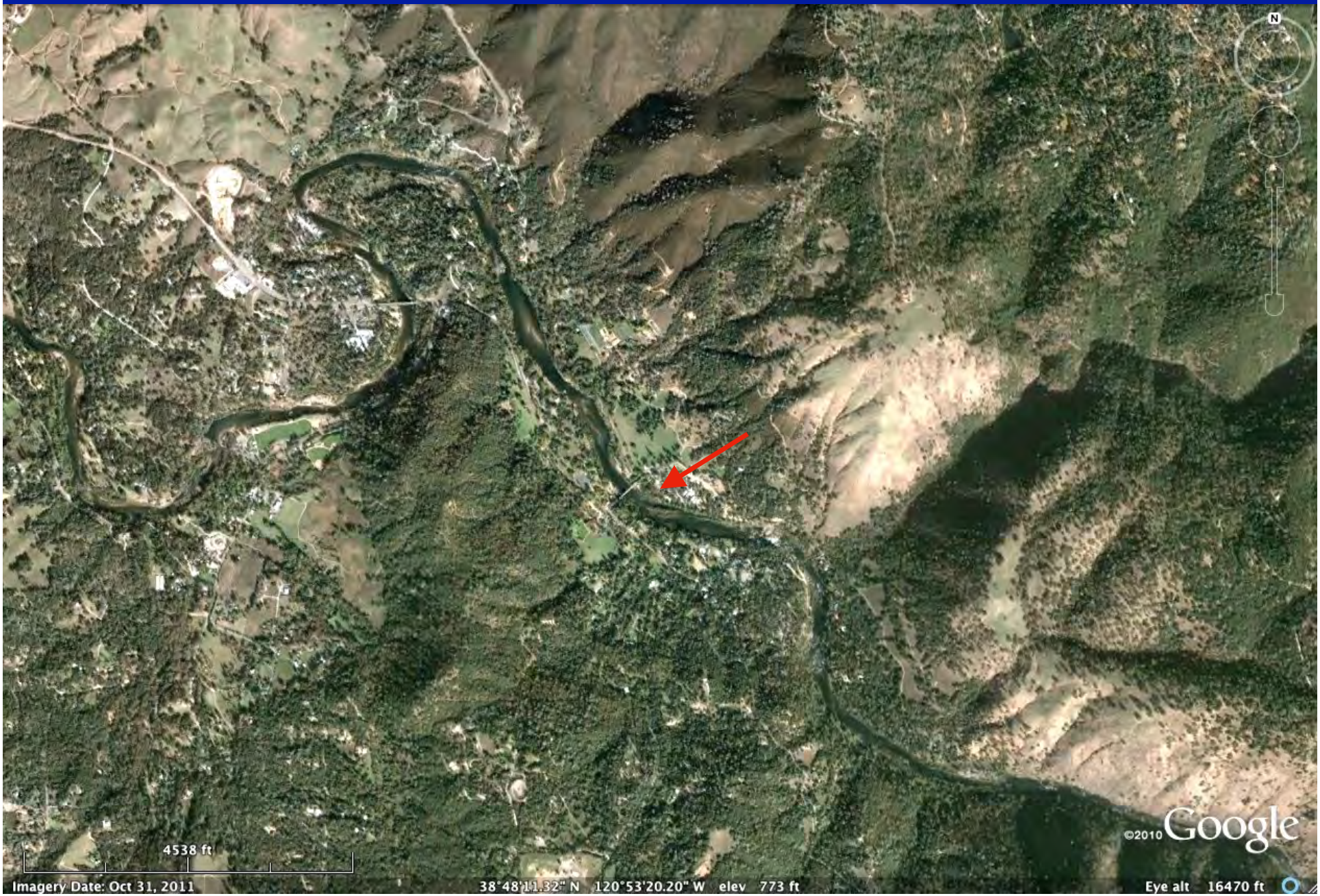
The American River, Coloma, CA

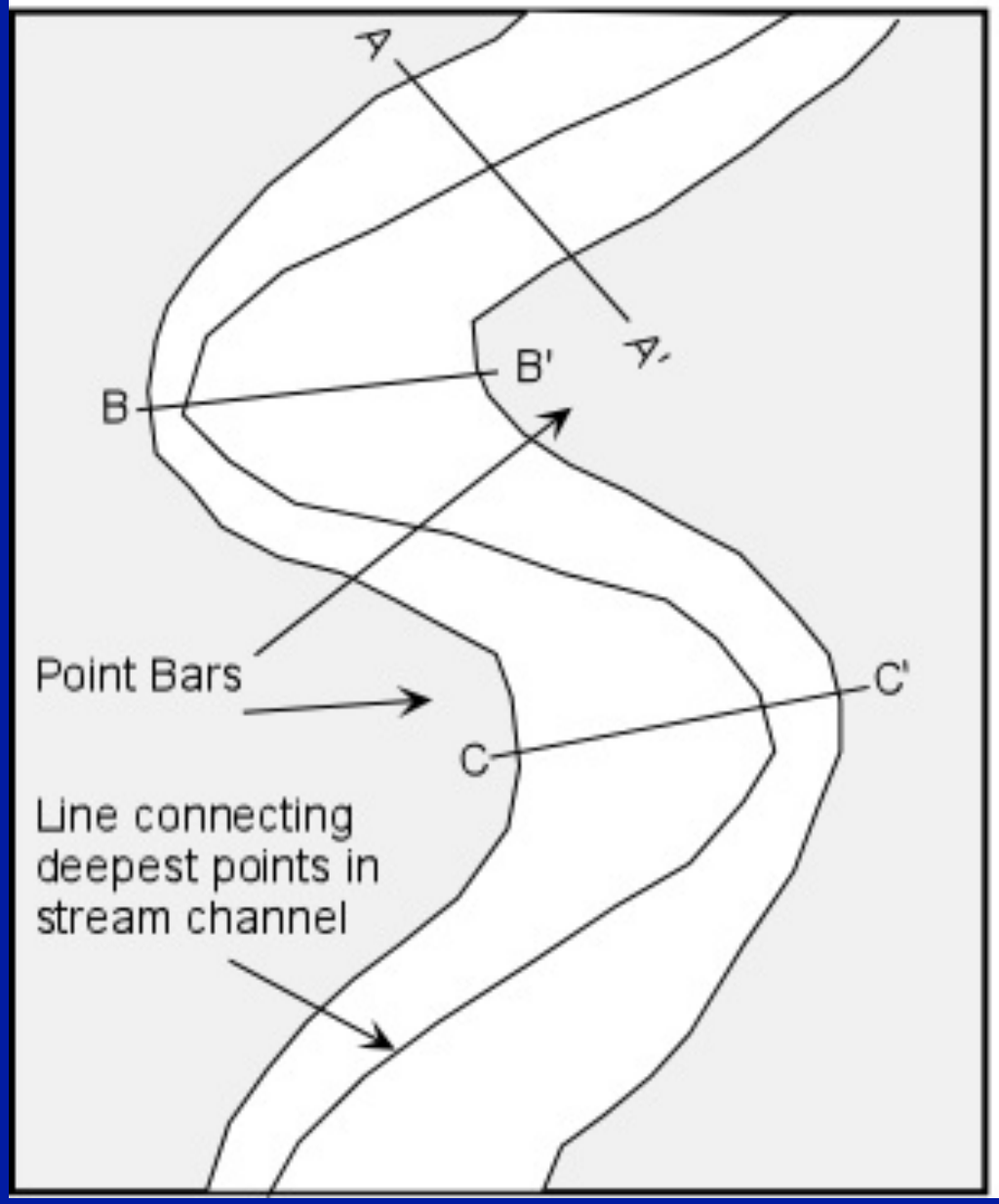
A replica of Sutter’s Mill, John Marshall, millwright

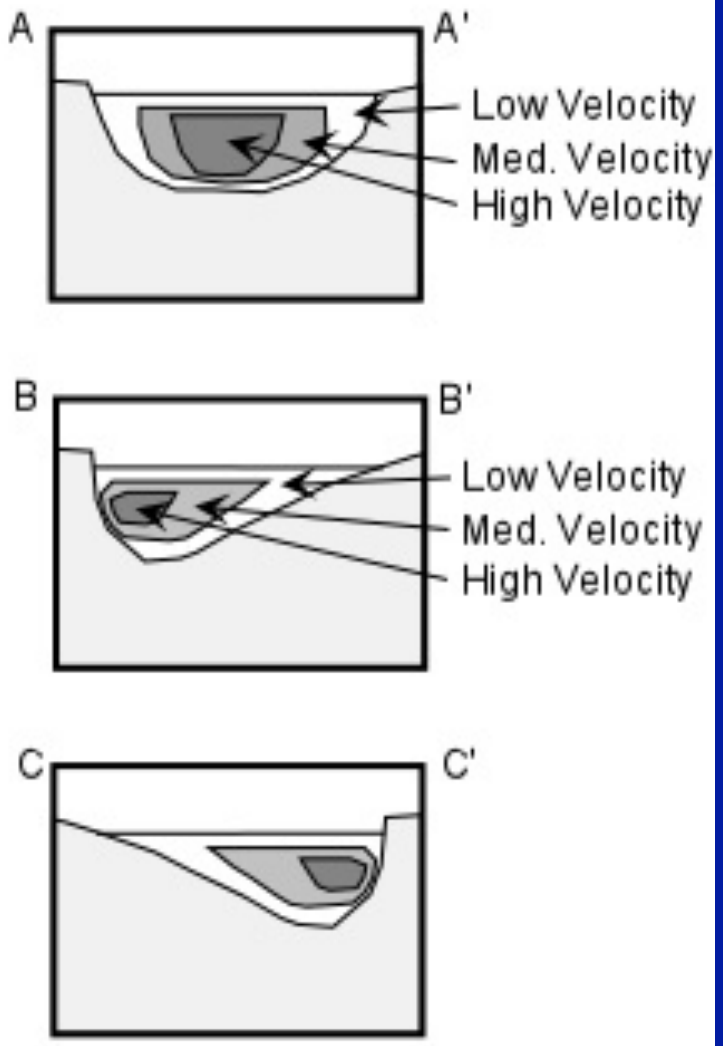
American River and Coloma, California



Sutter’s Mill, Coloma, CA

Meandering Channels



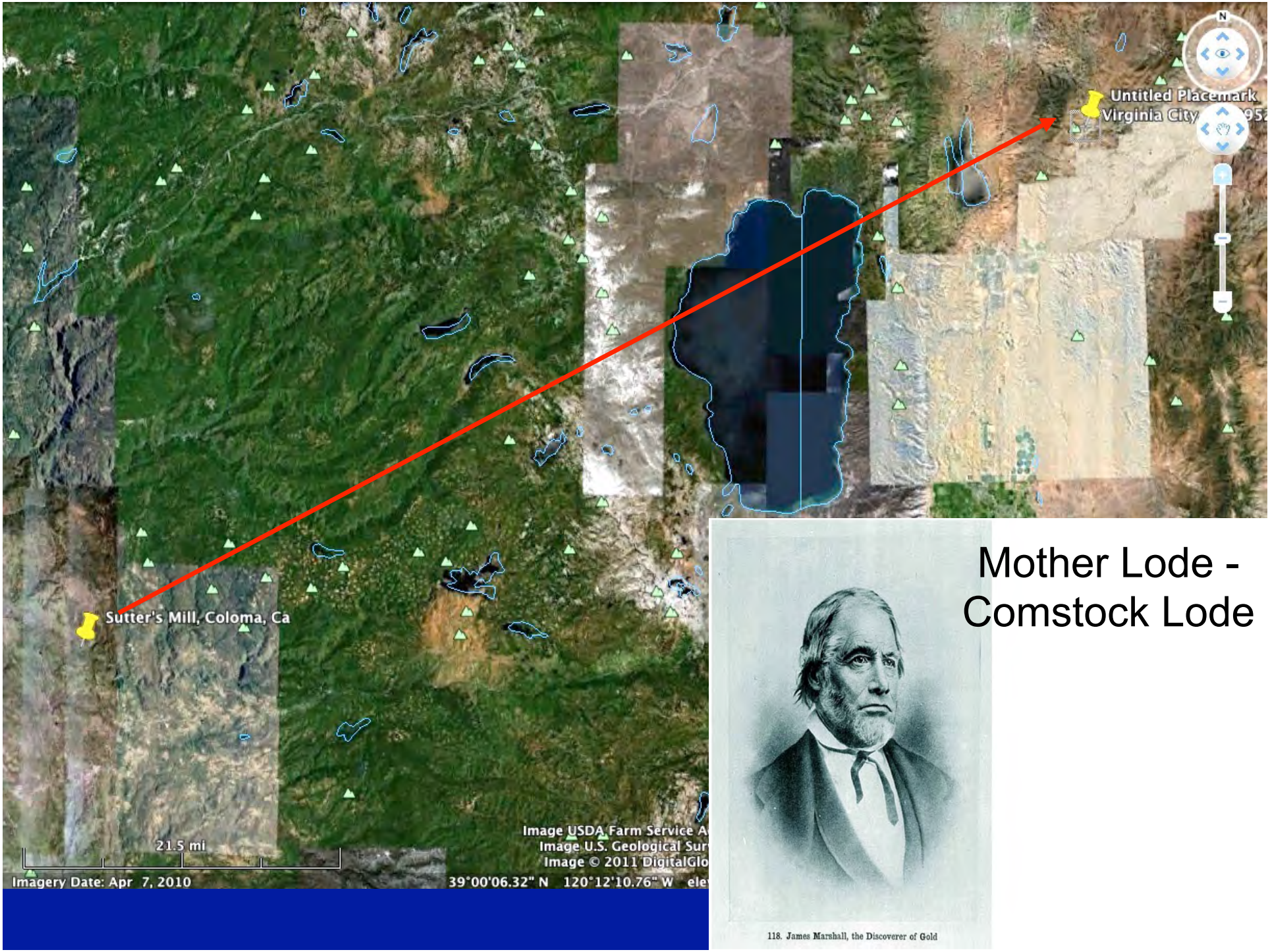


http://www.tulane.edu/~sanelson/images/meander.gif


TAHOE NATIONAL FOREST
55 miles to Reno
50 miles to Napa
60 miles to San Jose
Sacramento
GOLD COUNTRY
Calpine
Loyalton
Downieville
Sierra City
Sattley
Sierraville
Boca Reservoir
Nevada City
Rough & Ready
Grass Valley
Alta
Colfax
Weimar
Meadow Vista
Applegate
Foresthill
Bowman
Auburn
Lincoln
Newcastle
Penryn
Loomis
Rocklin
Roseville
North Highlands
Citrus Heights
Carmichael
Rancho Cordova
Georgetown
Cool
Pollock Pines
Placerville
Camino
Diamond Springs
Somerset
Folsom
Folsom Lake
Florin
Elk Grove
Plymouth
Drytown
Amador City
Volcano
Pioneer
Sutter Creek
West Point
Jackson
Ione
Hood
Courtland
Locke
Walnut Grove
Isleton
Galt
Mokelumne Hill
Valley Springs
San Andreas
Murphys
Vallecito
Angels Camp
Twain Harte
Copperopolis
Sonora
Tuolumne
Jamestown
Groveland
Big Oak Flat
Coulterville
Lake McClure
Hornitos
Mariposa
Catheys Valley
Ahwahnee
Oakhurst
Coarsegold
Raymond
O'Neals
National Forest
State Park
Freeway
Highway
Scenic Byway
Railroad
Pacific Crest Trail
State Capital
Attraction
Major Airport
Roadside Rest Area
Wildlife Viewing
Agricultural Inspection Station

Empire Mine, largest mine in California mother lode

Empire Mine



118. James Marshall, the Discoverer of Gold

Mother Lode - Comstock Lode

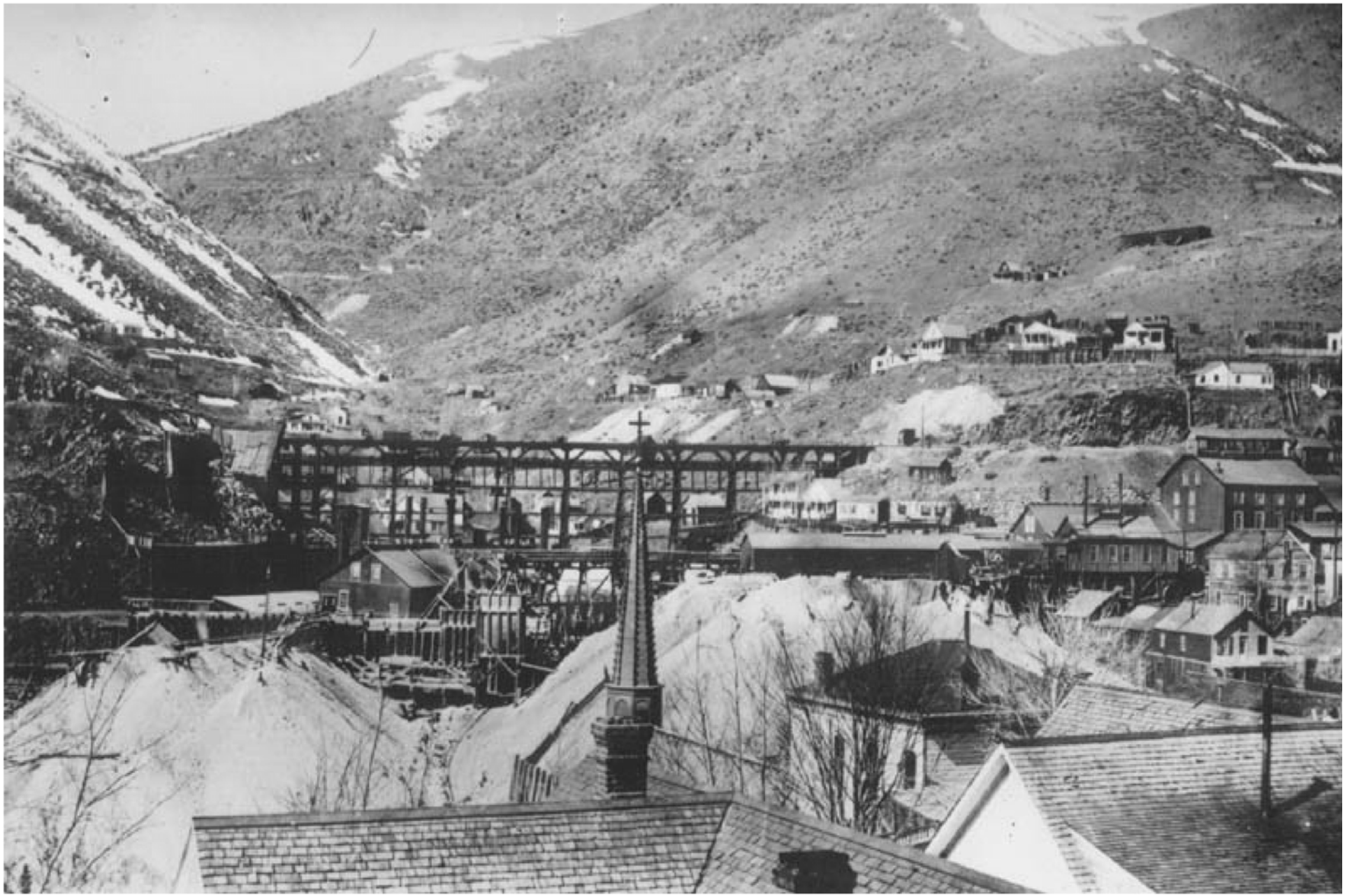
Placer Mining 1849

Malakof Hydraulic Mine

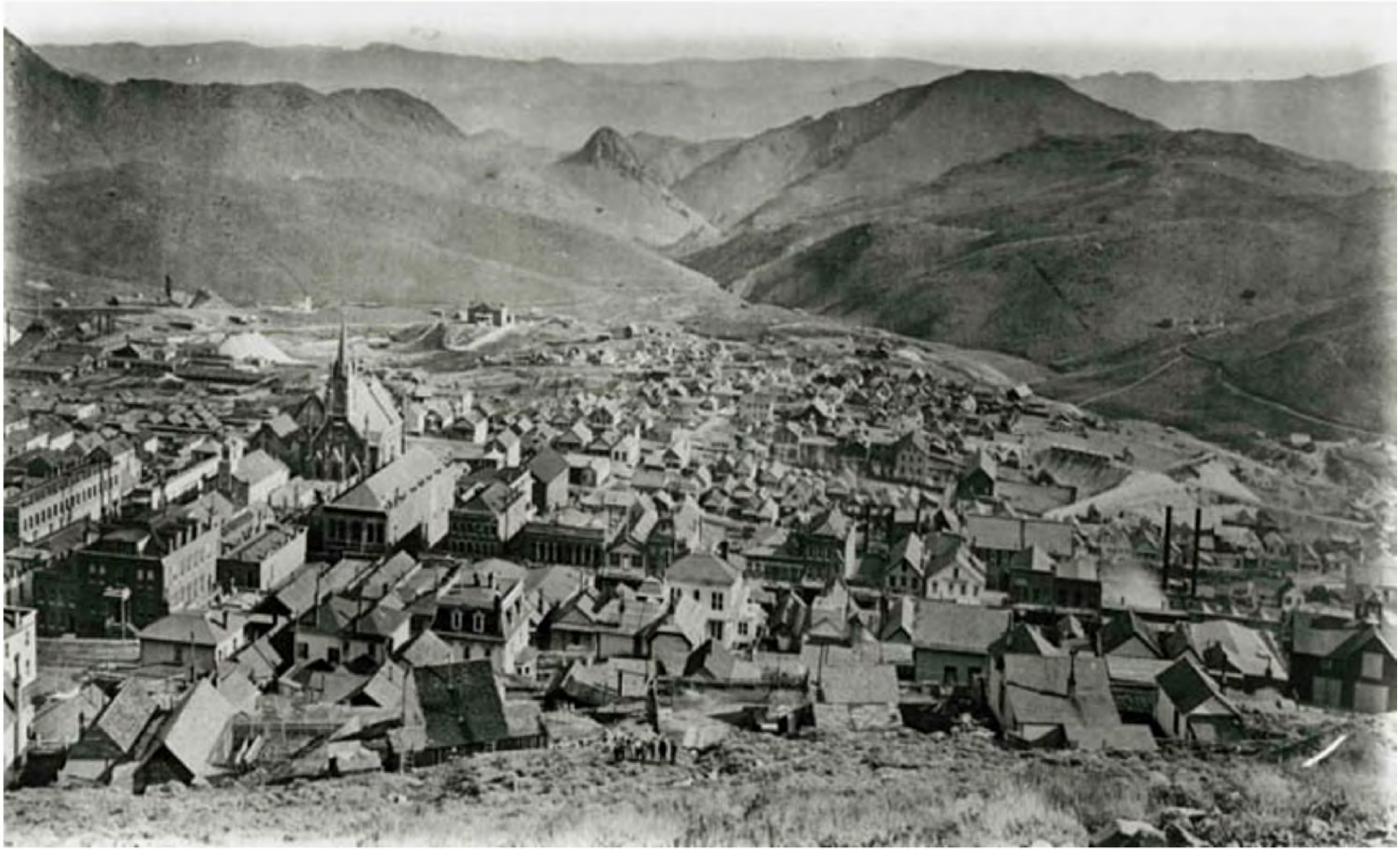
Henry Comstock
Discovered the
Comstock Lode

Did not get rich.

~1870 The Comstock Lode: Gold Hill, Virginia City NV



~ 1880 Gold Hill, Virginia City, NV



~1880 Virginia City NV

2010 Virginia City NV


Comstock Lode: Original Adit

LEGAL FRAMEWORK OF RESOURCE DEVELOPMENT

- Resource Ownership
  - Security of title
  - Specific obligations
  - Rights of indigenous peoples

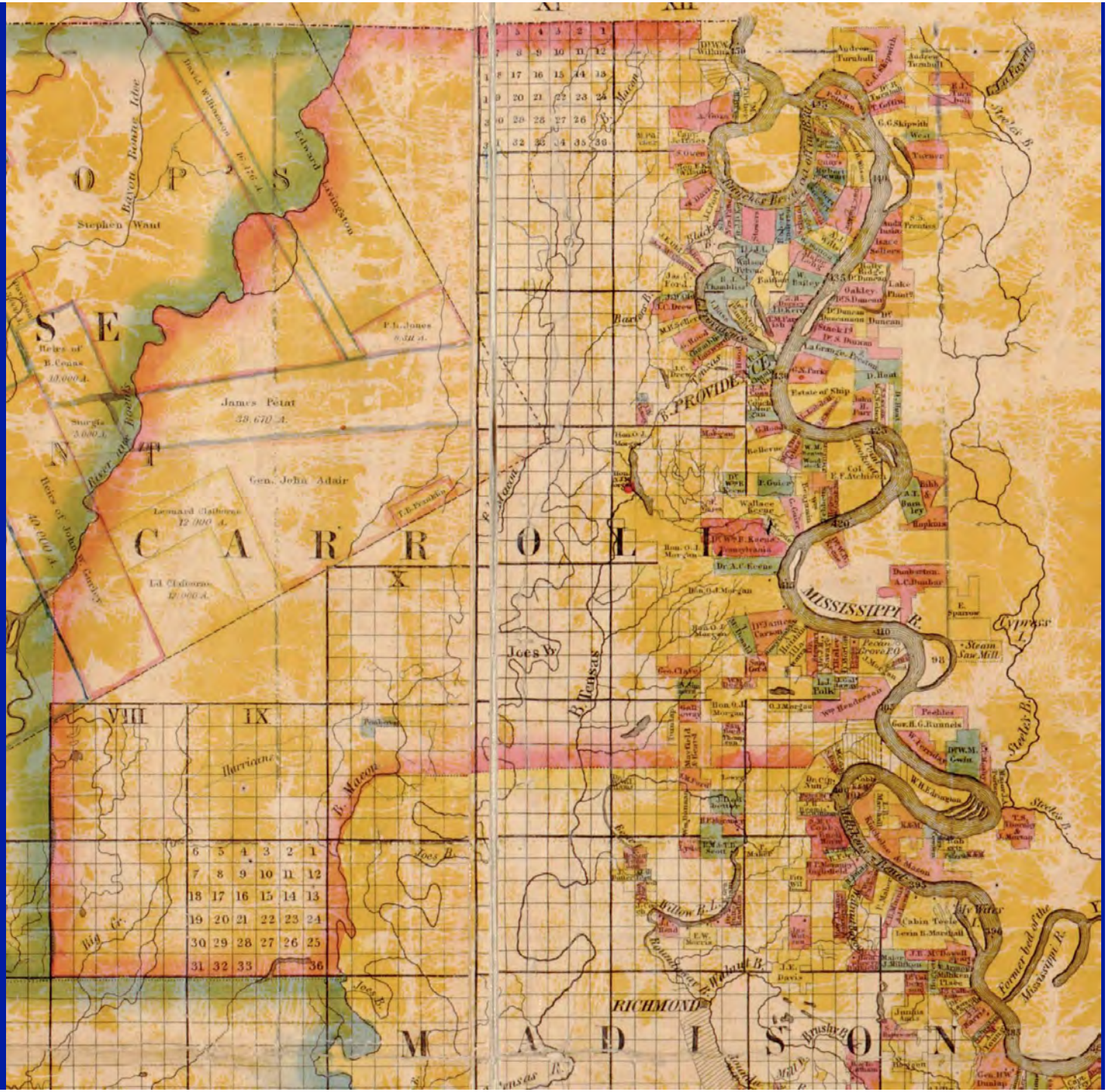
Government ownership of subsurface rights

- Concept of regalia
- Concessions negotiated with the government
  - Exclusive exploration rights
  - Type of commodity specified in the license
  - Financial arrangement specified in the license

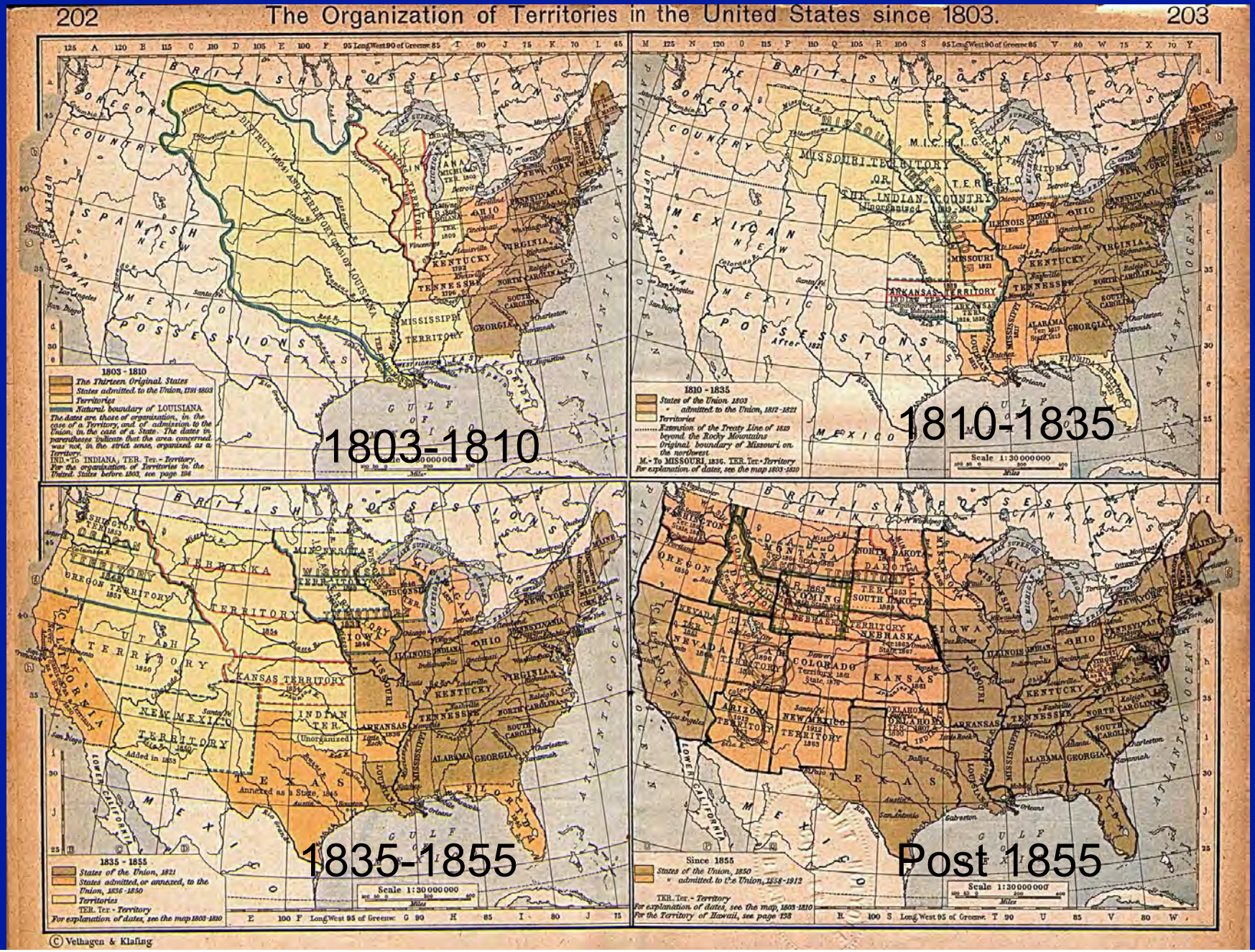
- Private ownership of subsurface rights
  - Southwestern US
    - Spanish Royal Code of 1783
      - Miners could acquire rights from the Crown
      - Courts settled disputes between claimants
  - Eastern US
    - Colonial charters granted rights to settlers
    - Patterned after Crown landgrants

Louisiana Land Plat

Note older French Plots and newer US Township And Range Plots



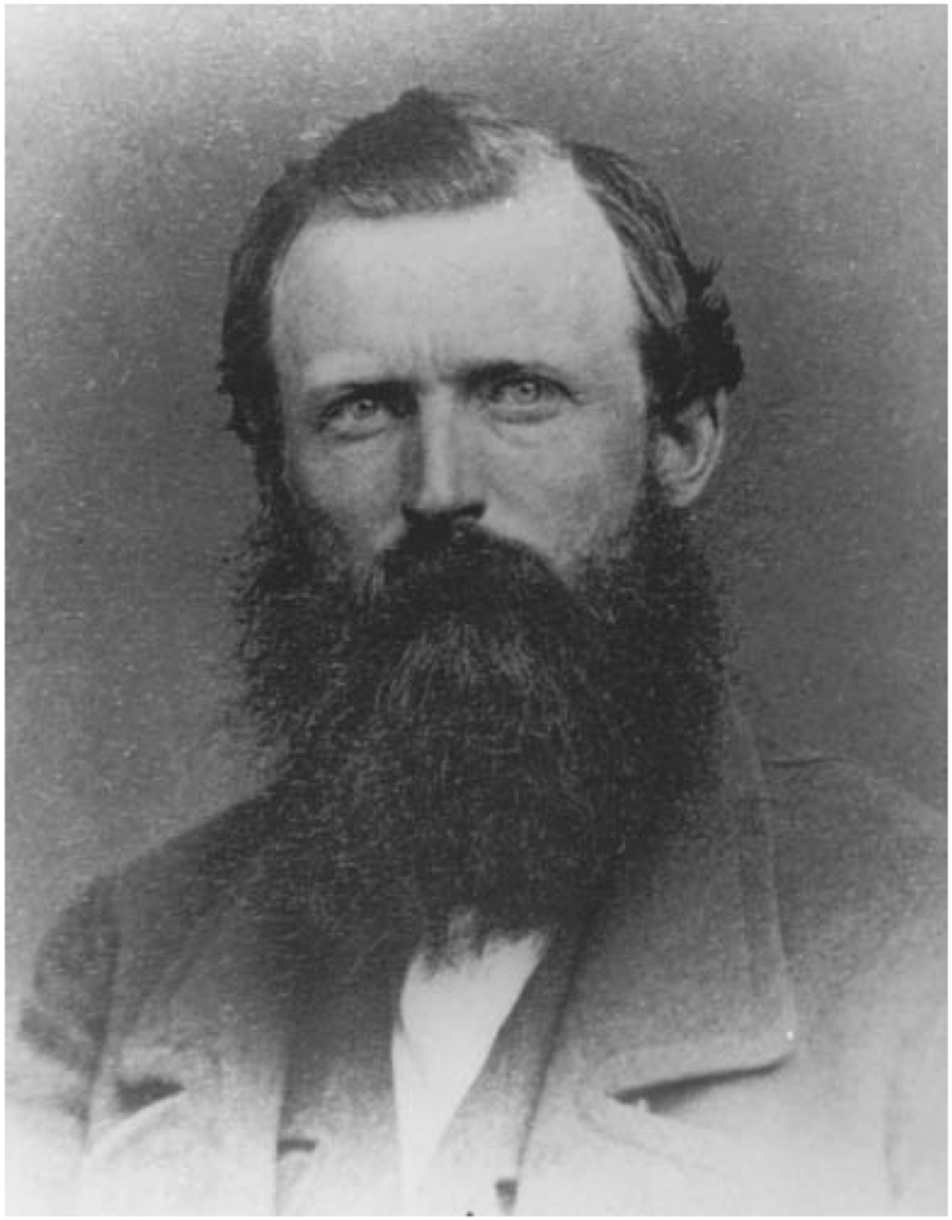
1848 Treaty of Guadalupe and Hildago




A MAP
OF THE
United States
OF
MEXICO,
As organized and defined by the several
acts of the CONGRESS of that
REPUBLIC.
Constructed from a great variety of
Printed and Manuscript Documents by
H.S.TANNER.
Third edition, 1846
OREGON
UNITED STATES
TEXAS
CALIFORNIA
GULF OF MEXICO
BAY OF VERA CRUZ
TABLES of DISTANCES
STATISTICAL TABLE
MAP OF THE ROADS &c. FROM VERA CRUZ & ALVARADO TO MEXICO

pgarace3s INTERIOR-GEOLOGICAL SURVEY, RESTON, VIRGINIA-2005

- The California Gold Rush 1849
  - Southwestern and Eastern traditions came into dispute
  - No US law dealt with mineral resources on public lands at that time
  - Miners in California were trespassing on US land when placing claims there
  - Eastern investors financed both the California Mother Lode and the Nevada Comstock Lode
    - Security of title
    - Security of tenure



Senator William Stewart

Leland Stanford's Attorney

And the author of
The Mining Act of 1872

The Mining Law of 1872

- Political Issue: Should the government own land or subsurface resources?
- The act intended to pass public land into private ownership
  - Resources should be developed by private companies, not by the government
  - Applied to specific, localized ores: Cu Au Ag Mo Pb Zn

The Mining Law of 1872

- Designed to protect interests of the prospector:
  - Permitted a claim of 20 acres (600 x1200’)
  - Required $5/year of assessment work
  - Land is essentially under private control
  - To retain claim, annual assessment work required
  - The act intended to pass public land into private ownership
  - A successful commercial claim would make the land totally private

The Mining Law of 1872

- Castle v Wombly (1894): The Prudent Man
  - "Where minerals have been found and the evidence is of such a character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a valuable mine, the requirements of the statutes have been met."
  - Minerals must exist in sufficient volume to justify efforts
  - Test is not whether a person is prudent, but whether deposit justifies expenditure.
  - The act intended to pass public land into private ownership

The Mining Law of 1872

- Castle v Wombly (1894): The Prudent Man
  - The Marketability Test:
    - Establishing the value to justify expenditure
    - Claimant must derive income from mining equivalent to what he could earn for the same time invested in the labor market
  - Law is a post discovery law
    - Found the deposit and staked a claim - not consistent with modern practice
    - Court interpretation recognizes the concept of *Pedis possessio*
    - Senior locator can maintain claims in absence of discovery as long as discovery is pursued diligently

The Mining Law of 1872

- Reform of the Mining Law of 1872
  - Should government receive royalties from mining of mineral wealth?
  - Should the right to patent land be maintained?
  - Law has no requirements for environmental accountability
  - Mining companies point to high risk of discovery

The Alaska Coal Lands Leasing Act of 1914

- Alaska was a territory
- Asserted public ownership of resources located on public land

The General Leasing Act of 1920

- Places title of all deposits of oil, shale oil, coal, sulfate, sulfur, potassium and sodium minerals in ownership of Federal Government
- Land does not pass to private ownership
- After recovery of resource, land reverts to Federal Government
- Develops system of leasing (leasables), may be competitive
- Allow prospector to obtain tract of land to explore (< 2560 acres)

The General Leasing Act of 1920

- If deposit is found - lease from Bureau of Land Management (Department of Interior) Land does not pass to private ownership
  - Conservation mining of the resource
  - Payment of royalties per unit of production
  - Reclamation of the surface after use

The Federal Land Policy and Management Act of 1976

- Concept of multiple use of public lands
- To be governed by sustained yield concepts
- Public lands to be managed for the public good
- All possible uses of the land must be considered.

US Private Lands

- Mineral and fuel exploration and production are contracts between private parties
- Contracts state conditions of exploration and development
- At present, surface estate is typically separated from the subsurface estates
- Subsurface right holders have right of access for exploitation of their respective resources.

International Mineral and Fuel Contracts

- Contracts must be agreed between exploration/development firms before any work can be done inside a country.
- Contracts normally provide the expected work commitment for the first exploration phase, and options for subsequent exploration and development phases.
- Contracts normally provide the expected work commitment for the first exploration phase, and options for subsequent exploration and development phases.

International Mineral and Fuel Contracts

- 1. Service contracts- the company is paid a fee for each unit of production.
- 2. Tax and royalty contracts-the company pays a royalty to the host country, as well as taxes on any net income.
- 3. Production sharing agreements- a sliding scale is used to split the production between the host government and the contractor.
- Bonus payments may be included in any contract
  - Signing bonus payments
  - Production bonus payments

How do we compare these contracts?

Consider a tax-and-royalty contract

Assume 100 units of production costs 30 units

Assume a royalty of 12% and a corporate tax rate of 50%

100 Units of Production
-30 Units Cost
70 Units Gross Profit
-12 Units Royals
58 Units
-29 Units Tax
29 Units Net Contractor Profit

How do we compare these contracts?

Consider a production sharing contract
Assume a royalty of zero percent
Assume a corporate tax rate of 50 percent
Assume contractor share of 30 percent
Then we can perform the following calculations

100 units of production
-30 units of cost
70 units gross profit

21.0 units contractor's share at ~30 percent
-10.5 units corporate tax at 50%
10.5 units contractor net profit

How do we compare these contracts?

As a contractor, which would you prefer?

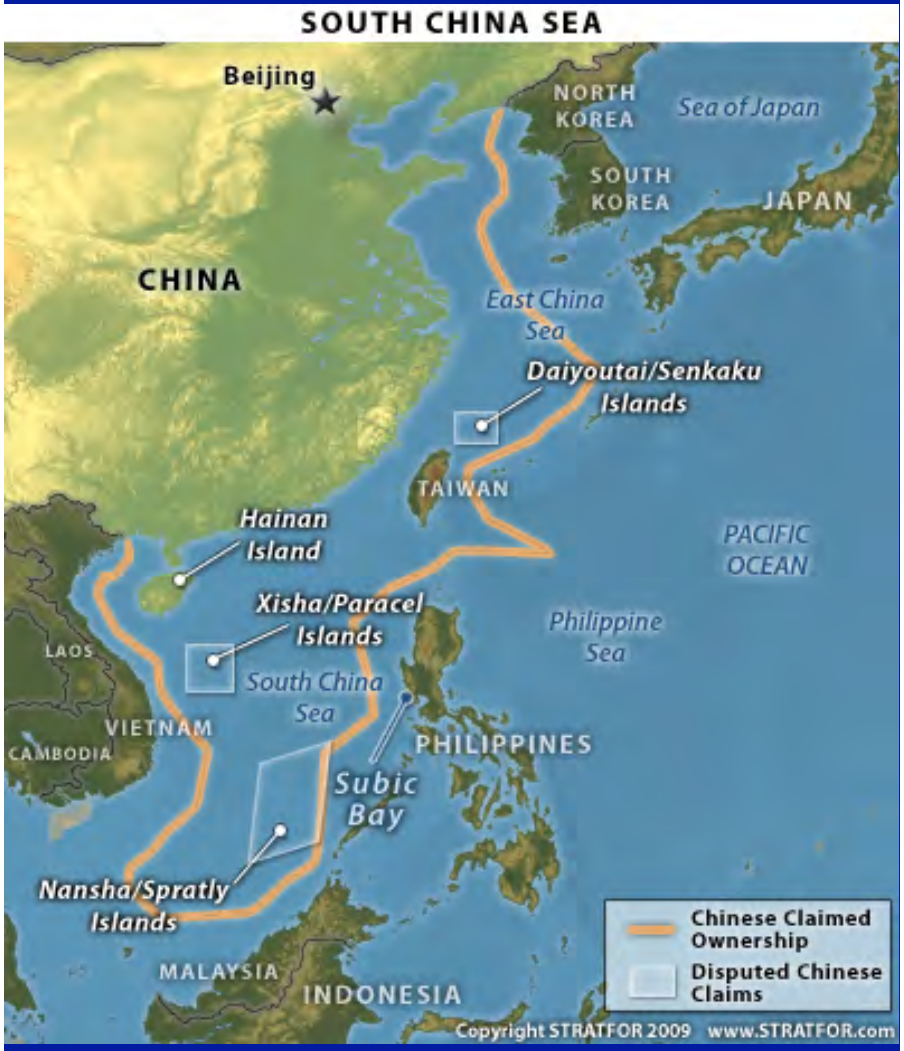
34.0 units of 100 units of production

10.5 units of 100 units of production

As a host government, which would you prefer?

36.0 units of 100 units of production?

59.5 units of 100 units of production?


SOUTH CHINA SEA
Beijing
NORTH KOREA
Sea of Japan
SOUTH KOREA
JAPAN
CHINA
East China Sea
Daiyoutai/Senkaku Islands
TAIWAN
Hainan Island
PACIFIC OCEAN
Xisha/Paracel Islands
LAOS
South China Sea
Philippine Sea
VIETNAM
CAMBODIA
PHILIPPINES
Subic Bay
Nansha/Spratly Islands
MALAYSIA
INDONESIA
Chinese Claimed Ownership
Disputed Chinese Claims
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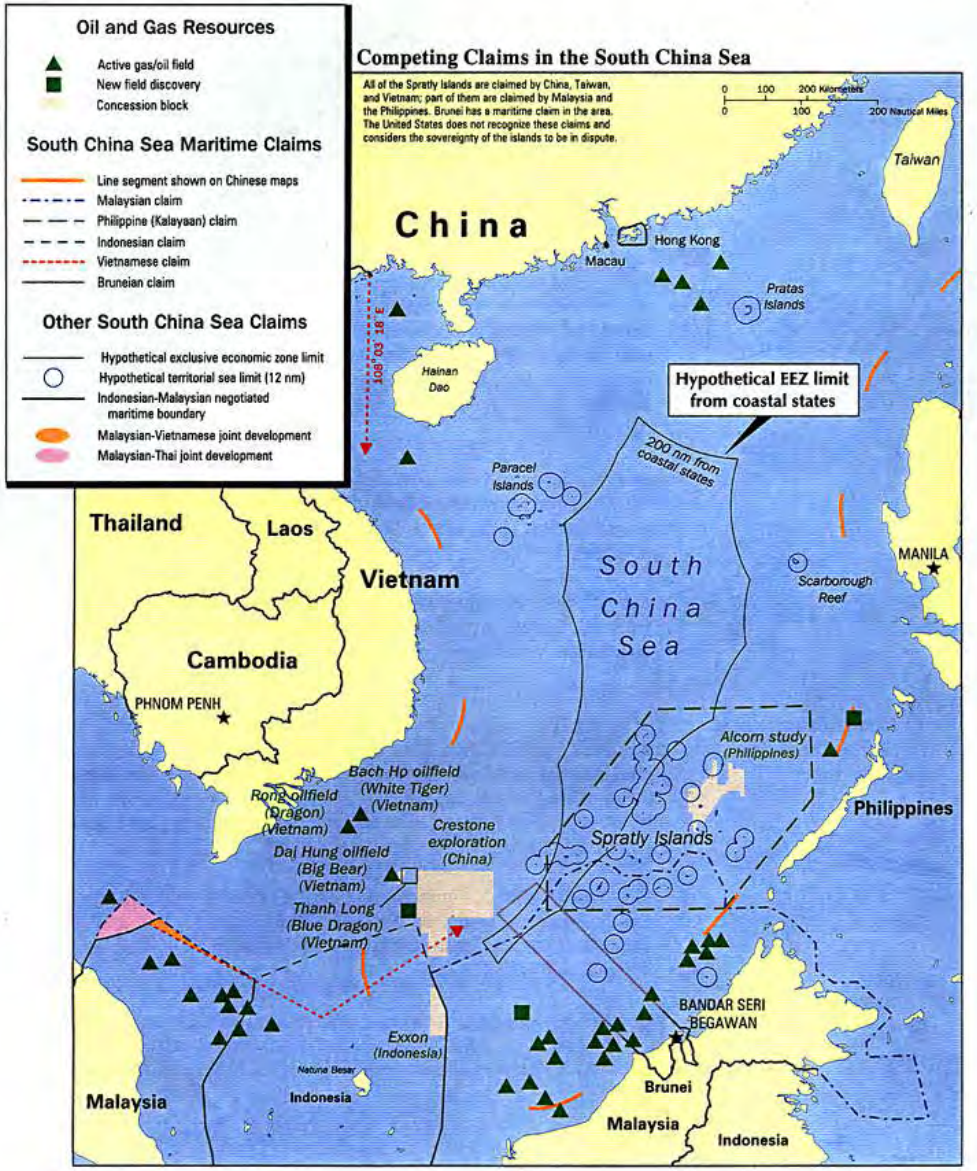

Oil and Gas Resources
Active gas/oil field
New field discovery
Concession block
South China Sea Maritime Claims
Line segment shown on Chinese maps
Malaysian claim
Philippine (Kalayaan) claim
Indonesian claim
Vietnamese claim
Bruneian claim
Other South China Sea Claims
Hypothetical exclusive economic zone limit
Hypothetical territorial sea limit (12 nm)
Indonesian-Malaysian negotiated maritime boundary
Malaysian-Vietnamese joint development
Malaysian-Thai joint development
Competing Claims in the South China Sea
All of the Spratly Islands are claimed by China, Taiwan, and Vietnam; part of them are claimed by Malaysia and the Philippines. Brunei has a maritime claim in the area. The United States does not recognize these claims and considers the sovereignty of the islands to be in dispute.
0 100 200 Kilometers
0 100 200 Nautical Miles
Taiwan
China
Hong Kong
Macau
Pratas Islands
Hainan Dao
Hypothetical EEZ limit from coastal states
200 nm from coastal states
Paracel Islands
Thailand
Laos
Vietnam
South China Sea
Scarborough Reef
MANILA
Cambodia
PHNOM PENH
Alcorn study (Philippines)
Bach Ho oilfield (White Tiger) (Vietnam)
Rong oilfield (Dragon) (Vietnam)
Crestone exploration (China)
Philippines
Spratly Islands
Dai Hung oilfield (Big Bear) (Vietnam)
Thanh Long (Blue Dragon) (Vietnam)
BANDAR SERI BEGAWAN
Exxon (Indonesia)
Natuna Besar
Malaysia
Indonesia
Brunei
Malaysia
Indonesia

1982 UN Law of the Sea

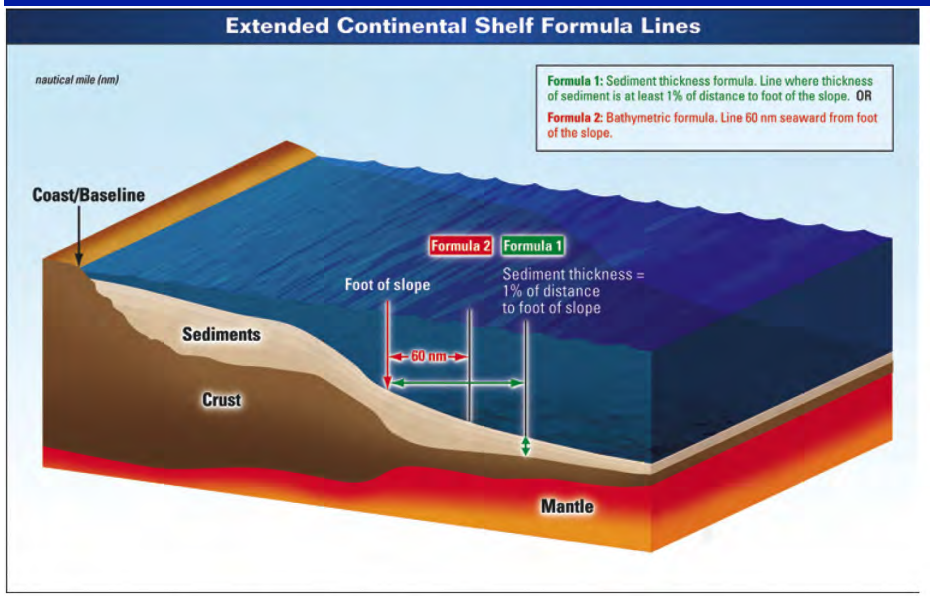


Figure 1. Formula lines. LOS Article 76 defines two formulas for calculating the extent of the continental shelf, one based on bathymetry and the other on sediment thickness. The position of the foot of the slope is the starting point for both formulas. The bathymetric formula defines extended continental shelf to 60 nautical miles seaward of the foot of the slope. The sediment thickness formula defines extended shelf to a point where sediment thickness equals 1% of the distance from the foot of the slope. A coastal nation may use either or a combination of both of these formulas to define the ECS area extending beyond 200 nmi from the coastal baseline. (from http://continentalshelf.gov/glossary.html).

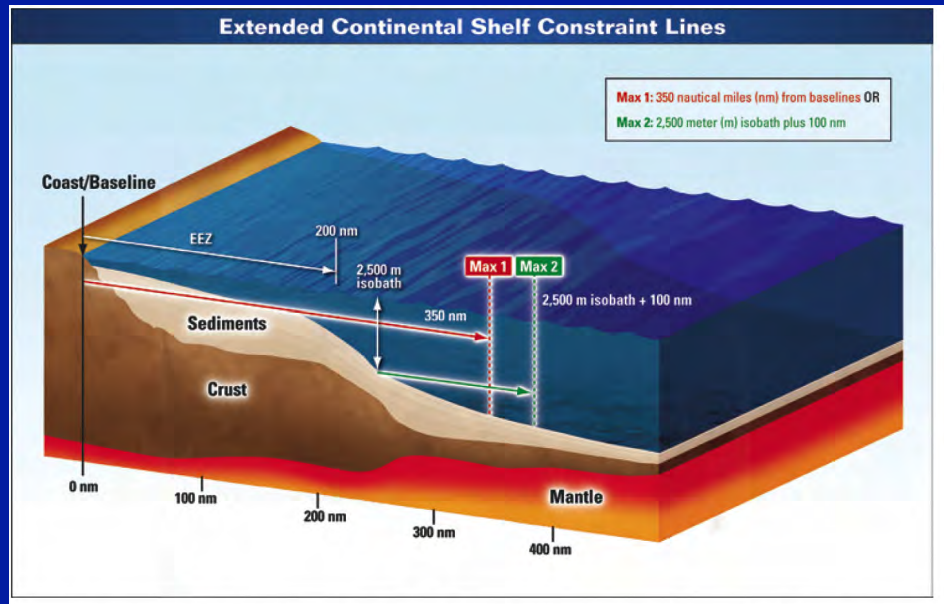
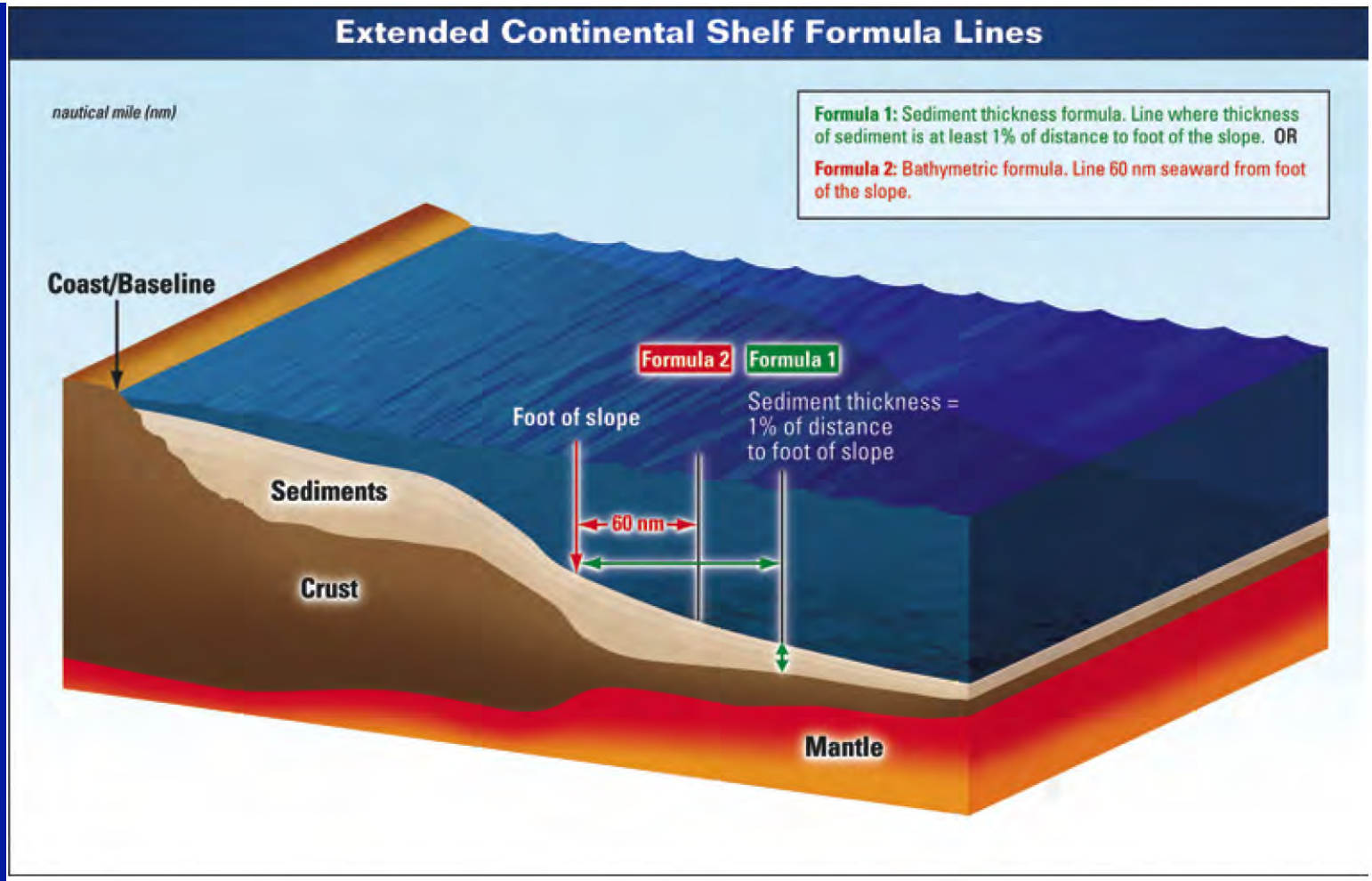


Figure 2. Constraint lines. LOS Article 76 defines two constraint lines, which limit the maximum extent of ECS. These are applied as cutoff-lines in areas where the formula lines define ECS beyond 200 nmi. One constraint line is 100 nmi seaward of the 2500-m isobath; the other is 350 nmi from the coastal baselines (Figure 2). In cases where both constraints are applicable, a nation may use the more seaward of these constraints. Mapping formula lines and then trimming them at the constraint lines determines where the outer limits of the ECS are located. (from http://continentalshelf.gov/glossary.html)



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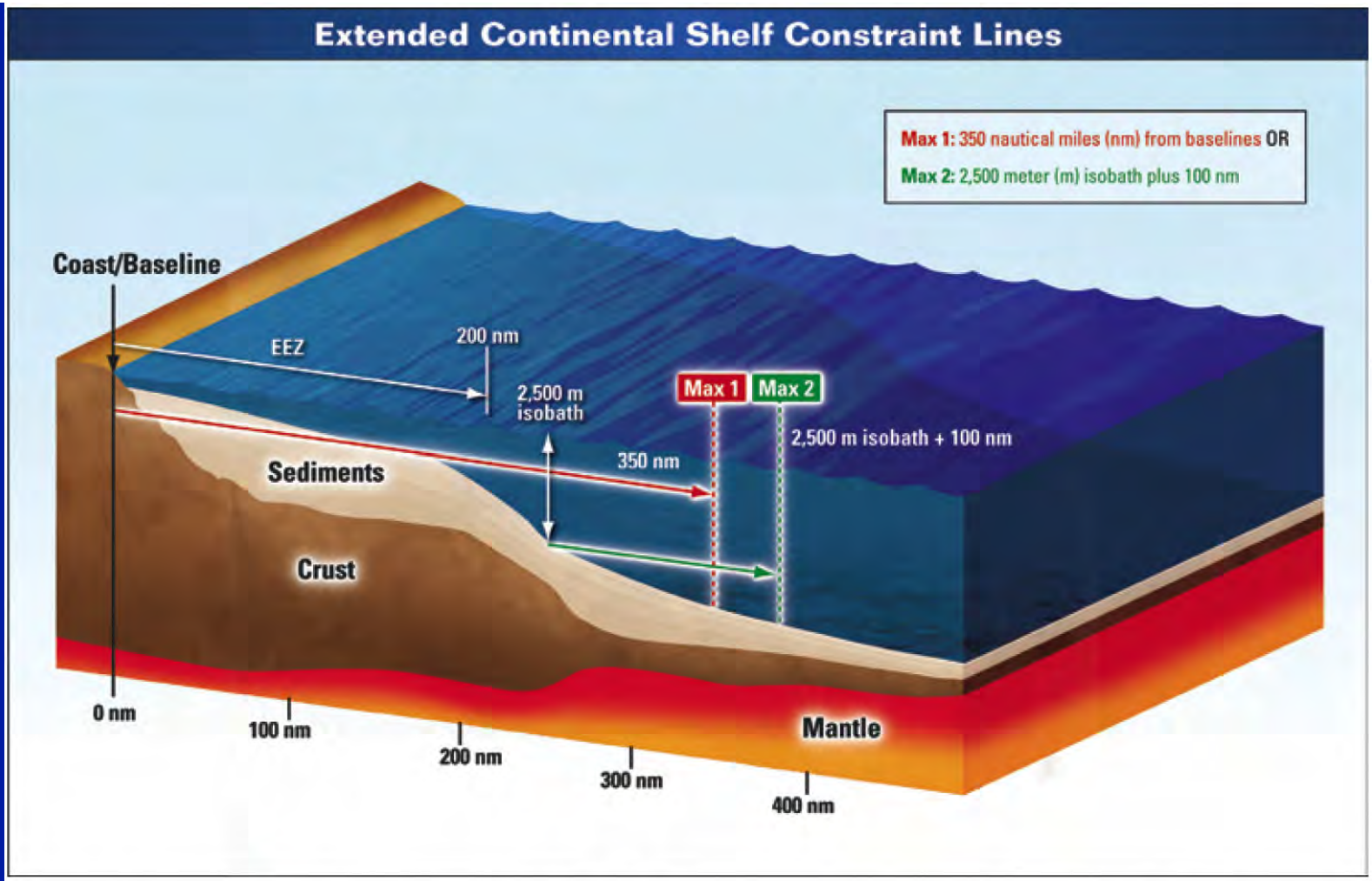

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http://www.nature.com/nature/journal/v469/n7329/full/469158a.html


ICE
COLD
If you can read this...ROLL ME OVER!!!
Jeep
NEVADA
242 WBG