# Connecting Geoheritage Sites Having Common Assets: Links between Petrified Forests in Colorado, Peru, and Thailand

#### **Paleontological Heritage Sites with Common Assets**

The concept of geoheritage encompasses specific geologic sites that share common assets, purposes, and needs for geoconservation and protection. Florissant Fossil Beds National Monument is currently involved in developing international collaboration between petrified forest sites in the USA (Colorado), Peru, and Thailand. All of the sites have been designated for protection by their respective governments, and all have aspired to achieve Geopark designations.



**Florissant Fossil Beds National Monument**, Florissant, Colorado, USA

Florissant's fossils have been studied since the 1870s, and the site became a national monument in 1969. The late Eocene Sequoia stumps are among the largest diameter trunks known in the world.



El Bosque Petrificado Piedra Chamana Sexi, Peru

The middle Eocene petrified forest near the remote Andean village of Sexi became known in the early 1990s and was protected by the government of Peru in 1997. It is one of the most species-rich sites of fossil wood in the world.



**Petrified Forest Park** Bantak, Thailand

This Pleistocene petrified forest was discovered in 2003 and has been protected by the Department of National Parks, Wildlife, and Plant Conservation since 2004. It has the longest continuous petrified trunk known in the world.

# Herbert W. Meyer

National Park Service, Florissant, Colorado, USA

## **Sharing Common Goals and Exchanging Ideas Conservation Issues and Stabilization Methods**





All of the sites share issues with deterioration of fossil trees. The causes range from freeze-thaw cycles at Florissant, to severe wind at Sexi, to high heat and humidity in Thailand. New methods of conservation are being developed at each site.





animal activity.

### **Promoting Education and Active Involvement for Students and Local Communities**

**GIP-GeoCorps™ America Paleontology Interns at Florissant** 



**Developing effective interaction** with the public and providing educational opportunities is an objective shared by all sites. Florissant has sponsored 50 Paleontology Interns and also offers programs for school groups. In Peru and Thailand, both curiosity and practical workshops help young students learn about fossils.

#### **Florissant Fossil Beds National Monument**

- >63,000 visitors in 2014 stimulated \$3.5M of spending in local communities (see below).
- Promotes economic benefits for proposed Geopark along the Gold Belt Tour National Scenic Byway.



# **Providing Economic Benefits for Local Communities**

#### El Bosque Petrificado Piedra Chamana

- > The village of Sexi identifies its geoheritage as the "Paleontological District."
- > Attracting more visitors is a long-term goal, but few have arrived vet.
- > A new museum building has been constructed with funding from sources in the USA.



#### Acknowledgements

Deborah Woodcock and Santiago Asenjo have collaborated closely with the project in Peru. Nareerat Boonchai facilitated the project in Thailand and provided photographs for the poster. Evangelia Kyriazi has been closely involved in developing methods for the conservation of petrified trees. The Friends of the Florissant Fossil Beds have provided assistance to Sexi, Peru and for international travel expenses. Apollo 8 astronaut Bill Anders provided a generous donation to support the project in Peru. Terri Cook prepared the article for Earth Magazine. Katie McComas, Mariah Slovacek, Conni O'Connor, and Michelle Wheatley assisted with the design and review of the poster.



Additional damage is caused by plant and

Shelters, both primitive and complex, help protect the fossil trees at Florissant and in Thailand.

Learning Conservation in Thailand



#### **Bantak Petrified Forest Park**

- > 50,000 to 150,000 annual visitors contribute to the local economy, but the number has been decreasing due to the deterioration of the fossils.
- > Local students earn income as guides.
- > More resorts and shops have opened, and local crafts are sold.

#### **Curiosity in Peru**

#### **Geoheritage Collaboration and Partnerships**

Maintaining collaborative links between petrified forest sites is important for sharing unique conservation methods and fulfilling similar objectives for community involvement, education, and economic sustainability. This has been pursued through several venues.

The nonprofit Friends of the Florissant Fossil Beds has joined in a formal partnership with a counterpart organization in Peru to effectively establish a "sister park" relationship between the two sites.



Scientists from Florissant Fossil Beds National Monument and Clark University have collaborated in onsite research and conservation to support El Bosque Petrificado Piedra Chamana, including development of a site inventory map and database with digital images.







Davila and Diana Pajuelo Aparicio, whe terb Meyer and others to learn about v important fossil sites and collection

A visit by representatives from Peru to Florissant in 2013 prompted a feature article in EARTH Magazine.



Broader collaborations to create a network of petrified forest parks worldwide was one result of the Seminar and Workshop on Petrified Wood Conservation held in Bantak, Thailand in August 2014.

#### **Future Goals and Objectives**

- > Develop and share new methods to protect and conserve fossil trees
- > Help local people sustainably utilize and conserve their fossil resources
- > Create exhibits to aid understanding of the scientific significance of petrified trees
- Promote geotourism and increase employment opportunities for the people in local communities
- > Create Geopark designations for each site
- Broaden international research and conservation collaboration to involve more petrified forest sites worldwide