

Spring 2015

# THE PLEISTOCENE POST

Newsletter of the Ice Age Floods Institute



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## WHERE IS THIS FLOODS' SITE AND WHY IS IT IMPORTANT?

In this newsletter, as well as future ones, we will have a photograph of an Ice Age Floods site. You will be asked to determine its location and see if you can determine why it is important. The answer will be found later in the newsletter. We hope you have some fun with this.

Here is the photo for this issue (courtesy of Tom Foster). See if you can determine where Eddy is and why it is an important part of the Floods story. The answer can be found on page 17.



Also in this newsletter and future ones, you will see a new feature called "Floods Talk." This is intended to help decode the complex geologic vocabulary used to describe and explain the catastrophic Floods events. Dispersed in each newsletter we will be featuring simplified definitions of commonly used terms. We hope these will increase the understanding and pleasure for all newcomers to the Floods story.

--Gary Ford

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# PRESIDENT'S MESSAGE

## *“Celebrating Our 20th Year”*

The Ice Age Floods Institute was incorporated in 1995 so this marks our 20<sup>th</sup> year working to help people learn about the Floods and to promote the Ice Age Floods National Geologic Trail. I'd like to briefly mention some of the highlights of the last 20+ years. Some of this information is from a summary prepared by Jim Pritchard, one of the founding members and Institute treasurer until 2004.

The story begins in 1993 with the Ice Age Floods Task Force. This was a group of mostly government agency people who felt the story of the Floods needed to be told. The Task Force soon concluded that what was needed was a non-governmental organization to pursue funding for recognition of the Ice Age Floods story.

Starting in February 1994, organizing the Institute got underway with incorporation occurring in 1995. Ten chapters were established between 2002 and 2008. Several educational brochures have been developed. The Institute website was established in 1998 at the University of Idaho and was hosted by the Idaho Geological Survey. This site was later reconstructed in its present form. In the early 2000s the IAFI Store was established.

In 1999, the NPS received funds to conduct a “Study of Alternative and Environmental Assessment: Following Pathways of Glacial Lake Missoula Floods.” The study was published in 2001 and presented to the Secretary

of the Interior. The recommendation was that an Ice Age Floods National Geologic Trail be created.

In the summer of 2004, legislation was introduced in the House by Congressman Richard “Doc” Hastings. This was followed by similar legislation in the Senate by Senator Maria Cantwell. There were a number of members of the congressional delegations from the northwest states who signed on as co-sponsors. The Congress authorized the establishment of the Ice Age Floods National Geologic Trail in 2009 after five years of promotion by many individuals and groups, including the IAFI.

**Membership in the IAFI has grown from 11 members in 1996 to 700 in 2014. We thank all of you for your continuing support.**

Continuing our emphasis on historical development of the IAFI, in this issue our chapters report on some of their accomplishments since being established. We salute some of our members who have been with us all the way from 1995 to the present. We have an update for you on recent activities on the Ice Age Floods National Geologic Trail. Some of our most recent generous members are noted. We note the passing of Bob Robinson, our Secretary. And we have information for you on the fall field trip to the Wenatchee area.

My thanks to Signe White for preparing another fine newsletter that we hope you all enjoy.

--Gary Ford

## IAFI DECAL



You can assist in spreading the Ice Age Floods story by purchasing vinyl 4.8”x 4.8” inside window decals for your vehicle(s). Decals are easy to attach using the detailed instructions printed on the peel-off backside of the decal. Individuals viewing your decal from a park, restaurant and other venues can easily use their smart device, such as a phone, iPad, or notebook and scan the QR (Quick Response) Code to access the Ice Age Floods Institute’s website instantly. Your decal purchases make you a partner with IAFI in spreading the fascinating Floods story.

Decals can be purchased from the IAFI Store by going to our website at [www.iafi.org](http://www.iafi.org) and clicking on the “Store” tab. The cost is \$5 which includes shipping and handling.

# CHAPTER NEWS

## Cheney – Spokane Chapter

### *Accomplishments*

While the Chapter has many accomplishments since being established in 2004, the following ones will be featured here.

*Establishment of the Williams Lake City Park -*  
On April 9, 2013, the City of Cheney purchased the Williams Lake Cataract and Plunge Pool property and development plans are underway in partnership with the Cheney-Spokane Chapter. Why is this property so important to the Ice Age Floods story? Collapse of an ice dam in northern Idaho (Lake Pend Oreille area) inundated eastern Washington with as much as 500 cubic miles of water during the last glacial cycle and created the famous Channeled Scabland and its world unique scabland features.

Multiple ice dam failures sent dozens of catastrophic floods through the scabland. One site created includes the Williams Lake Cataract and Plunge Pool. This is a valuable asset to ongoing strategic plans of the Chapter to provide public education of the Ice Age Floods, and complements public recreation lands in the area including Williams and Badger Lake, the Turnbull National Wildlife Refuge, and the Columbia Plateau State Park non-motorized trail system.

The Williams Lake dry falls cataract and plunge pool is nestled between Williams Lake and Badger Lake, important local recreation areas. A view from the Williams Lake Road below the cataract is interesting but less instructive compared to the view from the cataract rim. The 100-foot tall Williams Lake Cataract is spectacular, breathtaking, and unique in Spokane County because of its potential to be easily viewed by the public. The Williams Lake dry falls is the only place in Spokane County where such a feature can be viewed from near a public road. Other dry falls produced by the catastrophic Ice Age Floods occur in Spokane County on private lands but unfortunately are not accessible to the public or visible from public roads.

Both Williams and Badger Lakes draw visitors to this region of Spokane County. They are less than one mile from each other and the cataract and plunge pool sites are located between the two lakes, just east of Williams Lake. The Williams Plunge Pool area's fifteen acres have unique natural features and are a riparian habitat. The area is approximately six miles southwest of Turnbull National Wildlife Refuge and provides another recreational and educational site for visitors to view in the area. Water, rich soils, and diverse vegetation make it an exceptionally productive area for wildlife. The dense vegetation provides many wildlife species with escape, hiding, and resting cover, as well as cover for nesting. The plant community is also very complex, with many "layers" of plants, from the herbs on the forest floor, up through the brushy understory, to the tops of the highest trees. This complexity creates many niches, which offer homes to a great variety of wildlife species. Recreation users from Spokane County and other parts of the country will have opportunities to walk, bird watch, and use it as an environmental classroom.

The site adds to the established rural open space, the Turnbull National Wildlife Refuge and the Columbia Plateau Bike Trail system. It is the only plunge pool basin in the area that can be viewed from Spokane County roads and provides a buffer between natural areas and rural lands from existing urban or suburban development. The Williams Lake Cataract and Plunge Pool site will become an important stop and viewpoint along the Ice Age Floods National Geologic Trail (IAFNGT).



*Photos by  
Michael Long,  
son of Chapter  
secretary Linda  
Long.*

***Publications and Archive***

The Chapter has published several documents that spread the Ice Age Floods story, and has assisted in the establishment of the Ice Age Floods Archives.

*Field Guides* - A series of field guides contain recorded critical sites and information about the effects of the Missoula Floods in the Pacific Northwest. You can obtain these field guides individually or in Compendiums through the Chapter by emailing board secretary, Linda Long, at lindakl@centurytel.net or by calling (509) 235-4251. Auntie’s Bookstore in Spokane, WA stocks the Compendiums on its shelves.

*Curriculum Guide* - The publication, “Glaciers, Ice Dams and the Channeled Scabland, A Hands-on Science Curriculum for Grades 4-8,” was developed by Eileen M. Starr, Ph.D. in 2013 and was published by the Cheney-Spokane Chapter of the Ice Age Floods Institute. The curriculum guide has been widely received and used in schools to promote awareness of the Ice Age Floods story for students and their families. The curriculum guide may be purchased by emailing board secretary, Linda Long, at lindakl@centurytel.net or by calling (509) 235-4251.

*Ice Age Floods Archive* - An archive in John F. Kennedy Library on the Eastern Washington University campus in Cheney, Washington has been established and is dedicated to preserving appropriate Ice Age Floods documents and materials. Dr. Charlie Mutschler is the Archivist responsible for maintaining them. Students, researchers, and the public can have access to the content of these archives. Citizens are encouraged to donate their papers, field guides, field research, and other documents that will assist in the Ice Age Floods story. Dr. Mutschler can be contacted at cmutschler@ewu.edu, or by calling (509) 359-2254.

***Ice Age Floods Kiosk Installed in West Cheney***

On September 4, 2014 a kiosk in west Cheney was dedicated to Mike McKeehan who passed away in August 2012. He served five years as the ex-officio board member representing the City of Cheney. In November 2009, he reported that a kiosk was stored in a City of Cheney facility and that the

City would give it to the Chapter. Design plans began when it was learned that a Cheney boy scout, Daniel Franz, was looking for a project to earn his Eagle badge. He and several other Cheney scouts began work repairing the kiosk. Franz was a fifth grader when he first met McKeehan and is graduating from the University of Idaho with a degree in chemical engineering this year. Dan Lewis, a board member gifted with the appropriate skills, prepared the presentation of the Ice Age Floods story shown on both sides of the kiosk.



*Ice Age Floods Story Kiosk west of Cheney, WA (Photo by Jill Weiszmann)*



*Judy McKeehan, wife of deceased board member, Mike McKeehan (Photo by Jill Weiszmann)*

--Melanie Bell

***Coeur du Deluge Chapter***

The Coeur du Deluge (CDD) Chapter in Sandpoint, ID was chartered as an IAFI chapter in 2005 with 12 charter members. The CDD Chapter is still a small chapter with only 25 members of the approximately 700 total IAFI membership. However, our ratio of membership to the small population of our recruitment area (less than 7,000 in Sandpoint) is probably very high. Our chapter has especially benefited by having as Chapter members two former Idaho Geological Survey research geologists (Roy Breckenridge and Dean Garwood) whose research has focused on the Ice Age Floods. Having their expertise has allowed us to conduct field trips led by highly knowledgeable field trip leaders. Our chapter is also fortunate in having a strong local following as evidenced by the large numbers of attendees we have for all of our lecture events and field trips.

Almost every CDD sponsored lecture or field trip has been filled beyond capacity and occasionally the event was done a second time to accommodate the overflow. This article will focus on the main activities of our chapter during the last two years.

### **2013 Annual IAFI Meeting**

Our biggest Chapter sponsored event, by far, was the 2013 Annual IAFI Meeting held in Sandpoint on September 13-14, 2013. This was the first time that our chapter sponsored this event. The two-day meeting consisted of an all-day Business Meeting held at Schweitzer Mt. Resort, a public lecture, and an all-day field trip.

The public lecture, attended by over 350 people, was titled “After the Deluge: The Ice Age Floods and Their Impacts on North Idaho” and was presented by Idaho State Geologist Roy Breckenridge and author Jack Nisbet. The lecture was followed the next day by an all-day field trip attended by over 100 people travelling from Sandpoint to Clark Fork and on to the Cabinet Gorge Dam. The field trip was conducted by our two speakers of the previous night along with another Idaho State Geologist, Dean Garwood. The field trip focused on both the glacial, flood, and lake features in the area of the ice dam and insights into the formation of the present day cultural and physical landscape.

### **Additional Chapter Field Trips**

During 2014, our Chapter hosted two public field trips, led by Roy Breckenridge and Dean Garwood, and one special field trip conducted at the request of a local retirement facility. They are as follows:

*Hoodoo Valley Field Trip on June 1, 2014* - This all day field trip started in Sandpoint and explored the geologic history of the Hoodoo Valley. The approximately 75-mile route followed the Glacial Lake Missoula floods from their outburst at Lake Pend Oreille down the Hoodoo channel, north to the Pend Oreille River, and back to Sandpoint via Round Lake. The features observed on the trip included evidence of Ice Age glaciation and catastrophic megafloods and updated new research and mapping results.

*Clark Fork Field Trip on June 12, 2014* - This field trip requested for some of our local senior citizens from Luther Park at Sandpoint was a shorter half-day version of the Sandpoint to Clark Fork field

trip conducted for the 2013 Annual IAFI Meetings and was preceded by a lecture in the morning.

*Clark Fork Field Trip on September 6, 2014* - This all day field trip started in Sandpoint and focused on the geologic history of the ice dam area. The approximately 80-mile, all day field excursion explored the geology and physical geography of Northern Idaho. Field stops featured new research on glaciation of the Purcell Trench, failure of the Clark Fork Ice Dam, and the geology of Lake Pend Oreille.

### **Chapter Sponsored Invited Public Presentations**

Three public lectures by invited experts were hosted by the CDD Chapter during 2014 and early 2015.

1. Lecture titled “Setting the Stage: Insights on Local Historical Geology” by Jon Bair. Presented at Bonner County Library on January 23, 2014.
2. Lecture titled “Ice Age Floods in the Pacific Northwest: The Northern Reaches” by Gene Kiver, retired Eastern Washington University Geology professor and co-author of *On the Trail of the Ice Age Floods: The Northern Reaches*. Presented at the Sandpoint Community Hall on October 3, 2014. This lecture had over 150 attendees.
3. Lecture titled “Exploring the Ice Age Floods” by Bruce Bjornstad, author of several field guides on the Ice Age Floods, including two from the *On the Trail of the Ice Age Floods* series. Presented at Sandpoint Community Hall on February 12, 2015. His presentation included video images captured using his latest research tool, an aerial drone, for the study of Ice Age Floods. Over 150 people attended his presentation.

### **Public Presentations and Displays by Coeur Du Deluge Members**

“Origin and Impact of Ice Age Floods.” Lecture for the Community Assistance League presented at Panhandle State Bank, Sandpoint, ID on January 15, 2014.

“Bonner County Under Ice.” A design and construction of a display at the Bonner County History Museum in Sandpoint, ID in Spring 2014.

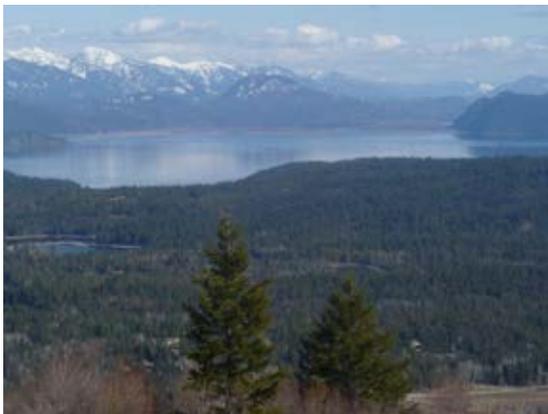
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“Sandpoint: Heart of the Ice Age Floods” presented at Luther Park at Sandpoint on June 12, 2014.

“Idaho Ice Age Floods: Why Here?” Presented at the Bonner County Farm Bureau in Sandpoint, ID on November 7, 2014.



*View from Schweitzer Mountain where the Purcell Trench meets Lake Pend Oreille. The mouth of the Clark Fork River is in the background where it appears to be raining.*



*Looking East from Gold Mountain to the mouth of the Clark Fork River. To the left of the photo is the Purcell Trench. The Cabinet Mountains and Scotchman's Peak are in the left background.*



*2013 Annual IAFI Field Trip. Some of the 100+ attendees looking north from City Beach in Sandpoint to the Purcell Trench and ruminating about the time when the ice plug covered Sandpoint with over 2,000 feet of ice.*



*Glacial striations gouged by the glacial plug as it moved up and blocked the Clark Fork River. The striations are located at Castle Rock, a feature east of Clark Fork, ID.*

--Tony Lewis

### Columbia River Gorge Chapter

On January 10<sup>th</sup> about 125 folks joined us at the Hood River County Library for a slide show and book signing by geologist, author, and photographer Ellen Morris Bishop. Her latest book, *Living with Thunder, Exploring the Geologic Past, Present, and Future of the Pacific Northwest* is fantastic! Hopefully the IAFI store will be carrying it soon.

On January 29<sup>th</sup> Denise Bausch, Chief of Interpretation and Education, Lake Roosevelt National Recreation Area, and a crew of four other interpretive specialists came through The Gorge as a part of the week-long Ice Age Floods National Geologic Trail scoping trip. Geologist Lloyd DeKay and I joined them at the Columbia Gorge Discovery Center and Museum in The Dalles, OR. After a tour of the center led by executive director Carolyn Purcell, Lloyd and I pointed out nearby Floods features and then led them to Rowena Crest via the Historic Columbia River Highway where more features were pointed out. We then joined them for lunch in Hood River, OR.

#### ***Gorge Geology Field Trips Continue to be a Big Hit***

Since 2010 Terry Hurd (Chapter President) and geologist member Lloyd DeKay have been leading field trips through the Gorge focused on the Ice Age Floods, for members and the public.

After 10 field trips (3 per year) with well over 200 guests and an expansion from 40+ RT miles to

## CHAPTER NEWS CONTINUED

80+ RT miles, the trips still fill up every time with guests from MT, ID, greater Portland and Seattle, and as far away as MI, IN, AZ and TX, some of whom come primarily for the field trip.

And as far as we can tell, no one has gone away less than thrilled with the experience. We've even picked up a few new members as a direct result of the field trips.

We use a 25 passenger bus (22 guests, + Lloyd, Terry, and driver) and start with a 40+ RT mile excursion between White Salmon – Hood River and The Dalles – Columbia Hills State Park. The small bus size is one of the keys to making the trips so successful. There is plenty of personal interaction and Lloyd can answer everyone's questions.

The original trip focused on Floods features, but also included some general geology, Native American petroglyphs and pictographs, and even a brief safari through an exotic animal farm. We soon expanded 40+ RT miles to the west into the heart of the Gorge, starting and ending in Cascade Locks.

This longer field trip has more emphasis on the geologic history of the Gorge and interesting geologic features in addition to the Floods story, the petroglyphs and pictographs, and the animal farm.

The only real complaint we've heard is about the length of time we take (7:30am-6:00pm, 10-1/2 hours), but when a geologist gets talking and waving his arms it just naturally takes a while to shut him up.

Partly as a result of these field trips we were invited to lead a field trip for 45 elementary school students (Mid-Valley Elementary, Hood River), and we've done talks for 20+ students from pre-school (Bright Beginnings, Hood River), elementary school (2<sup>nd</sup> grade, Trout Lake School), and high school classes (10<sup>th</sup> grade, Hood River High), as well as a talk for 50+ members of the Goldendale Chamber of Commerce.

We do one trip in each of the months of April, May, and September, so if you're interested, please check out more details at our website:

[www.GorgeFloods.org](http://www.GorgeFloods.org), and sign up to join us. IAFI members get a 20% discount.



*Lloyd talking about Missoula Floods on our September field trip*

--Terry Hurd and Lloyd DeKay

### Ellensburg Chapter

The Ellensburg Chapter has offered Sunday Field Trips consistently since our start in 2007. Two trips are offered each spring and two trips are offered each fall. Karl Lillquist and Nick Zentner (both professors at Central Washington University) take turns leading the trips. Karl is famous for his extremely detailed field trip handouts - often more than 40 pages! Nick leans more toward the visual approach - with just a few key diagrams per field trip. Both leaders emphasize the rich variety of geology and physical geography offerings in central Washington. In addition to the Channeled Scablands, we regularly dabble in topics and locations outside of the Ice Age Floods country. There is no shortage of field sites and topics. All are welcome on our trips!



*Top of Lookout Mountain. June 2014 field trip. Discussion at top involved evidence in Kittitas County of multiple glacial advances from the Cascade crest. The flat fields in the photo are outwash plains from an ice advance 300,000 years ago that left a moraine today known as Indian John Hill.*



*Top of Saddle Mountain. October 2014 field trip. Discussion at top involved Columbia River predating the development of the Saddle Mountains. Sentinel Gap is the result of the Saddles uplifting against the river. Ice Age Flood paths were also featured - both down the Columbia Valley and along the north flank of the Saddle Mountains.*

--Nick Zentner

### Glacial Lake Missoula Chapter

#### ***Some Significant Past Accomplishments***

The Glacial Lake Missoula Chapter hosted the first IAFI national meeting and bus trip. This got the ball rolling in 1995 and established the pattern of hosting a field trip in association with the fall meeting.

We also created the first shaded relief map of the entire flood, ice line and paleo sea coast. And we got it on google maps! This map was an amazing best seller and went a large way toward making us known. It was carried by both the Forest Service special map series and the USGS map outlets in Spokane and Denver.

We launched the boulder project to mark the Lake shoreline at significant locations. This is the latest project and is continuing with two rocks to be placed this summer. This is a good example of working with other landowners to advance the National Trail.

For 2015, our goals are:

- *Complete the cataloging of the documents in the Joseph Pardee box and create a display*
- *Increase membership*
- *Build a new display for the Natural History Center*



*One of the two engraved boulders installed on Mt. Jumbo showing the high water mark (4200 feet) for Glacial Lake Missoula.*

--Jim Shelden

### Lake Lewis Chapter

The Lake Lewis Chapter has continued to promote the Ice Age Floods as we host programs and participate in community activities. In August, the Lewis and Clark Trail Heritage Foundation held its 46<sup>th</sup> Annual Meeting in Richland. Several Lake Lewis volunteers manned a table at the event and geologist and author Bruce Bjornstad was a featured speaker.

On September 12<sup>th</sup> the Lake Lewis Chapter hosted the fall IAFI Board Meeting at the Shilo Inn in Richland. That evening Bruce Bjornstad presented a pre-field trip talk at WSU Tri-Cities. The next day Bruce and Gary Kleinknecht led a two-bus field trip from the Richland area across the Hanford Reservation to view Mt. St. Helens set S ash, erratics, bergmounds, and gigantic Floods deposits. The tour then went to the Hanford Reach National Monument overlook in Franklin County and to the eastern end of the Saddle Mountains to view the Parting of the Waters where the Floods exited the Drumheller Channels. The field trip ended with a quick visit to the Coyote Canyon Mammoth Site south of the Tri-Cities.

The Hanford Reach Interpretive Center (The Reach) offers several Ice Age Floods bus tours that are led by Bruce Bjornstad and Gary Kleinknecht. The Lake Lewis program on November 11<sup>th</sup> was held at The Reach for the first time. Northwest author Jack Nisbet presented a talk on the Floods' impact on life in the Northwest.

On January 13<sup>th</sup> Dr. Steve Reidel presented a program on Columbia River Basalts.

Dr. Eugene Kiver presented to the Lake Lewis Chapter at The Reach on “Missoula Floods in the Cheney Area: 2015 Summary.”

We established contacts with Columbia Basin College for an archaeology field lab for the Coyote Canyon Site that was first conducted last summer. We will conduct another such lab this May.

IAFI President Gary Ford has asked each chapter to comment on some achievements that we are particularly proud of as a way to commemorate the Institute’s 20<sup>th</sup> anniversary. Three significant accomplishments of the Lake Lewis Chapter since its founding in 2003 are:

1. *Becoming a beneficiary of the talents and efforts of Team Battelle*
2. *Being one of several parties that participated in the establishment of Badger Mountain as a very popular hiking park and Floods interpretive feature*
3. *Supporting the Coyote Canyon Mammoth Dig*

An additional accomplishment is establishing relationships with many organizations in our community that provide us with opportunities to educate the public about the Ice Age Floods.



*A high school student volunteer and public outreach employee from the Burke Museum at the University of Washington work in the sediment picking lab at the Coyote Canyon Mammoth Site. The mammoth skeleton is buried in Ice Age Floods deposits and was dated at 17,449 calibrated years before present.*



*Columbia Basin College Archaeology students practice their digging skills in a field lab class taught by Deborah Haberman, Bax Barton and Gary Kleinknecht at the Coyote Canyon Mammoth Site*

--Gary Kleinknecht

**Lower Columbia Chapter**

**LOWER COLUMBIA CHAPTER**



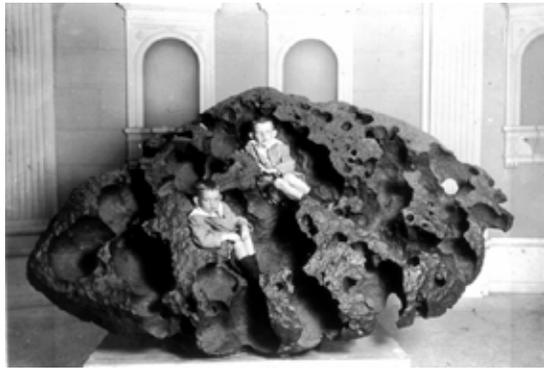
*Our chapter logo*

The Lower Columbia chapter was chartered in 2005. We first met at the West Linn Public Library and usually filled the meeting room. It was there, under the leadership of Mark Buser that we worked out the direction and goals for our organization and realized that West Linn was in a significant spot along the Ice Age Floods trail because of an artifact that was found there in 1902.

A Welsh woodcutter named Ellis Hughes found a strange rock that turned out to be the largest meteorite ever found in the U.S. and the sixth largest in the world. The rock has an interesting story that would take too long to relate here, but the tie to the Ice Age Floods is that we believe it is an ice-rafted object brought here by one of the largest floods.

One of our charter members, Dick Pugh is with the Portland State University, Cascade Meteorite Laboratory and is largely responsible for determining that the meteorite be designated as an erratic. In his research at the discovery site, he found no crater, but several obvious erratic rocks.

We now think that it landed near the Canada/US border on the ice that eventually blocked the Clark Fork River creating Lake Missoula. When the ice dam broke the meteorite was carried in an iceberg that was once part of the dam. It then floated across the scablands of eastern Washington, down the Columbia River, across Portland and somehow nestled onto a hillside in a part of West Linn called Willamette where Ellis Hughes used it for a resting spot before realizing that it was a very unusual rock.



*The meteorite when first displayed in New York*



*Pearl logo*

Someone suggested that the Willamette Meteorite is like a pearl of the Ice Age Floods. Our chapter liked that and decided to tell the story of the meteorite landing on a glacier, and then floating to Oregon in an iceberg.

With the help of many people, including IAFI members, grants and sales of miniature meteorite replicas helped change what was just a baseball park into a nature park dedicated to the Ice Age Floods and the Willamette Meteorite. There is now a paved nature walk along the Tualatin river, around a meadow, and through a stand of trees with three stone kiosks and eight interpretive panels telling the story of the Floods, the meteorite and the local history of the human interaction with the meteorite.



*Field's Bridge Park with nature walk and kiosks*

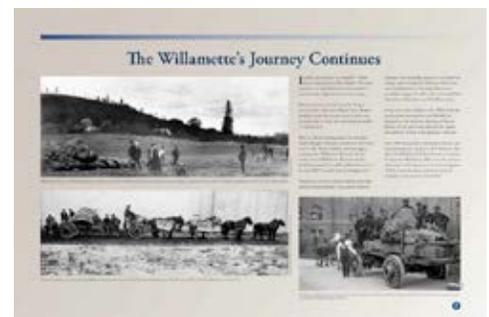


*First kiosk next to the river with fishing platform in background*

The centerpiece of the nature walk is a one-fifth size bronze replica of the Willamette Meteorite. The actual meteorite is in the Rose Center for Earth and Space in the American Museum of Natural History in New York City. The replica was cast from a computer scan of the original and is very accurate, even to the point of showing where a slab was sawn off for collectors.



*Meteorite replica and descriptive panel*



*One of the eight panels*



*History Kiosk*

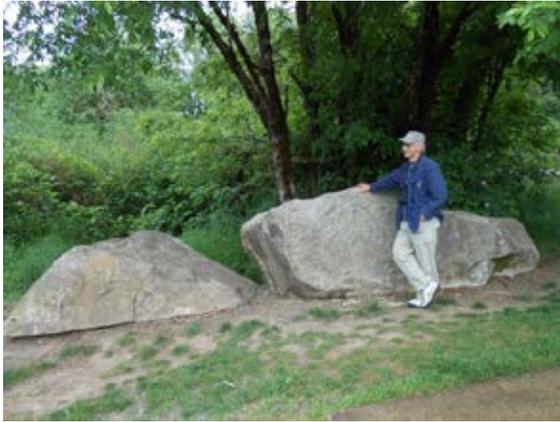


*Meteorite Kiosk*



*The dedication of the nature walk at Field's Bridge Park in August 2008*

At the start of the nature walk we placed three large erratic boulders found in an industrial development in Tualatin. Rather than allow them to be destroyed, we found enough money to have them moved to this location where they are displayed.



*Author, Eugene Kiver next to one of the 3 granite erratic boulders equaling 46, 000 pounds*

At about this same time our chapter outgrew the West Linn Library and moved east across the Willamette River to the Museum of the Oregon Territory overlooking the historic Willamette Falls. This gave us a much larger room which we needed when we brought in well-known speakers such as Bruce Bjornstad, Scott Burns, Jim O'Connor, Richard Waitt and others.



*View of Willamette Falls from the 3rd floor of the history museum*

Unfortunately, after a couple of years, the museum was not able to continue hosting us and we had the daunting task of finding a new home. The story took a fabulous turn for the better when we met with civic leaders from Tualatin at the Tualatin Heritage Center. They were working with a “branding” expert to find an identity for their city that would best display the unique features that Tualatin had to offer. Already in the minds

of some was the concept of featuring their Ice Age heritage. After all, they did find parts of a mastodon and a Harlan ground sloth right in town and had two parks with Ice Age play areas and information panels referring to their Ice Age history.

One of the last things Mark Buser did as president of our chapter before taking the reins of the national IAFI was to arrange for us to partner with Tualatin and the Tualatin History Society. The Tualatin Heritage Center became our home where we share monthly meetings with the Historical Society. We alternate speakers, but sometimes it is hard to say if it is an Ice Age Floods speaker or an historical speaker because the two areas overlap.



*The Tualatin Heritage Center, a former church, saved by the citizens of Tualatin, moved to its present location and was made home to the Historical Society*

*Inside the Heritage Center there are fossils of mastodon, sloth and other Ice Age fauna*



*Teacher David Ellingson and students from Woodburn High School present the Heritage Center with Ice Age flora and fauna that they excavated at the school's paleontology dig*

One of our first joint efforts was a geology symposium held at the Grange Hall and videotaped for local cable television. It featured speakers from the Tualatin River Keepers, the Ice Age Floods Institute and a geologist from Portland State University and others. When the program was broadcast sometime later a farmer, Doug Ott, saw it and when he heard about erratic boulders in our area, he said: “I’ll bet that is what that big

rock is that my father and I moved out of our field 40 years ago.”

He contacted the Historical Society and arranged for Yvonne Addington, THS President at that time, and myself, whom he had seen on the program, to come out to the Gaston area to identify his rock and a neighbor’s rock also. Sure enough they were ice-rafted boulders. The owners of the land they were on were more than eager to donate them to the Tualatin Historical Society where they are now on display as part of their Ice Age history.



*10 ton granite erratic at the Heritage Center*



*Two and one half ton feldspar boulder at the Heritage Center.*

A 22 mile hiking trail has been in the planning stage for several years, tentatively called the “Tonquin Trail,” because it passes the remnants of the old Tonquin Train station. But it is 100 percent within features left by the Ice Age Floods. We and many others launched a successful multi-town letter writing campaign to change the name to “The Ice Age Tonquin Trail.” The trail winds from Sherwood through Tualatin to Wilsonville and promises in the future to connect with an upcoming Ice Age art walk in downtown Tualatin.

The most recent development in the Tualatin Ice Age story is the opening of a large Cabelas store and the gift to Tualatin of a life-sized bronze sculpture of a baby mastodon. Inside the store

there is an actual Ice Age cave bear skeleton and other fossils in a beautiful and unique display.



*\$250,000 Bronze Mastodon Sculpture*

Each year we have at least one field trip showing some of the little known Floods features as well as some more prominent ones in our area. And we continue to have exciting speakers every month.

--Rick Thompson

### **Lower Grand Coulee Chapter**

Our Chapter partners with several groups to make presentations that tell the story of the Ice Age Floods that sculpted this area in which we are located. Our partners include the “Soap Lake Conservancy,” “Friends of the Lower Grand Coulee,” and the “Coulee Corridor Consortium.” Chapter members have manned or will be manning displays and talking about the Floods and Floods-carved features at events that include the 2015 Othello Sandhill Crane Festival (March 28), the Good Sam Samboree being held at the Grant County Fairgrounds (June 11), and the 2015 Floods Fest to be held at the Dry Falls Visitor Center in June. When set, the date for this annual Floods Fest will be publicized.

Members of the Lower Grand Coulee Chapter meet the second Saturday of each month at 11:00 am in the Soap Lake Senior Center, 121 2nd Avenue SE. A business meeting is conducted, and it is often followed by a program about one or more unique features found in our area along the National Ice Age Floods Geologic Trail. A highlight of each second Saturday is an afternoon outing and hike to an area exploring some of the geologic features left by the many Ice Age Floods. These outings are announced on the “Soap Lake for Locals” website, are well attended by both members and friends, and are free. Since the founding of the Chapter in

2007, there has only been one second Saturday when weather caused the outing to be cancelled.

A major undertaking by our then fledgling Chapter was the hosting of the 2009 IAFI Fall Meeting and tour. With the Soap Lake community's assistance and participation, attendees to this event came from western Montana, Idaho, Washington and Oregon. The exception was Nancy Turner, who was recognized for traveling the greatest distance from her home in Mount Desert, Maine. Nancy drove the round trip in her car.

This 2009 event was on the tenth anniversary of the IAFI's first tour of the area in 1999. During the day on Friday, October 2<sup>nd</sup>, the IAFI Board of Directors met in the Banquet Room at Don's Restaurant. Friday evening, the Annual Membership Meeting was called to order by IAFI President Gary Kleinknecht in the Masquers' Theater. Following the business meeting, Mr. Ron Hall of Spokane presented a program about using Google Earth for planning day trips along the Ice Age Floods Geologic Trail. With everything live on the large screen in the Theater, the program proved to be very effective, and attendees learned about the many features available to users of Google Earth. Following Ron Hall's presentation, a short video entitled, "Desert Garden" was shown that tells about the history and expanse of the Columbia Basin Project. The Project was designed and built to utilize many of the Ice Age Floods geologic features for storing and conveying Columbia River water to almost 700,000 acres of irrigated farm land.

On Saturday, October 3<sup>rd</sup>, IAFI members and friends boarded motor coaches with three tour guides: geologists Brent Cunderla, Gene Kiver and Greg Behrens. Traveling north from Soap Lake through the Lower Grand Coulee, each tour guide spoke to the attendees about the various features seen through the windows. The first stop was at the Lake Lenore Caves parking area where we learned about how the Floods eroded the coulee by cutting deeper into the steeply dipping fractured edges of the monocline and viewed the 1300-foot high Floods-eroded wall on the west side of the coulee.

The second stop was at the Ice Age Floods icon of the Grand Coulee, the Dry Falls and the State Park's Interpretive Center. We learned about

how the waterfall receded upstream during each flood as the basalt layers were eroded, and we viewed the plunge-pool lakes at the bottom of the 400-foot cataract from that viewpoint. After re-boarding the motor coaches, a short stop was made at the US Highway 2 overlook to view Banks Lake and the mouth of the Upper Grand Coulee, the Dry Falls cataract complex, the Scablands and the Hartline Basin.

Traveling north on State Highway 17, then west on State Highway 172, a stop was made to see the unique glacial depositional deposits known as "eskers" and "kames." Also, many "haystack rocks" can be seen across the Waterville Plateau. Continuing north and east to the Crown Point Vista which overlooks the Columbia River, the town of Coulee Dam and the Grand Coulee Dam, attendees viewed glacially striated and polished granite bedrock.

After the lunch stop in the park at North Dam, attendees traveled to Northrup Canyon with views of Steamboat Rock on the way. Walking into a viewpoint, we learned how this semi-hidden canyon was produced by cataract recession during floods occurring when the Okanogan Glacier blocked the Grand Coulee. From the Northrup Canyon turnoff, there is so much to see when traveling south along State Highway 155 from stains left by seasonal waterfalls on steep canyon walls to silt and flood deposits forming some of the shoreline of Banks Lake. We continued south through Coulee City following Pinto Ridge Road through Arbuckle Draw and Trail Lake Coulee to Summer Falls Park at the head end of Billy Clap Lake. Summer Falls occupies a small part of a much larger cataract created by the Missoula floods. From Summer Falls, we traveled through Dry Coulee to the formerly important train town of Adrian, then west and south through deposited boulders and gravels to Rocky Ford Creek and the Ephrata Fan with its mix of rounded granite and angular basalt boulders. Stopping at the flood transported Monster Rock, we learned about this basalt rock, estimated to weigh over 1500 tons, and the Ephrata Fan containing outwash from the Grand Coulee.

Saturday evening, a reception was held at the Soap Lake Art Museum to view paintings created by Mr. John G. Rankin of Ritzville, WA. Among the art

work was the original IAFI Logo on canvas created by John Rankin. This Logo art work is now in the possession of the Lower Grand Coulee Chapter.

The Lower Grand Coulee Chapter looks to educate the public about the gigantic floods that carved the Grand Coulee and the area's unique landscapes, including Steamboat Rock, Dry Falls, the Sun Lakes Chain and the mineral-water Soap Lake, the original plunge pool. The City of Soap Lake is at the crossroads of Washington Highway 28 and Washington Highway 17, the Coulee Corridor National Scenic Byway. This is the place of the healing waters, also known as "Smokiam."



*Looking eastward at the Monster Rock on the Ephrata Fan along Trout Farm Road.  
Photo by Gary Kleinknect*



*Summer Falls in the Trail Lake Coulee  
Photo by John Moody*

--John R. Moody

## **Puget Lobe Chapter**

### ***Chapter meeting, September 8 A Remarkable Geological Biography***

A notably large group of people came to hear John Whitmer, a retired psychiatrist, present an account of some of the major themes in his life-

long fascination with geological exploration and analysis in the West, and especially the Pacific Northwest. He is justifiably well known for his record of productive involvement with the local and regional geological interest groups that have a dynamic mix of expert and lay members.

In the early 1930s, it was the public interest and controversy about Grand Coulee, and especially Dry Falls, that kindled his intense interest in geology. Nevertheless, his career choice was medicine, and he considers it to be a great blessing that he has been able, over the decades, to pursue geology as a serious avocation.

His initial medical training was at the University of Oregon Medical School and he opened his first office as a general practitioner in Grants Pass, where he fell in love with the mountains and began backpacking and mountain climbing in the Siskiyou and on Mount Shasta. His passion was for glaciers, and that particular interest has endured throughout his life.

To improve his professional situation, he made a succession of moves to locations in Wyoming and Colorado, and in that way became acquainted with the Rocky Mountains. But he also came to be concerned that he should be working with the people that he felt most needed professional attention, so he returned to medical school, at the University of Colorado, to qualify for specialization in psychiatry. With that accomplished, he took a position at the VA Hospital at American Lake, WA, in 1964, from which he retired in 1984.

And he was able to move back close to the Cascades. His relocations had taken him to both the cold-climate (Arctic) glaciers of the Rocky Mountains and the temperate glaciers of Washington and the Cascades. That experience was the basis for the title he gave the engagingly biographical presentation reported here: "Cold Glaciers vs. Temperate Glaciers: A Striking Contrast." The contrast was in the differences between the glaciers, and their geologic effects, that he encountered in the Rockies, compared to the Cascades.

Although the Wyoming mountains had ice caps during the Pleistocene, their modern glaciers do not descend below 7,200 feet elevation. In the Rockies, the ice of the cold glaciers is dense and

lacks plasticity. It is locked to its bed by freezing and grows by becoming thicker---it does not spread. Glacial surface streams invariably end by falling into crevasses or into holes in the ice known as glacial "mills" or moulins.

The Cascade glaciers, especially in Washington, are much steeper, have more abundant snow cover, and descend as low as 3,400 feet. Ice prevails above 5,000 feet, and melt streams emerge from tunnels in the glaciers.

While in Wyoming, John lived for several years at an elevation of 7,200 feet, and he has observed that nobody in Washington lives at such an elevation because glaciers prevent it. With that in mind, he likes to say it must mean that Montana, Wyoming and Colorado have a much milder climate than we have in Washington.

John is currently active as a popular teacher in the Telos extension program at Bellevue Community College, and as the leader of notable marine field trips in the San Juan Islands. He recently led a pre-conference field trip with the regional Tobacco Root Geological Society.

### ***Field trip, September 20***

*Glacial Outburst Floods in Pierce County:  
Departure from Tukwila, south of Seattle*

This trip featuring Pleistocene Jökulhlaups was led by Kathy Troost, a Licensed Geologist and PhD with 35 years of experience who has published many geological maps and papers about Quaternary geology and deposits. She teaches in the UW Department of Earth and Space Sciences.

For decades, geologists thought that normal surface flooding caused the surface channels and cobble deposits in the region south and southeast of Tacoma. However, work by Dr. Troost and others has shown that the channeled landscape and extensive gravel/cobble deposits are the result of repeated jökulhlaups from Glacial Lake Puyallup, during the retreat of the Vashon Ice Sheet about 13,500 years ago. The affected landscape shows evidence of large outburst floods, such as kettle lakes from the grounding of large ice blocks, large-scale bed forms, waning-flow deposits with bogs, and thick deltas at the Puget Sound coastline.

A highlight of the trip was a specially arranged visit to the huge DuPont sand and gravel pit, operated by the CalPortland Co. The exposed walls of the pit display foreset bedding on a startling scale. These deposits are a very important economic resource, in that they provide much of the region's supply of the particular varieties of sand and gravel needed for many categories of construction and maintenance.

### ***Chapter meeting, November 3***

*The Hazel/Oso Landslide: Geologic Background,  
Other Landslides, and Landslide Policy  
Implications*

Dan McShane spoke about the disastrous March 22 landslide at Oso, which was not the first time that the slope above the North Fork of the Stillaguamish River had slid. This site had a long history of activity and was well known by geologists that conduct landslide work.

Dan has been engaged in geohazard assessments over the past 20 years and served as a county commissioner early in his career. His current position is as an engineering geologist with Stratum Group, a geology and environmental consulting firm based in Bellingham. Within hours of the slide, he began posting information about it on his blog, *Reading the Washington Landscape*, on which he deals with a wide variety of topics (<http://washingtonlandscape.blogspot.com>).

In his meeting presentation, he described the Ice Age and post Ice Age processes in the river valley that ultimately led to the catastrophic landslide, which caused 43 fatalities, ranking it second only to a 1985 event in Mameyes, Puerto Rico, as the worst landslide disaster in U.S. history

There are some unique geologic aspects of the Oso landslide that will likely offer valuable lessons regarding landslide risks and affect the ongoing development of related public policy. He put this disaster in perspective with other landslide hazards in Washington State, and presented an overview of the difficult policy questions and approaches that arise in dealing with them.

A USGS technical analysis of the landslide has recently been published. To see the news release,

go to: <http://www.usgs.gov/newsroom/article.asp?ID=4097>. To see the full report, go to: <http://www.sciencedirect.com/science/article/pii/S0012821X1400781X>

### ***Chapter meeting, January 5***

#### *The Earthquake that Wouldn't Stay Put*

Sandi Doughton was originally scheduled to be the speaker. She is an award-winning science writer for The Seattle Times and has been covering Northwest earthquakes for nearly 20 years, first at The News Tribune of Tacoma and for the past decade at The Seattle Times. She was able to enlist two geologists to join her in presenting the program, Brian Sherrod (with USGS) and Jim Miller (with GeoEngineers). They were directly involved in the recent revelation of the probable epicenter of the Great Earthquake of 1872. This program drew well over 100 people, and was the biggest audience in the chapter's history.

For an introduction to the project, see Ms. Doughton's Seattle Times news story at <http://www.seattletimes.com/seattle-news/scientists-may-be-cracking-mystery-of-big-1872-earthquake>.

To begin the program, Sandi gave a historical review of the interest in what was one of the biggest seismological mysteries in the Pacific Northwest: What was the origin of a powerful quake that rattled seven states and provinces in 1872? Over the years, a succession of candidate locations of the epicenter were proposed, studied, and rejected. But the effort continued because of the interest in anticipating a recurrence. The 1872 quake had knocked people off their feet at Snoqualmie Pass, cracked the lighthouse at Dungeness Spit, and triggered a landslide that temporarily blocked the Columbia River.

Its epicenter was still the subject of heated debate a century later, when several nuclear power plants were being planned. Now, thanks to lidar imagery and careful field excavations, Sherrod and Miller were able to report that they think that their crews have finally discovered the fault responsible, near Entiat, and have tentatively named it the Spencer Canyon Fault. It is already known that this vicinity in central Washington area is very active seismically, with many small quakes frequently

showing in local seismometer recordings.

-- Dale Middleton

## **Wenatchee Valley Erratics Chapter**

### ***Recording Our Legacy***

On January 13, 2015, the Ice Age Floods Institute (IAFI)-Wenatchee Valley Erratics (WVEs) Chapter (Wenatchee, Washington) had the opportunity to be part of the Initiative for Rural Innovation & Stewardship (IRIS) program called "Gathering Our Voice." If you have ever listened to Northwest Public Radio (NPR) the IRIS program is very similar to NPR's "Story-Core." The main focus of IRIS in north-central Washington is:

"To foster sustainable rural communities in North Central Washington by gathering and sharing success stories that enhance a sense of belonging, inspire action, and build community. We believe that thriving communities in a healthy environment create success."

Nancy Warner, who previously worked for The Nature Conservancy, is the local program coordinator for IRIS in north-central Washington with their office located here in Wenatchee, Washington. This was an opportunity for Nancy to interview several long-term members of the IAFI-Wenatchee Valley Erratics to learn more about our history and accomplishments since we became the first chapter of the IAFI. We became incorporated, as near as our records indicate, sometime in 2002.

The interview by Nancy lasted about an hour and was audio-taped. The individuals that have been long standing members present at the interview included: Dr. Ralph Dawes, Dan Smith, Ken and Susan Lacy, Karen Atkerson, Susan Freiberg, Marv McCamey, Ben Couch, and I. Charlie Mason, the person most responsible for the Erratic's Chapter incorporation, died in 2014 as have other long term members recently. This was a good reason to document the oral history of the Erratics before any more of our history is lost!

Nancy asked individuals of the WVE group for responses to the following five questions:

1) How did you first get involved with the Erratics?

- 2) What is the one thing most proud that you think was accomplished by the Erratics?
- 3) What obstacles are faced by the Erratics?
- 4) How was the group was named?
- 5) What is your hope for the future (Erratics/ IAFI)?

Although there is a varied background in geology with the individuals interviewed, the main theme was that people were intrigued by the Ice Age Floods story. Both the enormity and regional vastness of the Ice Age Floods pathways, as well as the human aspect of the unraveling of the Ice Age Floods story is what captivated the WVE members.

Several items that the WVEs said they were proud of during the group interview were our continued high membership numbers, interesting and very well coordinated field trips, and helping to pass the legislation for the Ice Age Floods National Geologic Trail. The members enjoy the Chapter's varied and interesting speakers, where often over a hundred people attend the bi-monthly WVE programs held at the Wenatchee Valley Museum and Cultural Center.

As with other groups/organizations one item the WVE members indicated was an obstacle is that it was difficult to get people to run for board positions. Another obstacle was the long amount of time taken to pass the Ice Age Floods National

Geologic Trail legislation. And although it did in 2009, now there is a long wait for funding and planning by the NPS to have it come to fruition. Also the WVEs find it hard to get young people involved.

The credit for naming the group "Wenatchee Valley Erratics" and the name of our newsletter "The Erratic Behavior" is given to our long time member Marv McCamey. Marv indicated during the interview that he submitted the name as kind of a "smartass" comment and the name stuck! The newsletter name was also provided by Marv during a "name the newsletter" contest and liked most by our members. Thanks Marv! I think our name, which stands for those ice rafted foreign rocks that melted out of icebergs and left high and dry around the Wenatchee Valley, is unique to the IAFI, as most other chapters are named after a location where the chapter resides.

What is the Erratics' hope for the future as related to the Ice Age Floods story? We indicated that if the Ice Age Floods National Geologic Trail becomes a reality, we hope that the National Geographic article on the Ice Age Floods comes out to help educate a wider audience. But most importantly the WVE group would like to see the Trail be finalized as a unit in the National Park Service so that the IAFI can work cooperatively with the NPS to provide maps, websites, educational information, and IAF interpretation sites to be enjoyed by future generations of IAF enthusiasts.

--Brent Cunderla

## ANSWER TO IAFI PUZZLER



This is the Eddy narrows along the Clark Fork River between Thompson Falls and Plains in Montana. It is the site where Joseph Pardee and Walter Langbein in the late 1930s made the first estimate of the discharge of water from glacial Lake Missoula. The Eddy Narrows was an excellent site to make this measurement because it was nearly straight for 10 miles and nearly uniform in width. Their estimate was a rough first approximation which has been refined by later researchers.

*\*This information from "Glacial Lake Missoula and Its Humongous Floods" by David Alt.*

# A MESSAGE FROM THE NATIONAL PARK SERVICE

As I wrote to you last time, there are some exciting things happening for the Ice Age Floods National Geologic Trail.

Lake Roosevelt National Recreation Area (LARO) has funded the development of an Interpretation Plan for the Trail. Contracting for the Plan was completed in the fall of 2014. During the week of January 26, 2015, Denise Bausch, LARO Chief of Interpretation, facilitated a trip across the trail to orient the contractor to the sites and introduce them to people involved with this fabulous resource. Some of you were able to meet with Denise and her entourage and provided them with great information. Thank you.

Next up on the Interpretive Plan were the workshops to formulate a draft. These were on the calendar for mid-March and were held in Spokane and Portland. The Plan will provide a vision for the future of interpretation, education, and visitor experience opportunities. The workshops will help identify and analyze interpretation, education, and visitor experience goals and issues, and define guidelines for partners in the most effective, efficient, and practical ways to address those goals and issues. Workshops will also address non-personal services (interpretive media and facilities) and personal services (programs, personal contacts), and help partners match interpretive media to messages to make sure they work well individually and collectively. Multiple partners,

agencies, and Tribes have been invited to participate. In addition, an education workshop will be held in June to develop the education component of the Plan.

In January, Colin Bloom, a Geologist-in-the-Park with the Geological Society of America entered on duty. He will be drafting a Transportation Plan that will include trail maps delineating the 1,300 mile main trail and also suggestions for step down maps of the multiple loop/spur trails. This will aid in developing new and integrating existing interpretive and educational opportunities for the Trail. This plan would be utilized by the partners in guiding the development of interpretive opportunities for the public visiting the only national geologic trail in the country.

Last, through our interagency partnerships, we have been able to obtain the services of a professional geologist and artist to help in the creation of an Ice Age Floods National Geologic Trail logo. The “geo-artist” works for the Bureau of Land Management and has developed logos on a professional basis. With her help, we hope to have an acceptable logo this summer to present to the partners.

Thank you for your continued work on this effort. Until next time.

-- Dan Foster, Superintendent  
Ice Age Floods National Geologic Trail

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## 20-YEAR MEMBERS

One important thing that sustains our organization is the long-term commitment many of you have made to the Ice Age Floods Institute. Many of you have been members for 5 years, 10 years, 15 years, and in the case of a small number of members, 20 years (since the Institute was founded in 1995). We salute these people and their dedication to the Institute.

Our records show the following people are both founding and current members. If you are in this category and are not listed, please let us know because we don't want to miss anyone.

Susan Freiberg (Wenatchee Erratics)  
Dean Ladd (Cheney - Spokane)  
Dale Middleton (Puget Lobe)  
Jim & Eula Pritchard (Lower Grand Coulee)

Jim Shelden (Glacial Lake Missoula)  
Norm Smyers (Glacial Lake Missoula)  
Joan Stern (At Large Member)  
Bill Youngs (Cheney-Spokane)

# IN REMEMBRANCE

## BOB ROBINSON



The Ice Age Floods Institute is sad to announce that (Bob) Scott Robinson, board secretary from 2011-14, passed away. Bob joined the Institute in 2005 and was affiliated with the Wenatchee Erractics Chapter.

The Ice Age Floods Institute has set up a memorial in his name and contributions may be sent to

Bob Robinson Memorial Fund  
Ice Age Floods Institute  
8220 Gage Blvd #186  
Kennewick, WA 99336

Bob is survived by his wife, Florence, of Monitor, WA, his sons: Andy (Mary) of Cashmere, Bob (Teresa) of Federal Way, and Gene (Andrea) of Monitor as well as

three grandchildren: Nathan, Matthew, and Anna. He was born in Chicago in 1940. He married Florence, his high school sweetheart, in 1958. Shortly thereafter, he joined the US Army and served in the Weather Bureau. Bob retired in 1997 after 34 years in the National Weather Service, during which time he and his family traveled across the country multiple times, finding a permanent residence in the Wenatchee Valley. He contributed to pioneering research for the field of Fruit Frost and Fire Weather forecasting.

Following retirement, Bob co-founded Clearwest, Inc. with two friends to provide specialized forecasts for local orchardists. In addition to previous graduate work, he completed a Masters of Science in Geo-Sciences in 2006. He dedicated himself to promoting public education, including volunteering at Bryce Canyon Interpretive Center and the Ice Age Floods Institute. A Celebration of Bob's Life is scheduled for Saturday, October 3, 2015 in Monitor, Washington.

--Melanie Bell

## FLOODS TALK BY CONSUELO LARRABEE

*Please refer to Links under Resources on our web page at [www.IAFI.org](http://www.IAFI.org) for more information and photos.*

*The geologic vocabulary used to explain the Ice Age Floods may be unfamiliar. Here are some simplified definitions of commonly used terms. We hope these will increase the understanding for newcomers to the Floods story. Other definitions will follow in later newsletters.*

**BASALT** – a dark, fine-grained igneous rock. 17 -6 million years ago, lava (molten rock on the earth's surface) flowed from long vents for great distances. These Columbia River Basalts covered much of southeastern Washington, eastern Oregon and central Idaho. They frequently formed columns as they cooled.

**CORDILLERIAN ICE SHEET** – name of the ice sheet originating in British Columbia and western Alberta. It covered most of British Columbia and Alberta and extended into northern Washington, Idaho and northwestern Montana. It advanced, receded and even disappeared many times over 2.5 million years. It was thousands of feet thick.

**ICE DAMMED LAKE** – a lake formed when advancing glaciers block drainages. The Clark Fork River could not get past the Purcell Lobe ice dam at the Idaho-Montana border at present day Lake Pend Oreille. This and other impounded waters formed glacial Lake Missoula which was 2000 feet at its deepest. Near present day Grand Coulee Dam, the Columbia River was blocked by the Okanogan Lobe of the ice sheet. The waters backed up to create another huge lake, glacial Lake Columbia.

**JÖKULHLAUPS** – say what? An Icelandic word (try 'YO-kul-yawps') for an outburst flood. When an ice dam like the one on the Idaho-Montana border fails, it does so immediately. Water, dirt and rocks burst out from the bottom of the glacier, like an explosion.

# IAFI FALL FIELD TRIP

HOSTED BY THE WENATCHEE VALLEY ERRATICS CHAPTER

Welcome to Wenatchee, the geographic center of the state, and one of the most geologically significant places in the world. The Wenatchee Valley Erratics (the geologic term, not a state of mind!) will again be hosting the IAFI Annual Fall Meeting on September 18-19, 2015. We wrote the book on how to successfully host these fun meetings so plan now to visit us. Forty rooms are being held at the Comfort Suites Choice Hotel in North Wenatchee, 195 E. Penny Rd., (509) 662-1818, under the promo code IAFI. A king or double-queen suite can be yours for \$118 (plus tax). This is a little higher than normal for these meetings (the rooms at this hotel generally go for \$160-\$180), but it includes a full breakfast with made-to order egg-scramble breakfast (similar to a personal omelet). Management has promised us that if you get there early enough for breakfast on Saturday, they will have enough staff there so that you can have a great breakfast and be out in plenty of time to walk to the field-trip bus site. The room rate also includes fresh-baked cookies from 3-8 p.m., a manager's reception of hot soup and chili from 5-7 (if you don't want to journey to one of our great restaurants), free WiFi, complimentary wine tasting cards to award-winning Chateau Faire La Pont Winery (just down the street - it's also a great restaurant), a gift shop including beer and wine, and free parking so you can leave your car there Saturday and walk the 1 block to the boarding area for the field trip. This motel has been in the top 10% of Choice Comfort Suites for the whole country every year since it started 4 years ago, and its the #1 motel in the Greater Wenatchee area per Trip Adviser. Six rooms have already been booked, so don't delay to get this great price.

Friday evening will be the IAFI Annual meeting at 7 p.m., probably at the Wenatchee Valley Museum and Cultural Center. There you will hear of the latest happenings with the IAFI, vote for board members, and have a quick preview via PowerPoint of the field trip the next day being led by Brent Cunderla and Jon Riedel.

Saturday we will be leaving by 8 a.m. from the Penny Road Park & Ride (just down the street from the motel). From there, we'll journey to Lake Chelan, taking in glacial moraines, Chelan silt beds, ice sheet sediments along the Chelan River, and a discussion of the human side of the glacial geology of the Lake Chelan area. Lunch will be a wonderful buffet at the Wapato Point Cellars (lunch is included in the price of the field trip tickets, still to be determined, but wine will be no-host). Then we will travel up Union Valley to view lateral moraines, an outcrop of glacially polished bedrock, an overview to look at kame terraces, then up the meltwater channel to see several kettles, and finally south to discuss glacial deposition and Ice Age flooding down the Columbia Valley, and back to Wenatchee. Whew! If that doesn't peak your interest, I'm not sure what will.

Registration forms and waivers for this trip will be available in early summer. As always, membership in the IAFI will be given first RSVP priority so watch the site. There will only be 2 large buses so you'll want to RSVP as soon as the forms are on the website. IAFI members will be notified when the forms are available.

So plan ahead for a Fall get-away. Maybe stay a few extra days to experience Pybus Market (a smaller version of Seattle's Public Market), many wineries and breweries, great restaurants with cuisine from Thai to Indian to Japanese to gourmet American, the Wenatchee Museum, and beautiful downtown Wenatchee. And Historic Cashmere and Leavenworth are just up the road. Book your room soon!

So "See you in September" (Wait, wasn't that a song title, or am I showing my age?)

--Susan Lacy

# THANK YOU TO IAFI MEMBER SUPPORTERS

Every member at every membership level is vital to IAFI's continued success. Your support helps us meet our mission of providing the Ice Age Floods story to the public and continuing our work on the Ice Age Floods National Geologic Trail. Every gift—no matter the size—counts. Thank you for making the IAFI what it is today and for helping shape it for the future.

We would like to acknowledge the following people and companies that joined or renewed their membership at the Benefactor or Sustainer levels. (July 2014 – February 2015). We also want to thank the people who made notable donations beyond their membership renewal during this same period.

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 Cheri Overman  
 Linda Schactler (non-member)  
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