

# DINOSAUR RIDGE



Mission of the Friends of Dinosaur Ridge (FODR),  
To protect the natural resources on Dinosaur  
Ridge and Triceratops Trail, and to educate  
visitors about the area's geological, prehistoric,  
and natural features.

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### Major Contributors:

- \* Rocky Mountain Association of Geologists (RMAG)
- \* Greater Denver Area Gem & Mineral Council
- \* Jeffco Conservation Trust Funds
- \* Scientific & Cultural Facilities District (SCFD)
- \* Golden Civic Foundation
- \* Dan & Mac Turner Estates
- \* Xcel Energy Foundation
- \* Western Interior Paleontological Society (WIPS)



**Scientific & Cultural  
Facilities District**

*Making It Possible.*

Cover Photo:  
Scout removing rock from an *Oreodont* skull  
at Boy Scout Day

# FRIENDS OF DINOSAUR RIDGE 2010

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Secretary	Beth Simmons	MSCD Geo. Instructor
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Pete Martin	U.S. Bureau of Reclamation

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Martin Lockley	University of Colorado, Denver
Marj MacLachlan	Geologist (Ret.)
Judy Peterson	Paleo-artist
Robert Reynolds	Denver Museum of Nature & Science
Kermit Shields	Geologist (Ret.)
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Martin Lockley  
Lou Taylor  
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### **Kermit Shields**

Tom Moglestad  
Clare Marshall

### **Bruce Wyre**

Pete Martin  
Joe Tempel  
Robert Reynolds  
Keith Meakins

### **Sam Bartlett**

### **Tom Moglestad**

## Committees:

Sub Committees:

### **Education**

Publications  
Curation/Ridge Report Editor  
Exhibits  
Events & Tours

### **Volunteers/Membership**

Community Outreach  
Membership

### **Finance**

Budget  
Fundraising  
Investments  
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### **Preservation**

### **Marketing**

## Staff - Friends of Dinosaur Ridge:

Executive Director	Joe Tempel
Programs & Operations Director	Tom Moglestad
Education Programs Assistant	Erin Fair
Visitor Center Manager	Roger Bennett
Visitor Center Assistant	Jack Davidson
Visitor Center Assistant	Barbara Davidson
VC Assistant and Computer Tech	Brian Davidson
Driver/Visitors Center Assistant	Bobbi Kilgore
Membership/Exhibits	Clare Marshall
Driver/Maintenance	Ted Gildea
Driver	Sue Kaberline
Driver	Dan Fanelli
Driver/Tour Guide	Morgan Gray

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# MANAGEMENT REPORTS

## PRESIDENT'S MESSAGE

On January 4th, Joe and I attended a meeting with the Ralph Schell, the newly appointed Jefferson County Administrator, to discuss various issues related to Dinosaur Ridge. Knowing that the county had just purchased 19 acres, including "Grandma Rooney's" house, we were hopeful that the Friends of Dinosaur Ridge could build the new 20,000 sq. ft. visitors center for which the developers, the Three Dinos, had previously spent \$30,000 to prepare a preliminary design. Unfortunately, we were told that the county commissioners had purchased this property solely for open space with no intention of allowing us to build a visitor center on the site. Further, the county commissioners decided that the Friends of Dinosaur Ridge would not be allowed to build a cover over the track site. Needless to say, we were stunned and confused with both of these decisions.

The decision on the track site cover was doubly confusing because the county commissioners had previously provided us with \$15,000 toward the final design of a cover. Perhaps they were not aware that the track site ranks in the top five dinosaur track sites in the United States, in the top ten worldwide, and needs to be protected quickly from the ravages of erosion. Ultimately, Jefferson County is responsible for protecting the tracks and the Friends were poised to raise over \$2 million to construct the cover. At this time, however, we cannot proceed any further until we can address the reasoning behind the commissioners' decision.

Currently we are in the process of fact-finding with various members of the community and local organizations with hopes of working with the commissioners to find a mutually acceptable solution to protect the endangered and irreplaceable dinosaur tracks on the Ridge. We have received an abundance of good advice and hope to reopen the conversations soon.

It is important to preserve the track site not only from a scientific standpoint but also from an economic perspective as well. More than 100,000 visitors come to see and study

the track site each year. These visitors spend over \$150,000 yearly in the Friends' gift shop, and they spend locally on meals and lodging. We are seeking a graduate student from a local university to conduct an economic study to determine the actual economic impact that Dinosaur Ridge has on the Jefferson County economy. If the dinosaur tracks are allowed to erode away, people will have much less reason to visit Dinosaur Ridge.

Another issue facing the Friends is our current lease and the lack of an agreement for operating on the Ridge now that Alameda Parkway over Dinosaur Ridge has been deeded to Jefferson County and closed to all but authorized vehicles. We sublease, through the town of Morrison, from Jefferson County until 2018. While the County has shown no interest in extending the current lease beyond the eight years remaining, they are working with us to combine the current visitor center lease with a lease to operate on the Ridge. The efforts to outline a new lease are described in Joe's Executive Director's Report. We are hopeful that ultimately the county will renew our combined lease in 2018, but we will not know anything definite until 2016.

In the meantime, the Friends of Dinosaur Ridge has formed a Long Range Planning Committee whose task will be to preserve the operation of a viable visitor center somewhere in the immediate vicinity of the Ridge. If we remain at our current location on 1.5 acres, we would need an additional 3-5 acres for parking and expansion. If we move elsewhere, we will need to acquire at least 5 acres and raise \$6-8 million for the property, parking and the construction of a new visitor center. As you can see, we have a lot of work to do and we are looking forward to working with Jefferson County and the Three Dinos to preserve our track site and our future.

-SAM BARTLETT

# MANAGEMENT REPORTS

## EXECUTIVE DIRECTOR'S REPORT

New grants received since the 2009 Annual Report:

- \$500 from First Bank to sponsor our Annual Meeting (March 17th)
- \$1,000 from the Rocky Mountain Association of Geologists Foundation to sponsor Boy Scout (May 1st) and Girl Scout (October 9th) Days.
- \$500 from First Bank to sponsor Boy Scout Day (May 1st).
- \$1,000 from the American Institute of Petroleum Geologists to sponsor National Get Outdoors Day (June 12th).
- \$4,500 from the Greater Denver Area Gem and Mineral Council to sponsor Geocaching Day on August 14th (\$500); to construct an interpretive kiosk at Triceratops Trail (\$2,000); to produce educational brochures (\$2,000).
- \$2,500 from Chevron Mining Inc. Employee Contribution Committee, Denver, CO to produce educational posters

### New lease being developed for the Visitor Center and Dinosaur Ridge

The Friends of Dinosaur Ridge are in the process of developing a new lease with Jefferson County that will address our activities at our visitor center and on Dinosaur Ridge. It should streamline our relationship with Jefferson County by making it directly between the Friends and Jefferson County. Our present 25-year lease (1993-2018) addresses our activities just at our visitor center which is on Jefferson County property. It is between the Friends of Dinosaur Ridge and the Town of Morrison. The Town of Morrison also has a similar lease with Jefferson County. This lease was created in this manner because in 1993 it wasn't possible for the county to have a lease directly with a nonprofit. Now, that is not a problem. We thank the Town of Morrison for having served in this intermediary capacity for 15 years and now we can let them off the hook.

The new lease should address the following activities at the visitor center and on the Ridge:

- Maintenance of existing or future improvements: The Friends are responsible for the maintenance of the improvements we make at the visitor center and on the Ridge. At the present time, Lakewood is responsible for maintaining the road over the Ridge, but Jefferson County may take over these responsibilities.
- Construction of new improvements: The Friends are responsible for getting approval from Jefferson County for any improvements.
- Access to the Ridge and visitor center: The Friends will control access to the Ridge and public access will be maintained to the visitor center. Bicyclists, pedestrians, emergency vehicles, fire/police vehicles have access over the Ridge. Dinosaur Ridge tour buses, school buses and vans, private tour buses and vans and handicapped vehicles also have access to the Ridge.
- Use of property for educational, recreational and park purposes: The Friends are responsible for providing educational programs on the Ridge and at the visitor center.
- Preservation of the geological and paleontological resources on the Ridge: While Jefferson County and Colorado are the owners of the fossils and geological resources on the Ridge, the Friends have been designated by the county to take the lead to coordinate any preservation activities.

We are working out all of the details associated with the activities described above with the exception of two things. We do not have approval to construct a roof over the track site and we aren't able to extend our 25-year lease at this time. The new lease that covers our activities on the Ridge will run concurrently with the lease for our visitor center that expires in 2018. We are hopeful that we will be able to work out these issues in the near future.

-JOE TEMPEL

# MANAGEMENT REPORTS

## PROGRAM DIRECTOR'S REPORT – 2010, 1ST QTR.

Visitation, Attendance and Sales			
Program	2009 1st Qtr.	2010 1st Qtr.	Change
<b>Visitors to Visitor Center</b>	7,973	7,156	-10%
<b>Tours (Total Attend.)*</b>	2,985	3,031	+2%
<i>Trek Through Time</i>	3,196	2,745	-14%
<b>Chats, Hikes, Field Trips</b>	112	101	-10%
<b>Traveling Exhibit Visitors</b>	1,000	1,000	-----
<b>Dino Discovery Days (o)</b>	-----	-----	-----
<b>Triceratops Trail Day</b>	-----	-----	-----
<b>Sales (\$)**</b>	26,572	26,264	-1%

\*includes guided school tours, shuttle bus tours and school outreach

\*\*includes receipts from Gift Shop, Shuttle Bus, and *Trek Through Time*

A slight increase in tour attendance was accompanied by slight downturns in visitation and sales after several quarters of uninterrupted growth. Tour attendance growth was a result of an increase in shuttle bus riders. Decreased visitation and nearly flat sales probably resulted from a cold and snowy first quarter.

### Dinosaur Detectives Is Successful

On Saturday March 13 FODR Education Assistant Erin Fair conducted the first public outdoor program of the year – a 90-minute workshop for about 35 young children. An appreciative parent praised Erin's presentation and donated \$300 to the Friends of Dinosaur Ridge. **Thanks Erin!**

### "New Discoveries" Exhibit Travels to Ft. Collins

As part of our New Discoveries promotion we displayed a replica of a track from the new Hawk Nest Site discovered by member **George Daggett** in 2009. **Dr. Martin Lockley** made the replica and donated it to the Friends. **Dr. Pete Mo-dreski** set up the exhibit at the Ft. Collins Rockhound Show, which was March 26, 27, and 28. An estimated 1000 visitors viewed the exhibit. **Thanks gentlemen!**

### Birthday Parties Exploding

The Birthday Party Program for kids was started a few years ago by **Holly Tempel** as part of the Stegosaurus Snack Shack. Parties have increased steadily over time and suddenly have surged in the first quarter of 2010. The first two weeks of April included a weekend with the maximum of 4 parties. Snack Shack manager and party planner, **Bobbi Kilgore**, reports that most of the parties in 2010 so far have been either entirely indoors or partly so. The parties require a great deal of planning and hard work. Fortunately Bobbi gets a lot of help from her son, **Scottie**. **Thanks Holly, Bobbi, and Scottie!**

### VOLUNTEER AWARDS FOR 2009

Presented March 17, 2010, at the annual meeting

Medals for outstanding performance:

**Purple Heart Medal (for volunteering with significant ailments or soon after):** Duwayne Ebertowski, Ed Post, Dale Moser, Harald Drewes, Jan Jacobs, Matt Mossbrucker

**John Ghist Pathfinder Medal (for paleontological or archaeological discoveries):** George Daggett – Hawks Nest site; Dan Fanelli – Lena Gulch site; Martin Lockley – Lena Gulch site; John Ghist – Lakes Quarry #1 site; Beth Simmons – Lakes Quarry #1 site.

**Mariah Medal (for leading a tour in high winds):** Sam Bartlett, Frank Adler, Kermit Shields, and Bill Di-Paolo led Farrell B. Howell K-8 School on September 30, 2009.

**Capt. Sully Medal (for outstanding driving and/or dispatching during the inaugural 2-bus season):** Bobbi Kilgore, Ted Gildea, Sue Kaberline, Dan Fanelli, Jack Davidson, Barb Davidson, Brian Davidson

# MANAGEMENT REPORTS

**Certificates** for outstanding contributions to *Trek Through Time*:

**Docent Training:** John Townrow and Bill Danley.

**Design and Construction of Lacy the Apatosaurus Exhibit:** Judy Peterson and Terry Heister

**Design and Construction of the Singing O'Saur Family Exhibit (donation box):** Sharon Whelan and Dan Doughery

**Stegosaurus Pins with certificates** for outstanding Tour Guides:

Kermit Shields, Sam Bartlett, John Townrow, Harald Drewes, Bill Danley, Curt Johnson, Keith Patton, Mel Glerup, Bill DiPaolo, Don Brehm, Joe Tempel, Holly Tempel, John Ghist, Beth Simmons, Bob Munger, Frank Adler, Norb Cygan, Richard Kerr, DuWayne Ebertowski, T Caneer, Ed Post, John Kelly, Jonna Gentry, Tim Connors, Bob Raynolds

**Special awards** for specialized volunteers:

**Keith Meakins** was recognized for determined effort to get the bookkeeping and accounting converted to a new system. **Dan Green** was thanked for his on-call repairs and installations, particularly with respect to wiring, lighting, and locks. **Doris Meakins** was recognized for making tracks in the lab including Adopt-a Track.

**A Custom Shadow Box** for an Outstanding DDD Participating Partner:

**Barb Melby** representing the **Greater Denver Area Gem & Mineral Council**, participated in the August Dinosaur Discovery Day as she has for several years. At her booth she handed out free petrified wood to kids and answered questions about Dinosaur Ridge and the Denver Gem & Mineral Show.

## **Top Gun Awards**

**Lifetime Achievement Award:** **Norb Cygan** has served nearly 20 years on the Board of Directors. He is an outstanding educator, sharing his dinosaur knowledge and insight with thousands of young students. Among many things done for FODR he has taught classes of school teachers and led field trips for professional societies. **Thanks Norb!!**

**Outstanding Performance as Author or Compiler Award:** **Kathy Honda** – *Legacy of Arthur Lakes*. Kathy and co-compiler, **Beth Simmons**, made a significant contribution to FODR's list of publications. The popular book contributed greatly to Gift Shop sales.

**Outstanding Performance at an Outreach Award:** **Lou Taylor** conceived and built the "Track Returned" exhibit that was displayed at the Western Interior Paleontological Society's Symposium and then moved to *Trek Through Time*. **Matt Mossbrucker** of the Morrison Natural History Museum helped facilitate FODR's interactive exhibit on student day at the Denver Gem & Mineral Show. At the Colorado Science Conference FODR board member **Marsha Barber** presented a workshop on teaching about dinosaurs using Dinosaur Ridge.

**Outstanding Performance as Dinosaur Discovery Day Guide of the Year Award:** **Merlin Barnes** drew crowds of youngsters to his dinosaur cart and taught them a great deal.

**Outstanding Performance as Docent of the Year Award (a tie!):** **Sue Jenne and Cindy Barnes** each compiled over 120 hours of service as they helped thousands of visitors in *Trek Through Time*.

**Outstanding Performance as Tour Guide of the Year Award:** **Bill Danley** remained enthusiastic after a few episodes of tour groups showing up late by subsequently leading several tours including one in Spanish.

**Outstanding Performance as Volunteer of the Year for the Gift Shop Award:** **Beth Simmons** prepared thousands of specimens and organized them into hundreds of kits to be sold. Beth's effort helped the Friend's Gift Shop set a record for sales.

**Outstanding Performance as Volunteer of the Year Award:** **Richard Kerr** led several school tours on the Ridge, helped many visitors in *Trek Through Time*, volunteered at community outreaches, and designed and built a number of shelves, cabinets and counters for FODR. **Congratulations and thanks Richard!!**

-TOM MOKLESTAD

# CALENDAR OF EVENTS

**05/26/09 (Wednesday) – Fireside Chat: What Stars did the Dinosaurs See?** by Dr. Lindsay Rocks, astronomy professor, Front Range Community College, Chevron Classroom, Dinosaur Ridge Visitor Center, 7 pm. Free.

**06/05/10 (Saturday) Triceratops Trail Day on National Trails Day.** Guides stationed along the Triceratops Trail will point out dinosaur tracks and other fossil evidence. Directional signs at 19th Street and Jones Rd., (one block east of 6th Ave. and 19th St. in Golden. ) Visit [www.dinoridge.org](http://www.dinoridge.org) for a map. Free.

**06/12/10 (Saturday) -- Dinosaur Discovery Day: National Get Outdoors Day.** Geology exhibits and hands-on dinosaur activities at the Visitor Center. Metal detecting, gold panning, fossil hunting, door prizes; special guests: . Expert guides stationed along the Ridge Trail. Hike at your own pace or take the shuttle bus (\$2, age 5 & under free). 10 am – 2:30 pm. *Trek Through Time* free all day.

**07/10/10 (Saturday) -- Dinosaur Discovery Day: Reptile Day.** Live reptiles on display and hands-on dinosaur activities at the Visitor Center, Denver Zoo, Wildlife Experience, Wild Wings, and Lookout Mountain Nature Center Expert guides stationed along the Ridge Trail. Hike free or take the shuttle bus (\$2, age 5 & under ride free). Free. *Trek Through Time* exhibit free all day.

**08/02/10 (Monday), 08/03/10 (Tuesday), and 08/04/10 (Wednesday) -- Teacher Class: Paleontology and Dinosaurs,** taught by Marsha Barber, retired Science Curriculum coordinator, Jeffco Schools, in the Chevron Classroom, Visitor Center. Teachers earn one semester credit hour through the Colorado School of Mines. Hands-on activities/field trip. 8 am – 5pm days one and two, half day on day three.

**08/14/10 (Saturday) -- Dinosaur Discovery Day: Geocaching Day.** Geology exhibits and hands-on dinosaur activities at the Visitor Center. Geocaching activities. Expert guides stationed along the Ridge Trail. Hike free or take the shuttle bus (\$2, age 5 & under ride free). *Trek Through Time* exhibit free all day. 10 am – 2:30 pm.

**09/11/10 (Saturday) -- Dinosaur Discovery Day: Reading Really Rocks.** Festivities include dinosaur story time for kids, a used geology book sale for the adults, and a book signing by Dinosaur Ridge authors. Expert guides will be stationed along the Ridge Trail. Hike free or take the shuttle bus (\$2, age 5 & under ride free). Free. *Trek Through Time* exhibit free all day.

**10/09/10 (Saturday) -- DDDay: Girl Scout Day, Earth Science Week, and International Astronomy Day.** Geology and astronomy exhibits and hands-on dinosaur activities at the visitor center. Expert guides stationed along the Dinosaur Ridge Trail. Activities suitable for scouts to earn patches and other awards. 10 am – 3 pm. Scouts must register. Public is welcome. Free.

**11/05/10 (Friday) -- Rock Out for the Ridge,** the annual fundraiser includes dinner, an after dinner speaker, and a silent auction. Held at Red Rocks Park Visitor Center. Information and tickets at [dinodiscovery@dinoridge.org](mailto:dinodiscovery@dinoridge.org)



# COMMITTEE REPORTS

## VOLUNTEER NOTES AND TOUR GUIDE CORNER

What's new for the volunteers at the Ridge? Lots of good things!

All who have been watching the activity know that we have tours organized for almost every weekday in April, May and June. Many of these are the “mega-tours,” tours using multiple buses and requiring several tour guides.

We now have an easy way for you to find the tour schedule and know where to sign up. A new on-line calendar shows scheduled tours and includes some basic information about each tour: date, time, number of students and their grade, and sometimes the kind of information they are looking for in their tour. This calendar is available in a “hidden” location on the Dinosaur Ridge website, [www.dinoridge.org](http://www.dinoridge.org), so contact either Erin or me to learn how to access these data.

Also, a number of us have been working on new and improved posters for tours, signs for the Ridge, a brochure for volunteer recruitment, and props for the volunteers to use. These should be ready in time to be announced in the next *Ridge Report*—stay tuned.

The increased activity on the Ridge can be observed many days as the school tours, shuttle bus public tours, walkers, and bike riders nearly create grid-lock along the road. It is hard to imagine that a couple years ago traffic was flying along that route, threatening the safety of our tours.

We hope all of this activity will be overflowing into the gift shop and the Trek Through Time exhibit hall. Thanks go out to the exhibit docents who are guiding and educating our visitors. As summer rolls around, be sure to try and help us keep that exhibit hall well staffed. Clare Marshall is organizing exhibit docents and she will be glad to hear from you.

Lately, I have seen volunteers in the casting room with plaster up to their elbows as they were getting ready for the Boy Scout Dinosaur Discovery Day. Those volunteers are a great asset, as are those volunteers who take care of the grounds, the books, and everything else.

For the many of you who are tied up with real jobs during the week, we look forward to seeing you at the Dinosaur Discovery Days on the second Saturday of each month from June through October.

This will be a great spring and summer on Dinosaur Ridge, largely due to our great group of volunteers. Thanks for all the good work.



*John Ghist interacting with Scouts on Boy Scout Day,  
May 1st, 2010*

-KERMIT SHIELDS

Volunteer Committee Chairman

# COMMITTEE REPORTS

## BOY SCOUT DAY 2010

The fifth annual Boy Scout Day at Dinosaur Ridge was Saturday May 1. About 135 volunteers presented to 1800 visitors including 800 scouts, 675 family members and scout leaders, and 325 visitors from the general public. New activities added to this year's event included three booths describing new discoveries on Dinosaur Ridge, seven booths celebrating International Astronomy Day, a fossil preparation station, a new DVD – "Making Molds at Dinosaur Ridge", sieving for fossils, a life-sized dinosaur head puzzle, and a revised dinosaur name game. Thanks to First Bank and the Rocky Mountain Association of Geologists for sponsoring the event. The participation of the following groups that presented educational booths is gratefully acknowledged: Pioneer Natural Resources, Lookout Mountain Nature Center, Western Interior Paleontological Society, Colorado Groundwater, the Brighton Astronomy Group, Fred Olson Meteorites, and Vince Matthews and Matt Morgan, who generously loaned the Bear Creek Meteorite for display. Red and Green Miner-



als, Astronomy Magazine and First Bank donated giveaways. For door prizes Celestron donated a telescope and the Brighton Astronomy Group donated a telescope backpack and a DVD. The Thunder Valley Motocross Park generously donated parking space without which the event would have been far less successful.

### At the Visitor Center

The Western Interior Paleontological Society set up a fossil preparation station where scouts lined up five deep to chip matrix from fossils. Thanks to John Ghist, Lou Taylor, Joy Thompson, and Guy DiTorrice who facilitated the activity.

Beth Simmons, John Ghist and Dan Fanelli briefed visitors on three recent discoveries on Dinosaur Ridge: the Hawk Nest track site, the Lena Gulch crocodile trackways, and the re-discovery of Arthur Lakes Quarry #1. Thanks to Martin Lockley for casting the excellent track replicas.

Dave and Sue Jenne produced Making Molds at Dinosaur Ridge, starring Bill Kurtz, Doris Meakins, Karen Eberhardt, Sue Jenne and Derek Olson. Bill recently instructed the others in making molds and reproductions for exhibits and for sale in the Gift Shop. The DVD ran all day in Trek Through Time.

A life-sized, ferocious Tyrannosaurus head jig saw puzzle took between 10 and 20 minutes for the youngest scouts and siblings to assemble. Sharon Whelan and George Griffin created the beast. Sharon with Wayne Williams facilitated the activity.

Introduced last year to Girl Scout Day, sieving dry sand for tiny shells and sharks teeth was a hit in the hands-on section that included the standbys of the dinosaur dig and track painting.

# COMMITTEE REPORTS



The astronomy section, sanctioned by the Astronomical League, included telescopic solar observing, an exhibit of specimens of the K-T Boundary Layer, an armillary sundial, a meteorite collection, a large specimen of Jefferson County's own Bear Creek meteorite, a discussion of climate change as influenced by the Milankovitch cycles and recorded by tree rings, and the drawing for door prizes. Door prize winners were:

Alex Lark, Littleton – Celestron telescope and Orion backpack

Caleb Mahlin, Aurora – DVD on Mars Rovers

Rylee Dalton, Westminster – Diplodocus model

Elizabeth Day, Commerce City – shirt

The traditional educational booths for Boy Scout Day included rock, mineral and fossil identification, geologic time, earthquakes, volcanoes, groundwater, and careers. Thanks to the volunteers who facilitated these and to the Colorado School of Mines Geology Museum for loaning study collections of rocks, minerals and fossils.

The Stegosaurus Snack Shack fed the multitudes at the Visitor Center while scout troop 637 fed others up on Dinosaur Ridge. Shack manager, Bobbi Kilgore, recruited her spouse Kevin, who did some awesome burger flipping.

## **Off-Site Parking**

Circumstances required staff to seek off-site parking for the first time since the inception of scout days. Thunder Valley Motocross Park on Rooney Road a mile north of the Visitor Center donated room to park about 500 cars. Their gravel lot came in handy because rainy conditions prevailed in the days before the event. Other sites including the pasture north of the Visitor Center were too muddy for parking. Two school buses shuttled volunteers and visitors to the Visitor Center and back. Scout and volunteer check in went smoothly under the supervision of Kathleen McCoy and Marsha Barber. Boy Scout Troop 770 together with Guy DiTorrice and Joe Tempel directed cars to their spaces and people to their buses. Pre-event registration and check in combined to sell about 500 event patches.

## **Ridge Road**

Enthusiastic scientists manned the following Ridge sites: the bone quarry, the bulges, the main tracksite, the mangrove swamp, the ash layer, the concretion, the ripple marks, the trace fossils, the Western Interior Seaway, the Red Rocks overlook and Denver Basin overlook. The Lookout Mountain Nature Center presented local ecology and Pioneer Natural Resources presented coal bed methane.

Two other stops were set up for scout badge requirements. The mining station had a new display with economic minerals and their uses. Christine Johnson and Karen Jass from the Women in Mining organization and Ed Post, a retired mineral exploration geologist, spoke to the scouts about these mineral resources. Once again a crowded station, geologic and topographic mapping were facilitated by volunteers David Bernard, James Mullarkey, Chet Paris, Dick Robertson, and David Thomas.

## **Volunteers**

Of the 135 dedicated, enthusiastic educators who participated in this Scout Day, about half were helpers who often work at the Ridge. Another third help primarily on scout days. And 26 volunteers who helped on Boy Scout Day had never participated in a Discovery Day before! Thank you all, for your hard work. We hope you enjoyed the day and will be back for many more.

-TOM MOKLESTAD, CLARE MARSHALL



# COMMITTEE REPORTS

## GIFT SHOP NEWS

This has been a very interesting year so far - so what's new about that?

After such a good year in 2009, I wondered how this year would shape up. In January we beat last year—**good start!** Then, due mainly to bad weather, sales were down in February. After a great March last year, we struggled right up to the last minute to beat last year and did it —by \$10. Spring breaks make March a good winter month for us, so the bad weather was a big concern. With several days of bad weather and especially with our being closed one day, we were delighted to beat March 2009. We hope that April will put us ahead for the year.

If you haven't visited us for a while, come on out and see what we have. We not only cater to the kids but parents, and grandparents as well. There is something for everyone. If you have any suggestions for other items we might carry, pass them on to me.

-ROGER BENNETT

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## EDUCATION COMMITTEE REPORT

The Icelandic volcano Eyjafjallajokull had an impact on Dinosaur Ridge. We are all looking forward to the tales that FODR Publications Chair, Dr. Martin Lockley, has to relay from his recent stranding in Europe.

The Rooney Ranch booklet remains under review. More on this publication in the near future.

### Fireside Chats

Join the Friends of Dinosaur Ridge for an illustrated evening with paleoartist John Sibbick on **Wednesday June 23rd at 7:00PM at the Visitor Center**. This will be an informal, *richly illustrated talk* by one of the foremost 'dinosaur artists' of his generation. John Sibbick is famous for his meticulous work in such classic books as David Norman's *Illus-*

*trated Encyclopedia of Dinosaurs*. He has illustrated many other books and magazines on ancient life including Peter Wellnoffer's *Illustrated Encyclopedia of Pterosaurs* and many popular and scientific texts in widespread use.



Artist and author Gary Raham, also a Friends of Dinosaur Ridge member, presented a Fireside chat in January. Gary enlightened members about Loren Eiseley and his contributions to natural science through his books, essays, and poetry. Eiseley, a Nebraska native and University of Nebraska graduate, was an anthropologist whose scientific contributions included research on sites in Colorado. He was, of course, most well known for his popular books such as *The Immense Journey*, *Darwin's Century*, and *The Star Thrower*.

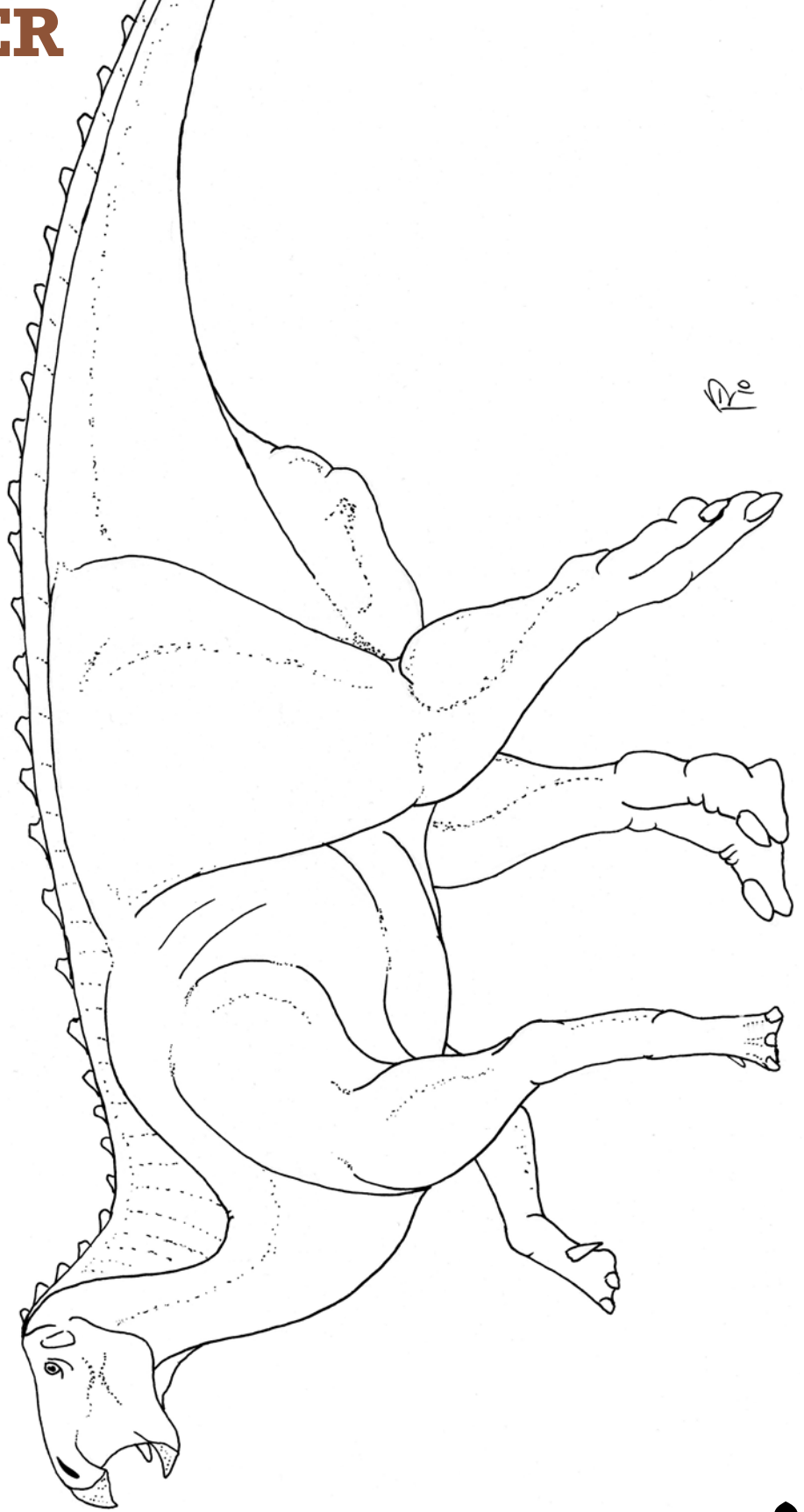
-BETH SIMMONS, PH.D.  
Chairman, Educational Committee



## **Eolambia**

Pronounced: ee-oh-lam-bee-ah

Eolambia was an early duck-billed dinosaur that was discovered in Utah. It is related to Iguanodon and could have lived in North America alongside its cousin. Eolambia could have been the track-maker at Dinosaur Ridge.



## ARTHUR LAKES TO BE INDUCTED INTO NATIONAL MINING HALL OF FAME

News came in late April that Arthur Lakes will be inducted into the National Mining Hall of Fame in Leadville at the annual banquet in September, 2010. Through the efforts of Beth Simmons and Kathy Honda and their book, “The Legacy of Arthur Lakes,” and all the others who made the book possible, Lakes’ name came to the forefront of heretofore unrecognized notables in the mining business at the turn of the century. The information below will appear on the plaque with his photograph that will hang in perpetuity at the Mining Hall of Fame.

### ARTHUR LAKES

1844 - 1917

Arthur Lakes contributed enormously to the geological and mining sciences in the western United States as a geologist, teacher, writer, and artist over a period of more than four decades beginning in 1869.

Born in England, Arthur Lakes came to the United States in 1865 and found his way to Colorado, where he was hired to teach at Jarvis Hall Collegiate School in Golden, Colorado in 1869. Lakes and Edward Berthoud, who taught geology at the fledgling Colorado Territorial School of Mines, established a “geological cabinet,” which eventually grew into the world famous Colorado School of Mines Geology Museum.

When Lakes discovered dinosaur bones along the Dakota Hogback of the Front Range in 1877, his fame grew instantly. In 1880, he was hired as the permanent instructor of geology and curator at the School of Mines.

Lakes published his first booklet, “A Mining Map of the San Juans,” in 1882. Samuel F. Emmons hired Arthur Lakes to help with the research, sketching, and field work for the Leadville project, which culminated in the publication of the celebrated “Geology and Mining Industry of Leadville, Colorado with Atlas” in 1886. Lakes wrote “The Trinidad Coal Region,” “The Coal Field of Crested Butte,” and the “Geology of the Aspen Region” in 1886; “The Geology of Colorado

Coal Deposits” in 1888; and “The Geology of Colorado Ore Deposits” in 1889, which he used as a textbook at the School of Mines.

The much-beloved professor of geology served the school until 1893, when he resigned to take a position as Associate Western Editor of the *Colliery Engineer and Metal Miner* in their new Denver office. As a leading mining journalist, he traveled to remote mining districts, reporting on the geology, the lay of the land, and the possibilities of production, in addition to the scenery and lifestyles. His most famous contributions were his reporting of the Cripple Creek district in the 1890s. He popularized mining through weekly articles in over two dozen different journals, including *Scientific American*, *Mining and Scientific Press*, *Mining Science*, *Mining World*, *Ores and Metals*, and the *Colliery Engineer* and its descendant, *Mines and Minerals*.

In all, Arthur Lakes published over 800 articles and five books – three editions of “Prospecting in North America” and two editions of “Geology of Colorado and Western Ore Deposits.” All were illustrated by his “pen sketches,” which showed panoramic views, geologic maps, and sketches of minerals, rocks, and fossils.

In 1902, Lakes became the lead consulting mining geologist for the American Exploitation Company in Denver, an investment group that supported extractive industries that ranged from gypsum and limestone quarries to precious metal mines. He continued to serve as a mining consultant until 1912, when he moved to Nelson, British Columbia to live with his sons, both mining engineers.

Still writing about mines, drawing, and painting, Arthur Lakes died in November 1917 in Nelson. His contribution to the modern geological realm is cemented over the doorway of the Colorado School of Mines Arthur Lakes Library.

-BETH SIMMONS

# ARTICLES

This article from the *Morrison Monitor*, March 21, 1914, contains the first use of the term “Dinosaur Ridge.” It also includes the term “Dinosaur Mountain” and mention of Mr. George Meyers, a new participant in the Dinosaur Ridge story.

The three-horned, Rhinoceros-like, fossil that the Otis Rooney sent to Professor Marsh could only have been a *Triceratops*.

## “REMARKABLE FOSSILS”

Prof. Schneider of the School of Mines with fifty students of the Freshman class, No. 17, came over from Golden Friday week on geological field trip.

They made a special study of the rock and formation of the Hogback three miles south of Golden.

Formation names and their geological age, of the geologic age, 1 ¼miles north of Morrison.

The mountains surrounding Morrison afford the richest field for study and investigation by the students of our best schools at home and colleges of other states have sent representatives here to examine them, particularly Dinosaur ridge immediately north of town where many remarkable fossils have been found. In 1878 fossil remains of an atlantosaur, or Great Lizard, were discovered in the shale beds of the Hogback by Prof. Arthur C. Lakes of the State School of Mines, assisted by Prof. Geo. L. Cannon now of the East Denver High School, and Messrs. Geo. Meyers and Shields of Morrison.

The vertebrae were about 26 in. in width, ribs about 4 in. in thickness, 6 to 8 in. in width, and something like 8 feet in length. Bones of limbs and feet were also found.

Prof. Lakes said in his lecture that the animal when alive was about 80 or 90 feet in length, was of an herbivorous nature and had a way of sitting upright upon its hind legs and tail, when feeding upon the luxuriant foliage then so abundant. In an upright position its head would be about 60 feet from the ground. It was 30 feet high in natural position. Prof. Lakes sent his discovery to Prof. O. C. Marsh of Smithsonian Institute at Washington.

Otis Rooney also discovered and sent to Prof. Marsh some fossil bones of a reptile similar to the “horned toad” which was 12 to 16 ft. in width by about 30 ft. in length. It had three horns somewhat like those of the Rhinoceros upon its head.

Many interesting specimens are still hidden in Dinosaur mountain, is the belief of the geologists.

-BETH SIMMONS

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## **Obituary**

FODR volunteer Terry Hiester passed away March 24th, after a long illness. Terry was a skilled finish carpenter. He built and remodeled houses, designed and built furniture, and was an accomplished artist. Terry designed and built five display cases and two work stations on wheels for the Dinosaur Ridge *Trek through Time* exhibit. He built these seven pieces low so that small children could see the exhibits. Terry also cut out, “Lacey,” the *Apatosaurus*, which is on the wall in the back next to the TV. He put a large wooden sauropod on Martin Lockley’s house so people could identify it from the road. Terry had deep interests in classic music, fine art, astronomy, spiders, geology, and paleontology. Terry was a good friend to us. He is greatly missed.

-JUDY AND BILL PETERSON

# ARTICLES

## DINOSAUR RIDGE RANKS TOPS AMONG AMERICA'S LARGEST DINOSAUR TRACK SITES!

**Summary.** Eleven of the most important dinosaur track sites in North America are evaluated using 15 measurable categories that are consistent with those used in several recent UNESCO proposals. The results suggest that Dinosaur Ridge, St. George and Fossil Trace are the top three sites in the USA, in this order. A logical next step is to attempt a global ranking of track sites. Although evaluation and comparative analysis is essential in order to determine whether important track sites (or any other paleontological/geological sites) qualify for local, regional national or international recognition, it is also important to note that evaluation criteria are complex, that scores and rankings may change and that, as yet, there are no universally agreed guidelines for defining the best criteria to use.

In the last 25 years many important dinosaur track sites around the world have been documented in considerable detail. The importance of these sites can be evaluated using many quantitative and qualitative criteria. Foremost among these criteria are those that establish the scientific and educational value of the sites. These criteria in turn may depend on other factors such as the size of the site (determining the amount of data it yields), accessibility and extent, and quality of historical and contemporary documentation.

Among the most important sites reported in the literature are those that have produced the first examples of particular track types, sites that provided the first evidence of unusual individual or group behavior such as running or herding, sites that show previously unknown morphological details of the foot such as skin impressions, sites that show previously unknown distributions of dinosaurs in space and time, and sites that have ecological census value. Given the variety of important criteria a considerable number need to be considered in any thorough evaluation.

An essential part of the scientific process is the comparative study of different sites in order to determine what is new and significant. This process in turn is very important in the

evaluations made by land owners and managers at the local regional or national level, and ultimately determines priorities that lead to the allocation of resources necessary to protect sites and pay for development as locally, regionally, or nationally protected sites such as state or national parks.

Revealing examples of this process were observed during the recent nomination of track sites in Boliva, Korea and Spain as candidates for inscription on the UNESCO World Heritage list. In order to comply with proposal guidelines it was necessary to compare the sites in these countries with other significant sites around the world. Some of the first-drafted proposals dealt mainly with the most obvious comparative criteria such as site size and number of tracks or track ways. Later proposals dealt with a much larger number of criteria. This process led to dialog between a large number of scientists, politicians and resource managers in many countries. This dialog is ongoing and has been the stimulus for the evaluation of American dinosaur track sites presented below.

This evaluation can be simply summarized as follows. Eleven important American dinosaur track sites (Table 1, page 17) were compared in 16 categories described below. Fifteen of these categories were scored on a scale of 1-5 using the comparative criteria also enumerated below (Table 2, page 17). The category that was not scored (land ownership) is provided for information only.

It is important to realize that the ranking of any site is subject to change. If a site is enlarged, brought under new management or otherwise obviously developed or changed the ranking will change. It is also important to note that evaluators have different knowledge and expertise. While a single evaluator can be consistent, in theory, he/she may have more knowledge of one site than another. Thus, it is important for evaluations to be checked by others. However, care should be taken not to have too many evaluators who may be prone to interpreting criteria inconsistently. Ideally, if the factual information is readily available to a number of evaluators, multiple evaluations can be conducted and the results averaged. However sifting all information is a huge task. For example, there are at least 100 scientific and guidebook citations available for the 11 sites considered herein.

*(continued on next page)*



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**Table 1: Evaluation scores for 11 major track sites in the USA. See Table 2 for scoring criteria.**

SITE NAME	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	TOTAL SCORE
Peacock Can, NM	3	4	4	2	4	5	2	3	2	1	1	1	x	1	1	1	35
St George, UT	2	5	5	0	4	5	5	3	3	5	5	4	x	4	3	4	57
Rocky Hil, CT	3	4	2	0	2	1	5	2	2	5	5	4	x	5	2	1	43
Red Gulch, WY	3	4	5	0	1	1	2	2	2	3	3	2	x	3	1	1	33
Moab MegaQ, UT	4	4	5	0	1	1	2	3	2	2	2	2	x	2	4	5	36
Purgatoire, CO	4	4	5	1	3	3	2	4	3	3	2	2	x	3	2	2	42
Dino Ridge, CO	2	3	4	2	3	5	4	5	5	5	5	5	x	4	5	5	62
Clayton Lake, NM	2	3	2	0	2	1	2	2	2	3	3	4	x	3	1	1	31
Mosquero, NM	2	3	4	0	2	2	2	2	2	2	2	2	x	1	1	1	24
Dino Valley TX	2	3	3	1	2	1	1	5	3	3	4	5	x	3	4	2	42
Fossil Trace, CO	3	2	3	3	5	5	2	4	3	3	4	2	x	3	4	5	51

**Table 2. Evaluation criteria used to score track sites listed in Table 1. See text for further details.**

CATEGORY	1	2	3	4	5
1 Site size	<250 m2	250-999m2	1000-5K m2	5K -20K m2	>20,000 m2
2 # tracks	<50	50-249	250-999	1000-2499	>2500
2 # trackways	1-25	26-50	51-75	76-100	>100
4 # holotypes	1	2	3	4	5 or more
5 # types	1	2 or 3	4 or 5	6 or 7	>8
6 # track levels	1	2 or 3	4 or 5	6 or 7	>8
7 Preservation	poor	fair	good	very good	excellent
8 Historic value	1	2	3	4	5
9 # Science pubs	<2	2 to 5	6 to 9	10 to 19	>20
10 Education value	1 aspect	2 aspects	3 aspects	4 aspects	5 or more
11 Access	1	2	3	4	5
12 Visitation	>1000	1000-4999	5000-24,999	25-999,999	>100,000
13 Management	1	2	3	4	5
14 Protection	1	2	3	4	5
15 Other site features	1 aspect	2 aspects	3 aspects	4 aspects	5 or more
16 Nearby sites	1 to 3	4 to 6	7 to 9	10 to 12	>12

In the section that follows a clear distinction is made between criteria that are easily reduced to unambiguous 'objective' numbers (i.e., 1-6, 9 and 12), and those that require non-numerical, potentially subjective criteria (i.e., 7, 10-11 and 13-15).

(continued on next page)

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## Track site evaluation criteria. Simplified after UNESCO proposals \*

Each category (size, number of tracks, visitation etc.) is ranked on a scale of 1-5

- 1) **Size, area in m2.** Self explanatory in Table 2.
- 2) **Number of tracks.** Self explanatory Table 2.
- 3) **Number of track ways.** Self explanatory in Table 2.
- 4) **Number of holotypes (type ichnospecies).** Self explanatory in Table 2.
- 5) **Number of general vertebrate track types.** Self explanatory in Table 2.
- 6) **Number of track levels.** Self explanatory in Table 2.
- 7) **Degree of preservation.**

<b>1 Poor.</b>	<b>2 Fair.</b>	<b>3 Good.</b>	<b>4 Very Good.</b>	<b>5. Excellent.</b>
Most or all tracks eroded or indistinct, track ways unclear	Some clear tracks, others indistinct, eroded, some track ways clear	Many tracks obvious to non-specialists, various clear track ways	Most tracks visually obvious, clear track ways	Almost all tracks & track ways very clear, some special features , e.g. skin

### 8) **Historic value.**

1. Recently found, one of many similar sites, slight relation to scientific tradition	2. Site more or less representative, adds minor info to database	3. Site important to science, more not less representative, adds much to historic database	4. Site very important, very representative, adds new info to historic database	5. One of first found sites, seminal to science for novelty and significance
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### 9) **Number of science publications.** Self explanatory in Table 2.

### 10) **Educational value.**

1. Site is named, locally known and visited	2. Site also has signage, trails and guide pamphlets	3. Signage, good guide-books, web info, tours often, locally well-known	4. Site famous, good signs, visitor center, web & guide-books, heavily toured	5. Major on-site exhibits, visitor center, big tour site, include all aspects 1-4
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### 11) **Access.**

1. Remote, difficult terrain, access not advertised by owners, dangerous for unadventurous	2. Remote but trail access allowed by owners/managers, moderate physical challenge	3. Vehicular access to site, use of back roads encouraged by owners/managers	4. Vehicle access to site by main roads, near major population centers, limited food /water	5. Direct access to visitor facility with handicap access, food /water, public toilets, etc.
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### 12) **Visitation.** Self explanatory in Table 2

### 13) **Management-ownership.** This category is for information only and is not scored. Relates to access (11) and degree of protection (14).

Private owners	Local, municipal	County	State, province	National
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### 14) **Protection.** Sheltered or covered sites should rank higher, regardless of ownership.

1. Private land, owner not involved in formal management	2. Local municipal owners have some protection strategy, signs, fences, etc.	3. County owners' protection strategy approaches level 4 management, part cover or shelter	4. State park (or province) level legal protection and management, cover or shelter	5. National park level legal register protection and management, cover or building
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### 15) **Other geological/natural/historic features at site.**

1. General geologic or natural scenery of contextual significance	2. Other scientific features (fossils, faults, landforms) already documented	3. Other published scientific or natural features used as destinations in their own right	4. Another historic or registered natural feature or destination known in its own right	5. Multiple historic or registered features standing in their own right
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# ARTICLES

**16) Nearby features in 25 km radius.** This category can be counted in a quasi quantitative way. In this survey sites of geological or paleontological significance should be included only if they reveal documented fossils (type specimens \* score higher), or fossils and geological features with interpretative signs or published documentation. This category potentially awards credit to an evaluated track site if it is in the same 25 km radius as another evaluated site.

<b>1.</b> 1 to 3 sites in radius	<b>2.</b> 4 to 6 sites in radius	<b>3.</b> 7 to 9 sites in radius	<b>4.</b> 10 to 12 sites in radius	<b>5.</b> more than 12 sites in radius
	<b>or</b> 1 to 3 sites in radius with interpretative signs/trails and at least <b>one type specimen</b>	<b>or</b> 4 to 6 sites in radius with interpretative signs/trails and at least <b>3 type specimens</b>	<b>or</b> 7 to 9 sites in radius with interpretative signs/trails and at least <b>5 type specimens</b>	<b>or</b> 10 to 12 sites in radius with interpretative signs/trails and <b>6 or more type specimens</b>

**Results:** The preliminary evaluation presented in Table 1 shows that the highest cumulative scores were assigned to Dinosaur Ridge (62), the Saint George track sites (57) and Fossil Trace (51), whereas in comparison the lower scores were given to sites like Peacock Canyon, Red Gulch and Clayton Lake. As each site is different only a few generalizations can be drawn. Higher scoring sites tend to be those that are more accessible to population centers and scientific and educational institutions, whereas those that have lower scores tend to be remote. For obvious reasons accessibility increases developmental and educational potential as well as visitation.

There are a limited number of large dinosaur track sites in the USA that have the potential to evaluate as highly as those listed in Table 1. However, large sites are known in Canada that could be included in a North American analysis. Likewise, there is considerable potential for global comparative analyses of the type undertaken in the UNESCO proposals. However, such evaluation processes are potentially complex, and much work still needs to be done, in order to consistently define major track sites (or tracksite complexes) and their intrinsic importance either in isolation, or in the context of other important paleontological and geological features in the immediate vicinity.

## Acknowledgements and sources

\*The impetus for evaluating large dinosaur track sites comes from recent efforts to nominate such sites as UNESCO World Heritage sites. The above evaluation criteria are modified from these proposals (listed below). Attempts have been made to strike a balance between using a few relatively simple criteria, as suggested in the Korean proposal, and the larger number of more complex, criteria used in the Spanish proposal. Thanks are due to Christian Meyer (Basel Natural History Museum), Luis Alcalá (Dinopolis, Teruel, Spain) Min Huh (Chonnam National University, Korea) and their various colleagues for seminal ideas, discussion and work on several UNESCO proposals. I thank Andrew Milner and Jerry Harris (St George, Utah), Brent Breithaupt (BLM Wyoming), and Bruce Schumacher (US Forest Service, Colorado) for providing data that helped evaluate sites 2, 5 and 7.

- 1) Korean Cretaceous Dinosaur Coast: a candidate for world heritage inscription.  
v. 1, 177p. v. 2, 179p. v. 3 (1-7), 506p. v. 4, 1067p. (1929 pages)
- 2) Dinosaur Ichnites of the Iberian Peninsula: world heritage candidacy 467p.

-MARTIN LOCKLEY

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