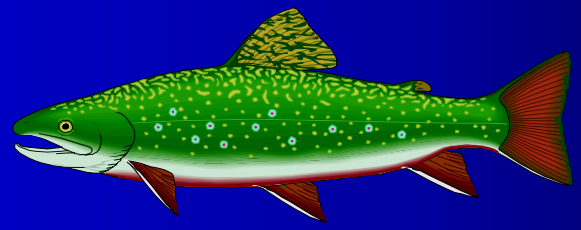
Liming and Brook Trout Restoration in the Adirondacks

Presentation prepared by:

William Gordon, Senior Aquatic Biologist

NY Dept. of Environmental Conservation



ACID RAIN

Without acid rain, liming programs would not be necessary. Acid rain is cited as a cause of environmental problems by numerous sources, and acidification impacts have seriously harmed aquatic ecosystems. In New York, the Adirondacks have been especially hard hit. Despite some recent improvements in surface water pH, the problem continues in many Adirondack lakes, thereby

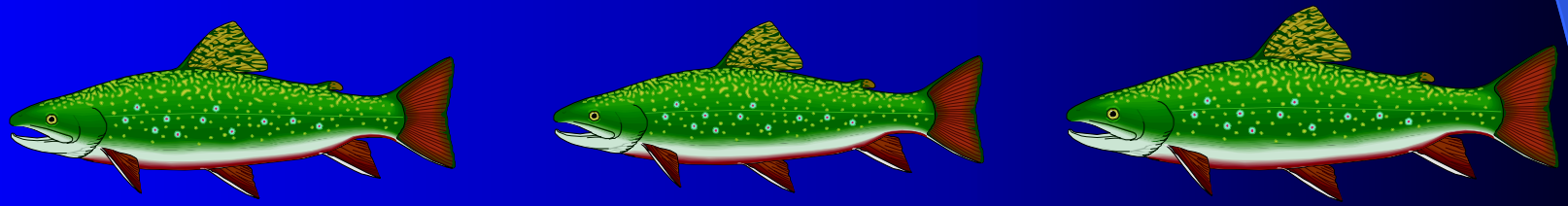
Goal of New York DEC Pond Liming Program

- Maintain the pH of a selected group of ponded waters at 6.0 or greater
- Preserve or restore important fish populations and viable aquatic ecosystems

Bureau of Fisheries' Approach to Pond Liming

Preserve and Restore Adirondack Brook Trout

- Intrinsic Values
- Sportfishery



Pond Liming in New York

- Since 1959
- 70 lakes and ponds
- 175 treatments
- Still active
- 40 program waters, 3-4/yr

Lake and Pond Selection Criteria

- ✓ pH < 5.7, ANC < 20 ueq/l
- ✓ Flush rate < 2.0 times per year
- ✓ *Sphagnum* < 50% of its shoreline
- ✓ Suitable DO and temperature or…
- ✓ Historic fish species record

- ✓ Retreatment: pH < 6.0, ANC < 25 ueq/l

APPLICATION METHODS

Accessible Waters

- Boat
- Snowmobile
- ATV

AERIAL APPLICATION

REMOTE WATERS

Materials and Dosage

- Agricultural limestone
- Calcium carbonate ($CaCO_3$)
- Dolomitic limestone ($CaCO_3$ –$MgCO_3$)
- One ton per surface acre
- Target pH (>6.0)

NEW YORK MODEL

Post treatment pH Change vs. Pretreatment pH, pretreatment ANC and lime dose (tons/acre)

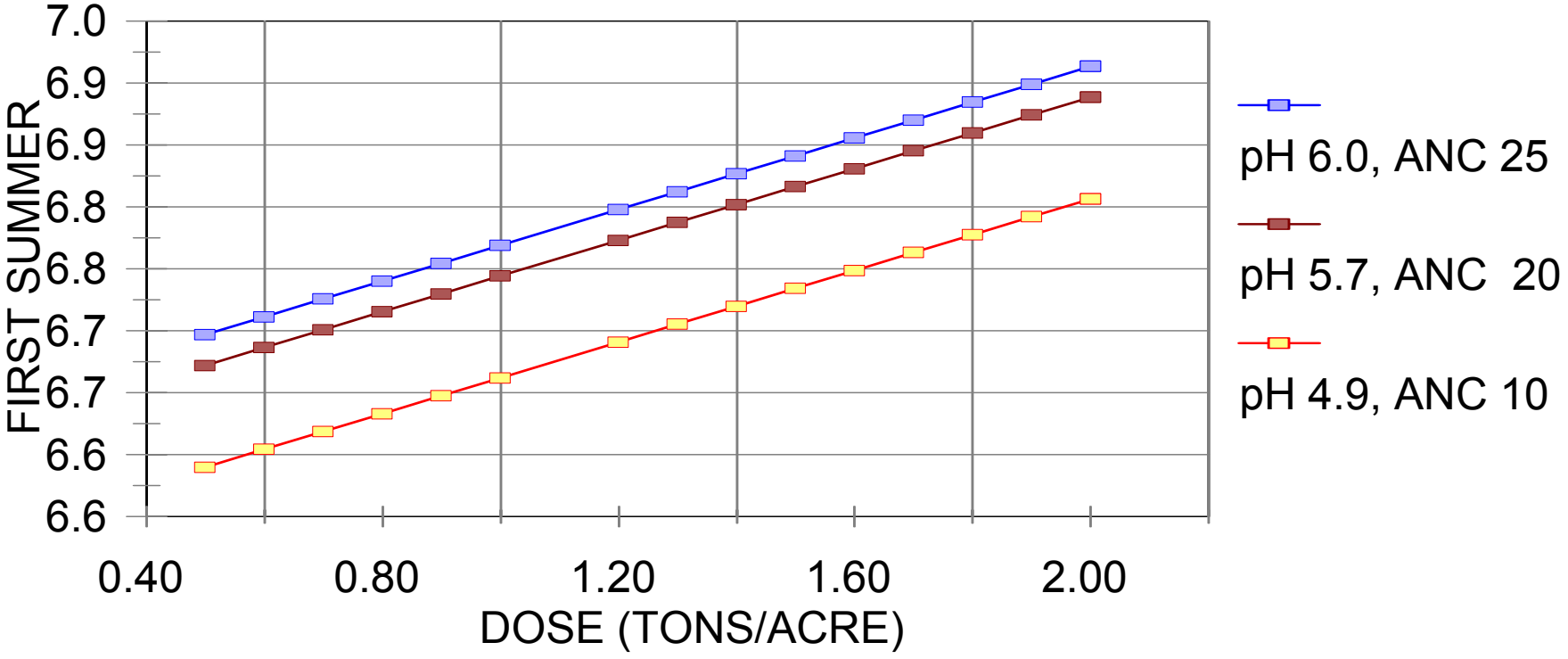
Using spreadsheet software, regression analysis compared actual pH change for more than 30 treated waters with a number of variables (e.g. dose, pretreatment pH and ANC) & physical characteristics (volume, flush rate, watershed area, etc.). This analysis indicated that post-treatment pH change is strongly correlated ($r^2 = 0.75$) with the combination of pretreatment pH, ANC and dose (tons/acre). Model results from this analysis are shown in the next slide.

NEW YORK MODEL

Based on Adirondack Experience

POST TREATMENT pH

PREDICTED



Liming Program Success ?

- Post treatment survival
- Regionally important sportfisheries
- Heritage Strains
- Restoration?

Example of Liming Success: Restoration of Two Adirondack Brook Trout Populations Lost To Acidification

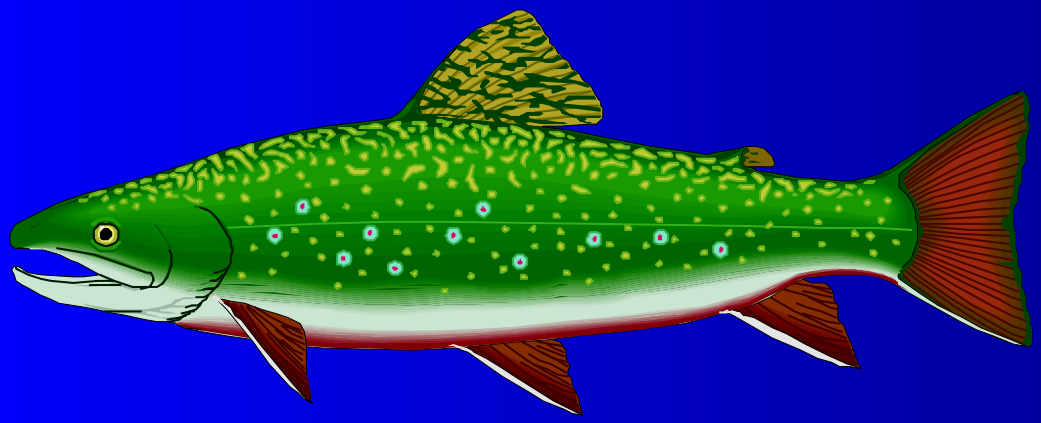
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Preliminary Results

- Case studies
- Post-liming Water Chemistry Changes
- Brook Trout Population Establishment
- Sport Fishery Development
- Natural Spawning Potential

Brook Trout Management

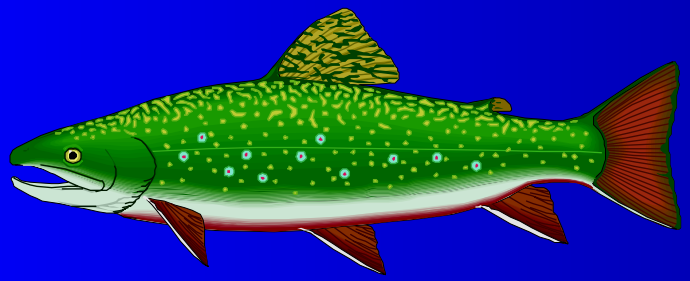
NEW YORK STATE

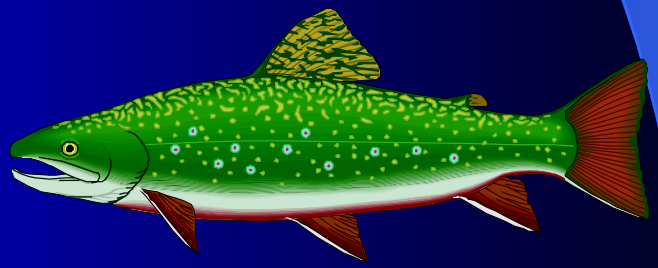


- State Heritage
- Sport Fishery
- Adirondacks
- Population Declines
- Acid Deposition
- Non-Endemic Species

Brook Trout Stocking

- Since the 1800s
- 400,000 Fall-Fingerlings per year
- Maintained distribution
- Wild trout production has been limited
- 4 % (3000+) Adirondack lakes and ponds support naturally-sustained brook trout populations

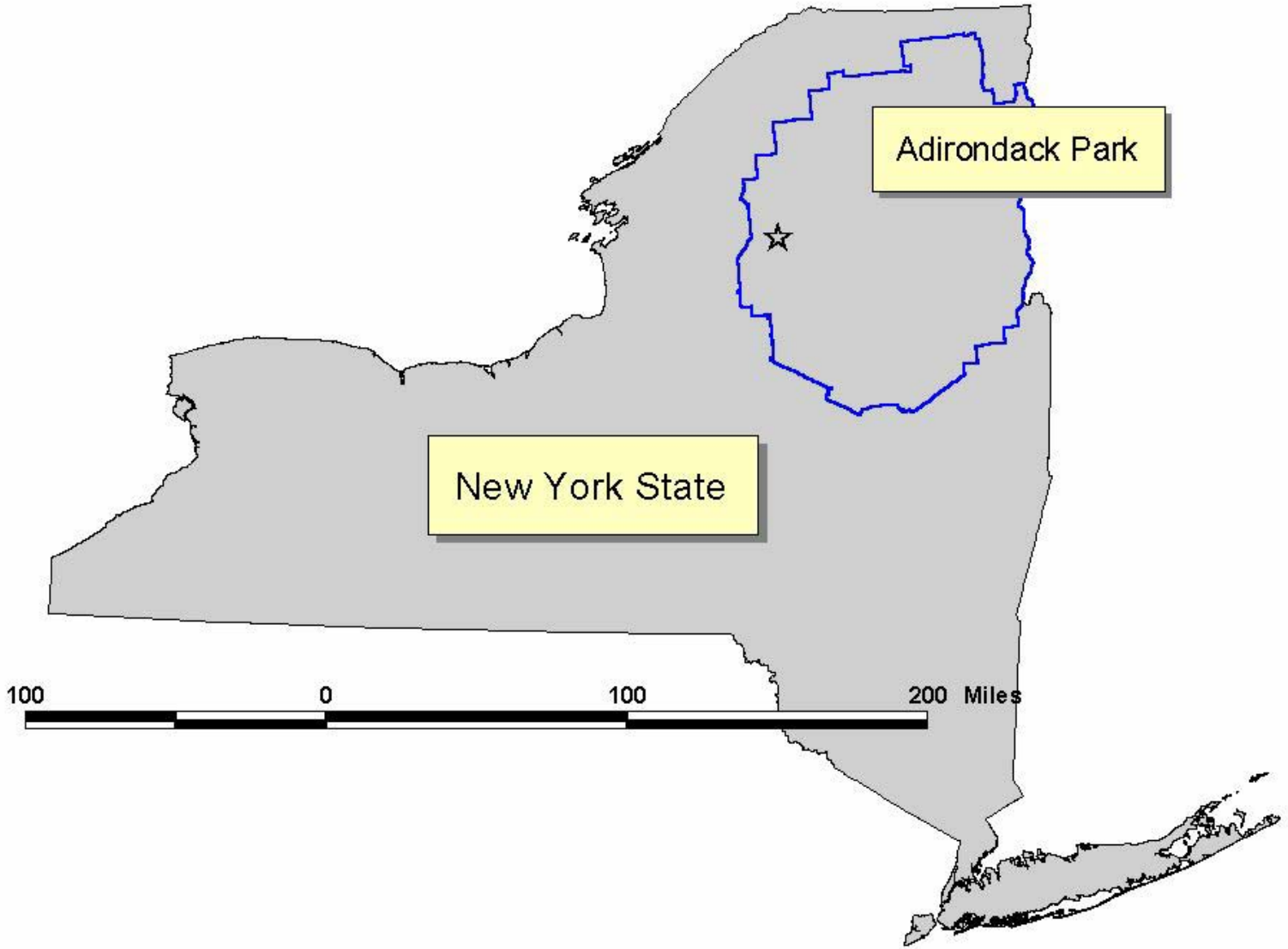




Pond Liming

…To Lessen Acid Deposition Impacts

- Since the 1950s
- Restore pH Levels
- Excellent Brook Trout Survival
- Limited Wild Trout Production


Adirondack Park
New York State
100
0
100
200 Miles

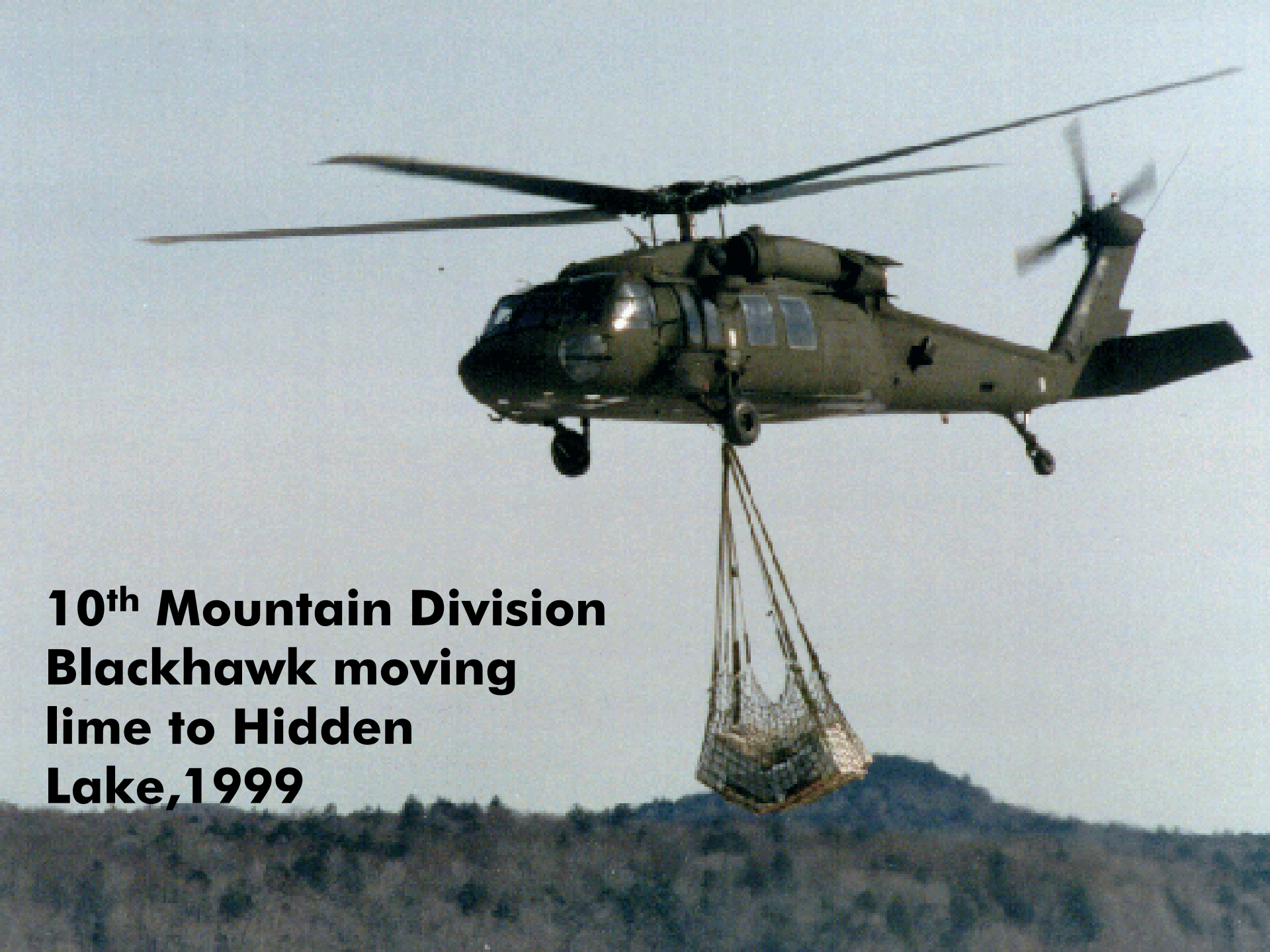
EVERGREEN AND HIDDEN LAKES

GOALS:

RE-ESTABLISH BROOK TROUT POPULATIONS

PROVIDE UNIQUE & HIGH QUALITY ANGLING EXPERIENCE

..ACIDIFIED AND FISHLESS
PRIOR TO TREATMENT

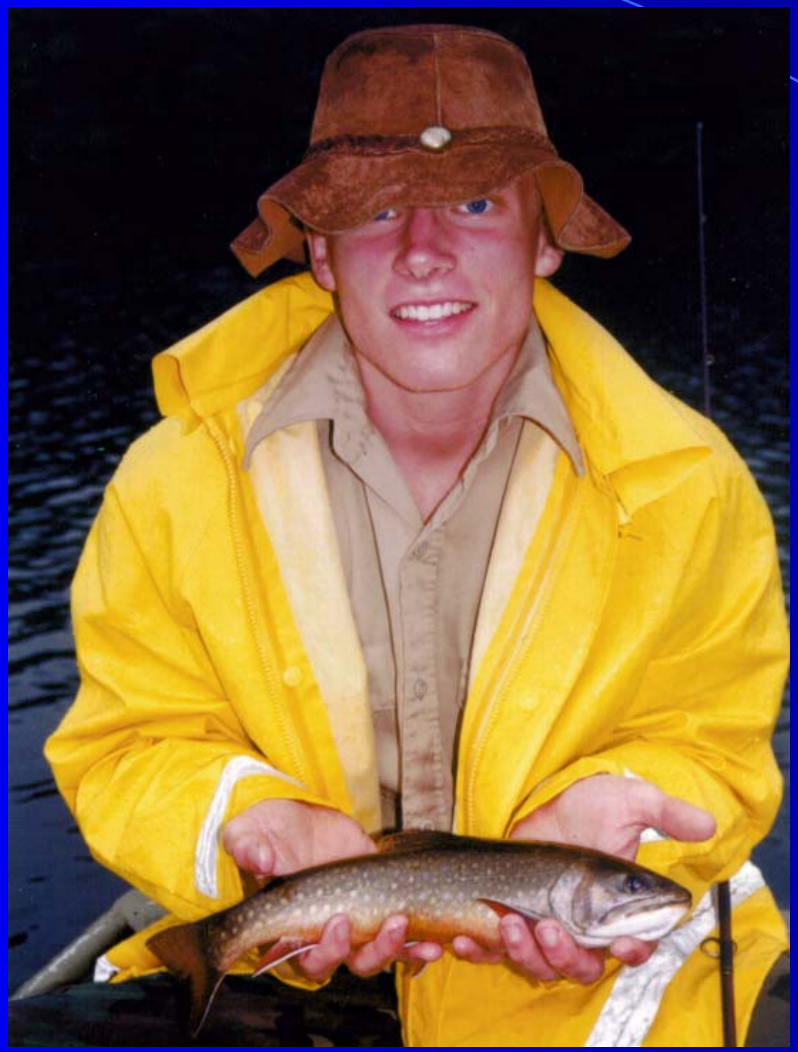


10th Mountain Division Blackhawk moving lime to Hidden Lake,1999

POST LIMING

WATER CHEMISTRY CHANGES

	EVERGREEN	HIDDEN
Pre-Liming pH	4.92	5.27
Post-Liming pH	6.42	6.57



Improved Water Chemistry…

Allowed for successful introduction of Little Tupper strain

Brook Trout

Brook Trout Populations

	1985	2000
Evergreen Lake	0 / net night	24 / net night
Hidden Lake	0 / net night	20 / net night