NONPOINT SOURCE APPENDICES

Appendix 1 Detailed Discussion of Nonpoint Source Stressors

- **Nutrients:** Western Lake Erie and other shallow embayments of the other Great Lakes have at times displayed eutrophication including oxygen depletion and harmful algal blooms (such as the current Wisconsin *Cladophora* outbreak and toxic cyanobacteria throughout the Great Lakes) that may be attributed partially to nutrient contamination. These stem in part from storm water events causing runoff carrying rural, suburban, and urban nonpoint source nutrients, both dissolved and sediment-attached. Much of this nutrient runoff is wasteful because it represents excess nutrients from air deposition, farms, and lawns. Eutrophication resulted in the recent large-scale die-offs of fish and waterfowl in Lake Erie; deadly botulism is caused by the powerful neurotoxin of the bacterium *C. botulinum*, produced in oxygen-deprived lake zones.

- **Contaminants:** The Great Lakes ecosystem exhibits some specific sites with persistent bio-accumulative toxics (PBTs), including PCBs and mercury, at levels that may threaten human health and the environment. In response, health agencies have issued fish consumption advisories for broad areas of the Great Lakes basin. PBTs continue to enter the Great Lakes and tributaries in part through atmospheric deposition, sediment resuspension, and urban and agricultural runoff. A portion of this runoff, caused by storm water events, represents the costly waste of pesticides (i.e., insecticides, fungicides, and herbicides) diverted from their proper function. The Great Lakes ecosystem and its beneficial uses may also be at risk due to nonpoint releases of new chemicals of concern. These may include certain brominated flame-retardants and pharmaceuticals (e.g., hormones and antibiotics).

- **Pathogens Affecting Human Health:** Bacterial contamination in runoff from wildlife animals and fowl, animal feeding operations, failing septic tanks, and diffuse sources in urban areas can limit the recreational use of tributaries and Great Lakes shoreline swimming beaches. Among animal feeding operations, this loss by runoff again represents a waste of a useful and valuable resource that might properly be used as fertilizer. Among septic tanks, it represents an annoyance and risk to the owner and neighbors.

- **Sediments:** Sediments can seriously impact aquatic habitats, choking riverine, coastal, and near-coastal wetlands. Sedimentation often results from storm water runoff from urban and rural developments. Many agricultural and forestry practices that do not employ conservation measures are adding excessive sediments as well as other pollutants to the Great Lakes and tributaries.

- **Alteration of Flow Regimes:** Both human-induced and natural changes in flow regimes can cause significant harm. In the Great Lakes basin, we frequently see human-induced changes result in excessive flows. These may be exacerbated by the loss of wetlands and the removal of natural, riparian vegetative cover, altering natural groundwater and surface water flow regimes to the detriment of aquatic species. Similar human-induced flow alterations that reduce groundwater recharge can diminish base flows and put cool water and cold water fisheries and ecosystems at risk; conversely, alterations that increase runoff can increase flooding, bank erosion, and channel instability. In some cases, flow alterations may combine to increase the risks of flooding while reducing the quantity and quality of physical habitat available.

Appendix 2 Existing Federal, State, and Local Programs

Federal Programs

A list of existing federal programs includes the following examples. Note that this list is not intended to be exhaustive.

Program	Agency
Aquatic Ecosystem Restoration System Program	COE
ARS – Research Units	ARS
Clean Water Act (CWA)	U.S. EPA
Clean Water State Revolving Fund	U.S. EPA
Coastal Nonpoint Pollution Control Program (under Coastal Zone Management Act Section 6217)	NOAA
Confined Disposal Facilities Program	COE
Conservation Innovation Grants	NRCS
Conservation of Private Grazing Land Program (GPCL)	NRCS
Conservation Security Program (CSP)	NRCS
Cooperative Forestry (CF)	FS
Delivery of Technical Assistance (Technical Service Provider)	NRCS
Endangered Species Program	FWS
Environmental Equality Incentives Program (EQIP)	NRCS
Environmental Improvements Program	COE
Farm and Ranch Lands Protection Program (FRPP)	NRCS
Fish and Wildlife Management Assistance	FWS
Forest Health Management	FS
Forest Land Enhancement Program	FS
Grassland Reserve Program (GRP)	NRCS
Grassroots Source Water Protection Program	NRCS
Great Lakes Basin Program for Soil Erosion and Sediment Control	GLC
Ground and Surface Water Conservation	NRCS
National Sea Grant College Program	NOAA
National Water Quality Assessment Program	U.S. EPA
Nonpoint Source Program	U.S. EPA
Partners for Fish and Wildlife	FWS
Total Maximum Daily Load Programs	U.S. EPA
Wetlands Reserve Program (WRP)	NRCS
Wildlife Habitat Incentive Program (WHIP)	NRCS
Conservation Technical Assistance Program	NRCS
National Cooperative Soil Survey	NRCS
Shore Protection	COE
Small Flood Control Project	COE
Conservation Reserve Program (CREP)	FSA
Coastal Zone Management	NOAA
Water Quality Standards	U.S. EPA

State Programs

The Great Lakes States have a variety of programs that address nonpoint sources of pollution in different ways. While some of these programs are from delegated authorities in federal statutes (e.g., Clean Water Act, Safe Drinking Water Act), others are from state authorities with programs that implement pollution control or conservation approaches to water restoration and protection. A list of existing state programs includes the following examples.

Program	**Agency**
Illinois Great Lakes Protection Fund	IEPA
Clean Michigan Initiative	MDEQ
Part 201 Programs	MDEQ
Minnesota Great Lakes Protection Fund	MSPA
Great Lakes Charter Program	ODNR
Lake Charter Program	ODNR
Lake Erie Project and Ohio Great Lakes Fund	OEPA
Pennsylvania Great Lakes Office	PDEP
Shore Structure Permit Program	ODNR
Great Lakes Salmon and Trout Stamp Program	WDNR
Great Lakes Harbors and Bay Restoration Funding	WDNR

Local Programs

Local programs include those administered by conservation districts, municipalities, non-governmental organizations, and other local entities.

Appendix 3 Concepts to Act Upon

During the meetings of the Nonpoint Source Strategy Team, literally hundreds of specific programmatic steps were pruned and consolidated into the five recommended actions in the current strategy (see core document). Other actions, which were not included in the core document, focused upon approaches or ways of doing business and affected more than one stressor and/or more than one of the five recommended actions. Many of these actions responded to the obstacles described in the Nonpoint Source core document (i.e., authority, funding, and coordination) and demonstrated underlying principles in approaching or implementing the major recommended actions. These are offered below to guide those in this or other task forces.

1. Adopt a science-based ecosystems approach, building upon the linkages among media, stressors, and habitats. Ensure that peer-reviewed science is used to guide management decisions. Do not manage resources based on the needs of any one specific species, but rather, based on the needs of maintaining an ecologically sound ecosystem.

2. Recognize these linkages within existing programs and proposed actions. For example, employ impact and cost-effectiveness formulae that take into account collateral benefits and disturbances (e.g., reduced waste or multimedia impact).

3. Act with awareness of the unique value and needs of the Great Lakes. This may include developing and addressing separate state priority lists among existing programs (particularly USDA, i.e., EQIP, nutrient management plans, etc.) for those areas within the Great Lakes basin.

4. Apply the principles of conceptual modeling and adaptive management throughout the operation of existing federal and state programs in order to view the problems on a systems level and identify significant data gaps and needs.

5. Streamline voluntary programs to make participation easier. For example, reduce the complexity of the processes associated with existing programs (e.g., TMDLs, nutrient management plans). This can be done by creating web-based administrative tools to guide the user through the scientific and administrative complexities of participation.

6. Leverage available resources by developing and promoting Decision Support tools to assess levels of need or appropriate responses, and prioritize them by cost and impact. Examples include the Indiana EQIP tool, the Purdue Optimization Engine, and the MSU Sedimentation tool.

7. Use locally-led processes to solve problems at the organizational level closest to where they occur. This may include opening federal and state grant funding for proposed action items to local conservation or drainage districts, public and private universities, or established NGOs with holdings or interests in the project area.