basin waters from municipal wastewater treatment systems and on-site disposal systems.⁸

¹ Various levels of body contact experienced by swimmers, water skiers, users of personal watercraft, scuba divers and tribal communities who live along the shore.

² Coastal Health is affected by the overall health of the natural ecosystem addressed in the Great Lakes Collaboration Habitat/Species strategy chapter. Coastal Health is also affected by the legacy of industrial pollution addressed in the Persistent Bio-accumulative Toxics Reduction and Areas of Concern/Restoration Sediments strategy chapters.

³The Persistent Bio-accumulative Toxics Team will address fish consumption advisories.

⁴2004 CSO/SSO Report to Congress.

⁵Morbidity and Mortality Weekly Report, CDC. 2004

⁶ NRDC Testing the Waters 2004.

⁷The date given in this goal assumes approximately five years for communities who have not done so already to create their long-term control plans (LTCPs) or other comprehensive wet weather solutions. The U.S. EPA CSO Control Policy of 1994, the driving engine for the LTCPs, did not provide a date by which communities needed to submit their plans for approval. However, the CSO Guidance for Financial Capability Assessment and Schedule Development of 1997 recommends a CSO control implementation period of 15 years for communities with high financial burden, while acknowledging that the time boundary is not intended to replace the negotiations and deliberations necessary to balance all of the environmental and financial considerations that influence the site specific nature of the controls and implementation schedules. Since the schedule recommendations laid out in the 1997 guidance have not been met in some communities, and considering the seriousness of CSOs' environmental impacts, the sense of the Coastal Health Strategy Team is that CSO control should be expedited. Therefore, the Team recommends a goal of implementing the LTCPs consistent with the guidance recommendations and, where feasible and appropriate, within 10 years of their approval. The recommended federal grant program described in Recommendation Action 1 would provide communities with the funding resources and incentives to accelerate both their planning process and their LTCP (or other comprehensive wet weather solution) implementation. Particularly given the recommended 45 percent local match to this federal grant program, local funding would significantly leverage this accelerated schedule.

⁸ This goal is intended to capture the intent of the U.S. Policy Committee's 2002 Great Lakes Strategy goals, several of which are now outdated. For example: • "By 2003, U.S. EPA and States will assist local governments in establishing alternate funding vehicles to

Interim Milestones:

- By 2006, EPA and the Great Lakes States will actively enforce NPDES authority to ensure pretreatment programs are properly implemented;
- By 2007, U.S. EPA and the Great Lakes States will undertake a thorough review of their ongoing wet weather control programs to identify and correct deficiencies, including adequate staffing and funding, to ensure that programs are achieving the requirements of the Clean Water Act (CWA), including anti-degradation;
- By 2007, watershed planning and applications of best management practices to promote infiltration and reduce impervious cover shall be components of wet weather management implemented by local governments;
- By 2007, Congress should fully fund the Clean Water State Revolving Fund;
- By 2008, U.S. EPA, in cooperation with Great Lakes States, will promulgate rules governing the disbursement of new wet weather management grant funds;
- By 2009, Congress will appropriate grant funds for a wet weather control program;
- By 2009, local governments shall develop ordinances to ensure proper construction, siting, and maintenance of on-site disposal systems, including conducting inspections and implementing any needed corrective actions at the time of property transfer;
- By 2010, or as soon as possible, all municipalities with wet weather overflows in the Great Lakes basin will have adopted and begun to implement comprehensive storm water control programs with the objective of meeting all appropriate state and federal regulations; and
- For communities with wet weather problems that have not proceeded with required planning and implementation by 2010, the States or U.S. EPA will apply necessary enforcement actions (administrative order or judicial action) to require correction of the problems by a date certain with appropriate penalties.

Goal: Achieve a 90-95 percent reduction in bacterial, algal, and chemical contamination at all local beaches. Steps to achieve this include: identify indirect pollution sources capable of adversely impacting Great Lakes coastal health, educate communities regarding their environmental impact, and remediate all potential indirect pollution sources through identification, estimation of relative contribution (based on historical data and sanitary inspection), and remediation of these sources. This will result in 90-95 percent of all Great Lakes public bathing beaches being classified as having “good” water quality.

Interim Milestones:

- By 2005, the BEACH Act will be fully funded to continue routine compliance monitoring of coastal waters;
- By 2006, real-time testing methodologies will be evaluated and trialed at Great Lakes beaches;
- By 2006, coastal States will have complied with the BEACH Act requirements for public notification;
- By 2006, a standardized sanitary survey form will be drafted;
- By 2007, standardized sanitary surveys will be trialed at select coastal communities;
- By 2008, States will add to their existing water quality monitoring programs a standardized tool for conducting sanitary surveys that will identify sources of contamination at the local level in those instances when bacterial indicator levels exceed published standards;
- By 2009, real-time test methodologies will supplant existing test methods (which take in excess of 18 hours before results become available) under the BEACH Act of 2000; and

implement CSO/SSO abatement construction projects. Storm water permits will be in place for all phase II storm water discharges • By 2005, 100 percent of all CSO permits in the Great Lakes will be consistent with the national CSO policy. • By 2010, all sewer systems will be operated under LTCPs which will optimize performance and minimize discharges from SSOs. • By 2010, 90 percent of monitored high priority Great Lakes beaches will meet bacteria standards more than 95 percent of the swimming season.” See the Nonpoint Source chapter for goals and action items related to minimizing storm water runoff from urban and agricultural areas. See the Persistent Bio-accumulative Toxics chapter for more on preventing discharges of industrial and pharmaceutical wastes from municipal sewage treatment systems.

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- By 2010, regional predictive models will be available using local data and forecasts of water mass movements derived from the Great Lakes Observation System.

Goal: At the local level, individual contamination events will occur no more than five percent of available days per bathing season, sources of these contamination events will be identified through standardized sanitary surveys, and remediation measures will be in place to address these events.

Interim Milestones:

- By 2007, coastal communities will have an education and outreach program in place for K-12, college, the general public, and coastal decision-makers, with assistance of the Great Lakes Sea Grant Network;
- By 2008, enforceable city ordinances will be in place that call for the placement of signs regarding the health risk associated with bather shedding, provision of adequate sanitary facilities for bathers, availability and importance of proper boater waste disposal, and prohibition of practices that attract nuisance wildlife to which fines are attached for violations;
- By 2008, use sanitary surveys to identify 90 to 95% of all indirect pollutant sources resulting in beach closures;
- By 2009, begin to control, manage, and/or remediate pollutant sources identified through sanitary surveys; and
- By 2020, nutrient loading will have decreased as evidenced by a decrease in nuisance algal blooms and ambient water concentrations of nitrogen and phosphorous in coastal areas.

Goal: The quality of Great Lakes basin drinking water from coastal and tributary sources will be protected from chronic and episodic threats of chemical and biological contamination that pose unacceptable risk following conventional water treatment.

Interim Milestones:

- By 2007, amendments to the Safe Drinking Water Act (SDWA) will be adopted to enhance flexibility in how State Revolving Funds may be used for infrastructure system improvements and the Clean Water SRF will be fully funded;
- By 2007, Bioterrorism Act amendments will be adopted to require implementation of security measures that address potential resource/facility vulnerabilities;
- By 2010, States will have strategies for protecting water quality for the intended use of public water supply; and
- By 2010, all States and local municipal water supply systems will complete plans for infrastructure upgrades that address aging system deficiencies and integrate security measures for vulnerable resources/facilities.

III. Recommendations

Based on assessments that identify existing pollution sources and potential threats to water quality, multiple actions are available to remediate and prevent adverse impacts on human health in nearshore waters. These include control/abatement and remediation of direct and indirect pollution sources into coastal and tributary Great Lakes waters, and protection of drinking source water quality. The following actions are required to achieve the Coastal Health goals for a minimum risk to human health within the Great Lakes.

1) Eliminate to the extent provided by existing regulation inputs of untreated or inadequately treated human and industrial waste to Great Lakes basin waters through implementation of wet weather programs, including improvements to wastewater treatment systems. Conditions governing this recommended action are presented in *Appendix C*.

- U.S. EPA and the States should fully implement, enforce, and report on their wet weather control programs to identify and correct deficiencies to ensure the requirements of the CWA are achieved in a timely manner.

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- As part of a 55/45 percent federal/local cost share, \$7.535 billion⁹ in federal grants should be made available over five years. These monies would then support state and local resources in the amount of \$6.21 billion, thereby raising \$13.70 billion to fund wastewater treatment improvements.
- \$10 million¹⁰ should be made available over five years to the three U.S. EPA regions to review and upgrade their Great Lakes wet weather programs – including the CSO Control Policy, NPDES permit issuance and enforcement, and storm water management—to ensure that issues are addressed comprehensively.
- \$40 million¹¹ should be made available over five years to the Great Lakes States to administer a new grants program, review, and upgrade all of their wet weather programs (including NPDES permits and enforcement), and implement anti-degradation rules in relation to sewage system expansions.

Rationale: Direct sources of contamination affecting coastal health are those that originate from a single, identifiable, fixed point such as rivers, streams, sewer pipes, septic systems, or a point of industrial discharge. Aging or overburdened sewage infrastructure, which can release raw sewage to source waters in urban areas through sanitary sewer overflows (SSOs) or CSOs, still exist in many Great Lakes municipalities where storm and sanitary systems remain co-mingled (see *Appendix B*). Substantial reduction of the discharge of untreated sewage into the Great Lakes will reduce health risks for bathers and bacteria load in drinking water supplies. Given the potential impact on human health, overflows of untreated human and industrial waste into Great Lakes waters must be controlled through comprehensive solutions that may include structural controls such as separating storm and sanitary sewers, constructing storage capacity or controlling infiltration/inflow; non-structural controls such as land use planning and aggressive use of best management practices to allow no net increase in storm water run-off; and regulatory controls such as issuing, updating, and enforcing National Pollutant Discharge Elimination System (NPDES) permits.

Cost: \$13.75 billion in new funds over five years, with \$7.54 billion provided by the federal government and \$6.21 billion provided by non-federal partners.

2) Identify indirect pollution sources capable of adversely impacting Great Lakes coastal health and, upon identification, promulgate and enforce regulations, provide public education, promote research, and initiate remediation to reduce the impact of these sources.

⁹ U.S. EPA's Clean Watersheds Needs Survey (CWNS) 2000 Report to Congress (www.epa.gov/owm/mtb/cwns/index.htm) breaks down costs by watershed and need category. For the Great Lakes watershed, the total cost for need categories I-V is 13.75 billion in January 2000 dollars. This total includes I. Secondary Wastewater Treatment, II. Advanced Wastewater Treatment, III-A. Infiltration/Inflow correction, III-B. Sewer replacement/rehabilitation, IV-A. New collector sewers and appurtenances, IV-B. New interceptor sewers and appurtenances, and V. Combined sewer overflow correction. [However, the CWNS Report to Congress states that its estimated cost to control CSOs (Needs Category V) is based on "capturing 85 percent of the flows that enter the combined sewer system during wet weather events." Furthermore, this cost is only for "providing those flows with the equivalent of primary clarification, solids and floatables disposal, and disinfection of the effluent." (CWNS 2000 Report to Congress, page 3-8). To the extent that implementation of CSO controls exceeds 85 percent capture and/or provides treatment for those flows equivalent to more than primary clarification, solids/floatables disposal, and disinfection, this level of funding will be inadequate. Future estimates of the needed funding must be increased to reflect the actual levels of CSO capture and treatment undertaken in the Great Lakes watershed.] The Coastal Health team's recommendation is derived by allocating \$13.70 billion of this total to support a federal grants program, and the remaining \$50 million of this total to support the three Great Lakes U.S. EPA regions (\$10 million) and the eight Great Lakes States (\$40 million). To put this figure in some context, the Report found that the estimated total cost of the upgrade projects necessary to meet the objectives of the CWNS is \$181 billion. The Coastal Health team independently derived the 55/45 percent federal/local cost share for the grants program, resulting in a federal cost of \$7.535 billion over five years. On an annual basis, the team's recommendation calls for \$1.507 billion in federal grants per year for five years. Although this amount is essentially all new funding, a small fraction may be supplied by the State Revolving Fund (SRF). According to NRDC, \$393 million is budgeted for the Great Lakes States' SRF in 2005, and \$260 million budgeted for 2006. The portion of this budget that goes to communities actually within the Great Lakes basin is a much smaller amount. If the SRF continues at its current level, it could represent an approximate \$100 million (estimated) in existing funding that could be subtracted from the team's recommended total on an annual basis. The CWNS 2000 Report states that "the needs must have existed as of January 1, 2000, to be included in the CWNS 2000." Therefore, the costs contained in the report do not have an implied timeframe or end date. The Coastal Health team, accordingly, recommends that the full cost of addressing these needs be provided over a five-year period. The CWNS is repeated and updated every five years. When the January 2005 data are published, the Coastal Health team's recommendations should be updated to reflect the most recent data.

¹⁰ *Ibid.*

¹¹ *Ibid.*

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- These may include but are not limited to bacterial loading from foreshore beach sand and submerged sediments, avian/animal deposition, algal blooms (can appear during dry weather, but are caused by nutrient loading during wet weather and aquatic invasive species), bather shedding, and untreated onboard boater waste.
- State and local public health agencies provide public education and/or incentives to reduce impacts from nutrient-loading, household and industrial products, attraction of nuisance wildlife, improper discharge of onboard boater waste, and bather shedding.
- Request that the Great Lakes Sea Grant Network make this an education/outreach priority for the region and a component of a Great Lakes Centers for Ocean Science Education Excellence (COSEE) program through NSF.
- State and local governments promulgate and enforce existing regulations which take action against boaters who discharge waste to the nearshore or open waters of the Great Lakes.
- Require regulations regarding the availability of adequate toilet and shower facilities based on projected bather density to receive BEACH Act grant funds.
- Assess extent of contaminated sediments, especially in Areas of Concern, that contribute to water quality concerns. (Addressed in AOC/Sediments chapter.)
- Research to clarify sources and transport of biotoxins (i.e., botulism) through foodweb.

Rationale: Indirect sources of contamination are sources whose origination cannot be traced to a single point such as a storm drain or sewer outfall (see *Appendix B*). The effects of indirect sources of contamination are diffuse and, therefore, determining their origin may require intensive investigation. For example, determining a correlation between increased bacterial level density at the bathing beach and various coastal processes, predominating weather conditions, and natural and human sources is often difficult. Remediating contamination sources responsible for indirect pollution water quality failures will reduce human health risks, increase availability/access to Great Lakes recreation, improve ecosystem health, promote sustainable practices, decrease economic loss (millions of dollars are lost each year due to beach closures), and increase commercial benefits.

Cost: Depends on indirect pollution sources identified at individual beaches based on annual sanitary surveys (see *Appendix E*). The costs associated with conducting educational campaigns and initiating remediation range between \$20,000 and \$1 million per source identified, based on the size of the population served, the extensiveness of the impact, and the need for infrastructure improvements. The cost would be shared between state and local agencies (possible through fines levied against offenders in some instances) and through the availability of federally approved loans or grant funding.

3) Standardize, test, and implement a risk-based approach¹² to manage recreational water.

- U.S. EPA to build the approach upon existing water quality monitoring programs and employ the latest technology for microbial assessment and standardized sanitary survey criteria, based on a holistic watershed assessment.
- U.S. EPA to take responsibility for accelerating the process necessary for field testing and approval of real-time test methodologies.
- Once these two tools are in place they can be tested at the local level, adopted by the federal government, and implemented at the state and tribal level.
- Federal, state, tribal and local municipalities have begun to work together to standardize the microbial assessment of recreational water and these working groups can also standardize the sanitary inspection process.

Rationale: Beach and coastal assessment methods (microbial and physical) are the front lines of defense for determining when contaminant influxes are most likely to impact human health in the context of surface water encounters. Tools available to beach managers and authorities responsible for monitoring these water bodies

¹² WHO, Annapolis Protocol, U.S. EPA National Beach Guidance and Required Performance Criteria for Grants, June 2002, EPA 823B02004.

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should accurately reflect risk, provide timely notification to the public, and enable investigation of potential contamination sources (both direct and indirect) thus leading to remediation of these sources.

Cost: \$2.0 million¹³ annually to the Great Lake states to standardize, trial, and implement a risk-based approach to beach/coastal assessment, a portion of which could be appropriated from U.S. EPA BEACH Act funds (assuming that they are re-appropriated at the federal level). \$7.2 million for U.S. EPA to conclude and analyze data from National Epidemiological and Environmental Assessment of Recreational (NEEAR) Water Study (\$9.0 million of the total cost of \$16.2 million has already been funded).

4) Protect drinking source water quality.

- U.S. EPA will establish ambient water quality criteria for parasites, pathogens, and disinfectant by-product (DBP) precursors for States to implement.
- The Clean Water State Revolving Fund (CWSRF) should be fully funded, and States should implement programs to assure that ambient water quality, following conventional treatment, does not pose an unacceptable risk to consumers.
- States should work with public water systems to reduce vulnerabilities identified in the source water assessments.

Rationale: In addition to effective implementation and enforcement of existing Safe Drinking Water Act (SDWA) and CWA requirements by EPA and the States, this action requires a combination of enhanced federal policy requirements to include ambient water quality criteria for parasites, pathogens and disinfectant by-product precursors, full federal funding and greater flexibility in how State Revolving Funds may be used. Ambient water quality criteria related to drinking water following conventional treatment are needed to support source water protection programs. Water quality criteria for pathogens, such as cryptosporidium, have not been promulgated under CWA authority, nor have criteria for DBP precursors been developed (although a disinfectants and disinfection byproducts rule may be promulgated under SDWA authority by 2006), while risk-based standards are being developed for finished water supplied by public water systems.

Cost: Fund the CWSRF at least to the level appropriated for FY 2004 (\$1.35 billion nationally and \$225 million to the Great Lakes States).

5) Use the Drinking Water State Revolving Fund to improve drinking water infrastructure and support source water protection.

- The Drinking Water State Revolving Fund (DWSRF) should be fully funded and increased flexibility should be given in how the funds may be used by the States and local municipalities for water infrastructure improvements.
- States and local public water supply systems to implement and enforce infrastructure improvement plans that include security measures to address resource/facility vulnerabilities and critical infrastructure facilities governed under the Bioterrorism Act.

Rationale: Protection of drinking water quality by public and private water supply systems throughout the Great Lakes basin must be improved. In addition to effective implementation and enforcement of existing Safe Drinking Water Act (SDWA) requirements by U.S. EPA and the States, this action requires a combination of enhanced federal policy requirements to include full federal funding and greater flexibility in how State Revolving Funds may be used to upgrade drinking water infrastructure systems, and implementation of water infrastructure improvement plans with security measures for vulnerable resources/facilities to reduce chemical contaminant and bioterrorism risks to drinking water supplies.

Cost: Fully-fund the DWSRF at levels authorized by the SDWA (\$260 million to the Great Lakes States) through 2010.

¹³ Note that the dollar amount appropriated for BEACH Act funds to the eight Great Lakes states in 2005 was \$1,965,460.