

# Jade State News

WYOMING STATE MINERAL AND GEM SOCIETY, Inc. - P.O. Box 697, CODY, WYOMING 82414  
 Volume 2015, Issue 2

## WYOMING'S PETRIFIED FORESTS



**May 2015  
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Wyoming is a state rich in fossil wood and has several petrified forests. The major petrified forests in Wyoming are (1) the Eden Valley and Blue Forest areas of southwestern Wyoming, (2) the Wiggins Fork area in Absaroka Mountains near Dubois, and (3) in the Yellowstone National Park region in northwestern Wyoming. (4) As a result of the erosion of these major areas, petrified wood was deposited by streams and can be found scattered throughout Wyoming.

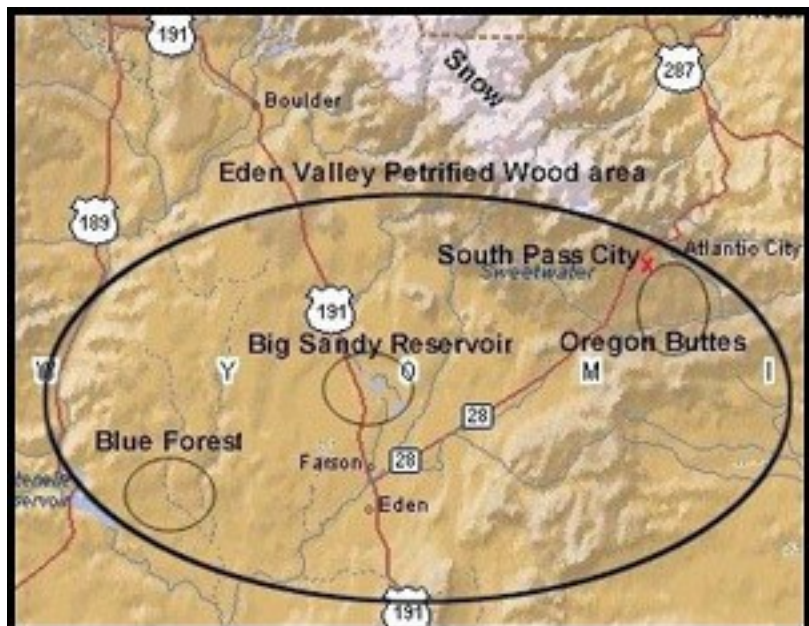
### (1) Eden Valley Petrified Wood

The petrified wood from one of Wyoming's petrified forests is known to collectors as Eden Valley Petrified Wood and is named

after the town of Eden, Wyoming. Eden is located in the west-central part of the state and is in the center of the 80 mile long area where the fossil wood is found. Three collecting areas are well known.

(A) The Blue Forest collecting area is located in the west end of the deposit about 30 miles west of Farson. The fossil wood found in this area is known for the light blue agate surrounding many of the pieces. ((sections 28, 29, 30, 31, 32 and 33, T24N, R110W)

(B) The Big Sandy Reservoir collecting area is located north of Farson and northeast



Article continued second column page 5

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Additional information on Club meeting days, times  
and locations is posted under the Club News and  
Announcements on Pages 12 and 13

**T**he Wyoming State Mineral and Gem Society (WSMGS) is a non-profit organization, with the purpose of educating, promoting and developing an interest and understanding in the Earth Sciences, Lapidary Arts, and their related fields for its affiliated members as well as the general public. The WSMGS is a member of the Rocky Mountain Federation of Mineralogical Societies (RMFMS) and the American Federation of Mineralogical Societies (AFMS). WSMGS Member Clubs are located in Casper, Cheyenne, Cody, Powell, Riverton, and Torrington, Wyoming. The WSMGS invites you to explore our website for information about Wyoming's minerals, rocks, fossils, and gemstones as well as for an introduction to the people and places that rockhounds can visit, explore and learn. *You can find us at:*

<http://www.wymineralandgemsociety.org/index.html>

# WSMGS INFORMATION AND UPDATES *by Stan Strike, President*



1. Club News and photos of your club activities for the Jade State News are due the 1st week of February, May, August, and November. Please send our JSN Editor-Verne Orcutt at least a paragraph or two: WSMGSplicity@gmail.com.

2. To date only two nominations for Club Rockhound of the Year and State Rockhound of the Year have been received. Each club's nomination will be recognized at the Annual Meeting. All Club **AND** State Rockhound of the Year Nominations are eligible to be selected as WY State Rockhound of the Year by a independent group of judges.

All Forms can be found online at the WSMGS website:

**wymineralandgemsociety.org – under the heading “Who We Are Forms”.**

3. The WSMGS Board met on 4/24/2015 at the Riverton Senior Center. The following items were discussed:

- \* Status of WSMGS affiliated club dues and membership changes
- \* Review of the Status of payments / reports required of WSMGS Board
- \* Historian's Report
- \* Grants submitted using WSMGS's 501(c)(3) status
- \* Noted the use of 501(c)(3) Donation Form for donations for State Shows & Grants
- \* Report on progress concerning 2015 RMFMS/WSMGS Convention & Rock Show
- \* WSMGS will provide judges, judging forms, and ribbons for all state shows
- \* Suggestions for May Jade State News
- \* Report from RMFMS State Director
- \* RE-Set Mineral & Gem Show Dealer/Worker Luncheon for Thursday 7/16/15- 11:30
- \* RE-Set 2015 WSMGS Annual Meeting for Thursday 7/16/15-1:00p.m.
- \* Discussed 2015 RMFMS Mineral & Gem Show speakers and field trips
- \* Report on Mineral & Gem Show Postcard -WSMGS web address error & solution

#### 4. WSMGS Board Action Items

- \* Finalized Judging Forms to be used at all WSMGS State Shows
- \* Updated Rock Shops and Museums of interest for WSMGS website
- \* Possible purchase of R.O.Y. mold and casting for past recipients
- \* Accepted immediate resignation of Treasurer-Jim McGarvey and audit of club bank balance and appointed Richard Heumier as temporary treasurer.
- \* Protest Review of Dept. of Revenues' decision to require sales tax paid on club show income
- \* Plan for selling fossils/petrified wood from private land
- \* Assigned tasks: secure judges, labeling display cases, organizing ribbons, special awards
- \* Plan to recruit new WSMGS officers to be elected 7/16/15.

**Continued at the top of page 5**

# Historian's Report

Apr. 24<sup>th</sup>, 2015

## State Historian's Report

I have received the annual state historians report from: the Rex Young Rock Club (Torrington), the Shoshone Rock Club (Powell), and the Cody 59ers Rock Club. The outstanding reward goes to Linna Beebe of the Shoshone Rock Club. She not only reports, but has a portfolio with pictures of the clubs events & highlights. Many Kudos, Linna.

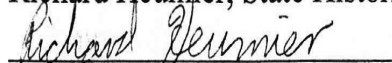
I have unofficially been informed that the Rex Young R.C. of Torrington has voted to make a bid at the annual State meeting in Cody, to host the 2016 State show. This was done by their secretary, Helen Vogel.

I was asked at the last board meeting to update a list of: Wyoming Rock Shops, Their E-mail addresses, phone numbers, and physical addresses. I looked up on the internet, called, and visited all that I know about and have listed them by alphabetical towns. I will pass that list out to the board members and have our President, Stan Strike, relay this list on to our Web master for posting. I also included a sheet with pictures of business cards for all the shops I have. Noted: on the sheets about the shops "out of business", or not using E-mail addresses, or "up for sale".

I was also asked, to get some ideas for categories for competitive & non-competitive showcases. Most of these ideas came from the State Show book, which I had researched many years ago from past show chairpersons. I will give this list to the State Board members at this meeting.

I will be resigning my 8 years of tenure as State Historian, due to family problems, as of the State annual meeting in Cody, at the Sweitzer H.S. gymnasium at 920 Beck Ave., at 1:00 pm. I have completely enjoyed working on the board as a member and working with the members during this time.

Respectfully submitted,  
Richard Heumier, State Historian

  
Richard Heumier

**WSMGS UPDATES AND INFORMATION** *Continued*

3. The WSMGS Board asks for your help:

A.-to encourage your club members to show off their special collections that are unique to Wyoming by displaying them at the 2015 RMFMS Show in Cody.

B.-for your club to consider hosting the 2016 State Show. The WSMGS will seek 501(c)(3) grants to reduce your expenses and provide assistance for the show.

C.-to consider volunteering a little of your time and talent by becoming a WSMGS board member/officer. Most of the present WSMGS Board will be resigning at the 2015 Annual Meeting.

**Wyoming's Petrified Forests, continued:**

(1-2 miles) of the Big Sandy Reservoir. This area is known for petrified palm wood. Reservoir. (T27N, R105-106W). *recommended map - US Geological Survey, Farson 1:100,000 topographic quadrangle*.

(C) On the eastern end of the deposit, fossil wood is found around Oregon Buttes just east of South Pass, Wyoming. Oregon Buttes is a major landmark on the Oregon Trail. Locally the Bridger Formation contains petrified wood near Oregon Buttes. This wood, known as the Bridger-type, consists of partially silicified black wood. Where it is completely replaced by silica, it ranges in color from brown, tan to green. (T26-27N, R100-101W)

In the **Eden Valley** in southwestern Wyoming, petrified wood is found over a wide area around Farson. This wood resembles ordinary weathered wood and has an opaque cream colored coating of silica covering a silicified black to brown core. The source of this material appears to be the Laney Shale Member in the upper part of the Green River Formation, and the overlying Bridger Formation both of Eocene age.

During deposition of the Laney Shale sediments, which consist of tuffaceous, buff, chalky to muddy marlstone and brown to grey shale, the climate was warm and moist. Under these conditions hardwood trees, pine, fir, magnolia and other types of trees flourished in widespread heavily forested swampland cut by numerous braided streams.

Lake Gosiute expanded and contracted in response to periods of increased precipitation followed by dry periods. The fluctuation in the lake level alternately allowed expansion of the forests around the lake, or drowned the timber as the lake rose. The drowned timber was gradually buried in lake sediments and showers of volcanic ash. Over time, the wood became petrified from the silica leached from the volcanic material.

Because the petrification process seems to have been "protected" by the algae cast formation, unusually detailed representations of the wood have been preserved. Worm holes, insect borings, woodpecker holes, and other events have been observed in the petrified wood. Even very rare lichen fossils and small clam shells have been duplicated in the agate.

**Blue Forest**



**Palm Wood**



**(2) Wiggins Fork of the Absaroka Mountains**

The Absaroka Mountains in northwestern Wyoming, have produced a variety of petrified woods and agates. Wood casts, fossil cone casts, agatized seeds, and oval nodules have also been found in this region. These are clear, gray, brown, yellow, green, and red with patterns that include fortifications, banding, spots, moss, tea leaf, and iris agate.

**T45N, R106W** (*recommended map - US Geological Survey, Ramshorn 1:100,000 topographic quadrangle*). Wiggins Fork petrified wood and agate are fairly abundant in the Wiggins Formation along the Wiggins Fork River and Frontier Creek. Large areas in this region are closed to collecting, and collectors should contact the Shoshone National Forest office to obtain information on which areas may be open to collecting.

*Article continued first column top of page 6*

**T43-44N, R107-108W** (recommended map - US Geological Survey, Ramshorn 1:100,000 topographic quadrangle). Horse Creek, Burrows Creek, and many other streams in this area have been reported as good collecting localities for petrified wood and agate. The wood and agate are derived from the Wiggins Formation. Some material is found in terrace and stream gravels in this region. Volcanic material other than the Wiggins Formation may also contribute to the petrified wood and agates in this area. Some chalcedony may also be derived from Paleozoic limestones. (Sutherland, 1990).

Wyoming Iris agate is found along the Wind River. It is known as Wind River iris agate. Most of the pieces found are petrified wood limb casts that have been wholly replaced by chalcedony in a water line agate form. Some of the layers are moss agate others are opaque to semi opaque while others are nearly water clear. Some of the limb casts have botryoidal agate or quartz crystals on the inside. Finding the iridescence is a bit of a challenge but a skilled lapidary craftsman will have luck with persistence.

### Wiggins Fork Limb Cast



Iris Agate



## (3) Yellowstone National Park Region

Volcanic rocks of the Absaroka Volcanic Supergroup (Eocene) within the Absaroka Mountains, contain scattered fragments of petrified wood and agate. Along the western margin of the range, Yellowstone Park is famous for its fossil forests at Specimen Ridge and Amethyst Mountain. Some prostrate fossilized trunks have been found in this region that are more than 50 feet long, and 5 feet in diameter (Sinkankas, 1959). Amethyst is also reported in the Yellowstone area at Amethyst Mountain. Collecting is prohibited in the National Park.



## (4) Petrified Wood Location Reports

**Cumberland Flats** (T19N, R117W). Some agate and petrified wood is reported in the Cumberland Flats area south of Kemmerer (Johnson, 1973) (recommended map - US Geological Survey, Kemmerer 1:100,000 topographic quadrangle).

**Fourmile Gulch** (sections 2, 3, 8, 9, 15 & 16, T23N, R110W; and sections 34 & 35, T24N, R110W). Exposures of the Bridger Formation are reported by Mitchell (1982) to yield several varieties of chalcedony. These include yellow and brown jasper and petrified wood. Some of the wood and agates have a blue color, but the majority of the agates are multicolored (recommended map - US Geological Survey, Rock Springs 1:100,000 topographic quadrangle).

**Jack Morrow Hills** (sections 1, 2, 11 & 12, T25N, R103W). Eden Valley petrified wood has been collected in the area of the Hay Ranch in the Jack Morrow Hills (Cheyenne Mineral and Gem Society, 1965) (recommended map - US Geological Survey, Farson 1:100,000 topographic quadrangle).

**Sublettes Flat** (T26-27N, R107W). Located west of Big Sandy Reservoir. This area is reported to host small limb casts of milky-white agate. The agates occasionally contain an internal tube-like structure and may exhibit an iris agate color display (Cheyenne Mineral and Gem Society, 1965) (recommended map - US Geological Survey, Farson 1:100,000 topographic quadrangle).

**Whiskey Basin** (T21N, R11W). Petrified wood and agate were reported in the Whiskey Basin area by Johnson (1973). This area is underlain by the Bridger Formation (*recommended map - US Geological Survey, Rock Springs 1:100,000 topographic quadrangle*). This area has had a long history of discoveries of petrified wood and other forms of chalcedony (**Figure 74**).

**Powder River Basin.** Within the Powder River Basin, are several varieties of chalcedony including petrified wood, chert and jasper that are associated with Paleozoic limestones along the eastern flank of the Bighorn Mountains (Hausel and others, 1990). Moss agates are also reported between Fort Reno and Crazy Woman Creek (Cheyenne Mineral and Gem Society, 1965).

The majority of the petrified wood found in the basin occurs in the Wasatch Formation (Eocene). The Crazy Woman Creek petrified wood, is durable and well suited for lapidary purposes. This wood is well silicified, banded in shades of brown and white, and is found in terrace gravels about 60 to 120 feet above Crazy Woman Creek in an area extending from the flank of the Bighorn Mountains to where Dry Creek joins Crazy Woman Creek. Large pieces of the Crazy Woman petrified wood, up to 18 inches in diameter and 16 inches long, were collected from the vicinity of Crazy Woman Creek in the past and can be found in landscaping and in local collections in Buffalo. Similar material has been found in terrace gravels along the Powder River near Kaycee (Sutherland, 1990).

**Crazy Woman Creek petrified wood** (S/2 section 24 & NE section 31, T 48N, R81W). Partially rounded cobbles of Crazy Woman Creek petrified wood ranging in length from 3 inches to more than 10 inches, have been found in piles of oversize material in a gravel pit in section 24. Chunks of the wood, up to 6 inches in length, have been found near an old gravel pit in section 31 (Sutherland, 1990) (*recommended map - US Geological Survey, Buffalo 1:100,000 topographic quadrangle*).

**McNeese Draw** (sections 30 & 31, T51N, R80W). Numerous, poorly silicified, petrified trees and logs are found between the Healy and Walters clincker/coal beds in the Wasatch Formation (Eocene). The US Bureau of Land Management maintains a withdrawn area in section 31 to allow visitors to see some impressive Early Eocene petrified forest remains. Durkin (1986) identified these trees as cypress and sequoia. Some specimens as tall as 12 feet, and 3 feet or more in diameter, have been found in this area (*recommended map - US Geological Survey, Buffalo 1:100,000 topographic quadrangle*).

T51N, R80-81W. East of Buffalo, Zeitner (1969) reported some amethyst-lined cavities were found in specimens of petrified wood (*recommended map -*

*US Geological Survey, Buffalo 1:100,000 topographic quadrangle*).

## **Saratoga Valley**

Six Mile Hill - Sand Flats area (sections 1, 2, 3, 10, 11 & 12, T18N, R84W, and section 24, 25, 26, 27, 34, 35 & 36, T19N, R84W). Agatized wood and dendritic agates are found on the flats along Wyoming State Highway 130 north of Saratoga. The host rock appears to be tuffaceous sandstones, siltstones, and claystones of the North Park Formation (Miocene) (Sutherland, 1990) (*recommended map - US Geological Survey, Rawlins 1:100,000 topographic quadrangle*).

According to the Cheyenne Gem and Mineral Society (1965), agates have been collected along Wyoming Highway 130, 14 miles south of Walcott Junction. From Saratoga north to the Union Pacific railroad, the flats contain common agatized and opalized woods which fluoresce green under ultraviolet light.

**Shirley Basin petrified wood** (T27N, R78W). This township and the surrounding areas of Shirley Basin have been known as a source of petrified wood since the 1930s. Humid subtropical woods such as palms and other species once grew here, as demonstrated by a forest of silicified logs and fallen trees with diameters up to 3 feet or more in the Wind River Formation (Eocene). The majority of this wood was hauled away by commercial collectors between the 1930s and 1950s (Sundland, undated). The wood ranged in color from white to brown to black, and is generally of poor quality. Typically, it breaks easily into small flakes. Harshman (1972) reported that the petrified forest area was located within sections 11, 12, 13, and 14.

## **Adapted References Utilized:**

<http://si02.blogspot.com/2011/04/agate-jasper-quartz-chalcedony-more.html>

<https://sites.google.com/site/wyomingrockhound/rocks-of-wyoming/wyoming-iris-agate>

<http://www.mineraltown.com/Reports/28/holz5-gross.jpg> presented in The Ammonite-December 2012 by WSDGMS

<http://gemhunter.webs.com/chalcedony.htm>

<http://thegemshop.com/pages/eden-valley-petrified-wood-location>

### **Computer Hunting: Go to**

<http://wn.com/petrifiedwood> where there is a two minute video show on Petrified wood / 15 million years old trees near Vantage, Washington. Also is also a list of eight more petrified wood videos –they are listed at left side of this website screen and three listed at the bottom that show on YouTube.

# GEOLOGIC MAP OF WYOMING

A geologic map is a portrait of the surface of the Earth in the same way a photograph is a portrait of the surface of your face. This map of Wyoming shows, in a very general way, the distribution of rocks and sediments across the face of Wyoming, scrubbed clean of its thin veneer of plants and soil. It is an old, wrinkled face and at first glance it may look hopelessly complex. The different colors show the different types and ages of rocks and they tell a wonderful story of the State's geologic history. In general, rocks exposed at the surface are progressively younger away from the mountain cores. On the map, rocks are divided into three major units based on age and rock type:

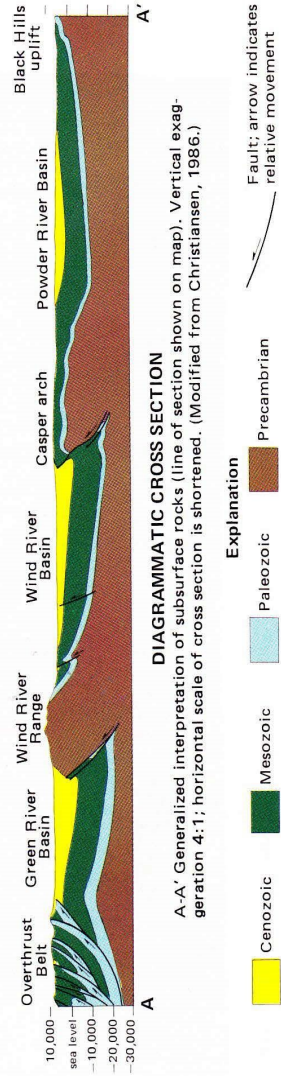
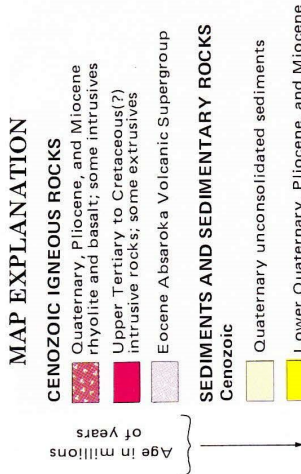
(1) Precambrian igneous and metamorphic rocks are the oldest in Wyoming, exposed only in the cores of mountain ranges where all the younger rocks have eroded off of them. The cross section shows they are actually continuous in the deeper crust. Some of these rocks have very complex histories, having formed from other rocks that were changed by extreme heat and pressure. Others crystallized from molten material. When the Precambrian rocks formed, life on Earth was mostly single-celled, microscopic bacteria and algae, which are preserved in Wyoming only in the Medicine Bow Mountains. Elsewhere, rocks that would have contained fossil life have been recrystallized.

(2) Paleozoic, Mesozoic, and Cenozoic sediments and sedimentary rocks are exposed over much of the rest of the State. Paleozoic and Mesozoic rocks often appear as thin lines of color on the map because they are tilted up on edge (see the cross section). Sandstones, shales, and carbonate rocks of this age contain fossils that record most of the evolution of life from the first appearance of animals with shells and skeletons through the dinosaurs. Most of the Paleozoic rocks formed from sediments deposited in or very near ancient seas that covered Wyoming. During Mesozoic time, seas advanced and retreated across Wyoming, leaving alternating marine and continental sediments.

Cenozoic unconsolidated sediments include nonmarine deposits left by glaciers; windblown sand and dust; river, stream, and lake deposits; landslide debris, and other unconsolidated earth materials. Cenozoic sedimentary rocks cover relatively unbroken areas of the basins. They preserve debris eroded from the mountain ranges when they were young; volcanic ash blown across the State; and sediments that collected in rivers, lakes, and swamps. Most of the evolution of mammals occurred at the same time the Cenozoic basins were filling and Wyoming has some excellent fossil sites of this age.

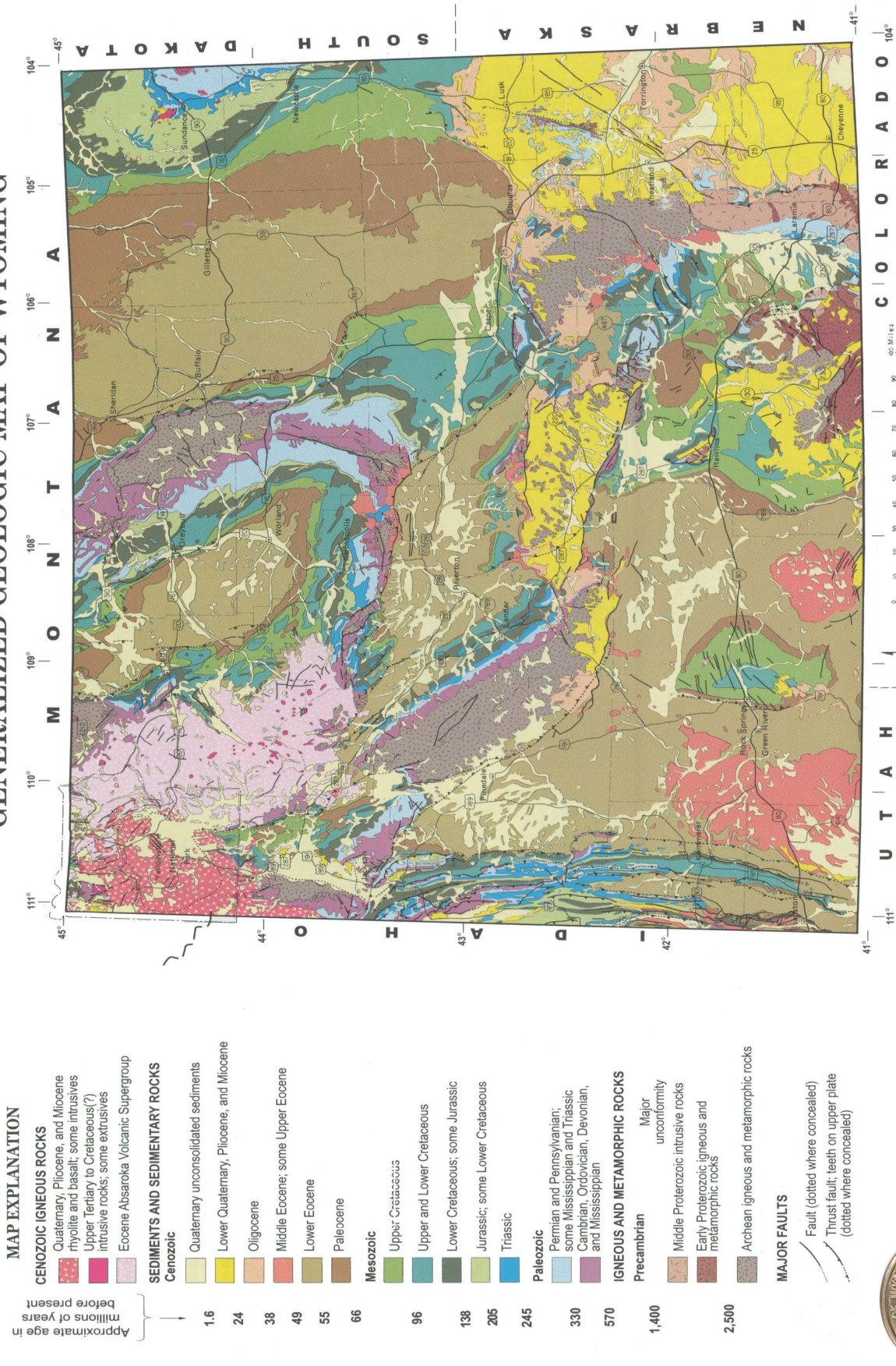
(3) Cenozoic igneous rocks in the northwest corner of the state formed during two separate episodes. The Absaroka Mountains Volcanics erupted first. Much later, magma flowed or exploded out of the Earth and covered most of the older rocks in the Yellowstone National Park area. Many of the Cenozoic sedimentary rocks in Wyoming contain volcanic ash from eruptions in Wyoming and in areas south and west of the State. Cenozoic igneous rocks also occur in the Black Hills area and a few other scattered locations in Wyoming.

Each of the three major units is divided into smaller units based on age and rock type, but the scale of the map does not allow representation of rock *formations*, which are the units usually mapped by geologists. The map also shows the location of major faults (breaks in the Earth's crust along which there has been displacement) and the cross section gives a generalized view down into Wyoming's layered rock crust.





# GENERALIZED GEOLOGIC MAP OF WYOMING



## MAP EXPLANATION

- CENOZOIC IGNEOUS ROCKS**  
 Quaternary, Pliocene, and Miocene rhyolite and basalt; some intrusives  
 Upper Tertiary to Cretaceous(?) intrusives rocks; some extrusives  
 Eocene Absaroka Volcanic Supergroup

Approximate age in millions of years before present

## SEDIMENTS AND SEDIMENTARY ROCKS

- Cenozoic**  
 Quaternary unconsolidated sediments  
 Lower Quaternary, Pliocene, and Miocene  
 Oligocene  
 Middle Eocene; some Upper Eocene  
 Lower Eocene  
 Paleocene

## Mesozoic

- Upper Cretaceous  
 Upper and Lower Cretaceous  
 Lower Cretaceous; some Jurassic  
 Jurassic; some Lower Cretaceous  
 Triassic

## Paleozoic

- Permian and Pennsylvanian; some Mississippian and Triassic  
 Cambrian, Ordovician, Devonian, and Mississippian

## IGNEOUS AND METAMORPHIC ROCKS

- Precambrian**  
 Major unconformity  
 Middle Proterozoic intrusive rocks  
 Early Proterozoic igneous and metamorphic rocks  
 Archean igneous and metamorphic rocks

## MAJOR FAULTS

- Fault (dotted where concealed)  
 Thrust fault; teeth on upper plate (dotted where concealed)



Wyoming State Geological Survey  
 Thomas A. Drean, Director and State Geologist  
 Laramie, Wyoming  
 2014 Reprint

Modified and adapted from Roberts, S., 1989, Wyoming Geomaps: Wyoming State Geological Survey Educational Series 1, 41 p.

SCALE  
 1" = 42 miles or 1:2,869,000

Cartography by Phyllis A. Ranz

NEBRASKA  
 SOUTH DAKOTA  
 COLORADO

# WYOMING

## Gemstones and fossils



*A very large piece of Wyoming Jade with a cut and polished surface*

### **State Gemstone: Jade (1967)**

Wyoming designated jade as its official state gemstone in 1967. Jade is a compact, opaque gemstone ranging in color from dark green to almost white. The term 'jade' is applied to specimens cut from the minerals jadeite and nephrite. Wyoming's state gemstone is of the nephrite variety. Nephrite, a member of the amphibole group of minerals, is a silicate of calcium and magnesium, with a small amount of iron replacing part of the magnesium. It is a tough, compact variety of the mineral tremolite. Nephrite's color depends on the amount of iron present. Nephrite is usually some shade of green: it may range from sea green, gray green, celadon, lettuce green, grassy green, and spinach green. Other colors of nephrite include blue gray, reddish gray, greenish gray, yellow, and black. The famed Wyoming jade fields occur in a rectangular band that runs roughly from Lander southwest to Farson, down to the Red Desert in Sweetwater County, east to Seminoe Dam, north to Alcova, and westward back to Lander. The 1930s and 1940s were the "glory days" of jade hunting in Wyoming. Many sources cite 1936 as the year of jade discovery near Lander.

From 1936 until 1945, Wyoming residents primarily hunted for jade. The end of World War II plus a 1945 article in Popular Science titled "Green Gold of Wyoming" changed that – the publicity created intense competition for Wyoming jade.



### **State Fossil: Knightia [fish] (1987)**

Wyoming designated Knightia as its official state fossil in 1987. Knightia is an extinct genus of fish well known from abundant fossils found in the Green River Formation of Wyoming. They rarely exceeded ten inches in length and are found throughout the formation. Knightia was a slender fish and seems to have been a secondary consumer, feeding mainly on ostracods, algal forms, and diatoms, as well as some smaller fish. They were schooling fish, and because of this they are frequently found together in mass mortality layers. Knightia lived in several large lakes that existed near the junction of Wyoming, Utah, and Colorado during the Eocene Epoch, some 50 - 40 million years ago. At that time, the climate was warm and tropical, instead of the arid badlands of today. The Eocene lake system consisted of three lakes, Uinta, Gosiute, and Fossil. Most of the best fish fossils come from Fossil Lake. They occur in mass die-offs, sometimes as many as several hundred fish densely packed in a single square yard of Green River rock. Because of this, Knightia is the most commonly collected vertebrate fossil in the world, and is frequently sold in souvenir shops across Wyoming and throughout the United States. It is thought that low oxygen conditions led to the death of large schools of fish, that settled to the lake bottom and were quickly buried and fossilized. Missionaries began reporting fish fossils as early as the 1840s.

Explorer James Hall and fur trapper Jack Robinson wrote of them in 1848, and the first published report appeared in 1856 authored by Philadelphia paleontologist Joseph Leidy. Rich exposures of fish fossils were exposed during the building of the Union Pacific Railroad. Today, part of the area is preserved as Fossil Butte National Monument near Kemmerer.



*State Dinosaur: Triceratops (1994)*

Wyoming is unique. Wyoming did not enact a state law specifying an official state dinosaur. Rather, Wyoming enacted a law specifying an election to determine the state's official state dinosaur. Accordingly, in 1994, students voted to make Triceratops the official Wyoming state dinosaur. It won with 70 percent of the vote, crushing opponents Apatosaurus, Megalosaurus, and Diplodocus. Triceratops had three horns on its skull - one on its snout and one above each eye. The name is derived from the Greek words *treis*, "three"; *kerat*, "horn"; and *ops*, "face." Triceratops was one of the largest horned dinosaurs and roamed the land that is now Wyoming near the end of the Cretaceous Period, some 68 - 65 million years ago, as the Western Interior Seaway that divided the continent was retreating to the south. ☐ Triceratops belonged to a diverse group of ornithischian ("bird-hipped") dinosaurs called ceratopsians characterized by a large frill at the back of the skull and a varying number of facial horns, that populated North America and Asia toward the end of the age of dinosaurs. Many different ceratopsians have been described, but of these, Triceratops is the best known and most familiar. It was a large, quadrupedal herbivore that fed on tough, low growing vegetation. Although a complete skeleton has never been found, many good skulls have been, and enough other bones of Triceratops are known for scientists to deduce that it was about twenty-five feet long and weighed around five tons. The first Triceratops specimen was discovered in Wyoming in 1887. It was originally thought to be an extinct type of bison, and only later recognized as a dinosaur. Since that time, many other Formations in the Black Hills region of South Dakota, eastern Wyoming, and Montana. Triceratops fossils have been uncovered, primarily in the Hell Creek Formation in the Black Hills region of South Dakota, eastern Wyoming, and Montana.

Credits: [<http://gatorgirlrocks.com/state-by-state/wyoming.html>]

## *Eight Steps to Close-up (Macro) Photography of Rocks, Gems, Minerals, and Fossils for Beginners*

*By Steven Veatch*

Learning to use your camera's macro feature will open up a whole new world in your photography. Also, macro photos will give you something new--a very different perspective. Compact cameras can shoot remarkably good close-up photos depending on the quality of the camera. But, there are several things you need to be aware of in order to take good macro images.

- 1. Turn on the macro mode** by pressing the flower icon (make sure the icon appears in your LCD viewfinder). This setting allows you to bring the camera lens in.
- 2. Lighting is important.** I like to take my outdoor macro photos on the porch. We have a nice table out there that works just fine. If the sun is bright, you may have to go back indoors and use electric lights on little stands. Avoid incandescent lights; they can create a harsh light and create a strange hue. In the winter I take my pictures inside near the picture window. Light coming in from a cloudy day can work. You will just have to experiment. I try both ways, indoors using natural light, and then artificial lighting that I have.
- 3. Use a tripod** to limit camera shake, which becomes more of a problem the closer you get to the specimen. Getting a small, inexpensive tabletop tripod from Wal-Mart is the key. Until you buy a tripod, you put your camera on a stack of books. Place your specimen on a stack of books across from the camera. Tilt the specimen up, put a piece of construction paper of the appropriate color behind it, and then another book behind the construction paper to keep the tilt going.
- 4. Always use your camera's self-timer.** This limits camera shake and vibration when pressing the shutter button. The self-timer is a delayed shutter release that records the image after all vibrations have subsided and eliminates the problem of pressing the release which would cause a slight motion. Check out your manual to see how it works on your camera. Once you press the button down to take a picture, do not touch or lean on the table. Just a slight vibration can ruin a close-up image.
- 5. Experiment with your flash.** It is not always necessary to use your flash but, it can reduce or eliminate shadows—a real problem for macro photographers. Try shooting where bright light is available to fill the shadows. I take a few pictures without the flash, and then a few with the flash. It costs nothing to take a number of images until you get the right one.
- 6. Fill the frame.** Do get as close as you can to your subject - get comfortable and relax. Enjoy what you are doing!

You are creating a whole new way to look at your mineral and fossil world. Be sure to take multiple shots, play with the lighting, move the subject around, and try different things. This way we will get your ultimate close up. Now go out and take some pictures of your field trips, meetings, etc. for your rock club bulletin editor.

The article above comes from Steven Veatch's Blog- (*via Colorado Springs Mineralogical Society, Lake George Gem & Mineral via AFMS Newsletter, 04- 2011*, via The Ammonite (May 2015).

# CLUB NEWS AND ANNOUNCEMENTS



## *Wyoming Rock Stars*

### *Cliff and Rowena Paton-Manuel*

Cliff Manuel, along with his wife, Rowena (Row) Paton Manuel, took early retirement in 1987 and relocated from Bonita, California, (*population many*) to Shell, Wyoming (*population 50*). During their 30 plus years living and working in California, Cliff and Row would spend their summer months in Shell, enjoying hiking, exploring, and rock and fossil hunting in the Shell Valley.

Avid hikers and nature lovers, Cliff and Row devoted much of their time after retirement to exploring the vast open spaces surrounding the area in more detail, collecting interesting rocks, some of which turned out to be fossils. Contacting paleontologists from the Smithsonian Institution's Natural History Museum, who were camping in the area, they discovered that these 'rocks' were actually fossilized remains of the marine reptile ichthyosaurus, which was then collected by the Smithsonian scientists, led by Dr. Michael Brett-Surman. And, some of these activities became even more productive, resulting in major discoveries including the rare middle-Jurassic age Red Gulch Dinosaur Tracksite near Shell.

Row, being a native of Shell, was raised on a horse - her folks owning and operating Paton Ranch, which was one the original 'dude ranches' in the Shell Valley area of northern Wyoming. Many geoscientists were friends of the Patons, the most famous of these being Barnum Brown, who, in 1934, collected over 4,000 fossil bones from the Howe Quarry near Shell for the American Museum of Natural History. Barnum Brown, and his wife, Lillian, became life-long friends with Row's parents - a friendship that lasted for over 20 years. Ref: "Bones for Barnum Brown" by R. T. Bird.

The Shell Valley area is world famous for its rocks and fossils, with extensive geological deposits encompassing all of multi-cellular life except one (Silurian), and with several dinosaur quarries which have yielded some of the best and most famous dinosaur fossils ever discovered. Many well known geologists and paleontologists have spent their summer days and weeks over the past 100 years and more studying these geological deposits, and searching for, and excavating, virtually complete dinosaur and marine reptile remains.

Cliff and Row befriended many of these geoscientists, educators and students, providing lodging and other

accommodations to support their activities, and accompanying them during their activities.

The Manuel's next door neighbor in the Shell area is the Iowa State University Geology Field Camp where, for over 50 years, geology students spend six weeks each summer studying geology. One of those students, their nephew Erik Kvale, continued his geology studies and Dr. Kvale is now a recognized authority on the geology of the area.

As the result of these activities, Cliff and Row, along with Dr. Kvale and Dr. Brett-Surman, established Geoscience Adventures, and have conducted field trips and educational workshops in geology and paleontology in the Shell area since the year 2000. These summer workshops are conducted as a series of three-day short courses that explore the geological and paleontological record of northern Wyoming. The workshops are open to educators and everyone that is interested in spending three days in the field learning geological and paleontological concepts from professional scientists. Ref: [www.geoscienceadventures.com](http://www.geoscienceadventures.com)

Geoscience Adventures is the educational arm of the Bighorn Basin Geoscience Center, an approved non-profit, tax-exempt 501(c)(3) corporation dedicated to the study, conservation & appropriate display of the northern Bighorn Basin's natural resources, and to the promotion of geoscience and local historical and educational activities, through exhibits and educational materials for educators, geoscientists, tourists and the people of Wyoming. Cliff serves as the Center's Founder and Chairman.

*Congratulations Cliff and Row!*

#### **Big Ben Watch Toss**

Three visitors to London climb up the tower that houses Big Ben and decide to have a contest. They're going to throw their watches off the top, run down the stairs and try to catch the watches before they hit the ground.

The first tourist throws his watch, takes three steps and hears his watch crash. The second throws his watch and takes only two steps when he hears his watch shatter.

The third tosses his watch off the tower, jogs down the stairs, goes to a candy store, buys a snack, walks back to Big Ben and catches his watch. "How did you do that?" asks one of his friends.

**"My watch is 30 minutes slow."**

# ROCKHOUNDING RULES ON BLM PUBLIC LANDS

## **Where is collection permissible?**

Rockhounding is recognized as a legitimate recreational pursuit on nearly all of the 18 million acres of public land in Wyoming. These public lands administered by the BLM are open to everyone to take limited amounts of rock material for noncommercial purposes without charge. Maps showing the location of public lands in Wyoming can be obtained from this office or any BLM offices (for addresses see information handout "WYNF-0007, BLM Offices in Wyoming"). You should check with the BLM field offices to become familiar with local procedures, policies and areas with authorized restrictions.

## **No historic artifacts, please**

The Paleontological Resources Preservation under the Omnibus Public Land Management Act of 2009, Archaeological Resources Protection Act of 1979 and the Antiquities Act of 1906 are designed to protect our nation's cultural resources. These laws prohibit the unauthorized excavation, removal, damage or alteration of any archaeological and historical site or object. Petroglyphs, human graves, old dwellings, pottery, stone tools, arrowheads and other remains of Indians and early inhabitants are protected by law because they may provide important links to our past.

## **How about fossils?**

Fossil collecting has its own set of rules. Vertebrate fossils (which includes all bones and teeth) are off limits to rockhounders, but invertebrate and plant fossils that are not of special scientific interest may be collected in reasonable amounts for personal use. No fossils collected from public land can be sold, traded or bartered. Please see the pamphlet titled "Fossils on America's Public Lands" available at BLM offices.

## **May petrified wood be collected?**

Hobby collection has special rules. Please see Fossils on America's Public Lands pamphlet. A material site contract must be obtained from a BLM office for collection of more than 250 pounds a year, or for commercial use.

## **Collected but not destroyed . . .**

Explosives or power equipment must not be used in excavating or removing petrified wood and may apply to other collecting. Off-road vehicle use may also be restricted. Also, fossil and/or mineral collecting may be restricted or prohibited in some areas to allow dedication of the land for another purpose. Such restrictions follow official notice in the Federal Register and the areas are posted.

## **Permits?**

The BLM grants permits to qualified individuals and institutions to conduct scientific research at archaeological, historical and paleontological sites. These permits are issued and administered by the BLM Wyoming State Office in Cheyenne. Permits are given only to individuals holding advanced university degrees in archaeology, paleontology or a related field and are associated with an accredited institution.

## **Reporting archaeological or fossil sites**

All archaeological or paleontological sites such as prehistoric campsites, buffalo jumps and fossils of many kinds may be of scientific interest. The sites should be reported to the nearest BLM field office for evaluation by archaeologists or paleontologists.

## **How about gemstones?**

The private collector is welcome to take specimens of gemstones as well as common variety minerals from public lands. However, a permit must be obtained from the BLM field office if common variety minerals are to be taken in large quantities or for resale.

## **"Locating" Gemstones**

Claims may be "located" for gemstones under the general mining laws if location requirements can be met. Collecting gemstone specimens on public land remains an accepted recreational use of the public land, however...

## **Don't be a "Claim Jumper"**

Care must be taken not to violate the rights of a mining claimant. Patented claims are private land and permission to collect specimens on them must be obtained from the property owner. Unpatented claims, however, are still public lands and rockhounders may pursue their hobby on such lands as long as they do not interfere with mining activities or collect locatable minerals or gemstones for which the claim is "located". In other words, if an unpatented claim is located for jade, rockhounders can look for and collect any mineral except jade (claimants frequently locate claims for all locatable minerals). The claimant is entitled to the rights to the jade which is, for all practical purposes, his private property. A claim owner may not legally charge fees for recreational use of unpatented claims.

**FOR MORE INFORMATION:** For specific information on the distribution of minerals and rocks in Wyoming, request a publication catalog from: Wyoming State Geological Survey, P.O. Box 1347, University Station, Laramie, Wyoming 82073 or by phone at 307-766-2286. BLM: Telephone: 307-775-6256 FAX: 307-775-6129

[www.blm.gov/wy/st/en/programs/mineral\\_resources.html](http://www.blm.gov/wy/st/en/programs/mineral_resources.html)

Article adapted from: <http://www.blm.gov/pgdata/etc/medialib/blm/wy/information/docs.Par.9237.File.dat/wynf-0004.pdf>

# Rockhounding, Prospecting, and Fossil Hunting on the Shoshone National Forest



Your national forests and grasslands are a great place to experience a wide range of recreational opportunities. Prospecting, rockhounding, and fossil hunting are among the many outdoor pursuits visitors enjoy on the Shoshone National Forest.

## What is prospecting, rockhounding, and fossil hunting?

**Rockhounding** involves the searching and collection of small quantities of common variety rocks, gems, or other geologic materials for personal use or enjoyment.

**Prospecting** is searching for valuable minerals. This can range from collecting hand samples of mineralized rock and gold panning, to using metal detectors and operating small sluices for dredges as long as they "do not cause significant surface disturbance" 36 CFR 228.4a(1)(iv).

Forest Service mining regulations listed in the 36 Code of Federal Regulations (CFR) 228, Subpart A and C, govern prospecting and rockhounding activities.

**Fossil hunting** allows the collection of petrified wood, invertebrate and plant fossils for personal use. Invertebrate fossils, such as clams, do not have an internal skeleton. Collection of vertebrate (has internal skeleton) fossils requires a permit (36 CFR 261.9i). The rules for petrified wood collection are found under 36 CFR 228, Subpart C.

Be advised that unauthorized collection of archaeological artifacts, such as arrowheads, old bottles, other historic artifacts etc. is prohibited on National Forest lands.

## How can I determine if a permit is required for my forest activities?

Prospecting, rockhounding, petrified wood, and invertebrate and plant fossil hunting usually do not require a permit when there is little or no disturbance to the ground, other resources, and environment. Check with the local ranger district if you have questions on whether a permit may be needed. For example, a free use permit may be required for removal of mineral materials. A Notice Of Intent (NOI) for prospecting activities should be submitted to the District Ranger which might cause significant surface disturbance. In part, this means if you plan to:

- Use explosives
- Use power equipment for excavation
- Drive vehicles off public roads or trails
- Clear or remove vegetation
- Store petroleum products or other hazardous or flammable material near streams

Based on the information provided in the NOI, a plan of operation may be required. Forest users should be sensitive to how their activities affect the environment. Rockhounds and prospectors need to carefully refill and revegetate any excavation, no matter how small.

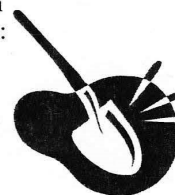
Water quality and fish habitat are critical concerns on national forests and grasslands, so activities in or near streams must be handled with special care. Consideration should also be given to possible cumulative effects when you do the same activity year after year in the same place.

Any sale or commercial use of petrified wood found on lands administered by the Forest Service requires a permit. A free use permit is required for amateur collectors and scientists to take limited quantities for personal use.

## Are all national forest lands available for prospecting?

**NO.** Some areas may be excluded, even from non-commercial activities. Examples include:

- Wild and Scenic River corridors
- Historical or archeological sites
- Campgrounds
- Wilderness Areas
- Administrative sites
- Areas "withdrawn" from mineral entry



In addition, you should not work on someone else's "mining claim" without permission. Claimants have rights to valuable mineral deposits on those sites. It's always a good idea to check with the local ranger district to identify closed areas and claim locations before you start. Claim information can also be found at [www.blm.gov/lr2000](http://www.blm.gov/lr2000).

## Are there any special restrictions that apply to suction dredging?

State and federal permits are required. A letter of authorization from the Wyoming Department of Environmental Quality (DEQ) is required for all dredging operations, even for small nozzles (3" or less). The following website has more information related to state guidelines: <http://deq.state.wy.us/lqd/guidelines.asp>

Also, because of the potential effects to streams and fish habitat from suction dredging activities, a NOI should be filed with the district ranger to determine if a plan of operations is necessary. State permits require prior approval and the decision whether or not a Plan of Operations is required must be made before you operate, so schedule paperwork well in advance of dredging.



## **Judging - Display Rules for WSMGS State Rock Show**

- 1. Each WSMGS rock club/society will be eligible to enter only one display case to be voted on by the public in attendance at the WY State Rock Show. To be eligible for the People's Choice Award each club's/society's display case should contain items that support the current show theme. The winner of the People's Choice Award will be determined and announced by the WSMGS board members present. The winner will receive the Peoples Choice Award as per WSMGS By-Laws. These same rock club/society cases will also be subject to judging by independent persons not affiliated with any Wyoming rock clubs.**
- 2. Rock Clubs/Societies are also encouraged to enter additional display cases as noncompetitive (not judged) displays.**
- 3. Individuals and rock clubs are encouraged to compete in the following Judging Categories:**
  - A. Rock Club/Society**
  - B. Rocks and/or Minerals**
  - C. Fossils**
  - D. Gemstones**
  - E. Assorted Display**
  - F. Lapidary Products**
  - G. Educational**
- 4. Ribbons/awards/trophies will be awarded for competitive displays as determined by an independent judging group.**

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### **RULES AND REGULATIONS FOR DISPLAYS**

- 1. Required Display Times:** All display cases should be in their assigned space for public viewing at the beginning of the Rock Show and not removed from public display until the end of the Rock Show unless permission is granted by the Host Club's State Show Chairperson or WSMGS Board.
- 2. Identification:** All competitive display cases will be assigned to a single judging category with a number and may not have any identifying name(s) displayed until after judging is complete.
- 3. Security:** It is expected that every display case and its contents will be secured such that theft and/or vandalism cannot occur. In the event that a display case needs to be accessed during the public viewing hours, it will be required that a member of the Host Rock Club/Society or a WSMGS officer serve as a witness. Security will be provided for all display materials outside of public show hours by the State Rock Show host Rock Club/Society.
- 4. Liability:** It will be understood that the Wyoming State Mineral and Gem Society and its host Rock Club/Society shall not be liable to any individual(s) or Rock Club/Society for any damage, loss, or destruction of an exhibit/display/or any other property or injuries to that individual(s) or Rock Club/Society that occurs during the WSMGS State Rock Show.
- 5. Censorship:** The Wyoming State Mineral and Gem Society and/or the member Rock Club/Society hosting the WY State Rock Show have the right to censor any exhibit, display, materials and/or persons which are detrimental to the expected character of the WSMGS State Rock Show and may result in the removal or eviction of the censored exhibit, display, material, and/or person. In the event that a censored occurrence results in the dismissal/eviction of an individual(s) or Rock Club/Society, there will be no refunds of any money previously paid by that individual(s) or Rock Club/Society.

**EXHIBIT / DISPLAY ENTRY FORM**  
**WYOMING STATE MINERAL AND GEM SOCIETY STATE ROCK SHOW**

Theme: \_\_\_\_\_

Hosted by: \_\_\_\_\_

DISPLAY SETUP: \_\_\_\_\_

WSMGS ANNUAL BUSINESS MEETING: -Date/Time \_\_\_\_\_  
\_\_\_\_\_

State Show:

- Dates/Times \_\_\_\_\_

- Location \_\_\_\_\_

---

PLEASE USE A SEPARATE DISPLAY / EXHIBIT ENTRY FORM FOR EACH DISPLAY

**Rock Club or Individual'(s):**

- Name(s): \_\_\_\_\_

-Mailing Address: \_\_\_\_\_

-City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

-Phone #: \_\_\_\_\_

email: \_\_\_\_\_

**This Exhibit/display should be classified and grouped: (Circle only one choice each)**

**1. Exhibitor Group:** Commercial/Dealer Amateur Junior Rock Club/ Society

**2. Type of Display:** Competitive (to be judged) Noncompetitive (not judged)

**3 Display Category:**

A. Rock Club/Society B. Rocks and/or Minerals

C. Fossils D. Gemstones

E. Assorted Display F. Lapidary Products

G. Educational

**Signature Required:** In order to display or exhibit at the WSMGS State Rock Show, it is agreed that all Rules and Regulations for Exhibitors/Displays will be adhered to in order to participate in the WSMGS State Show.

Signature(s) of Exhibitor/Displayer \_\_\_\_\_

Date Signed \_\_\_\_\_

Rock Club/Business Represented \_\_\_\_\_

**PLEASE RETURN THIS ENTRY FORM**

-By the Deadline Date: \_\_\_\_\_

-To: Name \_\_\_\_\_

Address \_\_\_\_\_

Email \_\_\_\_\_

Questions may be directed to: \_\_\_\_\_



**JUDGING SCORE SHEET**  
**WSMGS STATE ROCK SHOW**

**Group** \_\_\_\_\_ **Category** \_\_\_\_\_ **Display #** \_\_\_\_\_

**1. Presentation of Display Materials (20 points maximum)** \_\_\_\_\_ pts.

- A. Arrangement-5 points**
- B. Background-5 points**
- C. Proper Lighting-5 points**
- D. Originality-5 points**

**2. Display Material (20 points maximum)** \_\_\_\_\_ pts.

- A. Quality of display materials-10 points**
- B. Variety of display materials-10 points**

**3. Preparation of Display (20 points maximum)** \_\_\_\_\_ pts

- A. Appearance of display materials-10 points**
- B. Workmanship of display materials-10 points**

**4. Labeling Information (20 points maximum)** \_\_\_\_\_ pts

- A. Accurate Identification-10 points**
- B. Neat and legible-5 points**
- C. Word usage and spelling-5 points**

**5. Educational Value of Display (10 points maximum)** \_\_\_\_\_ pts

**6. Quality Impact of Total Display (10 points maximum)** \_\_\_\_\_ pts

---

**TOTAL SCORE** \_\_\_\_\_ **PTS**

**JUDGE'S COMMENTS:**

**FINAL JUDGING PLACEMENT OF DISPLAY:**

**CATEGORY** \_\_\_\_\_

**PLACE** \_\_\_\_\_

# ROCKY MOUNTAIN FEDERATION OF MINERALOGICAL SOCIETIES



Photo by Greg Willis



PHILIPMARTIN.COM

## 2015 MINERAL & GEM SHOW

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Rocks Minerals

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Flint Knapping

Jewelry Making Lapidary Supplies

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Mineral/Rock Identification

Kids Rock Area Guest Speakers

Exhibits/Showcases Field Trips

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For more information, email us at  
2015codyrockshow@wyminalandgemsociety.org



[www.wyminalandgemsociety.org](http://www.wyminalandgemsociety.org)

## **JADE STATE NEWS**

**WYOMING STATE MINERAL AND GEM SOCIETY  
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