Ohio EPA has been collecting ecological data on the status of its aquatic communities (fish and macroinvertebrate communities) for 20 years. Each warmwater stream in Ohio has one of four aquatic life use goals ("biocriteria") that varies with the ecological potential of that waterway. Biosurvey data tracking achievement of these goals is detailed in the Ohio Water Resource Inventory (1996) and recent data summarized in this and other fact sheets.

A large number of Ohio stream and river segments have been reassessed since point source pollution controls have been implemented to meet water quality standards. One benefit of the monitoring approach employed by Ohio EPA is the ability to forecast water quality changes into the future. A major challenge facing the Ohio EPA water programs is the goal of achieving full support of aquatic life uses in 75% of Ohio's streams and rivers by the year 2000. In order to determine if existing programs are likely to achieve this goal, we must attempt to look forward based on past observation. The current rate of improvement, projected from reassessment results observed between 1988 and 1998 (Fig 1 below), is an accumulating addition of approximately 2.2%percent of restored miles per year (90% Confidence Interval: 0.9-3.8%/year). This rate is largely the product of point source abatement efforts that are now declining in prevalence). Based on the current and projected rate of restoration, 66.1% of streams and rivers monitored in the preceding two-year cycle will be fully supporting their aquatic life uses by the water year 2000 (Assessment cycle 2002). Clearly, there is a gap between the 75% goal and the projected figures.

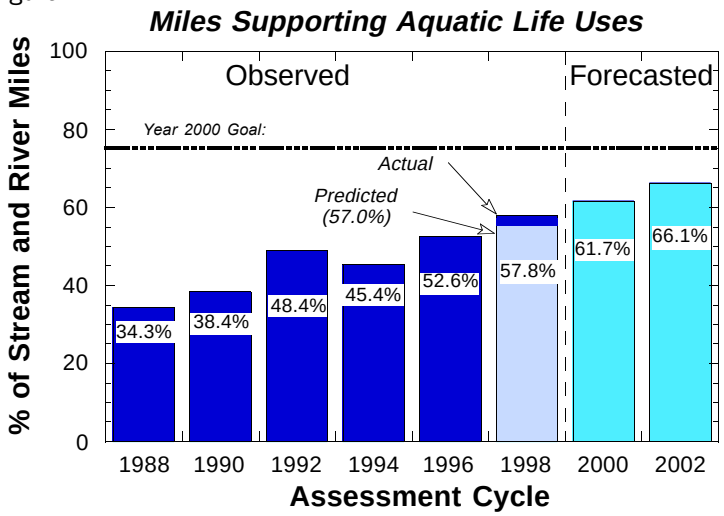
Ohio 2000 Goals:	
Aquatic Life Uses	
Goal:	75%
Forecast:	66.1%
1998 Cycle:[1]	57.8%

[1] **(95/96 Water Years)**

Future Actions

A strategy to reach the 75% goal needs to address those causes and sources of impairment that are limiting aquatic life. Point

Figure 1.



sources are dwindling in prevalence (Fig 2). Restored stream miles in the most recent cycle (1998) reflect abatement of point source controls implemented five or more years ago. To reach the 75% goal, there needs to be a shift towards restoring streams limited by nonpoint sources of impairment and to protect streams that are threatened by such sources.

Most of the threats to aquatic life are habitat or runoff related and are associated with suburban development, encroachment on riparian areas or hydromodifications. Existing efforts to control polluted runoff and to restore and protect habitats need to be supported and expanded to achieve the 75% goal. For example, ODNR is currently revisiting its Nonpoint Source Management Strategy in light of the statistics reported in Ohio's Water Resource Inventory and has a series of cross-agency workgroups dealing with important issues (e.g., headwater streams).

Measureable goals need to be developed for restoration and protection efforts so that efforts will be focused and directed. For example, the U. S. Department of Agriculture has set a goal of establishing *two million* miles of stream buffers. In the Chesapeake Bay watershed a goal of resestablishment of 2010 miles of woody riparian zones by the 2010 was established by Maryland, Virginia, Pennsylvania, and the District of Columbia based on the recognition that these habitats ultimately affect the health the bay. Ohio could benefit substantially from such a goal, especially if focused on restoring forested buffers along warmwater, exceptional warmwater, and coldwater streams.

Habitat modifications to streams are the leading cause of aquatic life impairment in Ohio.

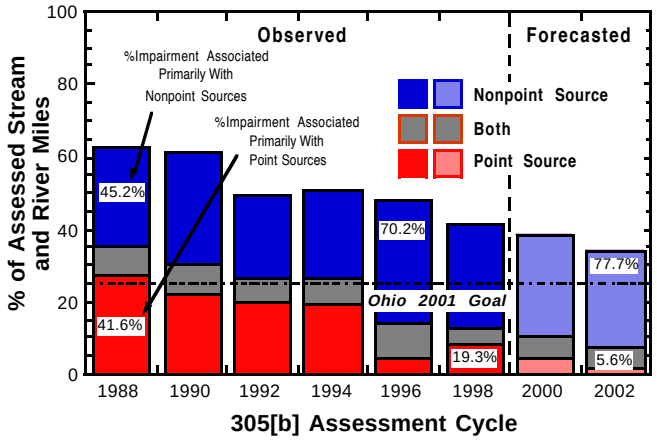


Figure 2.

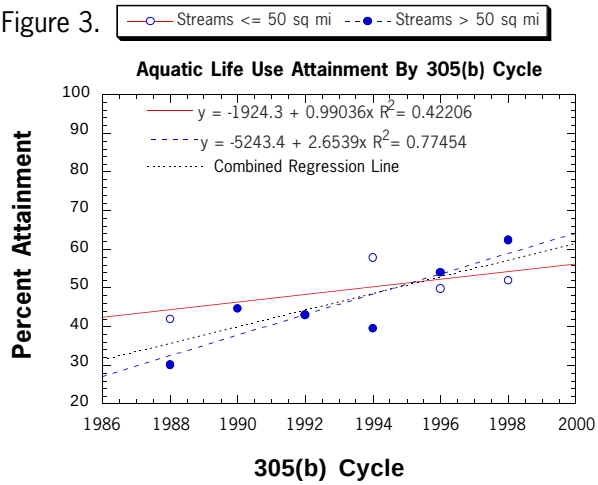
Expansion of the miles of streams covered by the 401/404 water quality certifications will have some effect on stemming unnecessary hydromodifications. This effort, however, does not address the hardening of a watershed and its effects which includes increased bank erosion, more frequent scouring floods, dewatering during drought, and increased delivery of nutrients, sediment, and toxicants via urban runoff. In addition, the loss of riparian vegetation, a key component of ecosystem function is also not addressed directly by either the

stromwater regulations or the 401/404 process.

Headwater Streams

Small streams are proportionately more affected by habitat degradation than larger waters. Examination of trends in smaller streams (< 50 sq mi, Fig 3) indicates that, as a group small streams have recovered less than larger waters. This is likely a result of the prevalence of habitat impacts which have not been addressed signficantly for Ohio waters. The failure to address such problems will make it likely that many small streams will lose their potential to support high quality biota. The loss of the natural functions of small streams (nearly 4/5th of all streams are headwater sized) will undoubtedly affect the condition of larger waters. The end result will be a gradual loss of the improvements from wastewater treatment that have been achieved with billions of dollars of point source abatement efforts.

Figure 3.



Site Specific Trends

In addition to tracking trends at the statewide level it is important to examine trends at other scales, from individual sites to watersheds.

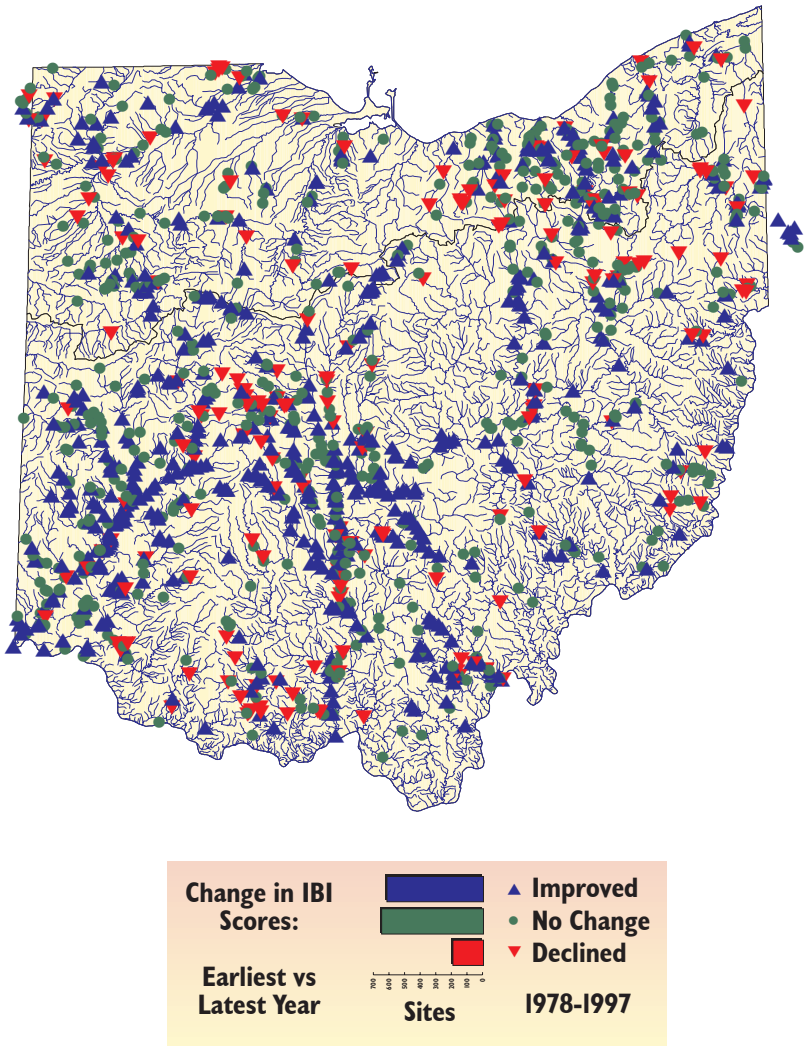
Individual Sites

The adjacent map illustrates sampling locations were we have sampled fish communities during more than one year. This map reflects the difference in IBI scores between the earlies and latest year and includes data between 1978 and 1997. Differences were classified as significantly improving, no change, and signficant declines depending on the change of 4 IBI units. This data is also illustrated on a "cumulative frequency plot" (Figure 4), which show a statistical difference between the distribution of IBI scores between the earliest and latest years for each site.

It is clear that many more sites have improved or not changed than have declined. Most of the improvements reflect the declining influence of point sources. Declines have occurred for various reasons including habitat destruction and development-related impacts.

Watersheds

The colorful maps on the bottom of the next page reflect changes



in attainment status within the 93 subbasins delineated for Ohio. Although Ohio streams and rivers will not likely approach 75% attainment of aquatic life uses by the year 2000, we have already surpassed this goal in a number of subbasins. Compared with the status of streams as of the late 1980s, there has been substantial progress in restoring aquatic life.

The pattern of attainment by watershed illustrates that the most progress has occurred in the central, south central, and northeast part of Ohio. Point source abatement efforts have occurred throughout the state. The pattern reflected here is a result of improving subbasins having intact stream habitats present that allowed for quick recovery from the abatement of point source impacts. Much of northwest Ohio has seen extensive stream habitat modifications that have precluded quick recovery and made the effects of remaining nonpoint impacts (e.g., nutrient enrichment) worse. Parts of southeast Ohio are still affected by old mine-related impacts (acid water and sedimentation to stream channels) that have not been abated as fast as point source impacts.

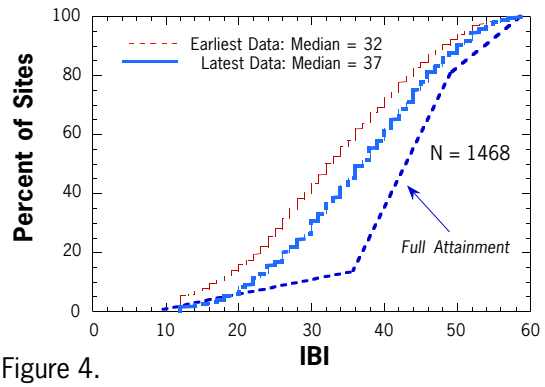


Figure 4.

It is clear that there has been substantial progress in restoring the aquatic health of many Ohio streams. In many ways, however, the most difficult causes and sources of impairment remain: finding ways to reverse the loss of aquatic habitats and polluted runoff in a rapidly urbanizing state.

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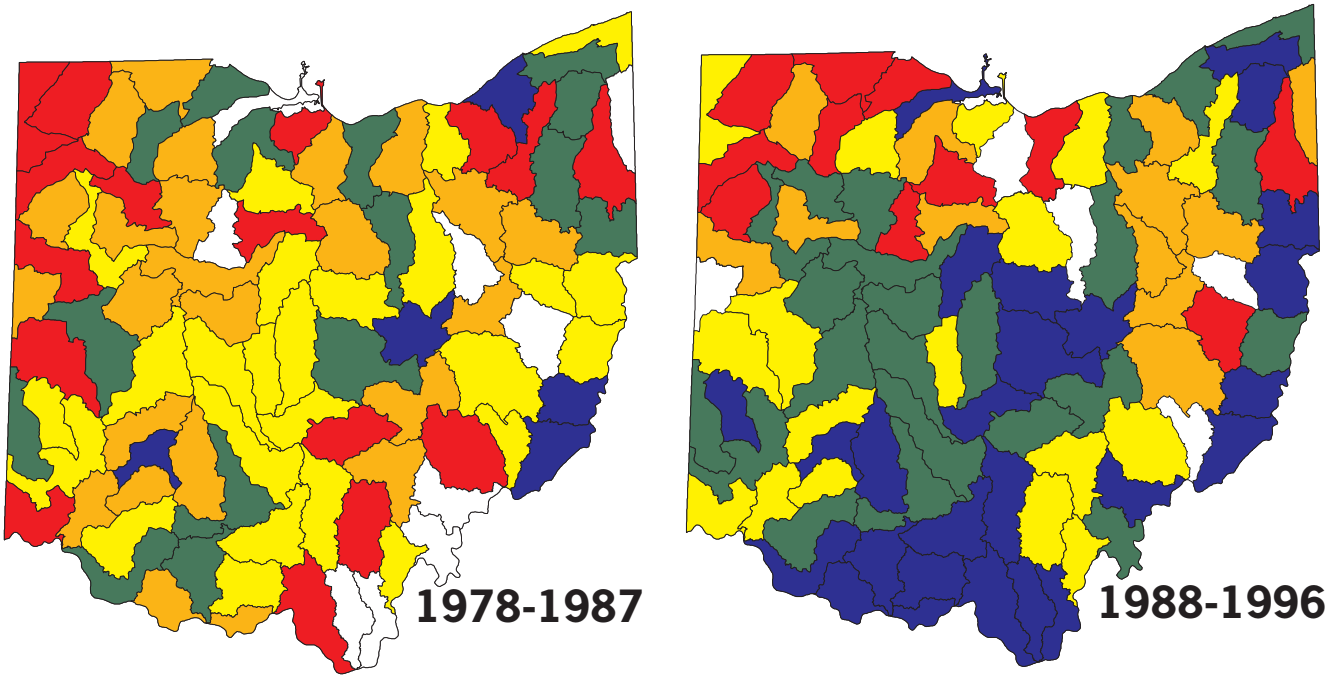

Aquatic Life Use Attainment in Ohio

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