

## LIBRARY SESSION

On Tuesday, Oct. 9 at 5:35 PM we will meet in the Geography Computer Lab Room 1090B HN.

We will get a demo on researching the media and professional journals for information at the county level.

Go directly to 1090B HN.

1

# MINING IN NYS

Prof. Anthony Grande

©AFG 2012 2

## NYS is a Mining State

- NYS ranks in or near the top third of all states in the value of its mineral production.
- Mineral resources make a substantial contribution to the state's total economy.
- Mining occurs in every county in NYS except those of NYC.

*NOTE: Print the mining and minerals handouts from home page.*

3

## NYS is a Mining State

**Almost 90% of mining in NYS involves the excavation of:**

- sand
- gravel
- limestone

These minerals are used in construction projects.

**NYS has important national reserves of**

salt	garnet
emery	gypsum
talc	zinc
wollastonite	

These minerals are used to produce sandpaper, wall-board, paint pigment, brick, ceramics, glass and industrial abrasives.

4

## History of Mining

**Mining began with the Native Americans.**

They used:

- chert** for arrowheads
- clay** for pottery
- stones** for jewelry and tools
- iron minerals** for pigment.

They knew the location of **salt springs**.

They were aware of **petroleum** and **natural gas** escaping from the ground.

**European colonists** brought iron making technology with them.

They refined the low grade **iron ore** of the Hudson Highlands and the Taconic Mts. (esp. in Orange and Columbia counties) into iron ware products.

They found and used **lead, copper, and silver.**

5


## History of Mining

- By the mid-1800s numerous metals and non-metals were discovered in the Adirondack Mts.
- NYS accounted for **25%** of the **US iron** production.
- The period 1880-1920 was the height of the NYS mining era.
- There was a renewal during World War II (1940s).

- **Sand and gravel** was considered a nuisance until the late 1800s when cities began to grow.
  - Now there was a need for construction materials!!
- The **proximity** of sand and gravel and natural cement (limestone and clay) **to the NYS cities** aided their growth in the early 1900s.

6

## History of Mining



Salt spring "mining" started in the early 1800s.

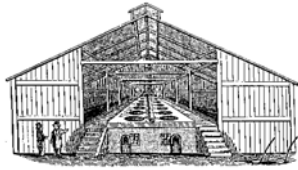
Salt water (brine) was boiled to remove the water. Salt crystals were dried and bagged for shipment.

Syracuse once provided salt for the entire US. (During the War of 1812 salt from aboard was embargoed.)


After the Erie Canal was opened (1825) salt was shipped east and west by canal boat. This continued into the late 1800s.

7

## 19<sup>th</sup> Century Salt Works Salina, NY



Interior view of a salt manufacturing facility.  
From Barber's Historical Collections of the State of New York, 1905




Interior of a boiling block. The men labored in intense heat (over 120° F). Note baskets of wet salt.  
(From the collection of the Onondaga County Parks Office of Museums).

8

## History of Mining

Underground **salt mining** in western NYS was started in the 1860s.




Half mile deep US Salt Company brine well at Watkins Glen, Schuyler Co. was first opened in 1882.

By the 1880s a new technique called **solution mining** was developed.

Reopened mines in the 1990s have gone back to using **room and pillar** techniques.

9

## Underground Salt (halite) Mine Room-and-pillar Method



10

## History of Mining

**NYS is at the northern edge of the Pennsylvania oil fields.**

- **Petroleum** (oil) was discovered in SW NYS by Native American Indians who used it as a medicine and for waterproofing.
- In 1627 they showed the "seep" sites to French missionaries.

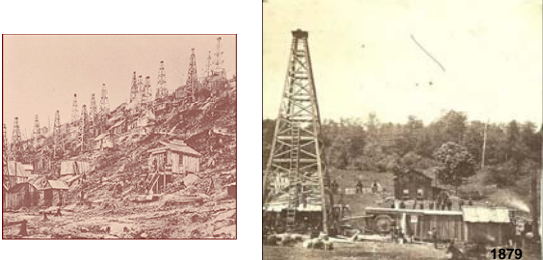
11

## History of Mining

- The petroleum industry **began in 1859** with the first exploratory wells and **peaked in 1882**.
- It declined rapidly in the 1890s until new technologies were invented in the 1930s. Over **75,000** wells have been drilled.
- **Natural gas** was burned off as a useless and dangerous by-product in the 1800s.

12

### 19<sup>th</sup> century Oil Wells



13

### History of Mining

- In 1980s during first energy crisis, there was a resurgence of drilling for **natural gas**.
- Currently the **Marcellus Shale** formation is the major source of natural gas in NYS.
- New methodologies, esp. **fracturing**, have stirred controversy across the Southern Tier counties.
- *See articles in the Web-readings Section of the Home Page*
- New technologies developed in the 1990s has made the recovery of gas profitable.

14

### National Ranking of NYS Mineral Resources

- New York is the **only** state in the U.S. that produces **wollastonite**.
- New York ranks **second** in the nation in the output of **garnet** and **zinc**.
- New York ranks **third** in **salt** production and **fourth** in crude **talc**.
- New York ranks **seventh** in the production of **construction sand and gravel**.

15

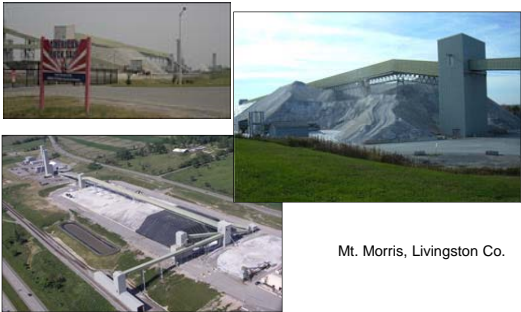
### Current Leading Mineral Commodities Produced in NYS

(based on value)

- 1<sup>st</sup> Crushed stone
- 2<sup>nd</sup> Limestone
- 3<sup>rd</sup> Salt
- 4<sup>th</sup> Construction sand and gravel
- 5<sup>th</sup> Zinc

16


### American Rock Salt Co. Mine



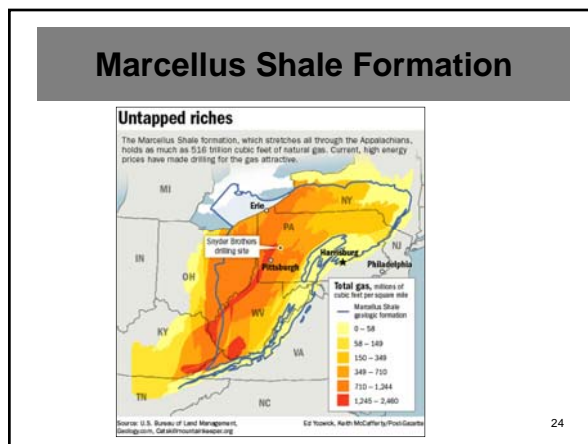
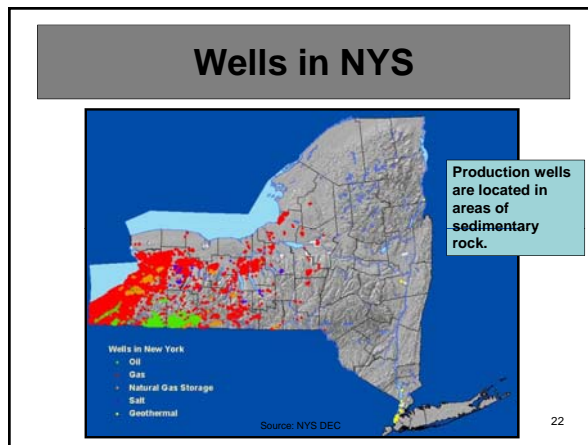
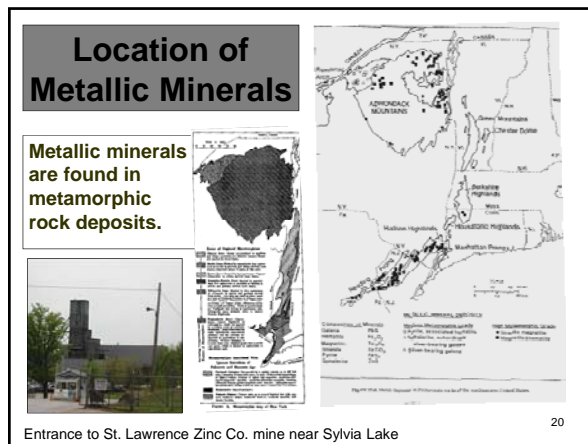
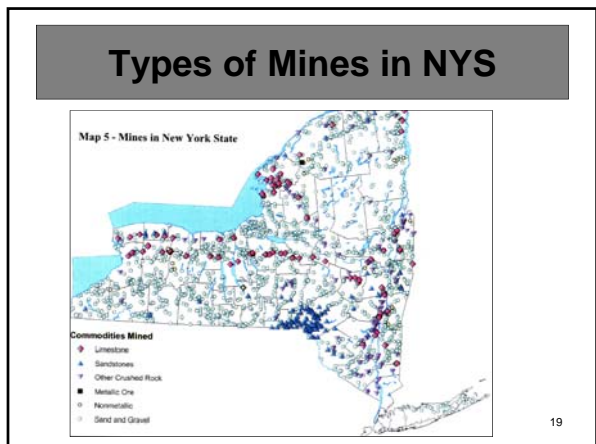
Mt. Morris, Livingston Co.

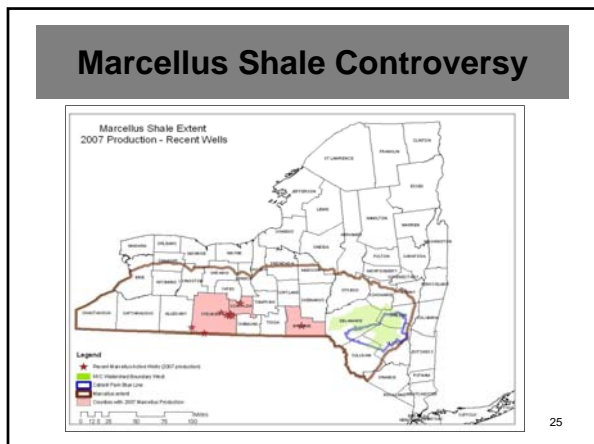
17

### Location of Mineral Deposits



18





### “Fracturing” the Shale

Hydraulic fracturing of shale layers to release natural gas by inserting water and chemicals under high pressure.

*Contamination of groundwater is a possible side effect.*

26

### Protecting Groundwater from Fracturing Process

[http://www.dec.ny.gov/docs/materials\\_minerals\\_pdf/gwprotection.pdf](http://www.dec.ny.gov/docs/materials_minerals_pdf/gwprotection.pdf)

[http://www.nytimes.com/interactive/us/DRILLING\\_DOWN\\_SERIES.html](http://www.nytimes.com/interactive/us/DRILLING_DOWN_SERIES.html)

<http://www.nytimes.com/interactive/2011/03/01/us/ch-emicals-and-toxic-materials-in-hydrofracking.html>

Oct 1, 2012:  
<http://www.nytimes.com/2012/10/01/nyregion/with-new-delays-a-growing-sense-that-gov-andrew-cuomo-will-not-approve-gas-drilling.html?ref=nyregion&r=0>

Sept 30, 2012:  
<http://www.nytimes.com/2012/09/30/realestate/fracking-fears-hurt-second-home-sales-in-catskills.html?pagewanted=all>

28

### Mined Land Reclamation Act

- **In 1975 Mined Land Reclamation Act was enacted** – Its purpose is to put mined lands back to public use as parks, farms, wildlife habitats and residential developments.
- **This is a NYS success story.**

28

### Restoring a Mine

DEC Mined Land Reclamation presentation:

<http://www.dec.ny.gov/lands/33251.html>

29

### Mined Land Reclamation Goals


- Prevent improper disposal of mining waste
- Require erosion and sediment control
- Prevent the contamination of surface and ground water supplies
- Require dust and noise abatement
- Guard against aesthetic degradation (scenery)
- Protect property value (local tax base)

30



### Galster Sand and Gravel Pit Onondaga County

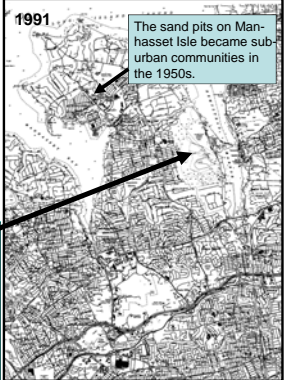
Before reclamation      After reclamation



Approximately 36 acres, 20 feet deep, were excavated for gravel above and below the water table at the pit. Kinsella instituted procedures to protect the environment surrounding the pit, stockpiled topsoil to allow for re-vegetation of all disturbed areas, and created a lake from the exposed aquifer.

31

### Manhasset Neck, Nassau Co., Land Use Map: 1991



1991

The sand pits on Manhasset Isle became suburban communities in the 1950s.

East shore commercial sand mining operations stopped in the 1980s.

Quarry was closed and then rehabilitated under NYS law (1975). The area is now a county park.

32

### Exercise 5

Required **Exercise 5: Mining in NYS** is ready to download and print from the course homepage.

>> It is due Thursday, October 11, 2012.

33