Honnedaga Lake Watershed Liming Project

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**Honnedaga Lake**

- **Surface Area**: 312 ha (770 acres)
- **Max Depth**: 56 m (183 feet)
- **Elevation**: 701 m (2300 feet)
Honneleda Lake Summer Surface Water: 1959 to 2010
Fall Trapnet Surveys
Fall Trapnet CPUE of Brook Trout

No Trap Net Surveys

CPUE (n/night)

1970s 2000s
pH in Honnedaga Lake Tributaries

- Mean pH < 5.0
- Mean pH > 5.0
Stream Electro-Fishing Surveys
Young-of-Year Brook Trout and $A_{im}$ in Tributaries

**Presence / Absence**

- YOY Brook Trout Presence (Y/N)
- $P < 0.05$
- $R^2 = 0.65$

**Density**

- YOY Brook Trout CPUE (number / m$^2$)
- $A_{im}$ (micrograms/L)
- Temperature

Inorganic Monomeric Aluminum (micrograms/L)
Leaf Breakdown Assessment

3 g Leaf Packs Composed of *Acer rubrum* (Red Maple) Leaves
Macroinvertebrate Communities in Leaf Packs After 2 Weeks in the Streams

Numbers/Leaf pack

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<tr>
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<th>0.94</th>
<th>1.22</th>
<th>1.42</th>
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<td>T16</td>
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- **Ephemeroptera**
- **Plecoptera**
- **Trichoptera**
- **Diptera**
- **Misc. Others**

**Chronically Acidic**  **Episodically Acidic**
Current Status of the Honnedaga Lake Ecosystem

Since 1990 Amendments to the Clean Air Act

Modest chemical and brook trout population recovery within Honnedaga Lake – reflective of an acid impaired ecosystem

Chronic acidification of numerous groundwater influenced tributaries / catchments within the watershed

The acid impaired state of tributaries likely limits young-of-year and consequently adult brook trout abundance – as well as invertebrate community diversity

Honnedaga Lake remains an acid impaired ecosystem with low probability of recovery in chronically acidified tributaries / catchments
Tributary Watershed Liming

Design and Rationale

Selective in-stream and watershed lime applications to restore habitat for spawning and young-of-year brook trout, macroinvertebrates and forests.
Honnedaga Lake Tributaries

Proposed design for the Honnedaga Lake tributary and watershed liming project:

Chronically Acidified Tributaries
  • T24 (control – no lime)
  • T15 (instream liming)
  • T16 (watershed liming)

Episodically Acidified Tributaries
  • T9 (control – no lime)
  • T6 (instream liming)
  • T8 (watershed liming)
Chronically Acidified Tributaries

Tributary 16

**pH**

- 1/22/2010
- 3/13/2010
- 5/2/2010
- 6/21/2010
- 8/10/2010
- 9/29/2010
- 11/18/2010

**ANC (ueq/L)**

- 1/22/2010
- 3/13/2010
- 5/2/2010
- 6/21/2010
- 8/10/2010
- 9/29/2010
- 11/18/2010

**Al_{im} (umol/L)**

- 3/3/2010
- 3/23/2010
- 4/12/2010
- 5/2/2010
- 5/22/2010
- 6/11/2010
- 7/1/2010
- 7/21/2010
- 8/10/2010
Episodically Acidified Tributaries

Tributary 8

pH

ANC (ueq/L)

$A_{lim}$ (umol/L)
Chronically Acidified Tributaries
- T24 (control – no lime)
- T15 (in-stream liming)
- T16 (watershed liming)

Episodically Acidified Tributaries
- T9 (control – no lime)
- T6 (in-stream liming)
- T8 (watershed liming)
Proposed Liming Schedule

In-Stream Lime Applications
Annual applications in June (2012, 2013, 2014)
West Virginia and Clayton Formulas
High calcium sand limestone
T6 (11 tons/yr), T15 (0.5 tons/yr)

Watershed Lime Application
One time application (tentative 2012)
Aerial application of pelletized lime
Amount to be determined for T16 and T8
Tributary Monitoring Program: Pre-Lime and Post-Lime Application

- **Tributary Chemistry and Flow** (stream gages, automated water samplers)
- **Brook Trout Populations** (back pack electro-fishing, redd surveys)
- **Macroinvertebrate Populations**
- **Leaf Litter Decomposition**
- **Forest and Soils**
Tributary Chemistry and Flow

(Stream Gages, Automated Water Samplers)
Anticipated Outcomes from Lime Applications

In-Stream Lime Applications

- Improved stream chemistry (↑ pH, ↑ ANC, ↓ Al_{im})
- Increased presence and density of YOY brook trout
- Increased presence / diversity of macro-invertebrates
- Increased leaf litter decomposition rates

Watershed Lime Application

- Improved stream chemistry (↑ pH, ↑ ANC, ↓ Al_{im})
- Increased presence and density of YOY brook trout
- Increased presence / diversity of macro-invertebrates
- Increased leaf litter decomposition rates
- Improved soil chemistry and forest “health”