

Water Quality and Sustainable Practices on Land Strategic Action Plan Full Content Outline

Objective: Enhance water quality in the ocean, along our coasts, and in the Great Lakes by promoting and implementing sustainable practices on land.

I. Overview of the Priority Objective

- The Water Quality and Sustainable Practices on Land (WQ/SPL) strategic action plan (SAP) addresses the notable obstacles to and opportunities for enhancing water quality in the ocean, along our coasts, and in the Great Lakes:
 - The major impacts of urban and suburban development and agriculture, including forestry and animal feedlots, on ocean, coastal, and Great Lakes waters.
 - The relative contributions of significant land- and ocean-based sources of pollutants, sediments, and nutrients to receiving coastal and ocean waters, and ways to address them, including recommendations of how to integrate and improve existing land-based conservation and pollution programs.
 - Best management practices, use of conservation programs, and other approaches for controlling the most significant land- and ocean-based sources of nutrients, sediments, pathogens, toxic chemicals (e.g., oil, heavy metals, pesticides), solid waste, marine debris, and invasive species.
 - Implementation of a comprehensive monitoring framework and integration with state monitoring programs based on the strategy developed by the National Water Quality Monitoring Council.

II. Context and Continuity

- The Water Quality and Sustainable Practices on Land SAP outlined below is founded on four themes:
 - Theme 1: Enhance water quality through sustainable practices that reduce upstream sources of excessive nitrogen, phosphorus, and sediment, helping to reduce hypoxic zones and restore degraded ecosystems.
 - Theme 2: Reduce trash and marine debris in ocean, coastal, and Great Lakes waters to minimize impacts on natural and human environments.
 - Theme 3: Reduce harmful health impacts from water quality impairments in the ocean, our coasts, and the Great Lakes.
 - Theme 4: Identify, protect, and conserve high quality ocean, coastal, and Great Lakes waters.

III. Body of the Plan

The following actions are grouped by theme. Theme 1 includes Actions 1-3; Theme 2, Action 4; Theme 3, Actions 5-6; and Theme 4, Action 7. The first four Actions focus on reducing stressors to water quality. Actions 5 and 6 focus on assessing health impacts and improving communication, while Action 7 focuses on protecting high quality waters.

A. Action 1 – Reduce rural sources of excessive nutrients and sediments.

Implement measures to reduce the burden of excessive nutrients and sediments in coastal and Great Lakes watersheds from rural sources (e.g., agriculture, forestry) by focusing on locations where conservation practices have the greatest returns, in conjunction with tribes, regional partners, landowners, and other stakeholders.

1. Why Do This

- Control of excess nutrients and sediments from rural sources can enhance aquatic ecosystem health, reduce costs to wastewater treatment plants, retain storage capacity in flood control structures, and enhance recreational opportunities.
- Government investments to improve watershed health will result in enhanced coastal water quality.
- This action will be connected with many of the other SAPs, notably Coastal Marine Spatial Planning (CMSP), Climate Change, and Regional Ecosystem Protection and Restoration.

2. Timeframe – Mid-term

3. Outcomes

- Improved nutrient and sediment management in agriculture, including aquaculture, aquatic animal feeding operations (AAFO), concentrated animal feeding operations (CAFO), animal feeding operations (AFO), and crop agriculture, through focused use of best management practices.
- Established priority watersheds for restoration and management through data, information collection, and assessment to better focus application of conservation practices.
- Established integrated monitoring, modeling, and assessment partnerships of priority watersheds to measure water quality and conservation program effectiveness, building on regional landscape initiatives (e.g., U.S. Department of Agriculture (USDA) Mississippi River Basin Initiative).

4. Milestones

- Evaluate Federal datasets (e.g., U.S. Geological Survey SPARROW) that will inform review of priority watershed locations (e.g., USDA Chesapeake Bay Watershed Initiative, USDA Mississippi River Basin Initiative).
- Utilize Federal conservation programs, assess program effectiveness, and report results (e.g., Conservation Effects Assessment Project), with emphasis on the most vulnerable lands (e.g., USDA Chesapeake Bay Watershed Initiative, USDA Mississippi River Basin Initiative).
- Develop a focused research strategy to strengthen science and management tools to support water quality improvement decision-making.
- Explore with Federal and regional partners incentive-based ecosystem market programs for nutrient and sediment reduction, and implement pilot projects (e.g., USDA Chesapeake Bay Watershed Initiative).

- Develop remote sensing systems, models, and decision-support tools to better evaluate the effectiveness of conservation practices at the watershed scale.

5. Gaps and Needs in Science and Technology

- Coordinated interagency monitoring framework to improve data collection and analyses.
- Water quality monitoring data to validate predictive nutrient runoff/reduction models at the field scale, in-stream, and in large ecosystems.
- Data on nutrient and sediment contributions from septic tanks, boat discharges, lawns, rural wastewater treatment systems, hardscape features, stream bank erosion, and other non-point sources.

B. Action 2 – Reduce urban sources of excessive nutrients and sediments.

Implement measures to reduce nutrient and sediment loadings in coastal and Great Lakes watersheds from urban sources (e.g., wastewater treatment plants, stormwater, impervious surfaces, septic systems, lawns) by targeting locations and practices with the greatest returns, establishing scientifically-based water quality targets, in conjunction with tribes, regional partners, landowners, and other stakeholders.

1. Why Do This

- Cities, suburbs, and towns have large areas of impervious surfaces (e.g., paved streets, parking lots, rooftops) that do not allow rain to percolate into the ground, resulting in polluted stormwater runoff that negatively impacts aquatic habitat and organisms.
- Wastewater treatment plants and combined sewers contribute significant amounts of nutrients to waterways, impacting downstream water quality.
- Using a targeted approach that includes public reporting promotes progress and innovation in linking upstream actions to downstream impacts.
- This action will be connected with many of the other SAPs, notably CMSP, Inform Decisions and Improve Understanding, and Regional Ecosystem Protection and Restoration.

2. Timeframe – Mid-term

3. Outcomes

- Focused water quality assessments, including air deposition, in areas with the greatest water quality degradation and/or disproportionate impacts on disadvantaged communities.
- Promotion of cost-effective stormwater controls, long-term control plans for combined sewers, and water quality-based effluent limits for other point sources.
- Increased adoption, through coordinated Federal and regional partner efforts, of low-impact development, green infrastructure, smart growth strategies, and other innovations.
- Reduced impacts of hydrologic alterations that change or disrupt the natural flow regime and delivery of flow to coastal wetlands.

4. Milestones

- Engage communities in developing innovative market-based mechanisms to provide cost-effective nutrient reduction strategies.
- Promulgate a more effective National Pollutant Discharge Elimination System stormwater rule, and expand the program to fast-growing suburbs and ex-urban areas to reduce discharges from developed lands.
- Promote research and foster community education and training to adopt green infrastructure, low-impact development, and best management practices for wet weather events, and promote pilot programs to assess the socio-economic benefits of these activities, focusing on federal facilities and disadvantaged communities.
- Standardize state and Federal water quality data collection to help assess the impacts of urban pollution and flow volume and timing, and report progress in reducing nutrient and sediment loadings.

5. Gaps and Needs in Science and Technology

- Tools to characterize watershed-scale benefits due to implementing green infrastructure practices and low impact development.
- Data on the amount of nitrogen and phosphorus discharged from wastewater treatment plants and combined sewers.
- More detailed maximum daily load data that clearly identify the amounts of nutrients and other contaminants contributed by various sources, including stormwater runoff.

C. Action 3 – Assess hypoxia status, trends, and impacts nationwide.

Assess hypoxia status and trends in coastal, estuarine, and Great Lakes waters, and communicate the results to regional partners and other stakeholders.

1. Why Do This

- Severe oxygen depletion or hypoxia is one of the most readily recognized symptoms of impaired ocean and marine water quality, evoking a strong public reaction to incidences of mass fish mortality, loss of bivalve and coral reefs, economic impacts on commercial and sport fisheries, and degradation of ecosystem health.
- Cumulative economic losses associated with hypoxic conditions could amount to billions of dollars due to reduced commercial and recreational opportunities.
- In most cases, human actions are the primary cause of increasing hypoxic conditions in coastal waters.
- Hypoxia is reversible.
- To support existing interagency efforts and foster information exchange between regions.
- This action will be connected with many of the other SAPs, notably Environmental Based Management (EBM), CMSP, Inform Decisions and Improve Understanding, Regional Ecosystem Protection and Restoration, and Observations, Mapping, and Infrastructure.

2. Timeframe – Near-term

3. Outcomes

- Established partnerships (e.g., regional governance structures) to identify priority areas for assessing and forecasting effects of reduced nutrient flux on the onset, size, severity, and persistence of hypoxic conditions, and report findings.
- Measurable improvements in modeling and forecasting of hypoxic conditions under different nutrient control strategies, and analysis of ecological and socio-economic impacts of reduced hypoxia and improving watershed water quality.
- Coordinated monitoring in priority watersheds and adjacent coastal waters (e.g., Guanica Bay, Chesapeake Bay) to assure continuum of observations, quantify flow and flux of materials, and provide quality-assured data for determining trends.

4. Milestones

- Provide results of integrated modeling and resulting toolkits for communicating hypoxia-related information to coastal managers and other stakeholders.
- Develop a multi-parameter strategy for water quality monitoring, including frequency of observations.
- Develop methods and procedures for reducing uncertainty about the relationships between nutrient enrichment and hypoxia, and produce an interagency report on benefits to coastal communities of restoring hypoxic zones.
- States, Federal agencies, and other partners and stakeholders collaboratively develop and implement effective nitrogen and phosphorus pollution reduction strategies that: 1) assess watersheds; 2) demonstrate load reductions; and 3) provide accountability and transparency for tracking progress.

5. Gaps and Needs in Science and Technology

- Improved modeling and ecological forecasting that incorporate site-specific parameters as well as linkages between nutrient loading and hypoxia.
- Coordinated monitoring, shared data protocols, and sustained support for Federal and non-Federal monitoring programs.
- Research and assessments for improved evaluation of biological effects and ecological impacts of hypoxia, including effects of non-nutrient factors and scenarios (e.g., water availability).
- Integrated science, including assessment of socio-economic impacts of hypoxic conditions and cost-benefit analysis of alternative management strategies.

D. Action 4 - Reduce trash and marine debris through pollution prevention and removal.

Reduce the impacts of marine debris and trash on ocean, coastal, and Great Lakes waters, and associated watersheds, through pollution prevention efforts (e.g., waste management and minimization, stormwater management, education and outreach), mitigation, and removal activities.

1. Why Do This

- Marine debris and trash are pervasive problems in and along our watersheds, Great Lakes, coasts, and the ocean.
- Marine debris and trash enter our waterways through both land- and ocean-based sources, resulting in impacts to human health, the environment, and the economy. The issue is visible, preventable, and solvable using a comprehensive approach that engages communities in prevention, mitigation, and removal efforts.
- This action will be connected with many of the other SAPs, notably EBM, CMSP, Inform Decisions and Improve Understanding, Regional Ecosystem Protection and Restoration, and Observations, Mapping, and Infrastructure.

2. Time Frame

- Long-term

3. Outcomes

- Measurable reduction in land- and ocean-based marine debris and trash (i.e., prevent items from becoming marine debris).
- Measurable reduction in the impacts of marine debris and trash (i.e., preventing, mitigating, and removing marine debris) to Great Lakes, coastal, and ocean resources, human health, and affected communities.
- Strengthened partnerships with affected communities, tribes, stakeholders, industry, and government to ensure development of a more comprehensive approach to marine debris and trash impact reduction and prevention.

4. Milestones

- Work with governmental (including Federal, tribal, state, and territorial), industry, and non-governmental partners, and communities to develop and encourage behavior change, create incentives, and promote non-regulatory efforts to mitigate the impacts of marine debris and trash (e.g., enhanced recycling, composting, pay as you throw, waste to energy, tagging and identification of fishing gear, product design and packaging, green chemistry, education, other trash and marine debris removal and reduction programs).
- Improve use of and expand existing regulatory tools (e.g., Total Maximum Daily Loads (TMDLs), Combined Sewer Overflow (CSO) controls, waste and recycling management, stormwater management, Superfund) to reduce land-based sources of marine debris and trash.
- Identify the types of marine debris producing significant negative effects on the marine environment, and quantify these impacts to focus targeted prevention, removal, and mitigation efforts.
- Establish marine debris location and amount baselines through standardized monitoring or existing data, and address specific trash and marine debris sources (e.g., vessels), pathways (e.g., CSOs, landfills), and accumulation points (e.g., urban areas, islands).

5. Gaps and Needs in Science and Technology

- Innovation in product formulation, design, packaging, and handling to reduce the accumulation and toxicity of marine debris and trash.
- Analysis of socioeconomic impacts of marine debris and trash.
- Standardized land- and ocean-based monitoring protocols (i.e., develop and ensure consistent baseline by which to measure effectiveness of marine debris reduction efforts), databases, and statistically valid analyses quantifying the amount of marine debris in ocean, coastal, and Great Lakes waters at relevant spatial and temporal scales.
- Assessment and quantification of trash and marine debris toxicity, both as a source and as a sink, including impacts on the food web, human health, ecosystem health, and our waterways.

E. Action 5 - Assess health risks of coastal waters.

Enhance disease surveillance, environmental/wildlife monitoring, and watershed/waterbody modeling to assess the health risks of degraded water quality and inform remediation efforts.

1. Why Do This

- We now face numerous health threats to animal and human populations from impaired water quality, including degraded and less resilient ecosystems and the presence of human pathogens, algal toxins, chemical contaminants, and potentially zoonotic diseases (transmitted from animals to humans) in drinking water, recreational waters, marine organisms, and seafood.
- To address these threats, enhanced support for surveillance and monitoring programs is necessary to better understand the linkages between upstream sources of pollution (i.e. land-based) and downstream impacts, along with effects of ocean-based sources of pollution.
- This action will be connected with many of the other SAPs, notably EBM, CMSP, and Regional Ecosystem Protection and Restoration.

2. Timeframe – Mid-term

3. Outcomes

- Improved inter- and multi-agency coordination, resource-leveraging, and capacity building to identify health risks from impaired water quality.
- Enhanced understanding of current and emerging health risks from impaired water quality and the links between upstream land use practices and downstream impacts on human and wildlife health.

4. Milestones

- Strengthen research and provide interdisciplinary training opportunities on the links between degraded water quality (e.g., harmful algal blooms) and human and wildlife health risks.
- Identify baseline pollutant levels (including land-based sources) and health impacts for monitoring long-term trends.

- Establish a scientifically sound public health foundation for implementing best management and sustainable land practices to reduce upstream and coastal pollution inputs from non-point and point discharges (e.g., harmful algal bloom mitigation, stormwater management, vessel discharges, aquaculture systems management).
- Enhance existing activities, including disease surveillance, environmental monitoring, organism and toxin detection, pollutant source tracking, watershed/waterbody modeling, and assessment of health risks related to environmental pollution.
- Review existing best management and sustainable land practices to highlight successful remediation strategies for degraded water quality and associated health risks, and prioritize pilot regions to implement improved practices.

5. Gaps and Needs in Science and Technology

- Identification and prioritization of the greatest risk factors related to water quality.
- Identification of the sources of harmful microbes and chemical contaminants, and understanding of the causes of harmful algal blooms related to impaired water quality.
- Availability of detection, tracking tools, sensors, and observations with adequate temporal and spatial coverage.
- Building capacity for diagnosing marine wildlife health concerns, including those associated with potential zoonotic and other diseases that may be transferred from marine wildlife to humans or vice versa.
- Identification of the impacts of pollutants and other discharge constituents, including invasive species, on the health and resiliency of ecosystems and food web stability and robustness.

F. Action 6 – Provide warning and reduce public health risks of coastal waters.

Provide warning and reduce public health risks from ocean, coastal, and Great Lakes water pollution through integration of disease surveillance and environmental/wildlife monitoring and improved forecasting capabilities.

1. Why Do This

- There is a critical need to integrate environmental monitoring with disease surveillance and develop predictive models to enhance existing and advance new early warning systems for pathogens, algal toxins, and chemical contaminants.
- Forecasts and warnings can help quickly identify threats and notify communities of risks associated with contaminated recreational and drinking waters, seafood, and beaches; reduce health risks from pollutants; and help safeguard coastal resource-dependent economies.
- Improved risk warning systems will support informed decision-making by managers and local communities about coastal resource uses.
- Improved intergovernmental coordination will promote informed risk management control strategies, including decision-making and identification of priority areas for remediation.
- This action will be connected with many of the other SAPs, notably CMSP, Regional Ecosystem Protection and Restoration, and Observations, Mapping, and Infrastructure.

2. Timeframe – Mid-term

3. Outcomes

- Reduced health risks from impaired waters through early warning advisories made possible by improved collaboration within the Federal government, and with territory, regional, tribal, state, and local partners, and other stakeholders.
- Improved use and understanding of health-related environmental information by local communities and resource managers.
- Greater public confidence in drinking water, recreational waters, and seafood.
- Reduced public health costs associated with adverse health outcomes from impaired water quality, and enhanced coastal economies.

4. Milestones

- Strengthen coordination within the Federal government, and with tribes, regional partners, and other stakeholders, to increase capacity for holistic (i.e., societal, economic, ecological) and efficient decisions.
- Inventory existing tools and systems applicable to forecasting activities and health warning systems.
- Integrate activities and data related to human and animal/wildlife disease surveillance, environmental monitoring, organism and toxin detection, pollutant source tracking, watershed/waterbody modeling, and assessment of health risks.
- Improve and expand health early warning systems, forecasting capabilities, and existing advisories (e.g., harmful algal blooms, seafood contamination) through increased collaborations with states and within the Federal government.
- Launch pilot early warning systems or demonstration projects for a variety of current and emerging health risks in partnership with state and regional efforts.
- Improve communication, training, access, and use of information, including the development of new tools to effectively communicate risk, to increase public understanding of degraded water quality impacts.
- Explore expansion of the National Coastal Condition Report (NCCR) to: 1) address pollution problems resulting in human health impacts including fish and shellfish contamination, safe beaches, waterborne disease, and harmful algal blooms; 2) expand the Federal/state interagency team responsible for preparing the report to include public health agencies; 3) align the NCCR regions with the CMSP Regions; and 4) describe the actions that Federal agencies will take to address environmental and human health risks identified in the report.

5. Gaps and Needs in Science and Technology

- Integration of climate change predictions into health risk assessment and early warning systems.
- Better understanding of how and how often urban residents use contaminated coastal water bodies (e.g., subsistence fishing, swimming) and are thereby exposed to health threats.

- Improved assessment of socio-economic impacts of health threats, including public health costs related to impaired water quality.
- Development of new remediation techniques for preventing and controlling pollution and its impacts.

G. Action 7 - Identify and protect high quality coastal waters.

Promote and conduct collaborative, holistic assessments and initiate steps for the protection, conservation, and maintenance of high quality ocean, coastal, and Great Lakes waters, as well as the watersheds that affect those waters.

1. Why Do This

- The protection, conservation, and maintenance of high quality waters and healthy watersheds is a cost-effective, long-term solution for assuring the sustainable conditions of the ocean, coastal waters, and Great Lakes and their associated environmental services, including human uses.
- Maintaining the conditions of high quality waters is paramount to assuring the continued functionality and resiliency of aquatic life and its ability to adapt to environmental stressors such as climate change.
- Preventing degraded water quality through coordinated response to coastal and offshore pollution helps to ensure the safety of aquatic life in high quality waters.
- This action will be connected with many of the other SAPs, notably EBM, CMSP, and Regional Ecosystem Protection and Restoration.

2. Timeframe – Long-term

3. Outcomes

- Identification of high quality waters for priority consideration in conservation efforts through assessments of chemical and physical parameters, hydrology, geomorphologic processes, shoreline modification, incidence of aquatic invasive species, natural disturbance regimes, landscape condition, and human uses.
- Improved control and regulation of water pollutants and other constituents in discharges (e.g., invasive species, pathogens, toxics, sediments) from vessels and ocean dumping.
- Coordination and integration of stakeholder/partner monitoring programs to encourage community involvement, education, and stewardship in the protection of healthy watersheds.
- Improved coordination among Federal agencies in the prevention and response to coastal and offshore oil/chemical pollution from spills and industrial/shipping operations.
- Enhanced coordination of water quality monitoring by promoting implementation of the strategy developed by the National Water Quality Monitoring Council and coordinating it more closely with the NCCR.

- Application of tools (e.g., climate change models) and water quality protection measures to help protect, maintain, and conserve high quality waters and healthy watersheds within existing programs.

4. Milestones

- Develop collaborative action plans to protect, maintain, and conserve high quality waters on public and private watersheds (e.g., Forest Service National Watershed Condition Framework).
- Develop or revise regulations and permits for discharges from vessels pursuant to the Clean Water Act.
- Issue a biennial report card on water quality, quantity, and timing status, trends, and success stories in federally managed, protected, or funded areas.
- Coordinate and enhance research, preparedness, and response to coastal and offshore oil/chemical pollution from spills and industrial/shipping operations.
- Expand the scope of the National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries to address the physical, chemical, and biological integrity of rivers and streams by leveraging the State/EPA National Aquatic Resource Surveys.
- Initiate a demonstration project linking healthy watershed protection to estuary protection, and evaluate the success in protecting and conserving high quality coastal waters (e.g., National Estuary Program).

5. Gaps and Needs in Science and Technology

- Improved ability to generate, manage, store, and display data and analyses generated by interagency collaborative protection and conservation efforts.
- Improved understanding of the environmental impacts from vessel discharges.
- Improved existing capabilities and assure closer collaboration between agencies in the identification and protection of high quality waters and healthy watersheds.
- Improved capacity to accurately measure, display, and incorporate social/economic/ecological factors that affect values and decisions about land use, high quality coastal waters, and tradeoffs.
- Robust sensitivity analyses to implement the activities recommended by the National Water Quality Monitoring Council in its National Monitoring Network for Coastal Waters and Inland Tributaries.