HOMER LAKE CAPSTONE

Shelby Frost, Natalie Juda
Jim Miller
Where we Mapped

- Homer Lake, located on the edge of the Boundary Waters
- Axe Lake, north of Homer Lake
- Whack Lake, west of Home Lake
Why Map?

- Mainly educational
- 1977 - D.M. Davidson and J.R. Burnell mapped three units
  - Olivine gabbro
  - Gabbroic anorthosite
  - Granophyric granite
- Main geological units are mapped but need more detailed study
A detailed version of Davidson’s map
Brule Lake Quadrangle; Cook County, Minnesota
D. M. Davidson and J. R. Burnell, 1977
Camp Life

- Camped on Homer Lake just outside Boundary Waters
- Campsite located on an oxide gabbro outcrop
- Camped with Jim Miller’s family
Typical Day

- 9:00AM-6:00PM
- One canoe
- One mapper, one note taker
- Sack lunch of summer sausage, cheese, and gorp
- 80% shoreline geology
- 20% bushwacking
Positive Aspects

- Generally beautiful weather
- Good exposure
- Great campsite
Obstacles we encountered

- Low water level
- The bush
- Swampy areas
- Strong wind
Duluth News Tribune

- Reporter Jana Hollingsworth and photographer Clint Austin
- Duluth News Tribune
- Visited Tuesday night and Wednesday morning
- Got a look into the PRC
Research Tools

- Mylar with topographic underlay
- GPS
- Brunton and Silva compasses
- Prismacolor pencils
- Rite-in-Rain notebooks
- Hammer and chisel
- Handlens
Data Collection

- Mapped outcrop locations and structural information on Mylar overlays of topographic maps at 1:10,000 scale
- Took note of grain size, texture, fabric, and mineralogy
- Collected 43 rock samples
Identifying texture and mineralogy

Measuring Structures
Collecting Samples

Note taking
Rock Types

- Two intrusive sequences found
  - Homer Lake Gabbroic Sequence
  - Axe Lake Gabbroic Sequence
- North Shore Volcanic Group (NSVG)
  Hornfels volcanics and interflow sedimentary rocks
- Inclusions and lenses in the gabbroic sequences (felsic, anorthositic)
Homer Lake Gabbroic Sequence

- Oxide Gabbro
- Foliated Oxide Gabbro
- Foliated gabbro occurs in thin layers that interlayer with the non-foliated gabbro
Oxide Gabbro

- Gray coarse grained non-foliated
- Intergranular-subophitic
- Subprismatic px 4-10mm
- <10% granofere
- Inclusions of granofere and anorthosite
Foliated Oxide Gabbro

- Gray medium grained foliated
- Porphyritic plagioclase
- Weathered out olivine pits
Granophyre

- Pink medium grained intergranular
- Occurs as lenses in the oxide gabbro
Gabbroic Anorthosite

- Light gray coarse grained intergranular
- Poikolitic olivines weathered out
- >80% Plagioclase
Axe Lake Gabbroic Sequence

- Granophyric Gabbro
- Ferromonzodiorite
- Oxide Gabbro
- Diabase
Granophyric Gabbro

- Part of a contact zone with the underlying hornfels volcanics
- Peachy pink medium-coarse grained
- Subophitic
- Felty texture
- Prismatic pyroxenes
- >10% granophyre
Ferromonzodiorite

- Pink, medium grained non-foliated
- Prismatic pyroxenes
- Intergranular
Oxide Gabbro

- Similar to Homer Lake oxide gabbro
- Gray coarse-medium grained intergranular
- No inclusions present
- <10% granophyre
Diabase

- Light gray medium grained
- Subophitic, granular
- Oikiocrysts 3 cm
- Olivine rich
NSVG Hornfels Volcanics

- Basaltic Hornfels
- Hornfels Interflow Sedimentary Rock
Hornfels

- Gray fine grained massive to brecciated hornfels mafic volcanic rock
- Granoblastic
- Metamygdules of pyroxene
- Flowtop breccia
- Cross-cutting veins of amphibole
Flowtop Breccia
Interflow Sandstone

- Gray-blue fine grained interflow sandstone
- Interbedded to cross-bedded; thinly bedded
- Bedding is randomly oriented
- Cross-cutting veins of epidote
Geology

- Hornfels and interflow seds formed 1.1 Ga
- Gabbro, diabase, and ferromonzodiorite rocks intruded in a series of layered mafic intrusions, including the Homer Lake and Axe Lake sequences
- Older anorthositic rocks settled into the melt as inclusions
Geologic Story

- Very different rock units from those of previous maps
- Miscellaneous intrusions within the North Shore Volcanic Group
- Uniform layer of interflow sediments
- Anorthosite intrusion correlates with previous map
Lab Work

- Four days working in the lab
- Arc View
  - Created actual map with topographic base, outcrops, structures, samples, and contacts
- Adobe Illustrator
  - Created final map with units and legend
- Power Point
- Future work: petrography of hand samples, chemical analysis
Any Questions?