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# ENVIRONMENTAL Fact Sheet

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CO-GEO-1

2005

## Gold in New Hampshire

by Eugene L. Boudette, retired N.H. State Geologist

*To many, the mention of gold conjures up an image of a lonely old prospector toiling away in a far-off desert or in the high Sierra or Yukon Territory. But gold can be found a lot closer to home. Small amounts have been found in vein and placer deposits in New Hampshire. This document is intended to shed some light on this precious metal and its presence in the Granite State.*

### **The nature of gold**

Gold is a noble element in several ways. Its unique qualities have led to the creation of artifacts of aesthetic beauty and, indeed, empires across the planet.

An element of distinction, gold does not readily enter into chemical bond during mineral crystallization, and it resists chemical weathering. It also behaves as a malleable metal, a property which can contribute to amalgamation, producing nuggets during stream transport. Geologically, the metal is genetically associated with a wide range of rock and sediment types where it occurs in lode deposits (gold, held loosely in intracrystalline space, alloys, or is detritus), disseminated deposits (low-grade in specialized rocks), and placers (stream gravels, beaches and marine deposits, and stratified glacial drift). Gold tends to be fractionated into late-stage hydrous magmatic fluids during the crystallization of rocks such as granite. It is relatively fugitive (mobile) in rock metamorphism, especially in the presence of abundant water. Gold, in anomalous amounts, is not only associated with granitic rocks, but also with rocks such as serpentinite at the other end of the igneous spectrum. Gold is commonly associated with volcanic rocks, especially those characterized by the analogs of granitic rocks, rhyolite for example.

### **The rocks of New Hampshire**

Volcanic rocks, not abundant in the state, are only found associated with the granitic rocks of the southern White Mountains. About 50 percent of the state is underlain by metamorphic rocks which are in part derived from the recrystallization of rocks which were of volcanic origin. The remainder of the rocks of the state are granitic or related rocks ([see map](#)).

### **Gold in the rocks and water**

Trace amounts of gold are found in nearly all of the rocks and surficial deposits of New Hampshire, and they can be identified dissolved in natural water (usually less than one part per billion). Gold in water, especially groundwater, is of scientific interest only. Mapping the distribution of gold in groundwater is a technique (geochemical exploration) that can be used to

find gold lode deposits as well as other metals. Rocks enriched in dispersed gold in New Hampshire are of primary interest to mineral producing companies which have been exploring here. Modern gold exploration is centered more on low grade, large volume deposits than on high grade lode deposits such as quartz veins. Such quartz veins are, however, important sources for rock and mineral collections throughout the state.

### **Gold in surficial deposits**

Gold that is weathered out of rocks, transported by erosion, and redeposited as detritus in stream, lake, and coastal marine sediments (placer deposits) is of the most interest to recreational panners or operators of sluice and rocker boxes and portable dredges in New Hampshire. Recreational panners are not regulated by New Hampshire statute, but the permission of landowners to access streams is recommended. However, dredging and similar operations are regulated by the state under statutes RSA 482-A and RSA 485-A:17 because of the potential for environmental damage. Thus, operators who anticipate dredging or similar work are required in some cases to obtain a permit. Detailed information regarding permitting can be obtained from:

**N.H. Wetlands Bureau  
PO Box 95, 29 Hazen Drive  
Concord, N.H. 03302-0095  
(603) 271-2147**

The use of power equipment for gold recovery including sluice boxes, rocker boxes, and dredges is **not** allowed in the White Mountain National Forest, but recreational panning is.

### **Occurrences, production and resources**

No really important gold production has ever been recorded in the state even though mining interest began in colonial times. The potential does, however, exist for the discovery of major gold reserves within the context of modern gold genetic models and the application resource analysis technology.

Anomalous occurrences of gold in New Hampshire were well documented by the middle 1800s (see Suggestions for Additional Reading). Gold had been identified in placer deposits, quartz veins, and in metamorphosed conglomerate, especially the Clough Formation in the western side of the state. The best known deposits were described by C.H. Hitchcock in 1878 who established the Ammonoosuc Gold District centered on Lyman, Monroe, and Bath, including southwestern Littleton, northwestern Landaff, and western Lisbon.

The first discoveries were made in the Ammonoosuc in 1864 when several small mines were opened which supported two milling operations. About \$50,000 worth of gold (at period value) was shipped to the Philadelphia National Mint before economic circumstances closed operations in 1878. A much smaller amount of gold was also shipped to the mint from the Diamond Ledge Mine in Ossipee. Gold in the Ammonoosuc District is found in veins with sulfide minerals such as pyrite, as "free" gold in quartz veins, and dispersed in sheared chloritic schist or chromiferous, carbonate rock. Streams draining into the Connecticut River, especially from the confluence of the Ammonoosuc River at Woodsville north to the Connecticut Lakes, are all favorable for finding gold in placer deposits. The Baker River, draining into the Merrimack River is also reported as favorable for detrital gold. The gold in placer deposits ranges in grain size from very fine to sparse nuggets up to pearl size. In truth, arduous work can probably produce traces of gold from almost any stream in the state.

## Resource potential

The Ammonoosuc Mining District is part of a belt which continues out of Vermont, up the Connecticut River north into Quebec. This belt comprises a bedrock terrane which holds the highest potential in the state for important discoveries of gold reserves as well as other metals. This belt is defined by metamorphic rocks, many of which were deposited as volcanics which could have been in part, endowed with gold. The most intensive placer-recovery gold activity in recent years has occurred in the surficial deposits within the belt. Other terranes, including the rocks of the White Mountains and genetically associated rocks to the south such as those within the Pawtuckaway Mountains, are also favorable for gold prospecting. The potential also exists for the occurrence of gold along faults, especially those that have been silicified.

## Where To Go

Gold has been reported from many streams in northern and western New Hampshire. The following is a partial list:

<b>Town</b>	<b>Stream</b>
Benton	Tunnel Brook
Lincoln	Notch Brook
Lisbon	Salmon Hole Brook. Reported to be the site of an 1866 con scheme when a sluice box was salted with gold to attract investors. Wild Ammonoosuc River Ammonoosuc River below Bath
Northern Coos Cnty.	Indian Stream. Gold is also reported in glacial deposits in the area Perry Stream Dead Diamond River Swift Diamond River

Gold panners must be aware of the potential environmental impact of panning and work to reduce damage to the environment. Panners should try to keep disturbance of the stream bed to a minimum and avoid damaging stream banks. Panning can increase turbidity and cause siltation downstream which adversely affects aquatic life, particularly fish. Undercutting and other alteration of stream banks can expose loose soil which will continue to erode long after the panner has departed.

## For further information

For additional information on the geology of gold, please contact State Geologist David Wunsch at the N.H. Department of Environmental Services, PO Box 95, Concord, NH 03302-0095; (603) 271-6482.

## Suggestions for additional reading

Boudette, E.L., 1990, The Geology of New Hampshire: Rocks & Minerals, v. 65, no. 4, p. 306-312.

Heylmun, E.B., 1986, Ammonoosuc Gold District: California Mining Journal, (October issue).

Hitchcock, C.H., 1878, Geology of New Hampshire. Vol 3: Part 3, surface geology; part 4, mineralogy and lithology; part 5, economic geology; and atlas.

Jackson, C.T. 1844. Final report on the geology and mineralogy of the state of New Hampshire with contributions toward the improvement of agriculture and metallurgy.

Lyons, J.B., Bothner, W.A., Moench, R.H., and Thompson, J.B., eds. 1997, Bedrock geologic map of New Hampshire: Reston, Va., U.S. Geological Survey State Geologic Map, 2 sheets, scale 1:250,000 and 1:500,000.\*

\*An 8 1/2" x 11" color copy of this map may be downloaded from the DES web site at [www.des.state.nh.us/geo1link.htm](http://www.des.state.nh.us/geo1link.htm)

Meyers, T.R., and Stewart, G.W. 1956. The Geology of New Hampshire, part III, minerals and mines (with 1:500,000 scale map).

Morrill, P. 1960. New Hampshire mines and mineral localities, 2nd ed., Hanover, NH, Montshire Museum, 46 p.

Pearre, N.C., and Calkins, J.A. 1957. Mineral deposits and occurrences in New Hampshire exclusive of clay, sand, and gravel. U.S. Geological Survey, Mineral Investigations Resource Map 6.