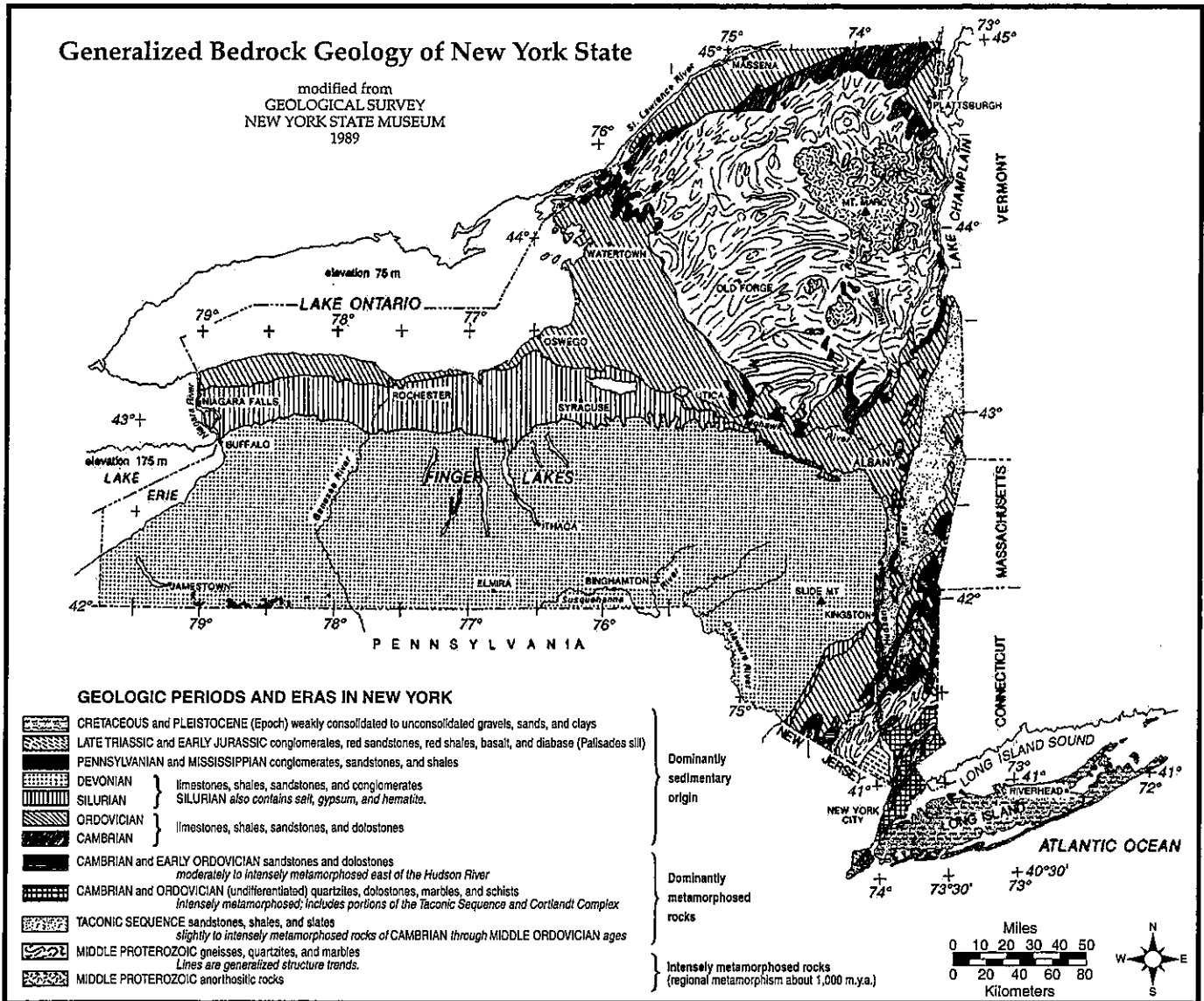


# Generalized Bedrock Geology of New York State



## Overview:

This map shows the type and the geologic age of the bedrock that is found in NYS. Most of the times one doesn't see the local bedrock, since it's usually covered by vegetation, soil, concrete or blacktop. But if we could scrape off these layers we would eventually reach this solid rock layer. From exposed outcrops, geologists have mapped the location and extent of the different types of bedrock found throughout NYS. The bedrock types have been classified according to their geologic age, as shown by the given key in the Geologic History of NYS chart.

## The Map:

**Key Area** - The Geologic Periods and Eras in New York - Shown are 12 different geologic divisions, starting with the youngest - the Pleistocene Epoch - and ending with the oldest - the Middle Proterozoic - with each one representing a bedrock layer. As one goes down this key, the age of the bedrock increases. To the right of these geologic divisions is given the type of rocks that make up the bedrock. For example, the

Devonian bedrock are sedimentary rocks consisting of limestones, shales, sandstones and conglomerates. Notice that the last two divisions, both Middle Proterozoic, are part of the very old Precambrian. The key also shows that the Middle Proterozoic rocks are intensely metamorphosed. Being metamorphic and so old, fossils would not be found here. The Adirondack Mountains (see the Generalized Landscape Regions of NYS chart) consist mostly of the Middle Proterozoic bedrock.

*Bedrock Geology of NYS Map* – The NYS map shows the location of the different types of bedrock based on their geologic ages. Once we know the geologic name of the bedrock, and using the Geologic History of NYS chart, we can get the age range of the bedrock and can identify specific fossils that lived during that time period. For example, the map shows that the bedrock around the Finger Lakes is Devonian in age. Using the Geologic History of NYS chart, it shows that this Devonian bedrock is 359 to 416 million years old. At the bottom of this chart are shown numerous Devonian index fossils that can be expected to be found within this age bedrock and around the Finger Lakes region. The Bedrock chart shows that north of this Devonian layer is the Silurian layer, where Syracuse is located. The key shows that the Silurian layer is older than the Devonian layer. Thus, where one finds Devonian bedrock, usually Silurian bedrock would be located under it. Using this method, the Ordovician layer would be under the Silurian layer, and so forth.

*Latitude and Longitude Coordinates* – On the right and left sides of the map, latitude numbers are given. The 42° represents the latitude reading of 42° N. The longitude numbers can be found along the bottom and top of the map. The 76° represents the longitude reading of 76° W. Halfway between the latitude and longitude readings is a line marking the 30' (minutes) position. Remember, that one degree of latitude or longitude is subdivided into 60 minutes. Example: Find the coordinates of Ithaca. First find Ithaca's latitude. Using a straight edge, the map shows that Ithaca is higher than 42° N but slightly less than 42° 30' N, being very close to 42° 20' N. Its longitude is very close to 76° 30' W, giving the full coordinates of Ithaca as 42° 20' N, 76° 30' W. (See Latitude, Longitude and Time Zones chapter in the last section of this book.)

*The Angle of Polaris* – The altitude of Polaris (the North Star) is equal to the observer's latitude. Thus, if you live in Niagara Falls, with the latitude very close to 43° N, the altitude of Polaris would be to 43°. As one heads north the angle of Polaris would increase.

*Other Features* – NYS major cities are shown along with the major lakes and rivers of NYS. Notice the Genesee River flows north, traveling over the Devonian layer, the Silurian layer and finally over the Ordovician layer, eventually emptying into Lake Ontario. The elevations of both Great Lakes are given. Mt. Marcy, located in the Adirondacks, has the highest elevation in our state, and Slide Mt is shown in the Catskills region. On the bottom right of the map is the distance scale in miles and kilometers.

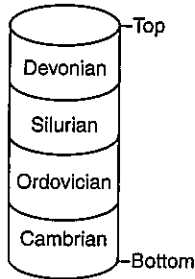
***Additional information:***

Due to the interest we have with dinosaurs, NYS has a small section of Mesozoic rocks labeled in the key area as Late Triassic and Early Jurassic Period. This small area can be found north of NYC, bordering New Jersey. The footprint of the raptor *Coelophysis* has been found here. Locate its skeleton and you might become very rich. Happy hunting.

**Set 1 — Generalized Bedrock Geology of New York State**

1. Bedrock in the area of Binghamton, New York, consists of
- (1) plutonic igneous rock
  - (2) sedimentary rock layers
  - (3) faulted and tilted volcanic rock
  - (4) folded metamorphic rock    1 \_\_\_\_\_

2. The diagram below represents bedrock of different ages beneath a location in New York State.



Assuming that the rock layers have not been overturned and that no unconformity exists, at which location is this bedrock found?

- (1) Albany
- (2) Old Forge
- (3) Elmira
- (4) Oswego     2 \_\_\_\_\_

3. Large garnet mineral crystals are found in the metamorphic surface bedrock in which New York State landscape region?
- (1) Catskills
  - (2) Adirondacks
  - (3) Erie-Ontario Lowlands
  - (4) Tug Hill Plateau     3 \_\_\_\_\_

4. What is the age of most of the surface bedrock found in New York State at a latitude of 45° N?
- (1) Precambrian Middle Proterozoic
  - (2) Triassic and Jurassic
  - (3) Silurian and Devonian
  - (4) Cambrian and Ordovician     4 \_\_\_\_\_

5. At which New York State location will an observer most likely measure the altitude of *Polaris* as approximately 42°?
- (1) Jamestown
  - (2) Plattsburgh
  - (3) Oswego
  - (4) New York City     5 \_\_\_\_\_

6. State the latitude and longitude coordinates of Mt. Marcy, New York. The units and compass directions must be included in your answer.
- \_\_\_\_\_

7. Identify the geologic age (in million of years) and name of the surface bedrock found at Slide Mt.
- \_\_\_\_\_

8. Give the geologic age sequence of the bedrock from Ithaca to Watertown.
- \_\_\_\_\_

**Set 2 — Generalized Bedrock Geology of New York State**

9. Which New York State river flows generally southward?  
(1) St. Lawrence River  
(2) Niagara River  
(3) Genesee River  
(4) Hudson River                      9 \_\_\_\_\_

10. Near which location in New York State would a geologist have the greatest chance of finding dinosaur footprints in the surface bedrock?  
(1) 41° 10' N latitude, 74° W longitude  
(2) 42° 10' N latitude, 74° 30' W longitude  
(3) 43° 30' N latitude, 76° W longitude  
(4) 44° 30' N latitude, 75° 30' W longitude  
  
10 \_\_\_\_\_

11. The approximate latitude of Utica, New York, is  
(1) 43°05' N    (3) 75°15' E  
(2) 43°05' S    (4) 75°15' W    11 \_\_\_\_\_

12. Which New York State landscape region is composed mostly of intensely metamorphosed surface bedrock?  
(1) Hudson Highlands  
(2) Allegheny Plateau  
(3) Atlantic Coastal Plain  
(4) Erie-Ontario Lowlands              12 \_\_\_\_\_

13. The Generalized Bedrock Geology Map of New York State provides evidence that water flows from Lake Erie into Lake Ontario by showing that Lake Ontario  
(1) is north of Lake Erie  
(2) is deeper than Lake Erie  
(3) has a larger surface area than Lake Erie  
(4) has lower surface elevation than Lake Erie                      13 \_\_\_\_\_

14. As one flies from Elmira to Old Forge, what is true about the age of the bedrocks one passes over?  
\_\_\_\_\_

15. Explain why one would have a better chance of finding the fossil Phacops, a trilobite, in the surrounding bedrock of Ithaca, than in the surrounding bedrock of Watertown.  
\_\_\_\_\_  
\_\_\_\_\_

16. Give a statement comparing the height of Polaris at Watertown to the height of Polaris at Binghamton.  
\_\_\_\_\_  
\_\_\_\_\_