SPECIAL REPORT 190

RELATIVE LIKELIHOOD FOR THE PRESENCE OF NATURALLY OCCURRING ASBESTOS IN PLACER COUNTY, CALIFORNIA

2006

DEPARTMENT OF CONSERVATION
California Geological Survey

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By

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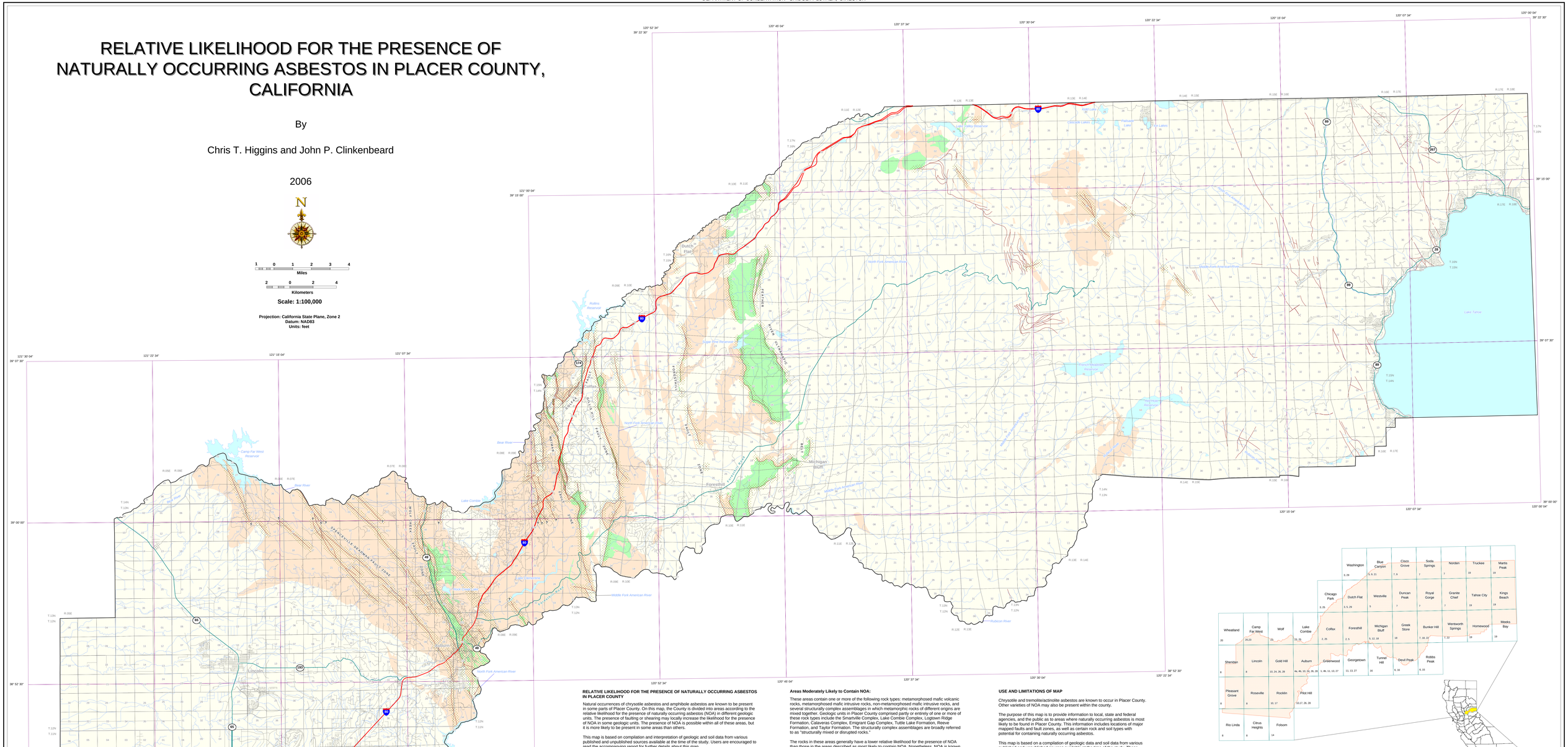
N

1 0 1 2 3 4
Miles

2 0 2 4
Kilometers

Scale: 1:100,000

Projection: California State Plane, Zone 2
Datum: NAD83
Units: feet



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FRAMEWORK DATA

Base map data for hydrography and roads were provided by Placer County Planning Department; Public Land Survey (PLSS) by California Department of Conservation, Division of Oil, Gas, and Geothermal Resources; and political boundaries by California Department of Forestry and Fire Protection.

Cartographic design and GIS development by Milton Fonseca

RELATIVE LIKELIHOOD FOR THE PRESENCE OF NATURALLY OCCURRING ASBESTOS IN PLACER COUNTY

Natural occurrences of chrysotile asbestos and amphibole asbestos are known to be present in some parts of Placer County. On this map, the County is divided into areas according to the relative likelihood for the presence of naturally occurring asbestos (NOA) in different geologic units. The presence of faulting or shearing may locally increase the likelihood for the presence of NOA in some geologic units. The presence of NOA is possible within all of these areas, but it is more likely to be present in some areas than others.

This map is based on compilation and interpretation of geologic and soil data from various published and unpublished sources available at the time of the study. Users are encouraged to read the accompanying report for further details about this map.

Based on existing information, determination of the presence or absence of NOA at specific sites on this map is not possible. Determination of whether NOA is present or absent at a specific site will require a detailed geologic investigation of that site.

Areas of Relative Likelihood for the Presence of NOA

Areas Most Likely to Contain NOA: These areas include ultramafic rock and serpentinite (serpentine rock), and associated soils, which are most likely to contain NOA.

Areas Moderately Likely to Contain NOA: These areas include those metamorphic and igneous rocks that are moderately likely to contain NOA.

Areas Least Likely to Contain NOA: These areas include those metamorphic, igneous, and sedimentary rocks that are least likely to contain NOA.

Areas of Faulting or Shearing: These areas are zones of faulted or sheared rock that may locally increase the relative likelihood for the presence of NOA within or adjacent to areas moderately or most likely to contain NOA. The solid lines represent mapped traces of fault and shear zones; question marks indicate uncertainty regarding the continued extent of the traces.

Mapped trace of fault or shear zone. These features may locally increase the likelihood for the presence of NOA within areas least likely to contain NOA. The presence of NOA along these features is more likely within areas mapped as most likely or moderately likely to contain NOA as described above.

EXPLANATION OF THE AREAS OF RELATIVE LIKELIHOOD FOR THE PRESENCE OF NOA

This section provides more information on the characteristics of each of the NOA areas shown on the map of Placer County. Additional details are presented in the report that accompanies this map.

Areas Most Likely to Contain NOA:

These areas contain ultramafic rock and serpentinite, and their associated soils. Serpentinite and partially serpentinized ultramafic rock commonly contain chrysotile asbestos. These rocks may also host amphibole asbestos, typically the following varieties: tremolite, actinolite, or anthophyllite. Soils derived from ultramafic rock and serpentinite may contain NOA. These soils are commonly designated as "ultramafic soils" or "serpentine soils" on soil maps. Soil maps of Placer County by the U.S. Department of Agriculture's Natural Resources Conservation Service and the U.S. Forest Service include the following ultramafic- and serpentinite-related soils series: Dubakella, Henneke, and Forbes.

The California Geological Survey did not evaluate deposits of unconsolidated sediment along rivers and creeks below areas of ultramafic rock and serpentinite for their likelihood to contain NOA. Such deposits may contain NOA, but no studies of NOA in such sediment in Placer County were identified during research for this mapping project. Many of these deposits are too small to depict on this map.

Areas Moderately Likely to Contain NOA:

These areas contain one or more of the following rock types: metamorphosed mafic volcanic rocks, metamorphosed mafic intrusive rocks, non-metamorphosed mafic intrusive rocks, and several structurally complex assemblages in which metamorphic rocks of different origins are mixed together. Geologic units in Placer County comprised partly or entirely of one or more of these rock types include the Smartville Complex, Lake Combie Complex, Logtown Ridge Formation, Calaveras Complex, Emigrant Gap Complex, Tuttle Lake Formation, Reeve Formation, and Taylor Formation. The structurally complex assemblages are broadly referred to as "structurally mixed or disrupted rocks."

The rocks in these areas generally have a lower relative likelihood for the presence of NOA than those in the areas described as most likely to contain NOA. Nonetheless, NOA is known to be present in these rock types either in Placer County or in similar rocks in nearby counties. The most likely settings for NOA in these rocks are in fault zones and shear zones that contain slivers of serpentinite and/or high concentrations of the minerals talc and chlorite. Both chrysotile asbestos and amphibole asbestos are known to occur in such environments.

Areas Least Likely to Contain NOA:

These areas contain one or more of the following rock types: metamorphosed sedimentary rocks, metamorphosed non-mafic volcanic rocks, granitic rocks, volcanic rocks, alluvium, and glacial deposits. Geologic units in Placer County comprised partly or entirely of one or more of the metamorphic rock types include the Colfax sequence (Fiddle Creek Complex), Calaveras Complex, Shoo Fly Complex, Sailor Canyon Formation, Sierra Buttes Formation, Peale Formation, and Lake Tahoe sequence. The granitic rocks include the Rocklin and Penryn plutons.

The technical documents reviewed during compilation of this map did not indicate the presence of NOA in any of these rock types within Placer County. The mineral actinolite has been reported at a few localities in the metamorphosed sedimentary rocks, but whether or not it is asbestos was not reported; in general, non-asbestiform actinolite is much more common than actinolite-asbestos in the Sierra Nevada. Based on the available information, the relative likelihood for the presence of NOA in these areas is lower than that in areas identified as most likely or moderately likely to contain NOA. Small bodies of rock or soil with moderate or higher likelihood for the presence of NOA may occur within some of these areas, but they remain undiscovered or are too small to depict on this map.

Areas of Faulting or Shearing:

The western half of Placer County contains many mapped fault and shear zones, some of which contain NOA, or are potentially favorable environments for its presence. These are linear belts of highly fractured and deformed rocks, highlighted by stippling on the map where they overlap areas most likely or moderately likely to contain NOA. These areas may have an increased likelihood for the presence of NOA beyond that of the underlying area.

The stippling on the map is intended to draw attention to these areas as localities with increased likelihood for the presence of NOA above that of unfaulted or unsheared areas. For example, an area of faulting or shearing shown within an area mapped as moderately likely to contain NOA would be expected to have a higher relative likelihood for the presence of NOA than that of the moderately-likely area by itself. The widths of the stippled areas shown on the map are not intended to precisely depict the actual width of a fault or shear zone at any particular location. Fault zones in the Sierra Nevada Foothills are seldom less than two hundred feet wide and may be several thousand feet wide or more. The width of a fault zone commonly varies along its length. Detailed information on the width of fault zones is largely unavailable for western Placer County.

NOA in Other Geologic Environments

NOA can be associated with many different rock types in a variety of geologic environments. The geologic environments for NOA discussed on this map are those known or strongly suspected to contain NOA in Placer County. The research for this mapping project did not reveal occurrences of NOA in other geologic settings in the county. However, the possibility that additional occurrences will be discovered in the future cannot be ruled out. These less-common possibilities for the presence of NOA are discussed in the accompanying report.

USE AND LIMITATIONS OF MAP

Chrysotile and tremolite/actinolite asbestos are known to occur in Placer County. Other varieties of NOA may also be present within the county.

The purpose of this map is to provide information to local, state and federal agencies, and the public as to areas where naturally occurring asbestos is most likely to be found in Placer County. This information includes locations of major mapped faults and fault zones, as well as certain rock and soil types with potential for containing naturally occurring asbestos.

This map is based on a compilation of geologic data and soil data from various published and unpublished sources available at the time of the study. These sources are identified on the map and in the accompanying report. This map is also based on limited geologic fieldwork by staff of the California Department of Conservation, California Geological Survey.

The scale of this map is 1:100,000 (one inch = 1.6 miles). This map is intended for use in conjunction with the companion report. The report provides detailed information on the underlying geologic assumptions for the map, map compilation procedures, map accuracy, and guidance on map usage and limitations.

This map should not be used to determine whether bedrock or soil on a particular parcel of land contains naturally occurring asbestos. A detailed site-specific investigation is required to make such a determination.

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