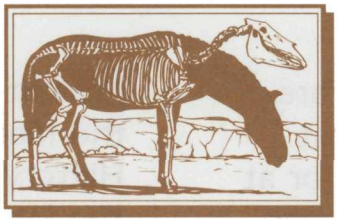
HAGERMAN FOSSIL BEDS NATIONAL MONUMENT

The FOSSIL RECORD



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VOLUME 4, NUMBER 2

THE BARE BONES OF THIS ISSUE:

VISITOR INFORMATION

Tour Schedule Through July

Rangers are starting public tours of the Monument during National Park Week on Fossil Days and the schedule through July is at the end of this newsletter.

Fossil Day Now Days (Two!)

Mark your calendar for May 27 and 28 for the Fossil Days community event in Hagerman. In the 11:00 a.m. parade the National Park Service will have a covered wagon like those that rolled along the Oregon trail, guarded by a cavalry officer in 1859 gear.

Also look for the wagon at 1:00 in the community park for a special

program, "Oregon Bound With Maudie Miller, 1843."

Boat tours of the Fossil Beds along the Snake River are available both Saturday and Sunday as a result of coordination between the Hagerman Fossil Council, Inc., 1000 Springs Tours, and the National Park Service. There is a charge for the boat ride, which will depart the Bell Rapids boat dock southwest of Hagerman. Saturday the tours are first-come, first-serve commencing at 1:30 p.m. and every half hour thereafter until 4:30 p.m.. Sunday, the tours are by reservation obtained by phoning (208) 837-9006.

Two free bus tours to the famous Horse Quarry, where the Hagerman Horse was discovered, are available on Sunday, May 28 free of charge. The bus will depart from the National Park Service office along Highway 30 across from the Hagerman High School. Just show up prior to the 1:00 and 3:00 departures; first-come, first serve.

Be sure to drop by the visitor center to see the fossils, exhibits, slide and video shows about the Monument. Directions are available there to a wheel-chair accessible boardwalk overlook on the Monument.

Contact the Hagerman Valley Chamber of Commerce at (208) 837-9131 for the additional Fossil Days events and other local attractions.

National Trail Day - Come hike "Along" the Oregon Trail to show your support for National Trails. The hike will follow a proposed trail intended to give visitors a sense of what it was like to travel along this expanse of country. The trail goes up a canyon parallel to the commonly travelled ridge route. The round trip is 6 miles with an elevation rise of 600 feet. If you want to hike a shorter distance, you can go 3 miles if you arrange for a second vehicle. Contact (208) 837-4793 for more information.

Volunteers In Parks (VIPs) - We're looking ahead for another success in the volunteer program in the upcoming months. The program grew beyond our most optomistic expectations for 1994. Approximately 35 volunteers spent more than 2,300 hours on various projects. That is more than double the 1993 hours!

VIP's (Volunteers in Parks) worked in the field assisting with collection and preparation of fossils and in the "lab" with the preparation and cataloging of new fossil finds. They worked in the Visitor Center at the information desk and assisted at interpretive programs. Some have used their writing, computer, and photography skills; others provided the muscles to move heavy fossils!

If you would like to volunteer a minimum of twenty hours per month, contact Park Ranger James Ward at (208) 837-4793.

Teacher Training - A two-day continuing education course through Idaho State University Extension will train teachers in how to use the Monument for a field classroom. Teachers will receive a curriculum for grades 7-9 with classroom, laboratory, and reference materials. A "travelling trunk" for loan provides the support materials including soil samples, books, fossil casts, and much more.

The one credit class is on June 15 and 16 at the National Park Service Visitor Center in Hagerman. Contact (208) 736-2101 for enrollment information.

Ranger Patrol - Fences continue to be cut for trespass by off-road vehicles onto the Monument. The National Park Service requests the assistance of responsible recreationists to apprehend those who are not. The downed fences further allowed cattle from adjacent lands to enter the Monument, causing erosion on some steep slopes. Daily patrols will be the norm in further attempt to stop this problem. Violators are subject to fines up to $500 and or 6 months in jail.

With the irrigation season again underway, visitors need to keep in mind the potential for severe mud conditions for those who access the Monument by roads other than the paved Bell Rapids grade.

New Staff - Tina Vader of Hagerman has filled the vacancy of the Office Technician. Her prior work was with the Farmers Home Administration in Gooding and Jerome. She occupies her time away from the office with her husband, two boys, and a small ranch operation. Tina says, "My time here has been fun, and there's never a dull moment."

Zip Code Response - Thanks to those of you responding to our request for the four digits following your Zip Code. Please check your mailing label, and if you only have five digits, we still need you to let us know your complete code (9 digits).

MONUMENTAL SCIENCE

RESOURCE MANAGEMENT

PULL UP YOUR SLEEVES - How would you like to help combat a persistent plant that has invaded this valley and the shores of the Monument. It is called purple loosestrife (the name gives one a clue about its growth habit!) and its ability to outcompete the native plants associated with waterways. Its seeds are spread on the water or by birds. The dense stems and root system makes poor habitat for waterfowl. A plant ecologist for Idaho Power Company reported the plant's arrival in 1994. Park Rangers and volunteers spent time hand-pulling the plants invading the Monument shoreline. Some plants were already too well established to pull, so some chemical treatment will be necessary in 1995. The Resource Management staff intends to work with county personnel and river front owners to see if a more concerted effort can produce desired results.

FRACTURES, SEEPS and FAILURES - Part II or Like Rats through a Maze, So Flows the Groundwater

By Larry Growney, Monument Geologist

The last "Fossil Record" discussed the complexity of tracing the flow of ground- water as it heads toward the cliffs in the Monument. Evidence now shows the unnatural water flows and seeps on the slopes occur from seepage in the unlined canal. The path of flow between the two is the mystery. We can't see what obstacles it encounters, or where it is heading, without expensive

subsurface testing. But just like surface water, ground- water sometimes has to twist and turn to get past obstacles.

Everyone knows there's at least two things you can count on with water flow: (1) water flows downhill and, (2) flowing water occupies the lowest part of the channel. But in addition to these two constants, groundwater flowing through sediments will follow the most "permeable path." The following progression offers, in simplified terms, a examples of decreasing permeability (the ability of water to move through a medium): open fractures, gravel, sand, silt, and clay.

Within the Monument, the path the groundwater takes on its journey from its source to the cliff is dependent upon its ability to move through the sediments. This means that the water will move more quickly through coarser-grained materials, like gravel, than through finer-grained sediments, such as clay. As you would suspect, water will move most quickly through open fractures, such as those found in the Shoestring Road Basalt flow. Because we can't see where the materials in the subsurface, we have no way of knowing where oversaturation will occur until it happens. When this oversaturation reaches the cliffs, the water flows out as seeps.

These seeps are the result of "perched aquifers." Normally, groundwater will work its way down through the sediments to the regional aquifer, which is generally at the level of the Snake River. In a perched aquifer, the groundwater cannot flow through a lower sediment layer as quickly as it can flow through the overlying layer. This happens when the permeability of the lower layer is less than the permeability of the upper layer. Consequently, the water sits on, or flows across, the lower layer rather than moving down through it toward the regional aquifer. It is due to the presence of these perched aquifers that the water flows out of the hillside above the level of the river.

Because of the perched aquifers, groundwater is held higher on the

slope, oversaturating the sediments. When this happens, the strata at the base of the saturated area lose cohesion as the water forces the individual grains apart, they can no longer support the weight and a landslie occurs

The ability of water to flow along different paths at different rates is clearly illustrated at the 1991 landslide location just east of the Horse Quarry. Here, open fractures in the basalt supply groundwater at a rate of nearly 100 gallons per minute, creating prominent seeps just below the basalt flow. The heat of the basalt flow baked the underlying sediments, reducing their permeability. As a result, the water flowing through the fractures in the basalt finds it easier to flow over this baked zone, rather than through it, thus forming the seeps at this location.

Approximately twenty feet below these prominent seeps occurs yet another set of seeps. However, the water feeding these seeps must travel a minimum of twenty feet through sandy and silty sediments. Because of the reduced permeability of these materials as compared to the open fractures of the basalt, much less water flows through these seep locations in the same amount of time. Although the speed of oversaturation varies between the two sets of seeps, landslides are the end result in both cases.

So like rats through a maze, groundwater must pick and choose its course through the mixed strata beneath the Monument. Sometimes it runs into a dead end, but with enough time, it finds that twisting route that leads out into the open.

Fossil Beavers at Hagerman: A Gnawing Problem

by Dr. Greg McDonald, Monument Paleontologist

Zebra, lama, mastodon, ground sloth, sabertooth cat; whenever we think about the different types of fossil animals found at Hagerman Fossil Beds it is usually the exotic species that

come to mind. Yet, many of the animals that are part of the monument's diverse fossil fauna are very similar or identical to animals living today in the Hagerman Valley and would be quite recognizable. One of those animals is the beaver.

The sediments that form the bluffs of the Monument above the Snake River were deposited in a floodplain of a meandering river that was dotted with ponds. Just as beavers today flourish in such wetland habitats so it was 3.5 million years ago. Beaver bones are often encountered while conducting paleontological field work on the monument, and of the few skeletons found on the monument outside of the Horse Quarry, most have been beaver. An almost complete skeleton of beaver was discovered during the summer of 1994.

The beaver that lives in the Hagerman Valley today has the scientific name Castor canadensis. Our fossil beaver is also the genus Castor but it is placed in a separate species, californicus, in reference to where the first fossil specimen was found, California. There is a second species of living beaver Castor fiber which today lives in Europe and Asia.

One of the features that distinguishes the living beavers Castor from all other rodents is their large flat scaly tail. Because the bones of the tail, or caudal vertebrae, of the fossil beaver from Hagerman are similar in shape to the tail bones of the living beavers, it is safe to speculate that its tail looked similar to today's beaver.

In fact the skeleton and teeth of all of these species are very similar and can only be distinguished by subtle details. For example the front gnawing teeth or incisors are chisel-like and the area of the skull and jaw that anchors the jaw muscles that permit both gnawing and chewing are similar in both modern and fossil species of Castor. The resemblance of the skull and teeth in fossil and modern beavers indicates that like its modern relatives, the Hagerman beaver was capable of cutting down

trees. It may be that some of the carboniferous paper shales found in the sediments at the Monument are the remnants of old beaver ponds, but we haven't found any fossil beaver dams yet.

Although there is only one genus and two species of beaver living today, there are may different kinds of fossil beavers. In North America the fossil record of beavers extends back to the Oligocene about 30 million years ago. However, these fossil beavers were not aquatic like the living beaver but instead lived on land. At Agate Fossil Beds National Monument in Nebraska, skeletons of a fossil beaver have been found preserved in the burrows that they dug. The preserved burrows showed that this particular fossil beaver had a life style similar to that of today's prairie dogs. The modern genus Castor which we know is aquatic, does not show up in the fossil record until much later in the Pliocene. The first appearance of Castor is in both North America (Hagerman) and Europe (France) in rocks of almost identical age, so at the moment we don't know if our living beaver originated in North America and then dispersed into Europe, or if an earlier beaver ancestor in Europe evolved into the living beaver which then entered North America. This is one of the many interesting problems that we hope the fossils preserved at the monument will help resolve.

Since the sediments at the Monument preserve about half a million years of earth's history, the location of each of the beaver fossils found will be important. Those beaver fossils found at lower levels in the sediments may prove to be older than those in Europe, especially if found at a level below the Peter's Gulch ash which current research considers to be 3.7 million years old. If this is the case then we may be able to safely say that the ancestors of the modern beaver first originated in North America, unless an older example is found in Europe. In either case, the question can only be resolved by carefully recording the location and level of the specimen when it is found and before it is collected, since with that information we can place the

fossil in the proper time frame. Eventually comparisons will need to be made between the Hagerman and European material to see how similar or different these animals are and what their relationship to each other might be. No matter what the final results turn out to be, you can be sure that Hagerman fossils will play an important role in resolving the question -- and probably in generating some new questions.

Schedule of Monument Tours: May - July, 1995

Programs start at Visitor's Center in Hagerman along Highway 30 across from High School unless otherwise noted. Visitors must provide their own transportation if not stated otherwise. Be prepared for rapidly changing weather. Most programs require sturdy footwear and sufficient water. Morning programs conclude by noon. Most tours are not suitable for access impaired individuals. Call (208) 837-4793 for information.

May 27	Fossil Days Parade along Highway 30	11:00 a.m.
	Oregon Bound with Maudie Miller, 1843.	1:00 p.m. Community Park
	Boat Tours of Monument: FEE	1:30 - 4:30 p.m. Bell Rapids boat dock
May 28	Boat Tours of Monument: FEE And By Reservation (208) 837-9006	1:30 - 4:30 p.m. Bell Rapids boat dock
	Bus Tours of Monument: NO FEE	1:00 and 3:00 p.m.
June 3	National Trails Day - Hiking "Along" the Oregon Trail 3 or 6 mile hike - see the newsletter for specifics	8:30 a.m.
June 10	Small Mammals of the Monument	9:00 a.m.
June 17	Hagerman Horse Quarry	9:00 a.m.

June 24	Early Morning Bird Watch	7:00 a.m.
June 25	Hagerman Horse Quarry	9:00 a.m.
July 1	Hagerman Horse Quarry	9:00 a.m.
July 2	Mary Inman, Oregon Trail Program	2:00 p.m. indoors
July 8	Geology for Kids	9:00 a.m.
July 9	Hagerman Horse Quarry	9:00 a.m.
July 15	Hagerman Horse Quarry	9:00 a.m.
July 16	Hagerman Horse Quarry	9:00 a.m.
July 22	Oregon Trail Experience	8:30 a.m.
July 23	Hagerman Horse Quarry	9:00 a.m.
July 29	Hagerman Horse Quarry	9:00 a.m.
July 30	Monument from the Water	9:00 a.m.