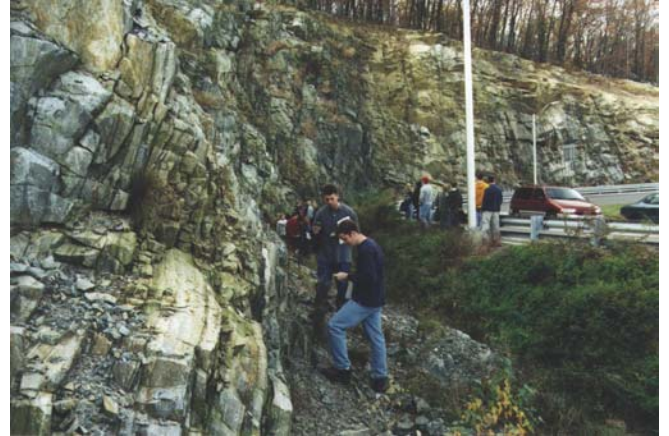


# Geology of Northern NJ & the Delaware Water Gap



Physical Geology Field Trip (GEOS112)  
Department of Earth & Environmental Studies  
Montclair State University  
April 12, 2003

**SEDIMENTARY ROCKS**

**CENOZOIC**

- Holocene: *beach and estuarine deposits*
- Tertiary: *sand, silt, clay*

**MESOZOIC**

- Cretaceous: *sand, silt, clay*
- Jurassic: *siltstone, shale, sandstone, conglomerate*
- Triassic: *siltstone, shale, sandstone, conglomerate*

**PALEOZOIC**

- Devonian: *conglomerate, sandstone, shale, limestone*
- Silurian: *conglomerate, sandstone, shale, limestone*
- Orodvician: *shale, limestone*
- Cambrian: *limestone, sandstone*

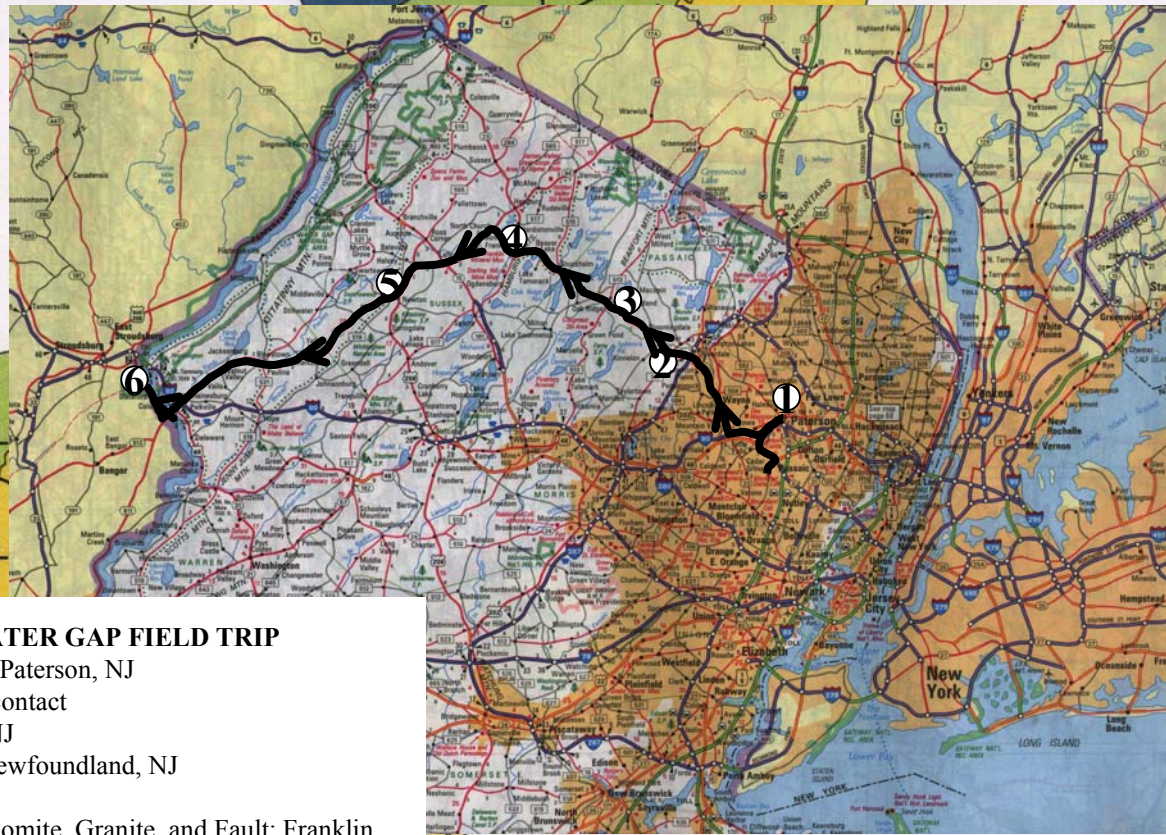
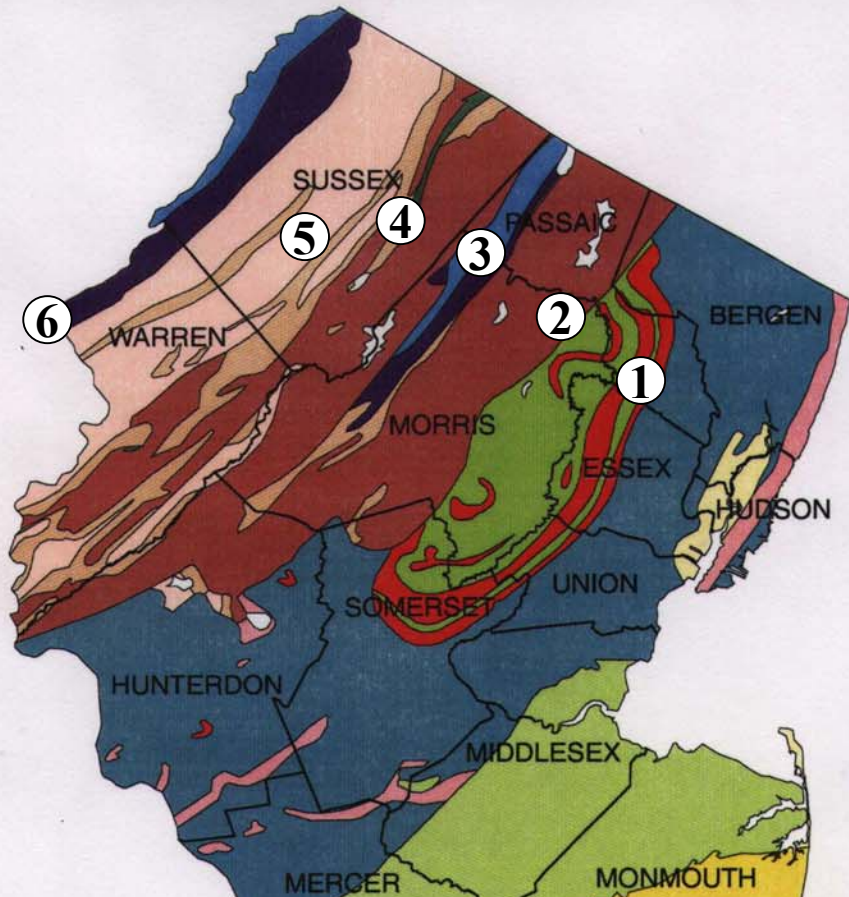
**IGNEOUS AND METAMORPHIC ROCKS**

**MESOZOIC**

- Jurassic: *basalt*
- Jurassic: *diabase*

**PRECAMBRIAN**

- marble*
- gneiss, granite*

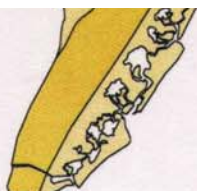
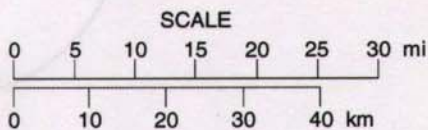


**GEOLOGIC MAP OF NEW JERSEY**

Department of Environmental Protection  
 Division of Science, Research and Technology  
 Geological Survey  
 1999

**NORTHERN NJ & DELAWARE WATER GAP FIELD TRIP**

- Stop 1: Great Falls of the Passaic River; Paterson, NJ  
Orange Mtn Basalt/Passaic Fm contact
- Stop 2: Precambrian Gneisses, Butler, NJ
- Stop 3: Rte 23 Fold; Green Pond Fm, Newfoundland, NJ
- Lunch: in Franklin
- Stop 4: Franklin Marble, Allentown Dolomite, Granite, and Fault; Franklin
- Stop 5: Martinsburg Fm, Newton
- Stop 6: Shawangunk Fm., Delaware Water Gap on PA side



## Dr. Gorrings Rules on Field trips

- NO WHINING
- NOSE ON THE OUTCROP

### Things to look for and questions to answer at each outcrop:

#### **Stop 1: Newark Basin Rocks and Great Falls of the Passaic River, Paterson**

- Find the contact between the Orange Mtn Basalt and the Passaic Formation.
- Are these the same rock types as the ones exposed on campus? Support your correlation (or lack of one) with evidence from the outcrop (rock types, sedimentary structures, etc.).

#### **Stop 2: Precambrian Gneisses and Granite, Rte 23, Butler**

- Find evidence to support the conclusion that these are very high-grade metamorphic rocks.
- Try and find the fault zone (~5 m wide zone of closely spaced faults) in this outcrop. Look for rocks that are dark green and have small pyrite crystals (if you look very closely!!).
- Find the granite in this outcrop. Is the granite younger or older than the gneiss??

#### **Stop 3: Green Pond Formation, Rte 23, Newfoundland**

- What rock types are exposed at the rest area and along the road??
- Compile a list of evidence that suggests that these rocks have been deformed??

#### **Stop 4: Franklin Marble, Allentown Dolomite, and Pegmatite, Franklin**

- This outcrop contains all three basic rock types (igneous, metamorphic, sedimentary) as well as an igneous intrusion and a fault.
- Locate the contact between the pegmatite and the Franklin marble. The pegmatite is a very white, with large crystals of feldspar and quartz. The marble is white to light brown color and has a “smeared-out”, fine-grained texture.
- Locate the fault. It is marked by a ~1 m zone of soft, light-brown, ground-up rock material that you can crush in your hands.


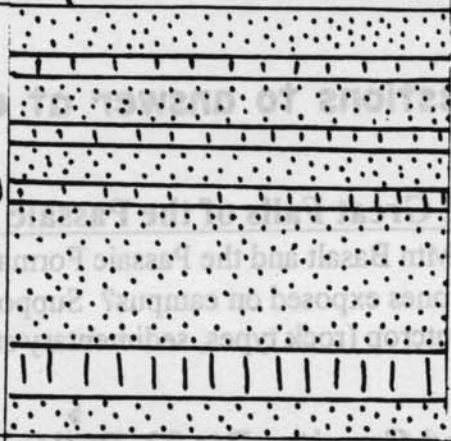




#### **Stop 5: Martinsburg Formation, Rte 94, Newton**

- What is the name of this rock?
- These rocks have been weakly metamorphosed. What is the evidence??

#### **Stop 6: Delaware Water Gap**

- Chill out and enjoy the view!!!

# NORTHERN NJ & DELAWARE WATER GAP FIELD TRIP

-AGE -FORMATIONS		GEOLOGIC COLUMN	OBSERVATIONS OF ROCKS & FEATURES → INFERRED GEOLOGIC SETTING/HISTORY
<ul style="list-style-type: none"> <li>-Pleistocene (14000ya)</li> <li>-Terminal moraine</li> </ul>			
<ul style="list-style-type: none"> <li>-Jurassic &amp; Triassic (200 mya)</li> <li>-Watchung Mountains</li> <li>-Passaic Fm</li> <li>-Pallades Sill</li> </ul>	<p style="text-align: center;">①</p>		
<ul style="list-style-type: none"> <li>-Devonian (350mya)</li> <li>-Bohem</li> </ul>			
<ul style="list-style-type: none"> <li>-Silurian (400mya)</li> <li>-Green Pond/ Shawangunk Fm</li> </ul>	<p style="text-align: center;">③ &amp; ⑥</p>		
<ul style="list-style-type: none"> <li>-Ordovician (450mya)</li> <li>-Martinsburg Fm</li> </ul>	<p style="text-align: center;">⑤</p>		
<ul style="list-style-type: none"> <li>-Cambrian (550mya)</li> <li>Allentown Dolomite</li> </ul>	<p style="text-align: center;">④</p>		
<ul style="list-style-type: none"> <li>-Precambrian (1 bya)</li> <li>-Crystalline basement rocks</li> </ul>	<p style="text-align: center;">② + ④</p>	