Adirondack Mountains
New York
"Courtesy of the Adirondack Museum at Blue Mountain Lake, New York,"
"Courtesy of the Adirondack Museum at Blue Mountain Lake, New York,"

1850-1880, 7 million bushels of charcoal annually
7000 acres of forest cut per year
"Courtesy of the Adirondack Museum at Blue Mountain Lake, New York,"

"The Adirondack Museum 2006"

TO THE MEN IN OUR EMPLOY

We are sorry to have to inform you that the prospects of the Iron Business are growing worse and worse, and the times look so bad that we are obliged to either close the mines or reduce wages. After much consideration we have decided not to close, but to reduce; and from and after DECEMBER 15th, the wages for a day of Ten Hours, will be as follows:

For Pit Foremen, . . . $2,25
“ Miners, . . . . . 1,75
“ Pit Men, . . . . . 1,50
“ Bank Men, . . . . . 1,35
“ Drill Boys, . . . . . 1,00
“ Drill Sharpeners, . . . 2,00
“ Machine Drill Men . . . 1,75
“ Assistant Drill Men . . . 1,50

Witherbees, Sherman & Co.
The Port Henry Iron Ore Co.
Port Henry, N.Y. Nov. 30, 1874.

"Courtesy of the Adirondack Museum at Blue Mountain Lake, New York,"
Natural vegetation

Development hindered by:

1) Acid soil
2) Excessive water drainage
3) Poor nutrient-holding capacity
4) Fragipan
5) Heat reflection
6) Exposure to wind
Newton Falls Road

Artificial lake – former drainage into Chaumont Swamp
Benefits of paper mill Sludge

- High pH neutralizes acid soil
- Sludge increases water-holding capacity
- Sludge increases nutrient-holding capacity
- Application via trenches breaks fragipan
- Resulting vegetation reduces heat reflection
- Resulting vegetation reduces wind exposure
Hypothesis

- Incorporating paper mill sludge into the iron mine tailings increases the productive capacity of the site and allows the development of a more natural ecosystem.
Monitoring well
Older projects
10-year-old red pine
10-year-old white pine
Advancements in the 1999 Trial:

• Incorporated dewatered sludge in addition to regular (liquid) sludge
• Incorporated disturbed and undisturbed controls
• Incorporated fifteen species-density treatments
• Used only aggressively-growing hardwood species
2001 Data – Two growing seasons
2001 Data – Two growing seasons

Average Height of Three Species, by Treatment at the Mine Tailings Project as measured July, 2001
2001 Data – Two growing seasons

Height by Species and Treatment of Three Species Planted at the Mine Tailings Project

- Black Locust
- Hybrid Poplar
- Willow

Treatment: Undisturbed Control, Disturbed Control, Liquid Sludge, Dewatered Sludge
What does it look like today?
Liquid sludge trenches
Dewatered sludge trench
Disturbed control row
Disturbed Control

Locusts and poplars
Willows Undisturbed Control between two Dewatered Sludge rows
Undisturbed Control hybrid poplars and locust
Liquid sludge – poplars
Black locust with willow understory
1999 Mine Tailings Project
Seven-year Growth Results

Height (m)

Sludge Treatment

UC  DC  LS  DS

Willow
Hybrid Poplar
Black Locust
Percent Change in Average Heights from Undisturbed Control

- Willow
- Hybrid Poplar
- Black Locust

Treatment:
- DC
- LS
- DS
Percent Change in Average Root Mass from Undisturbed Control
Does a developing forested ecosystem, on a former waste dump, constitute a “beneficial use” of entrenching paper mill sludge?