

Annotated Bibliography

Primary Sources

Books:

Bretz, J. Harlen. Glaciation of the Puget Sound Region. Olympia: Washington Geological Survey, 1913.

This book, written by Bretz himself, gives an excellent overview of what his interests were before he became interested in the scablands. Another way that this source helped me to understand Bretz was how brilliant a geologist he was, even before he had gone to the University of Chicago to become a geologist – he was writing professional-quality papers as an amateur. I mainly used this as a primary source of Bretz's early teaching days, when he was a biology teacher.

Bretz, J Harlen. The Grand Coulee. New York: American Geographical Society, 1932.

Another book written by Bretz, this book did not contribute as much as some of my other primary sources, simply because it focused only on one feature of the scabland. However, it did help me in showing how Bretz wrote after he had stated his initial scablands theory, and was writing more papers as justification for his theory. It helped me to understand Bretz's stubbornness as a person, and how he did not give up despite the derision that the geological community showed him.

Bretz, J. Harlen. Washington's Channeled Scabland. Olympia: State Printing Plant, 1959.

Yet another source written by Bretz, this was perhaps the most important primary source book that I read. This was because it outlined Bretz's entire theory, plus it was written by Bretz himself, thus giving a first-hand account of all that his thesis encompassed. While my secondary sources gave abridged or restated his theory, this book was all of Bretz's

ideas and evidence compressed into one source. As such, it was extremely helpful in writing my documentary's script, allowing me to get the most accurate information possible without cutting any corners. This source also helped me to understand Bretz's individuality; it does not read like a normal scientific paper—it reads more like a story or narrative. As this sort of writing stood out in the scientific community of the day, it definitely showed Bretz's individuality.

Interviews:

Lowenstam, Heinz A. "Heinz A. Lowenstam." Interview with Heidi Aspaturian.

This interview with a former geology professor at the University of Chicago had a very small section about Bretz, but it gave me a huge insight into his character. The interviewee had been a former student of Bretz, and he used words like “fantastic” and “magnificent” to describe Bretz's character. This helped me to understand how much Bretz was respected by his students. This source was primary because the person interviewed was an actual student of Bretz, and he had a first-hand account of the type of person that Bretz was.

Letters:

Bretz, J Harlen. "(Untitled)." Letter to Stephen J. Gould. 14 Oct. 1978. The Panda's Thumb. New York: W.W. Norton & Co., 1980. 203.

As this letter was written from Bretz to the scientific author Stephen J. Gould, it is definitely a primary source. I used it mainly as a source to show how Bretz's work went beyond the Scablands (this is the topic of the letter) and helped me to understand the legacy that Bretz left.

Magazine Articles:

Bretz, J Harlen. "Glacial Lakes of Puget Sound: A Preliminary Paper." Journal of Geology July 1910: 448-58.

This scientific article by Bretz was another source that discussed something other than the scablands, and it did help me to comprehend his range of geological knowledge before he was even in the field as a professional. As a source written by Bretz himself, I also used this article to show how Bretz was beginning to stray further and further from his previous field of biology, and into the subject that he truly loved.

Bretz, J Harlen. "Modern Conceptions of Earth History." The Scientific Monthly Mar. 1924: 239-56.

An article written by Bretz originally for the University of Chicago's school newspaper, this article was later published in the predecessor to Science. It helped me to understand Bretz's geologic perspectives while he was developing his Scablands theory further. However, this article does not explain the Scablands, so it did not contribute to my understanding of Bretz's theory. But it did show me the range of actions that Bretz was taking in the field of geology, *besides* the Scablands. And this, in itself, was truly staggering.

Newspaper Articles:

"Ancient Waterfall Once Dwarfed Niagara." New Castle News 12 Nov. 1925. Access Newspaper Archive. King County Library System. 16 Apr. 2009

<<http://access.newspaperarchive.com/Viewer.aspx?img=57429947&firstvisit=true&src=search¤tResult=4>>.

This article was an excellent source for the point of view of Bretz's theory when it was first released to the public. Its response is generally positive, while Bretz's colleagues

were more negative. This article helped me to see outside of the geologic community's perspective of Bretz's theory and I was able to see how the general public thought.

Written almost exactly when Bretz released his theory, this is a primary source.

Barrett, Eldon. "Earth's Biggest Documented Deluge: 'Great Spokane Flood'" The Herald [Provo] 12 Sept. 1974: 42. Access Newspaper Archive. King County Library System. 10 Mar. 2009. Keyword: J Harlen Bretz.

One of the many newspaper articles that documented Bretz's achievements, this particular article told of the flood *after* his theory had been proven correct. This article helped me in my documentary by showing how the publicity for Bretz's success was actually quite widespread—it was printed in newspapers all over the country. Because it directly cites quotes from Bretz and had a first hand account of his success, this article is primary.

"Basalt Channels Report Revisited." Tri-City Herald 30 Apr. 1959: 26.

This newspaper article was particularly interesting, simply because it was from the Tri-Cities in Washington. This article was useful to me because it gave an account from a city that is actually located in the Scablands. And because it was a first-hand account of the Scablands debate, it is primary.

Garvin, A.E. "Recent Flood (Only 123,000 Years Ago) Destroyed Falls Greater Than Niagara." The Daily Independent [Murphysboro] 6 Nov. 1924: 2. Access Newspaper Archive. King County Library System. 10 Mar. 2009. Keyword: J Harlen Bretz.

As I searched through library databases on the internet, this particular article showed up several times. It was an extremely in-depth account of the Bretz story, focusing more on the flood itself than Bretz. This was a good balance for some of the other articles that I

cited—they provided a look at Bretz’s accomplishments, while this one focused on his theory. This newspaper article came out as Bretz was formulating his theory and goes hand-in-hand with Bretz’s thesis, so it can be classified as primary.

"Johnstown Flood Tiny to Grand Coulee." Cumberland Times 29 Jan. 1933. Access Newspaper Archive. King County Library System. 16 Apr. 2009

<<http://access.newspaperarchive.com/Viewer.aspx?img=102587286&firstvisit=true&src=search¤tResult=5>>.

This source from a Tennessee town discussed the Missoula Floods in perspective to a recent flood that had occurred in the area. This was an interesting view to take on the geological event, so the article helped me to view the floods in a different perspective—in comparison to a massive flood that had occurred in that area. It gave me an even better idea of how huge these floods were, making our modern “catastrophic floods” appear to be little trickles of water! Because it was written during the years of the debate over Bretz’s theory, it is a primary source.

"Prof. Bretz Rites Pending; noted geologist at U. of C." Chicago Tribune 6 Feb. 1981: 17.

One of my most valuable newspaper sources, this was Bretz’s obituary for when he passed away at 99 years of age. This article also discussed Bretz’s winning the Penrose Medal of Geology, which none of my other sources discussed (because they were too early). I found this invaluable for my documentary, and this was the only newspaper article that I actually included inside of my documentary when I was discussing Bretz’s last triumphs before his death. Because this was an obituary written at the time of Bretz’s death, it can be considered primary.

Sullivan, Walter. "Satellite Film Backs View on Early Flood." The New York Times 17 Sept.

1974: 77-77.

This primary source for the New York Times was a first-hand account of how Bretz's theory was ultimately proven correct by a satellite, which the USGS sent into the atmosphere to view the scablands from aerial views. Although Bretz's theory did not have a general "turning point" where it was suddenly being supported, this article really did show the gravity of how amazing it was that his thesis had been proven. This source also helped me understand how, after a few decades of fighting upstream, Bretz finally achieved one of the greatest victories any geologist can gain.

"We Hear of a New Wonder." Jefferson City Post-Tribune 4 Sept. 1932, 14-A sec.: 14.

One of the more interesting sources that I stumbled upon, this particular article discussed Bretz's theory from a philosophical perspective. I had never seen this approach taken, so I was able to use this article to see a different viewpoint about Bretz's flood other than the traditional scientific one. This article was one of my primary sources written during the actual Scablands debate, and it documented it quite well.

Photographs:

Anonymous. AAQ-3F-50,51. United States Department of Agriculture, Washington, D.C.

Washington's Channeled Scabland. Olympia: State Printing Plant, 1959.

A picture of a scabland tract, this photo was helpful when I discussed the features that the flood created. This was a perfect example of how it cut into the earth and made terrific gouges in the basalt. The image is primary because, again, Bretz used it in one of his publications when he discussed the impact of the water on the landscape.

Anonymous. Albion Class Photo. 1906. Bretz Family Photographs, Chicago.

This photograph helped me to visualize Bretz in his early days at Albion College. I also used it to show how Bretz even looked like an individual in his college days—he appears to be the most academic-looking in his class. This photo is a primary source because it was taken of Bretz when he was in college.

Anonymous. Lake Lenore, Lower Grand Coulee. United States Bureau of Reclamation, Washington, D.C. Washington's Channeled Scabland. Olympia: State Printing Plant, 1959.

A primary source photo that Bretz used in one of his publications to show how the flood swept through the Scablands and carved out bizarre features that are like no other place on earth. More of a scenery photo, I used this image when I was discussing the impact of the flood on Eastern Washington's geology, as the landscape was very dramatically cut by the fast-moving water.

J Harlen Bretz - 94 Years Old. 1976. Bretz Personal Collection, Private Photograph, Chicago. Cataclysms of the Columbia. 8th ed. Portland: Timber P, 2005.

A primary source photo of Bretz in his mid-90s, I used this picture when I discussed the telegram that he received after a group went to the Scablands to check his theory. This picture also showed me that Bretz was an intellectual right up until his death—he loved reading well after he could not move anymore.

Anonymous. Commercial Building, Albion College. Albion College, Albion. Historical Albion Michigan. 2009. Albion History/Genealogy Resources. 8 Mar. 2009

<http://www.albionmich.com/history/histor_notebook/images/Comercialbldalcollege.jpg>.

One of two Albion college photos that I used, this photo really conveys the sense of rural living that Bretz experienced up until he moved to Seattle. The mood of the photograph is peaceful and helped me understand how “far away from it all” Bretz was growing up and attending college. This photograph is primary because it was taken while Bretz was attending Albion College in 1906, and it reflects the rustic charm of the campus extremely well.

Anonymous. Cosmos Club (corner house) on Lafayette Square, looking toward the Washington monument. Cosmos Club Collection, Washington, D.C. Presidents in the Cosmos.

Cosmos Club. 8 Mar. 2009 <<http://www.hillyer.org/historyexhibit/fullwebsite.html>>.

A photograph of the infamous Cosmos Club where Bretz’s colleagues berated him, I used this photograph to visualize the setting of one of the events that influenced Bretz’s career the most. This photograph is also a primary source because it was taken in the early 1900s, right as the building was first constructed.

Anonymous. Franklin High School. 1912. Seattle. Franklin High School. PSTOS. 8 Mar. 2009 <http://www.pstos.org/instruments/wa/seattle/franklin_exterior_1912-1.jpg>.

Another excellent primary source photo, this picture of Franklin High School was taken during the years that Bretz was teaching biology there. I used this photo to show how Bretz even had an influence on Seattle, with his (short) biology teaching there.

Anonymous. Grand Coulee Exploratory Group. 1925. Frank W. Guilbert Library of Congress Collection, University of Washington, Seattle.

One of the most famous photographs taken of Bretz, this photograph is definitely primary because Bretz is in the frame—to the far left with the pipe, shorts, and the fedora. This image was extremely helpful in conveying Bretz’s love of “field trips” and outdoor

teaching, which allowed his students to learn the science on their own, in the field, just like real geologists.

Anonymous. Mansfield, G.R. 699 mgr00699. 18 Feb. 1924. USGS Photo Archives, USGS Photo Archives, Washington, D.C. USGS Photo Archives. US Department of the Interior. 9 Feb. 2009 <http://libraryphoto.cr.usgs.gov/cgi-bin/show_picture.cgi?ID=ID.%20Mansfield,%20G.R.%20699&SIZE=large>.

A primary source photo of J.T. Pardee, the man who suggested the theory of Glacial Lake Missoula. This photograph was especially helpful in showing the audience what Pardee looked like, and it helped my understanding of the topic when I was able to give faces to certain characters in Bretz's exploits.

Anonymous. Robinson Hall, Albion Methodist College. 1896. Albion College Postcards, Albion College, Albion. Albion College Postcards. Albion College Postcards. 8 Mar. 2009 <<http://www.albionpostcards.com/page92/files/robhall18a.jpg>>.

Although this photo was taken when Bretz was only a teenager, it is still a primary source photograph, because it is a direct picture of what Albion would have looked like during Bretz's days. Like the first photo of Albion, I used this to show how the campus of the college was extremely rural and peaceful—an ideal setting for a budding scientific mind like Bretz's.

Anonymous. Undated photo of Bretz smiling broadly by a Bretzville, Indiana, sign. Wendy Bretz Suit Personal Collection, Private Photograph, Chicago. Bretz's Flood : The Remarkable Story of a Rebel Geologist and the World's Greatest Flood. Seattle: Sasquatch Books, 2008.

A primary source photograph of Bretz in his granddaughter's collection, this photograph

was an excellent insight into Bretz's character when he wasn't being a geologist. It reveals a nature-loving family man with a bright countenance. I used this photo to express Bretz's temporary happiness when he discovered that the Cosmos Club of D.C. had invited him to their meeting to present his theory.

Bretz. Special Collections Research Center, University of Chicago Library, Chicago. Bretz's Flood : The Remarkable Story of a Rebel Geologist and the World's Greatest Flood. Seattle: Sasquatch Books, 2008.

Perhaps one of the most famous photos of Bretz, this picture shows a stony-faced academic countenance working hard at the University of Chicago—this was Bretz's business side. I used this photo to show how the nature-loving Bretz was also an extremely hard worker—he took his job very seriously. It helped me to understand that Bretz's academic side was not a jesting one, and how he was extremely serious about the work that he did in the scablands. Because this photo is of Bretz himself, it is primary.

Dr. Goldsmith, Julian. J Harlen Bretz. 1949. Illinois Geological Survey, Chicago.

The most famous photo of Bretz, this picture was invaluable for providing an “overview” of Bretz at the beginning and end of my documentary. I used this photograph to show the audience what he looked like before diving into my documentary, and then presenting it again at the end to bring my thesis full-circle. This photograph is taken of Bretz in his later years, so it is definitely primary.

Libby and Son. Blue Lake, Lower Grand Coulee, looking northeast. The Grand Coulee. New York: American Geographical Society, 1932.

A primary source photograph that Bretz utilized in one of *his* books to show a particular Scablands tract, this picture helped me, as well in visualizing the sorts of channels that

the Missoula Flood carved out during the ice age.

MacGregor, Susan. Vintage Postcard Harper Memorial Library. Whimsy Treasures Collection, Palmdale.

This reprint of a 1920s era Chicago University postcard helped me in the section about Bretz's early days. It displays a particular antiquity that I felt fit the theme for my description of Bretz in geology graduate school, and it also helps the audience see what the campus of the University was like when Bretz attended there. Because it was created during Bretz's days of teaching at the University of Chicago.

Mt. Rainier and Lake Washington. 1900. Lochkelden Mansion Collection, Museum of History and Industry (MOHAI), Seattle. Lochkelden Mansion Photographs. 2007. Historic Photos. 8 Mar. 2009 <<http://www.lochkelden.org/v02-840w.jpg>>.

This primary source photo from MOHAI was exactly the picture that I needed when I stated that Bretz became obsessed with the Puget Sound's geology, simply because it was right around the time that Bretz was teaching in Seattle, and it helped me to convey the theme of antiquity better than a modern photo of the Puget Sound would.

Sir Charles Lyell 1797 - 1875. Oxford University, London. Sir Charles Lyell 1797 - 1875.

Carthage University. 8 Mar. 2009

<http://www.cartage.org.lb/en/themes/Sciences/Lifescience/PhysicalAnthropology/HumanOrganicEvolution/ImportantPeople/SirCharlesLyell/lyell_charles.jpg>.

A primary source painting of Charles Lyell himself, creator of gradualism, this photo helped me to put a face with the creator of the principles that influenced geologists' thinking until Bretz introduced new ways of thinking about geologic processes.

Telegram September 1 1931. 1 Sept. 1931. Austin. Galea Salutis. 16 July 2008. 11 Mar. 2009

<<http://galeasalutis.net/wp-content/uploads/2008/07/sterling-cotton-2.jpg>>.

Although irrelevant to Bretz and his theory, this telegram heading *was* from the same era that Bretz lived in. I used this picture to give the viewers an idea of what Bretz was viewing, because the original telegram that he read was not accessible to me.

Undated Photo of Bretz as a young man. Bretz discovered a love of nature and hiking early in his

life. Undated. Private Collection of Wendy Bretz Suit, Private Photograph, Chicago.

Bretz's Flood : The Remarkable Story of a Rebel Geologist and the World's Greatest Flood. Seattle: Sasquatch Books, 2008.

This primary source photograph of Bretz as a young man helped me to display to the audience that Bretz was a lover of nature from an early age. I used it in order to set the mood for Bretz's childhood to show how he was an individual from an early age—while most children were playing, Bretz loved science and spent his time observing his environment.

United States Geological Survey. Blue Lake, Lower Grand Coulee. Grand Coulee Series, United States Geological Survey, Washington, D.C. The Grand Coulee. New York: American Geographical Society, 1932.

A primary source photograph from the USGS when Bretz was still trying to appeal with his theory, I used this to show how the USGS began to consider his theory more and more as the years went by, when they began to investigate the area where “Bretz's Flood” had supposedly occurred.

Von Kaulbach, William. Noah's Flood. 1908. Illustrations from Genesis. Biblical Illustrations. 8 Mar. 2009 <<http://www.wcg.org/images/b1/default.htm>>.

This sketch of Noah's Flood was drawn right around the time when the principle of

gradualism was at its peak. I used this image to show an early 1900's style of art while still displaying a picture of Noah's Flood. This image was instrumental in the explanation of the theory of gradualism, because every geologist at this point believed that geologic processes occurred slowly—not in catastrophes like Noah's flood, which, to them, Bretz was essentially suggesting.

Radio:

Bretz, J Harlen. "The United States During the Ice Age." Science Service Radio Talks. Columbia Broadcasting System. WABL, Chicago, Illinois. 12 Feb. 1932.

This radio manuscript that I discovered was an excellent primary source that Bretz used to address several theories as to the glacial activity in the northern United States. It addressed the Scablands debate, as well as helping to give me insights about the other studies that Bretz performed during his geologic studies. It is a primary source because it was broadcasted by Bretz on the college's radio station.

Raw Data:

Bretz, J Harlen. *Memories: Additional Albion Matter and other Memories and Stories*, Addendum (Part IV). Raw data. Dr. John Whitmer's Personal Library, Rock Island.

The final volume of Bretz's autobiography *Memories*, this was primarily made up of Bretz's personal stories, and, strangely enough, a compilation of his favorite jokes. This section went completely away from "Dr. Bretz" and his geologic work and it gave me an extremely valuable insight into Bretz's personal character—how he lived, what his sense of humor was like, and various other points. Written by Bretz himself, this is a primary source.

Bretz, J Harlen. *Memories: Part I*. Raw data. Dr. John Whitmer's Personal Library, Rock Island.

The first volume of Bretz's *Memories*, this part of his autobiography focused primarily on Bretz's studies. This was an insight into Bretz's theories, written by Bretz himself, so it was a valuable source for viewing the Scablands theory right from its source. It did not cover the Scablands theory in as much detail as Bretz's scientific papers, but it gave his ideas and observations in "layman's terms," making his thoughts a bit easier to understand for me.

Bretz, J Harlen. *Memories: Part II*. Raw data. Dr. John Whitmer's Personal Library, Rock Island.

In the second volume of his *Memories*, Bretz focused mainly on his exploits abroad in Greenland, Bermuda, and in other various countries. As such, it was not quite as useful to the Scablands theory as the other parts of his autobiography (still fascinating, though!). However, it did have some extra anecdotes about his daily life, along with some musings about his Scablands theory. This part of his *Memories* helped me to understand some of Bretz's other theories, and how his legacy stretched beyond just the Scablands, and how he influenced the whole of geology.

Bretz, J Harlen. *Memories, Part III*. Raw data. University of Chicago, Chicago.

I can think of no better primary source than Bretz's unpublished autobiography, *Memories*. This slightly disorganized collection of stories from Bretz's life gave an invaluable insight away from the "scientist Bretz" and into the real character of Bretz, with his dry sense of humor. This source took away the academic shell that Bretz had in the other sources that I read and displayed Bretz for who he truly was: a loving father with an immense fascination with the sciences, and a taste for practical jokes well into his elderly years. I used this source in a multitude of different ways, from giving insights in my documentary into Bretz's character to finding anecdotes from Bretz's life that really

shows the audience the kind of person that he truly was.

Secondary Sources

Books:

Alt, David. Glacial Lake Missoula and Its Humongous Floods. New York: Mountain P Company, Incorporated.

This book by David Alt focused completely on the Missoula flood geology, and had a few mentions of Bretz. I used this source to help me to understand Bretz's theory, and how his work with the Scablands has influenced modern geology. Because this book uses Bretz's works to create a separate work, it is a secondary source.

Bjornstad, Bruce. On the Trail of the Ice Age Floods : A geological field guide to the Mid-Columbia Basin. Boston: Keokee Company, Incorporated, 2006.

I used this book sparingly with my comprehension of the Scablands theory; it is more of a field guide to the Columbia Gorge area. However, this book was invaluable when I was actually in the Scablands. It gives directions on how to get to key features in the Scablands, and it gives their historical significance and how Bretz studied them. Also, the author of this book was extremely helpful in answering any questions that I had about Bretz's theory.

Ryan, William, and Walter Pitman. Noah's Flood: The New Scientific Discoveries About The Event That Changed History. New York: Simon & Schuster, 2000.

This was a book discussing the impact of a cataclysmic flood on the Black Sea area, and how it created the Bosphorus Strait. Although it did not mention Bretz, his theories are still

discussed in the book, which shows how his legacy still impacts scientists' thinking today with modern theories of the earth's formation. I used this book to solidify my knowledge of Bretz's impact on the Earth Sciences and how his flood theory can be applied to other areas other than the Scablands.

Soennichsen, John. Bretz's Flood : The Remarkable Story of a Rebel Geologist and the World's Greatest Flood. New York: Sasquatch Books, 2008.

This was the first book that I checked out, and it gave me a complete outline of Bretz's life. This book was particularly useful in several ways—first of all, it contained several quotes from Bretz, his family members, and former students, all of which were great “imbedded primary sources” that I utilized for some information about Bretz. Also, this was one of the few secondary sources that was about Bretz himself, instead of his theories. The author of this book interviewed countless family members, students, and others related to Bretz in some way, and put together a fascinating read that gave me a sort of starting point for my research.. This source was secondary with primary sources, because the writing itself was based on research with primary sources, but it had several interviews, photos and other pieces of primary source material interspersed throughout.

Book Chapters:

Gould, Stephen J. "The Great Scablands Debate." The Panda's Thumb. New York: W.W. Norton & Co., 1980. 194-203.

Renowned science author Stephen J. Gould wrote a fantastic article for the magazine *Natural History*, in which he provided an excellent historical background for the “case of the Scablands.” It also had a primary source in the back: a letter of correspondence from Bretz to Gould. I used this source to relate the historical background of Bretz's life to his

scientific theories.

Brochures:

Dr. E. K. Peters. Lake Roosevelt and the Case of the Channeled Scablands. Brochure. Pullman.

Another scientific source that presented Bretz's theory in an interesting way: like a detective case. I used this source as backup information and statistics for my primary sources, as well as for interesting factual anecdotes and other information, mainly about the flood more than the Scablands.

Emails:

MacRae, Andrew. "J. HARLEN BRETZ AND THE NORTHWEST SCABLANS: A HERESY JUSTIFIED." E-mail to Walter Alter. 18 Apr. 1996.

An email that I found on the University of Calgary website, this was a lengthy oration of the type of person that Bretz was. The sender had interviewed several of Bretz's old students, and wrote an email of the experiences that he had had. I used this source to get a light insight into Bretz's character and how he taught. Because this email didn't contain any details of the conversations with the students, it is more of a secondary source.

Encyclopedias:

Tate, Cassandra. "Bretz, J. Harlen." HistoryLink.org- the Free Online Encyclopedia of Washington State History. 29 Nov. 2007. HistoryLink. 18 Feb. 2009 <http://www.historylink.org/index.cfm?DisplayPage=output.cfm&File_Id=8382>.

This HistoryLink article provided an excellent, in-depth summary of Bretz and his life, which was valuable for revisiting information that I needed quickly, as a reference tool.

This source could be considered secondary with primary source material, because most of it was written with the assistance of primary sources (the secondary part) and it had some

quotes from Bretz himself (primary).

Interviews:

Bjornstad, Bruce. "Glacial Lake Missoula and the Channeled Scablands." E-mail interview. 10 Mar. 2009.

A brief email interview that I had with Mr. Bruce Bjornstad, author of *On the Trail of the Ice Age Floods*. I used this interview to fortify the information that I had obtained from other scientific sources, and it helped me to understand the basic mechanics of the flood.

Soennichsen, John. "Bretz's Flood." Personal interview. 16 Feb. 2009.

Author of *Bretz's Flood*, this interview was extremely helpful to glean anecdotes from, and I utilized the video footage in my documentary, mainly for the type of person that Bretz was. This interview really helped me to understand Bretz's life and how great of an impact he had on modern geology.

Whitmer, John. "Bretz's Geological Theories." Personal interview. 21 Feb. 2009.

This interview with the former president of the Northwest Ice Age Floods institute was the scientific side to my set of interviews. While Mr. Soennichsen discussed Bretz as a person, my interview with Dr. Whitmer was meant to discuss the science of the flood and how the Scablands were formed.

Whitmer, John. "Follow-Up--Bretz's Theory and His Legacies." Personal interview. 18 Apr. 2009.

A follow up interview from the previous one in February, this interview involved various legacies that Bretz has left behind from his studies of the Scablands. The interview helped me to form better ideas of Bretz's legacy than I had previously. Because Dr. Whitmer's studies are based off of Bretz's, this interview was secondary.

Magazine Articles:

"Time to Set Geological History Straight." Whitman College Alumni Magazine Mar. 2009: 23-24.

This was a modern article from Whitman College's alumni magazine describing theories that have branched off of Bretz's original Missoula Flood theory. It discussed student-made theories about different dates that the flood could have taken place on. This article was useful in showing how Bretz's theory continues to modern times—it continues to make us think about the Scablands region and its origins. Because the magazine is from 2009, it is a secondary source.

Maps:

Map of the Pacific Northwest, showing the path of the Lake Missoula flood (dotted pattern) and glacial Lakes Columbia and Missoula (dark pattern). Answers in Genesis. By Mark Wolfe. 2009. 11 Mar. 2009

<http://www.answersingenesis.org/home/area/fit/images/fig10_5.jpg>.

This first map that I used was excellent mainly for location of the Scablands and Lake Missoula. Since the other map shows more of the general area and topography, this map was useful in that it showed the location of modern cities relative to large Ice Age features, like the Cordilleran Ice Sheet, the Missoula Lake, and the Scablands.

Music:

Edelman, Randy. "My Home Is Virginia." Gods and Generals. 2003.

A rural sort of song, I used this source to set the mood in the middle of my documentary. It was not too grandiose for use, and it helped to show how Bretz was a man who loved

rural settings and nature.

Frizzle, John. "VMI Will Be Heard From Today." Gods and Generals. 2003.

This tense music was perfect for the background when I was describing the floods and the origin of the theory. Its edgy theme really helped to show how large of a flood Bretz was dealing with.

Horner, James. "Legends of the Fall." The Ludlows. By The London Symphony Orchestra. MP3. Sony, 1994.

Another sort of country-style song that helped to set the theme of my documentary, this particular song had a kind of solemn theme to it that really helped set the mood at the end of my documentary when discussing Bretz's legacy.

Isham, Mark. "A River Through It." Rec. 1992. A River Runs Through It Silver Screen Soundtrack. By Mark Isham. MP3. Allied Filmmakers N.V., 1992.

I thought that the violins and harp in this song helped to set the mood for Bretz's humble beginnings when he was first getting into the field of geology.

Lane, Rob. "Opening Titles." John Adams: Music from the HBO Miniseries. By Rob Lane. MP3. Varese Sarabande, 2008.

This song had both the building tension and spectacular crescendo that was perfect for the beginning of my documentary. It really helped to emphasize how fantastic the very notion of the Missoula Flood was.

Newspaper Articles:

Sullivan, Walter. "New Theory on Ice Sheet Catastrophe Is the Direst One Yet." The New York Times 2 May 1995, sec. C: C4.

Another article by the New York Times writer that covered Bretz's theories, this was a

secondary source published *after* Bretz's death. I utilized this source mainly in determining the legacy that Bretz had left behind, stretching into the late 20th century and beyond.

Photographs:

Anonymous. Bosphorus seen from the Bosphorus University. 11 June 2006. Private Collection, Private Photograph.

I used this photo to have the audience visualize what the Bosphorus Strait looks like. It helped me to visualize how wide-reaching Bretz's theory reached: all the way into Asia. This photograph was also helpful in comparing the landscape of the Bosphorus with the landscape of the Scablands. Not a primary source because this photo was taken only three years ago.

Anonymous. Columnar and Hackly Basalt in Moses Coulee. Glacial Lake Missoula and Its Humongous Floods. Missoula: Mountain P Company, Incorporated, 2001.

A photo of a bizarre basalt formation in Moses Coulee, this photo helped me to understand how drastic an effect the Missoula Flood had on the Scablands. It helped to relay this message to the viewers, as well, and I used it as a landscape photo while discussing the "jagged landscape." Debatable as to what type of source this is, I believe that this photo is secondary, because it did not involve Bretz in any way, although it was a first-hand picture of the Scablands.

Anonymous. Hat Rock. Oregon Department of Transportation, Oregon Department of Transportation, Portland. Cataclysms of the Columbia. 8th ed. Portland: Timber P, 2005.

This photograph was an excellent secondary source as a visual in my documentary (more modern photograph) because it shows the audience the power of the flood—it had the

sheer force to cut around harder pieces of basalt and create columns in the landscape.

Anonymous. The Space Needle from Volunteer Park in Seattle. 14 Apr. 2007. Private Collection, Private Photograph, Seattle.

This vertically oriented photograph of the Space Needle was an excellent visual when showing how tall the Space Needle is, compared to the Missoula Flood! We normally think of it as a tall structure, but with another half of one on top, this visual comparison was truly staggering in showing how deep the Missoula Flood truly was.

Anonymous. We Climbed down to this glacial stream. 15 Aug. 2005. Seattle. Travel Webshots. 1997. Travel Webshots. 8 Mar. 2009

<http://image57.webshots.com/757/0/79/5/2506079050061567084wkRrQj_fs.jpg>.

I used this secondary source photograph (taken quite recently) to show the appearance of a standard glacial stream. This was a good visual comparison to show what glacial melt water looks like, and how scientists previously thought that one of these was the source of the Scablands' formation.

Delano. 76791 - Southeast Along Potholes Reservoir Across Lind Coulee. Delano Photographs. Cataclysms of the Columbia. 8th ed. Portland: Timber P, 2005.

I used this secondary source photograph from the 1990's as more of a scenery photo when I was describing the formation of the Scablands. It was useful as an overhead shot in seeing all of the geologic features that the Missoula Flood created.

Foster, Tom. Ripple Marks at Camas Prairie. Private Collection, Private Photograph, Missoula.

This photograph of ripple marks near Missoula that show the location of the lake, I used this picture to give the audience a visual image of the watermarks that the massive glacial lake left. It was also useful for me to see what the marks look like, as I have been only to

the Scablands, and not Missoula.

Landsat 5 TM. Landsat 5 TM Aerial Scablands Shot. 16 July 1988. EROS, USGS Center for Earth Resources Observation and Science, Washington, D.C.

A fascinating photograph that a USGS satellite took of the Scablands, I used this photograph when first introducing the area. This helped me to give a good overview of the landscape and how bizarre the region's topography was.

Noyes, Stephen. Mega Flood Scientist, J Bretz. Private Collection, Private Photograph. Stephen Noyes. PBase. 11 Mar. 2009

<<http://i.pbase.com/g6/78/624878/2/84579057.FLz7Du6v.jpg>>.

This is a photo of the closest thing Bretz has to a gravestone (he donated his body to science) and it gave me an excellent visual to use when my documentary discusses Bretz's death. It also was a good image that really invoked the gigantic legacy that Bretz left behind with his Scablands research. Because it was taken during modern times, after Bretz's death, it is a secondary source.

Opportunity Rover. PD-USGOV-NASA Victoria Crater from Cape Verde. 2006. Spirit and Opportunity Mars Panoramas, NASA/Jet Propulsion Labs/Cornell University, Washington, D.C.

A panoramic photo taken by the Opportunity Rover currently on Mars, this photo was invaluable in showing the Scablands-like geology that is on the Red Planet, most likely created by similar cataclysmic flooding. This photo especially showed me how geology can be similar in different places, even different planets. This photograph was also key in conveying Bretz's legacy that he left behind—his work even influenced astrogeologists who work beyond the Earth.

Pickering, Byron. Glacial Lake Missoula. Pickering Studios, Oregon. Byron Pickering: Marine Artist. Pickering Studios. 9 Mar. 2009 <<http://www.pickeringstudio.com/indexx.html>>.

A painting of Lake Missoula, I used this image to display an artist's more realistic perspective of the flood as a different point of view from the CGI action imagery that most of my documentary used. Also, most of the flood pictures that my documentary used showed the flood on the scablands, while this showed the lake itself. This was useful when I discussed the lake in my documentary. Because it is a modern painting, this source is secondary.

Soennichsen, John R. Devil's Canyon. Private Collection, Private Photograph, Cheney. Bretz's Flood : The Remarkable Story of a Rebel Geologist and the World's Greatest Flood. Seattle: Sasquatch Books, 2008.

Another landscape photograph of a famous Scablands channel, this image was instrumental when my documentary discussed the features that Bretz observed in his fieldwork. However, this photo also provided a modern-type style that offset the historic photos of Bretz. Taken by the author of *Bretz's Flood* only a year ago, this image is secondary because it is not related to Bretz's 1900s field work.

Soennichsen, John R. Drumheller Channels. Private Collection, Private Photograph, Cheney. Bretz's Flood : The Remarkable Story of a Rebel Geologist and the World's Greatest Flood. Seattle: Sasquatch Books, 2008.

A secondary source image by John Soennichsen, this was a photograph of a channel in the Scablands that I used in order to show an overview of the area's geology. It helped me to understand the landscape-altering effects that the flood had on the area's basalt.

Washington State Scablands Photos taken on February 14th-16th, 2009, Central-Eastern State of

Washington. Personal photograph by author. 14 Feb. 2009.

These photographs that I took myself on my personal trip to the Scablands provided high-quality images that were more detailed than any photo that I used from a book. Because of this, I was able to provide on-site images that put the audience directly into Bretz's point of view—what he saw when he studied the area and created his theory. In addition, they help the audience to visualize different formations created by the Missoula Flood.

Software:

Google Earth Pro. Vers. 5.0. Google Earth. 12 May 2009 <http://earth.google.com/enterprise/earth_pro.html>.

This program was helpful in visualizing the Scablands area from an aerial view. It also allowed me to take a video of the Scablands, zooming in from North America and into eastern Washington. I felt that this helped my audience to understand the location of the Scablands better in relation to the rest of the United States and North America. This is a secondary source because it is software composed of images taken by modern satellites and not photographs from Bretz's day.

Video:

Mystery of the Megaflood. Dir. Ben Fox. Prod. Joe Kennedy. DVD. PBS, WGBH Educational Foundation, 2005.

Because of its bizarre camera angles and information that I already found in my primary sources, I did not use this video much for information. However, I was able to find some fantastic aerial footage in this NOVA documentary that my budget and time did not allow for. I also used some of this documentary's CGI computer animation that recreated the flood. These accurate renderings really helped my understanding of the massive size of

the Missoula flood, and it provided an excellent visual for the audience in my documentary.

Personal Scablands Footage. 2009.

Some personal footage that I took on my own excursion to the Scablands, I used most of this for reference purposes, mainly because the footage was not professional-quality.

However, one shot of a snowy channel that I used was particularly striking with the dark basalt against the snow. This was an excellent contrast against the summertime footage of the aerial footage.

Websites:

"A Geologic Catastrophe." Glacial Lake Missoula and the Ice Age Floods. 2002. Glacial Lake Missoula. 18 Feb. 2009 <<http://www.glaciallakemissoula.org/story.html>>.

An interactive website about the Lake Missoula Floods, this source was another starting point for my research where I was able to get a relatively surface-level explanation of the floods, before diving into primary and in-depth secondary source material.

"Boulders, Braids, and J Harlen Bretz, Alaska Science." Geophysical Institute of the University of Alaska, Fairbanks. 17 Nov. 1993. University of Alaska. 25 Jan. 2009

<<http://www.gi.alaska.edu/ScienceForum/ASF11/1160.html>>.

I utilized this website in order to link Bretz's studies to the current explanation of the Scablands theory. This was a particularly useful source because, though a bit brief, it connected many facets of Bretz, his theory, and the current understanding into one concise, fluid paper.

Dr. Dutch, Steven. "Channeled Scablands: Overview." Channeled Scablands: Overview. 9 Apr.

2003. University of Wisconsin at Green Bay. 18 Feb. 2009

<<http://www.uwsp.edu/geo/projects/geoweb/participants/dutch/vtrips/Scablands0.HTM>>.

This was a more in-depth scientific source published by the University of Wisconsin providing a professional explanation of the creation of the Scablands immediately after the dam broke. I used this source to see how Bretz found evidence in the Scablands to support his theory.

Foster, Tom. "Ice Age Floods Mystery J Harlen Bretz Joseph Pardee Lake Missoula." Ice Age Floods-Discover Glacial Lake Missoula and Lake Bonneville. 2008. IAFI. 18 Feb. 2009

<<http://hugefloods.com/Mystery.html>>.

This website had several uses for my purposes, including links to primary source material, as well as interview subjects and recommended reads. However, this source was most valuable when I began to research Bretz's actions, and the historical context that it provided was extremely helpful for this purpose.

Sammons, James. "NOVA Online | Teachers | Classroom Activity | Mystery of the Megaflood |." PBS. May 2006. NOVA. 18 Feb. 2009

<http://www.pbs.org/wgbh/nova/teachers/activities/3211_megafloo.html>.

I mainly used this website for statistical data of the Flood, specifically the size of the ice dam, the fastest flow rate of the water, and the flood at its highest point. It helped me to understand truly how large the dimensions of the flood were; how staggering it would have been to have actually witnessed the catastrophe.

Unknown. "Guide to the J Harlen Bretz Papers." University of Chicago Library: Finding Aids.

2006. University of Chicago. 25 Jan. 2009

<<http://ead.lib.uchicago.edu/view.xqy?id=ICU.SPCL.BRETZ&c=b>>.

Besides giving a quick overview of Bretz and his theory, this website specifically led me to primary sources written by Bretz, as well as to photos and other helpful sources that enhanced my documentary.

Unknown. "ISGS. Our Heritage & A Memorial: J Harlen Bretz." ISGS - Home Page of the Illinois State Geological Survey. Illinois State Geological Survey. 25 Jan. 2009
<<http://www.isgs.illinois.edu/about-isgs/heritage/bretz.shtml>>.

This source assisted me in seeing Bretz's impact on geology as a whole, because it went beyond discussing Bretz and the Scablands—it talked about how his theories influenced modern geology's thinking and how he was an expert on all facets of geology; not just the Scablands.

This source also helped me comprehend Bretz's early life and what he did before he discovered the Scabl