



Improving Waters Program

Purpose

1. Define and document measurable improvements in water quality in streams, rivers and lakes that result in:
 - progress towards an impairment free condition
 - an increased value in the resource and quality of life for the surrounding community.
2. Implement BMPs where most needed/and where most chance of success

Reasons for Improvement

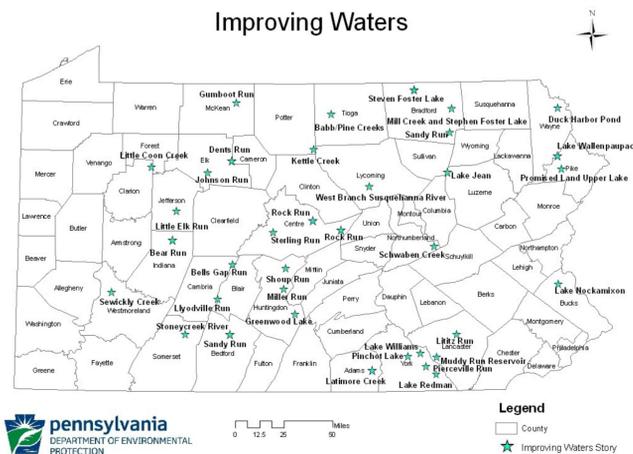
- Improvements may be due to:
- A period of natural healing
 - Restoration efforts and enhancements
 - Removal of threats to the health and/or integrity of a waterbody
- Improvements may be:
- Fully restorative (Full delisting)
 - Partially restorative (Partial delisting)
 - Incremental

Defining Incremental Improvement

- Measurable
- Technically defensible
- Positive change in the condition of water body where an improvement has been measured
 - If impaired - does not yet fully meet applicable water quality standards
 - If unimpaired – exceeds standards

Measurement of Incremental Improvement

- Can be accomplished in different ways
- Measurement method must be:
 - Scientifically sound
 - Appropriately used
 - Sensitive enough to generate data from which signal can be discerned from noise



Identification of Incremental Improvement in Streams and Rivers

- At least one chemical parameter that shows improvement of 15% or greater
- over a three year period OR;
- Benthic macroinvertebrate metrics showing improvement over a three year period OR;
- An increase in visual habitat scores in combination with an increase in benthic macroinvertebrate metrics OR;
- Improvement in a combination of physical parameters OR;
- Photo documentation (before and after) that indicates visual improvement.

Identification of Incremental Improvement in Lake, Ponds and Reservoirs

- Improvement trends in Trophic Status Indices (TSI) OR;
- A single physical or chemical parameter shows improvement of at least 15% over a three year period OR;
- Photo documentation (before and after) that indicates visual improvement.

Assessment Methods

- DEP ICE Protocol for Streams and Lakes
- DEP's Watershed Support Section's - Water Quality Monitoring Methods for Watersheds with Agricultural Impacts
- DEP's Watershed Support Section's - Water Quality Monitoring Methods for Abandoned Mine Drainage Impacts
- Water Quality Monitoring Methods as described in the *Pennsylvania Senior Environment Corps Water Quality Field Manual* and the *Pennsylvania Senior Environment Corps Statewide Volunteer Water Monitoring Quality Assurance Project Plan (2013)*

Data Analysis

Chemical Indicators	Physical
Biological	Dissolved Oxygen
Benthic Macroinvertebrates and Fecal Coliforms	Water Temperature
Chlorophyll-a, Plankton and Macrophytes	Erosion and Sedimentation – Pebble Counts
Invasive Species	Visual Habitat
Riparian Buffers	