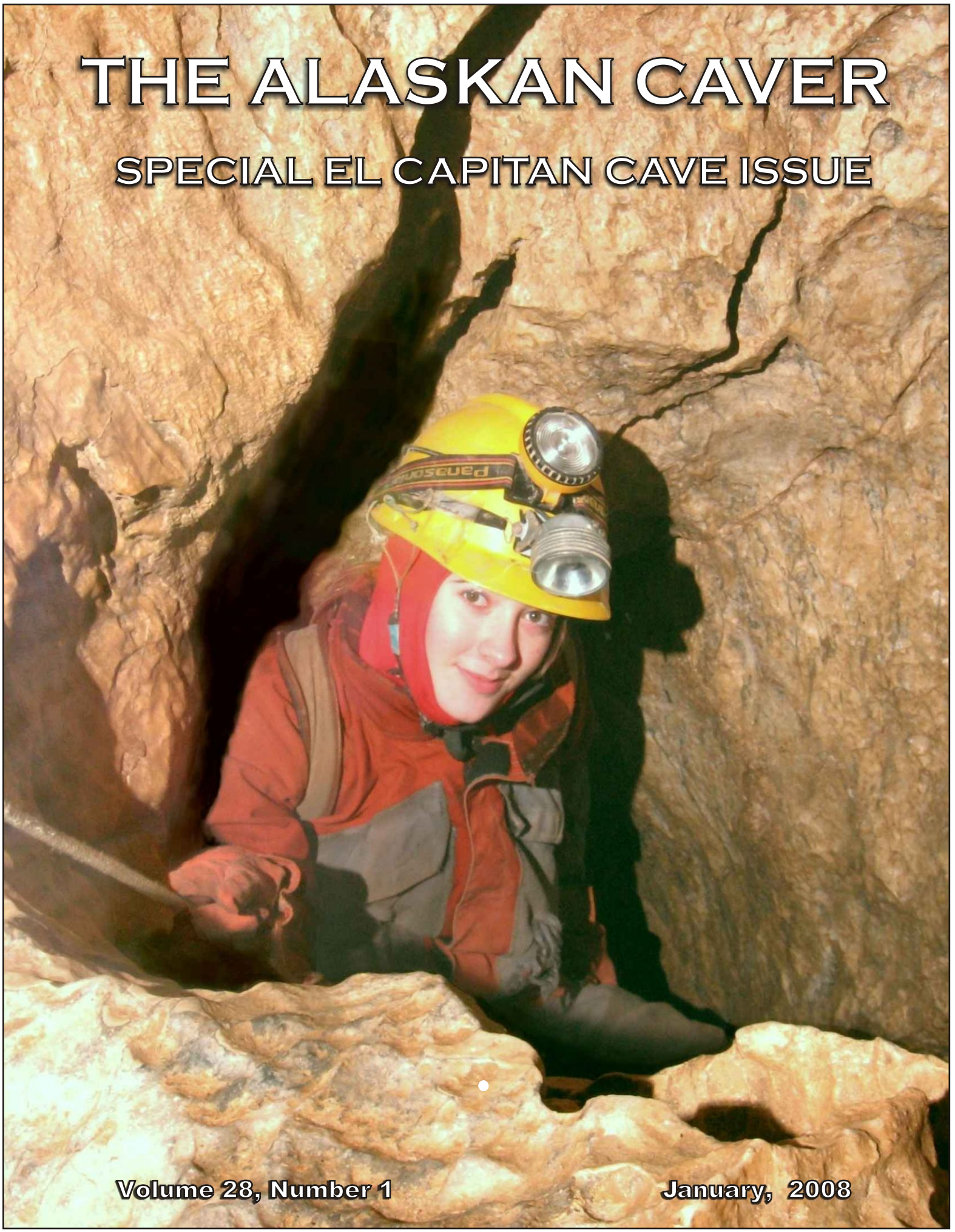
January 2008

# Alaskan Caver: Special El Capitan Cave Issue, Volume 28, No. 1, January 2008

Carlene Allred

# THE ALASKAN CAVER

## SPECIAL EL CAPITAN CAVE ISSUE



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THE ALASKAN CAVER

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By Liana M. Boop
15 November, 2007

### INTRODUCTION

During the summer of 2007, I accepted an Internship through the Student Conservation Association (SCA) where I worked with the United States Forest Service giving guided tours of El Capitan Cave. Located in the Tongass National Forest on Prince of Wales Island, Southeast Alaska, El Capitan Cave is Alaska's largest and only show cave, with over two miles of mapped passage.

At the beginning of the tour, visitors were given helmets and flashlights at the base of a 370 step staircase, which was the ascent to the cave. Rest stops were taken frequently to talk about some of the features of the temperate rainforest, including natural disturbances (overturned trees from wind and snow events), native flora (trees, ferns, berries), culturally modified trees (scars left from bark stripping hundreds of years ago), and visible epikarst, the features of a carbonate bedrock where it meets the surface.

### DEFINING SOUTHEAST ALASKA'S KARST

One of the most challenging parts of the tour was explaining the history of El Capitan to our visitors. At the start of the tour, I held a shell, and asked if anyone had ever been in a cave before. Some people, when asked, knew that caves are made of limestone (or marble). Limestone and marble are both carbonate rocks, I explained, which is why I was holding the shell. People have a hard time grasping that something that was once a tropical reef is now 360 feet above sea level, in Alaska.

The history of El Capitan Cave extends more than 400 million years back in time. According to Baichtal and Swanston (1996), the Heceta Limestone

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*Front cover: Samantha Barnes rappels down Twin Pits in El Capitan Cave, Prince of Wales Island. Photo by Carlene Allred*

*Back cover: "They came out of El Capitan so clean this time!". From left: Kevin Allred, Mira Wilhelm, Josiah Huestis, Samantha Barnes, Billy White and Taira Wilhelm. Photo by C. Allred.*

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Formation, which contains El Capitan Cave, was deposited near the equator during the Silurian, between 438 and 408 million years ago. Limestone is formed in shallow, tropical marine environments, as evidenced by the fossils found in the Cave (Figure 1). Blatt, Tracy and

*Figure 1: Marine fossils can be found in specific locations within El Capitan Cave. Photo by E. Bennett.*

Owens (2006), state that warm water temperature is needed to supersaturate the water in calcium carbonate ($CaCO_3$), thus causing it to precipitate out, forming sediment rich in calcium carbonate. The water must also be relatively shallow, so that light can reach the sea floor. Calcium carbonate is essentially the remains of shelly animals, ranging from large coral reefs to barely visible forams. The water must be clear (free of suspended sediment), so as not to block sunlight. Filter feeders, such as corals, also need clear water. Shelly organisms thrive "in areas of abundant light, constant salinity, and clear warm water" (p. 192). Carbonate deposition does not typically occur near the input of large rivers, which carry mud sediments, and decrease salinity by introducing a large amount of fresh water.

Tectonic forces caused deposition to cease, and lithification to occur. Baichtal, Streveler and Fifield (1997) report that over the past 170 million years, many different terranes, including that which contains the Heceta Limestone, were accumulated as plates moved past each other. The Heceta Limestone, once turned into rock, journeyed from the South Pacific Ocean, where it was joined to southeast Alaska. It has since been carved away.

The limestone of southeast Alaska ranges up to 99.5 % $CaCO_3$ reports Elliot (1994). A study cited in Baichtal and Swanston (1996) tested 67 carbonate bedrock samples from karst areas on the northern portion of Prince of Wales Island and found that the percent $CaCO_3$ ranged from 92 to 99%, and that the average was 98%. Particles that are not calcium carbonate may be sand, clay, or pebbles, which serve as the impurities in the limestone.

Cavities in limestone form when the calcium carbonate reacts with carbonic acid in rainwater. Carbon dioxide, $CO_2$, occurs naturally in Earth's atmosphere. It combines with rainwater, $H_2O$ to form carbonic acid, $H_2CO_3$, as reported in Ritter, Kochel and Miller (2002). Elliot (1994) states that between 60 to more than 250 inches of rain fall on southeast Alaska annually. The amount of available rain, coupled with the purity of the limestone, provides the potential for huge cavities to form underground, as well as very well developed karst features above ground.

Epikarst is the "highly solutional[ly] modified upper zone of the bedrock" (p. 10) according to Elliott (1994), whereas Baichtal and Swanston (1996) define it as "the saturated zones within the intensely dissolved veneers developed at the surface of carbonate rock sections, either beneath soils or on exposed rock outcrops" (p. 1). They continue: "deep shafts, crevasselike dissolved fissures, erosion or dissolution rills, and spires and spikes of carbonate bedrock (p. 1)" are characteristic epikarst features (Figure 2).

*Figure 2: Limestone meets the surface, showing features of epikarst along the trail to El Capitan Cave. The cracks are natural jointing, which roots take advantage of. These joints are conduits for water to move through, into the subsurface environment. Photo by Liana Boop.*

The geologic history of southeast Alaska is complex, made only more complex by the several periods of past glaciations, which carve the landscape and deposit sediments. Whereas water flows in the

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cracks and fissures through limestone, compacted glacial till and units of impermeable rock do not allow for subsurface movement of large volumes of groundwater in defined channels. As shown in Figure 3, water pools on the surface above these impermeable layers, creating bogs, locally referred to as muskegs.

*Figure 3: A typical muskeg as viewed from the Forest Service Beaver Falls Karst Interpretive Trail on Prince of Wales Island. In a muskeg, there is no definitive watercourse. The change in vegetation from primarily mosses and grasses to trees most likely indicates a subsurface change from an impermeable layer (such as glacial sediment) to a permeable unit, usually limestone. Photo by Liana Boop.*

Here, sphagnum mosses (and other varieties) brew rainwater to be even more acidic, down to 2.4 pH (Baichtal and Swanston, 1996; Elliot, 1994). These muskegs typically occur close to karst systems, so the acidic water does not have far to travel before it trickles into the subsurface.

While cave entrances and sinkholes are obvious karst features that water can flow through, the natural joints and cracks in bedrock introduce a large volume of the water that enters a cave. Igneous intrusions, fault planes, and other natural zones of weakness become the preferential route for water to flow along.

When the acidic water enters the subsurface, it reacts with the carbonate bedrock. Dissolved carbon dioxide in water dissolves the calcium carbonate, carrying it, in solution, until there is a drop in pressure, which is to say that the conduit opens. When pressure and velocity drop, the water loses its capacity to carry the dissolved material, so it precipitates out because of the loss of carbon dioxide. This is analogous to the bubbles formed from opening a soda can. Speleothems, or cave formations, form when dissolved calcium carbonate is deposited inside an existing passage (Figure 4).

Large passages form when large volumes of water carve over time, employing both physical (mechanical) and chemical weathering. There are many different patterns that a cave can form in; these are dependent on properties of the rock (purity, jointing) and height of the water table, as well as other factors (Ritter *et* al., 2002).

The frequency of karst features, on the other hand, is dependent on the purity of the carbonate bedrock, and the acidity of the water. As the Heceta Limestone is very pure, and the water is strongly acidic, karst is highly developed in Southeast Alaska, especially in areas that have been less modified by glaciers (alpine and sub-alpine regions). Schulte and Crocker-Bedford (2002) report that over 875 square miles of karst exists in the vicinity of Ketchikan, Alaska (this includes Prince of Wales Island). Elliott (1994) estimates that some areas have sinkhole densities ranging from 3,000 to 10,000 per square mile, whereas southern Indiana has an estimated 1,122 per square mile. The initial drop of El Capitan Pit measures 598.3 feet for a total depth, including a ledge, of 624 feet (Baichtal 1994), which ranks it as one of the deepest in the United States.

Southeast Alaska's karst is highly developed because of the purity of the limestone, the acidity and the amount of water. The area is influenced by the Alaska current, which is driven by the Pacific Ocean's Kuroshio Drift, which means that the average temperature is about 40°F (Schulte and Crocker-Bedford, 2002). The temperature inside a cave reflects

*Figure 4: Soda straws are a special type of speleothem, or cave formation, named for their resemblance to a beverage straw. These stalactites (which hang from the ceiling) form very slowly; the drop of water at the tip of each soda straw deposits dissolved calcite on the ring as water slowly moves through the hollow middle. Photo by D. McCully.*

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A FOCUS ON...EL CAPITAN..., continued from page 4

the average temperature on the surface. Caves typically have very high relative humidity, and low air flow. Elliott (1994) states that because caves are cool and protected, many specimens, such as 7,000 year old logs and 30,000 year old bones that have been found in southeast Alaska, are perfectly preserved.

## EL CAPITAN CAVE

Although karst landscapes exist throughout the United States, my passion (and perhaps a bit of luck) brought me to El Capitan Cave. The Cave is unique because of the history contained within its rooms. Many distinctive formations decorate its walls, and there is a plethora of research pertaining to El Capitan Cave.

In the field of geology, some things cannot be directly dated. For example, it is not known when the passages in El Capitan Cave started forming, and some have stopped forming. Fortunately, secondary deposits, such as sediment deposits and speleothems, are datable. This is due to organic particles within the deposits that can be dated. The flowstone in one room of El Capitan Cave is 100,000 years old. The flowstone contains pollen grains that correspond to biota outside the cave at a given time, as well as oxygen isotope ratios, which imply glacial periods.

There are three main levels in El Capitan Cave, although the tour route (Figure 5) only shows some of the middle level [editor's note: see elsewhere in this publication for complete maps of the cave]. The upper two levels are representative of past water table levels, while the current bottom level is the height of the water table; the Rockwell River flows, expanding the existing passage. According to Allred (1998), the mapped vertical extent of El Capitan Cave is 428.6 feet, and there is a total of 12,512.2 feet of mapped passage (El Capitan Pit is not known to connect to El Capitan Cave). [Editor's note: the total surveyed passage length at the time of this publication is 12,644.9 feet]. Many passages on the current map end abruptly in question marks, indicating that there is more to be mapped.


*Figure 6: The entrance to El Capitan Cave, located on Prince of Wales Island in Southeast Alaska. The Cave is at the top of a 1,300 foot long, 370-step-staircase. A gate, installed in 1993, is located about 150 feet inside. Photo by Liana Boop.*

Some passages end in "sumps," meaning that they are flooded, and most likely continue. SCUBA diving in southeast Alaska's caves is difficult because of the amount of equipment that must be carried to the dive site. Further complicating cave diving is the silt that rests on the floors of flooded passages; once disturbed, the water clouds very quickly, making it very difficult for divers to navigate. For these reasons, only limited diving exploration has been used in El Capitan Cave.

The main entrance of El Capitan Cave (Figure 6), through which the tour enters, is not the only entrance. There are two

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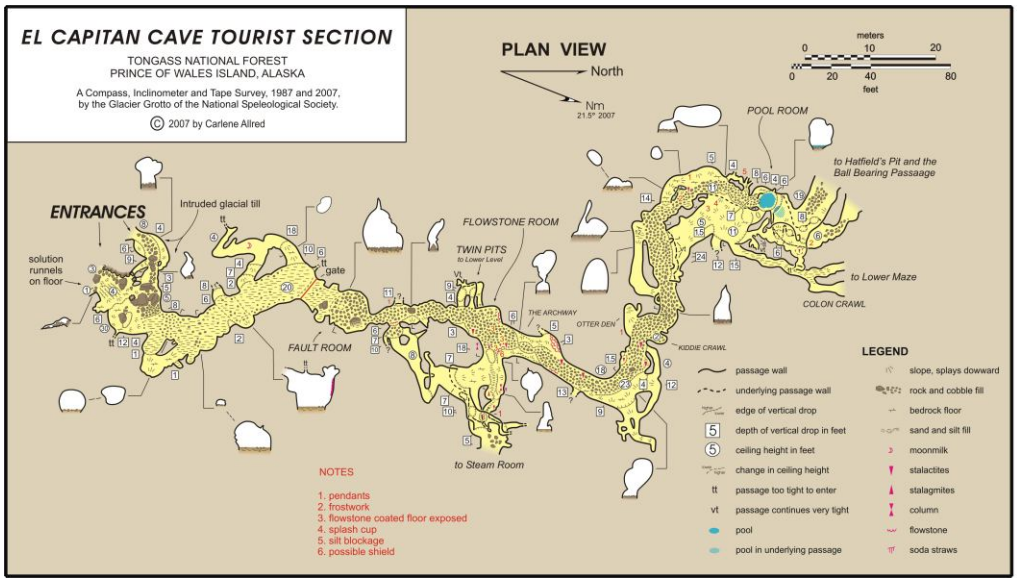


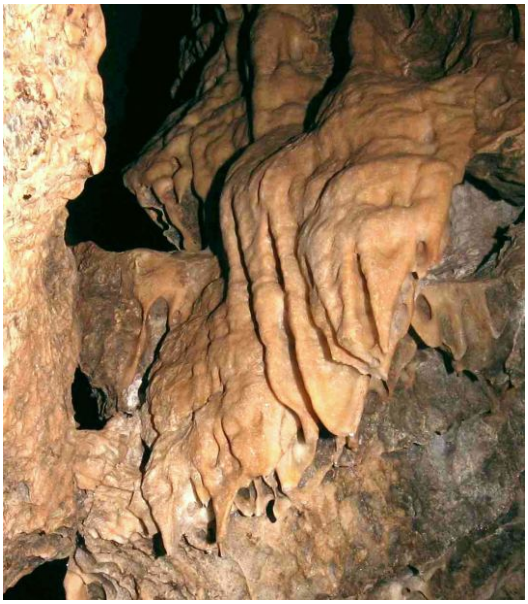

*Figure 5: Map of the tour route of El Capitan Cave, by Carlene Allred. The tour route (the widest passage, from left to right) goes about 600 feet from the entrance of the cave.*

*Flowstone Cascade along the tour route, photo by Carlene Allred (2007)*

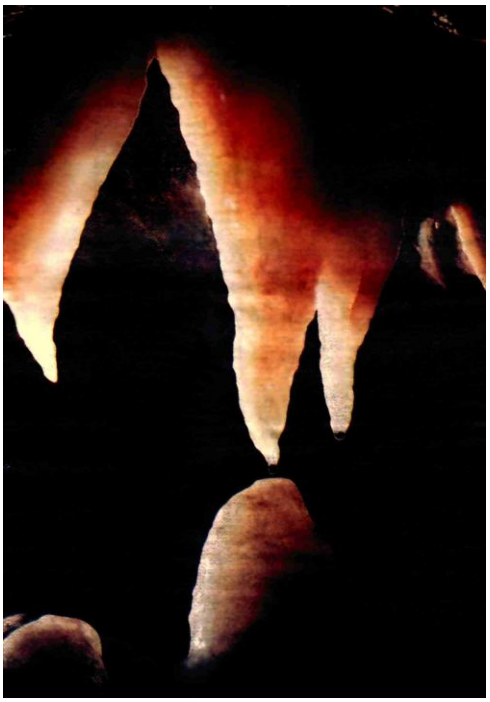
*The Alaskan Room, photo by Norm Thompson (1989)*

*David Klinger and Kathy Tonnessen admire formations in the area between the Pool Room and the Hot Fudge Sundae. Photo by Harvey Bowers (1988).*

# EL CAPITAN CAVE PHOTO GALLERY



*Draperies in the Flowstone Room. Note the vandalism that took place prior to gate installation. Photo by Carlene Allred (2007).*



*Dripstone, photo by Norm Thompson (1989)*

Stone "frostwork", photo by Kevin Allred (1990)

# AN AUTUMN EL CAPITAN CAVE ADVENTURE

By Taira Wilhelm

Photos by Carlene Allred

A long, steep flight of stairs greeted us as we walked up from the parking lot. It was October 11, 2007, and the Ketchikan Caving Club had made its way back to Prince of Wales Island for further adventures. At the top of the stairs was El Capitan Cave, a well known one in POW, but we had not been able to get to it before. Our troop included Kevin and Carlene Allred as our leaders, also Samantha Barnes, Billy White, Mira Wilhelm and myself. We were fully equipped in our sexy caving suits, with either backpacks or waterproof bags with our caving gear. Outside the maw of the cave we put on our harnesses and prepared our headlamps. In a vast show of grace I managed to accidentally drop my caving helmet off the edge of the platform built in front of the cave, but I quickly scaled down and recovered it.

We entered the cave and excitedly began exploring the first chamber, which was a mass of tunnels. On the far edges there were some glimmers of sunlight shining in, but the gaps were too small to get in and out of. Kevin found a passage that went upward that we could climb into, and while he was going up we spotted another one not far away. It went straight up, but was smaller. I climbed on Billy's shoulders and pulled myself into it. Wriggling my way upward through the tight passage, I came out near Kevin on a ledge above the main first chamber. We attached a rope and the others climbed up to help us survey.

*Mira Wilhelm and Kevin Allred begin mapping into the new upper level passage.*

The tunnel that continued parallel to the main passage floor below was very muddy, and I became wet and dirty in just a few minutes. It took us some time to survey the new area, which ended at a steep drop back down into the main passage. The upper level tunnel continued beyond the pit, but we couldn't safely reach it, so after we finished surveying we rappelled back down to the main passage.

A metal gate led us into the further segments of the cave where the floor was covered with large cobblestones. We continued onward for a while, past some pits and over a tricky climb, at which point we left Carlene for a while, because she was recovering from surgery and didn't want to gain further injury.

A side passage that was slick with mud led us downward to a place called the Diarrhea Pool. The tunnel was more of a slide than anything, and beyond the water was an area of cave called The Maze. The pool's name well fit its description, for it looked like a pool of mud that the rock dipped into and there would be no dry way to get through. [Editor's note: Beyond this pool is where Kevin became totally lost and alone, with only a very dim penlight, and it is only by a miracle that he managed to find his way back out. It is in honor of that bad experience in 1987 that the pool acquired its awful name.] At this point Sam, Billy and Mira decided it wasn't worth it to continue, so they headed back up and out of the cave.

Kevin and I decided to splash/swim through the "diarrhea" to get to the tunnels beyond. He slithered through first, then it was my turn. With my helmet on I couldn't fit my head under the rocks without submerging, so I dipped under into the freezing, brown, cloudy water and slithered on through.

We quickly ran through some of the maze tunnels beyond. They were narrow and intricate with some interesting formations. However, it wasn't long before we realized we should get back before we lost

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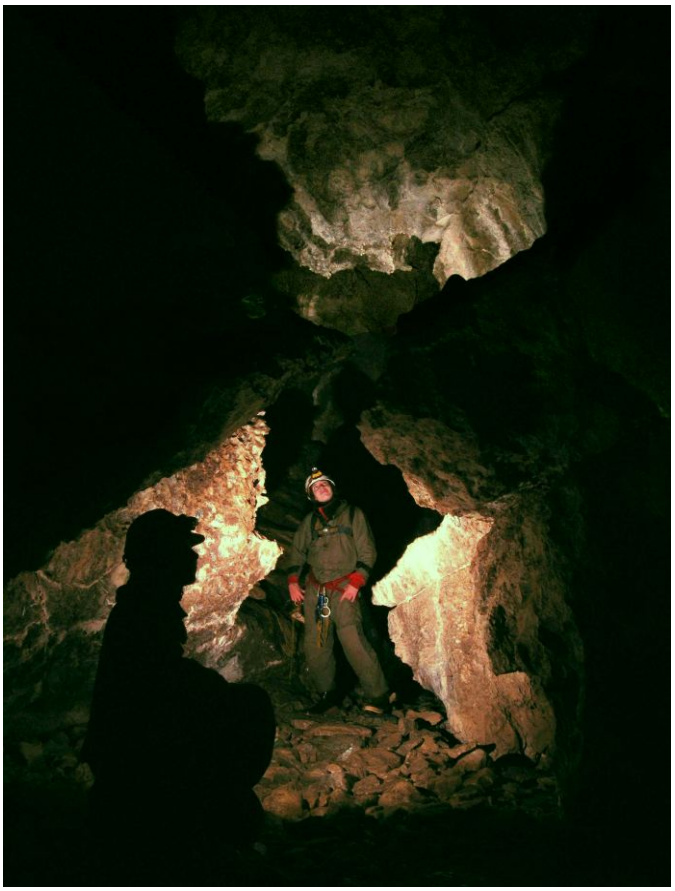
... EL CAP ADVENTURE, continued from page 7

ourselves in this mass of tunnels, so well dubbed "The Maze". We crawled back on through the Diarrhea Pool, up the slimy, muddy tunnel we had begun calling The Colon, and back to the climb to get to the sunny surface. We would return tomorrow to continue our adventures in El Capitan, but for now we were wet and ready to go to our warm cabin.



*Mira and Taira Wilhelm pause at The Archway, which is near the top of Twin Pits.*

Refreshed on Friday morning, we returned to the cave and headed up the main passage. Soon we came to the place we wanted, a long pit down [Twin Pits] that would take us to a river underneath. We went down one by one, and when it was at last my turn I hooked on with my figure-eight and went down a skinny, vertical well for about 20ft. Then it sloped down so I could just walk and lean back, till it dropped off again to the bottom.

Kevin was waiting further down at what appeared to be the end of the passage. He indicated a small gap in the rocks at our feet and a muddy puddle [the Rabbit Hole]. This was the way to the further reaches of the cave. We both laughed at this and attempted to excavate it slightly, only managing to create a deeper puddle. Kevin went through first, then I followed after Josiah Huestis reached the bottom of the descent.

The next cavern seemed to be entirely made of dirt, and we kicked up dust as we climbed around. It had a cool, domed ceiling and a little balcony outpost that we could climb up and around to sit about five feet above the floor of the cavern. The rest of our caving team pushed their way through the "Rabbit Hole" and squeezed on their backs to get into the cavern, with only minor injury when Samantha banged her head on a rock after her scramble to get in.

As we continued deeper, the next challenge was climbing down a steep, slippery rock downcline to continue through a skinny-shaped passage to the next big drop we would need to descend. Kevin was already down and setting up the rope. The rest of us took our time to get safely down the rocky decline. Mira and I had to wait in the entrance of the skinny passage as the others were going down the rope. Looking at the beautiful limestone with some hints of marble whiteness in them, we marveled at how water had rippled these rocks and created imaginative faces and shapes.

At last I rappelled down the drop [Rumbling Pit], coming to rest onto the floor with shiny, wet pebbles glittering in my headlamp, and the waterfall dripping down. We jumped/climbed down another little lip to continue.

Once again I gazed at Kevin like he was crazy as we gathered around a seemingly dead end, low passage full of water. The pool was only waist high, but as I went through I had to duck quickly under to get through with just the top of my head above water.

After a few feet I was amazed by the roar of waterfalls at the end of a high passage, carved by a fast-flowing stream that had carried foam to coat the rocks. I was chilled from the icy water I had just swum through, but psyched to get closer to the fantastic cascading waterfall [it was high water season]. We went against the current to get to Robin Falls. I tried to straddle the stream, as I was unwilling to get any wetter. The rock sides of the passage were very sharp, etched by the cave river. Billy grabbed a piece of the sharp rock which broke and cut his hand. Kevin bandaged it up with his handy first aid kit located in his helmet.

Climbing up through the waterfall, Billy and Mira pulled me up to get to the top of the falls. We went through a short long passage full of knee- high water to face an inclining passage of the stream, ending with a mighty waterfall gushing down. We got as close as we

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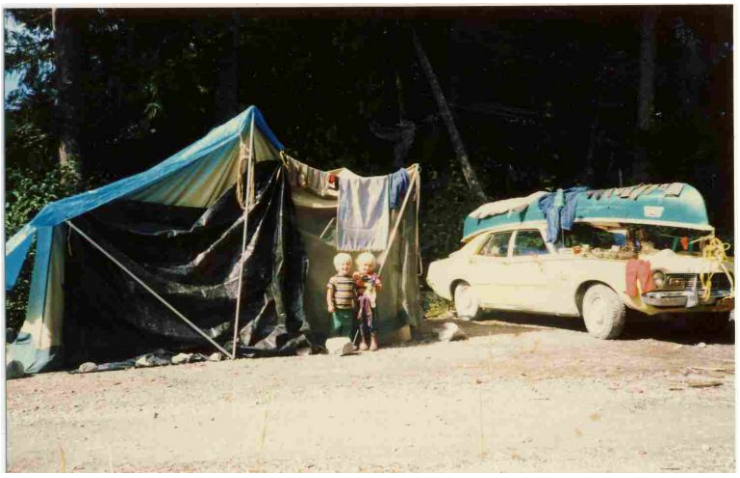
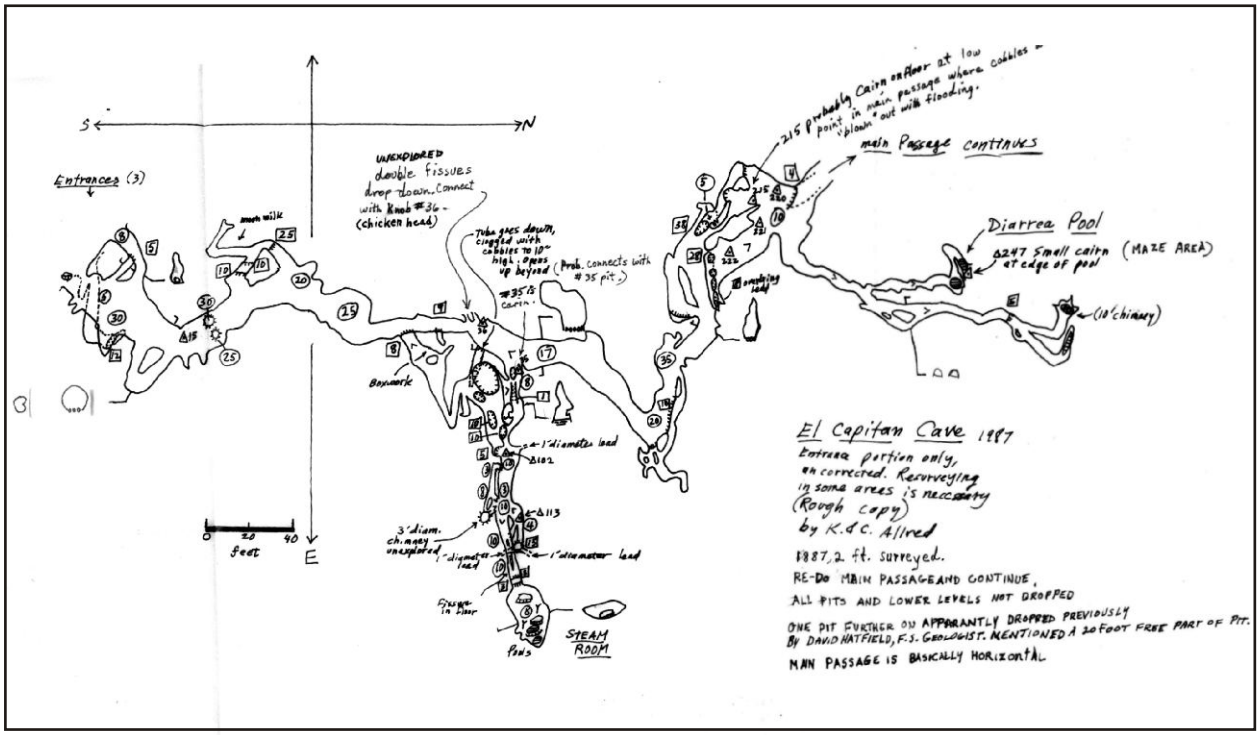
# A PICTORAL ACCOUNT OF THE MAPPING OF EL CAPITAN CAVE

By Carlene Allred



Below is the first El Capitan Cave map that we know of. It was drawn up just after our family's first reconnaissance caving trip to Prince of Wales Island in 1987. The map's purpose was to get the caving community excited enough to come explore further with us, for it had been necessary for Kevin and I to cave solo in order to map this far. One parent had to babysit the three small children while the other went underground alone. A copy of this map was sent to Julius Rockwell, who helped organize a Glacier Grotto expedition. The upper left photo shows our family's



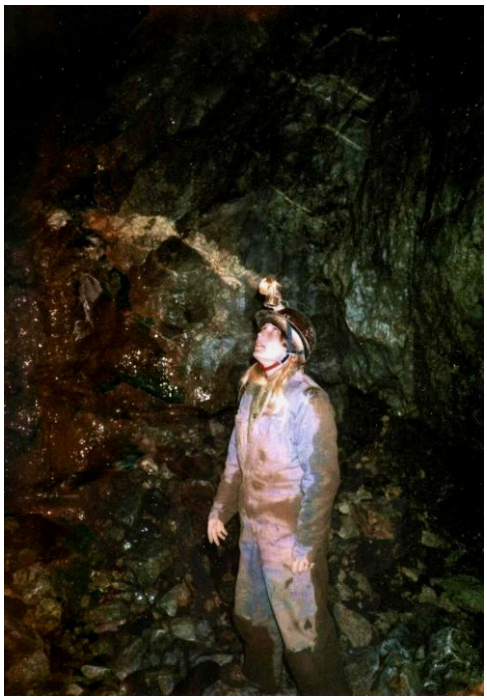

1987 caving camp on El Capitan Passage. The lower right photo shows the small caving group that gathered the next summer at El Capitan Passage. On that expedition the Alaska Room was discovered, but not entered. Also, it was on that expedition that El Capitan Pit was discovered and partially dropped.

(continues on page 10)

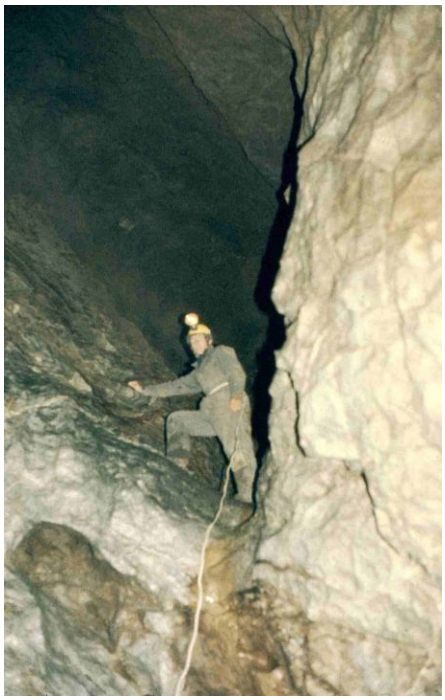
*POWIE 88 camp- From left: Soren, Kevin and Flint Allred; Bob Bastasz, Kathy Tonnessen and David Klinger standing; Jay Rockwell, Carlene Allred and Ella Allred sitting on right. Not shown are Harvey Bowers, Denise Ward and Mark Evans. Photo by Harvey Bowers.*

# EXPLORATION PHOTOS

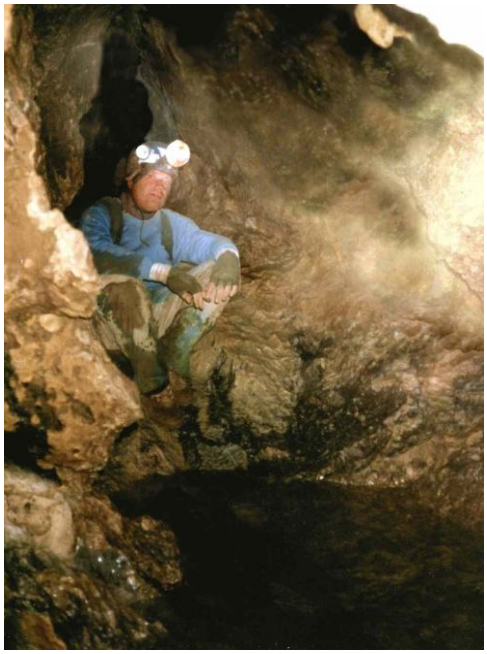
During exploration/mapping trips quick photos are often taken using simpler photographic methods. These pictures are seldom high quality photos, but help document the exploration process. Very often these are the only photos that will ever be taken of remote underground areas. On this page are displayed a few of these images.



*Carlene Allred is greatly relieved to be able to stand up again at last! She and David Klinger had been mapping their way through the seemingly endless, tortuous Ball Bearing Passage bellycrawl. When Dave emerged, he was so ecstatic that he named this room the Cathedral Room. 1988 photo by David Klinger.*



*Kevin Allred has just led up the vertical pitch in the newly-discovered Cathedral Room. He will anchor the rope so that his partner David Klinger can follow. They are about to discover what will later be named El Camino Real. The next day Bob Bastasz and Carlene will map their way further into the mountain and discover what they will name the Alaska Room, but they will not have time to actually enter it. They must wait until next year, for the expedition is over. 1988 photo by David Klinger.*



*Kelly Kelstedt is sitting next to a pool during a mapping trip that connected the Rabbit Hole area with the Lower Maze. 1989 photo by Carlene Allred.*

*Kelly Kelstedt is climbing upstream through what soon will be named the Lower Rockwell River. This spot was named Robin Falls. 1983 photo by Norm Thompson.*

△

# Rope Cutter

Dear Phreada,

I am a big game hunter and I am looking for a new niche market. It seems like all the other options for killing and bagging trophy animals have been filled or lousy regulations keep me from making a killing. Then I had this epiphany, I could take people hunting in caves for the incredibly scary animals that live there. How could I break into this market and where would be the best place to go caving?

Signed, Ernie Hummerweigh

Dear Papa Hummerweigh,

When I read your letter, scenes of future hunts immediately sprang into my mind. Let me replay them for you.

1. You and your client and a porter are lying on your stomachs deep in a cave next to a small puddle armed with a paintbrush the size you used when you were a child doing paint by number. Suddenly after hours of patient watching you spy the prey. There it is, a trophy arthropod. The porter hands him the paintbrush. You urge your client to spring forth and dab the prey onto the paintbrush, but alas he gets buck fever and freezes. You want that trophy badly, so you lunge across the client and snare the arthropod. Then you quickly stash the trophy in your sample container. Later you learn that it is indeed a rare Boone and Crockett trophy, and you have the electron microscope image to prove it.

2. You are at the bottom of a 100 foot drop, performing a bottom belay for your client. The client is rappelling with his gun strapped to his back. Unfortunately the client is a moron and has the gun loaded and the safety off. Then he swings into the wall and the gun goes off. Luckily the ricochet only kills the porter, but unfortunately you will be deaf for life from the sudden assault to your eardrums.

3. You hike for hours into the wild. There it is, the cave opening where your prey lives. Luckily you have reached the cave just before dusk so you can set up your nets. Soon you have the nets in place. You wait. The bell on the net jingles, lights go on. This is the moment of danger; it could escape or injure someone if not handled properly. Thanks to years of practice and some study you extract the prey from the net safely. There it is, and it's a beauty. You hand it to the porter who properly stows the little brown bat in the film canister for future mounting.

4. You head to Arizona in search of another great hunt. You find the cave. You bag the prey. You die from Hantavirus. Did Darwin have this in mind when he formulated his theories?

Next time you have an epiphany, perhaps you could trade it in on an aneurism. Other then bears and giant banana slugs the scariest thing most caves contain (animal wise) is the darkness and your imagination. This idea is not one that should be taken on the road.

Yours, (Sorry to burst your bubble) Phreada. △

A FOCUS ON...EL CAPITAN..., continued from page 5

additional entrances near the main entrance and another about 110 feet above the main entrance (which corresponds to the upper passage) that collapsed about six thousand years ago. Heaton (2002a) reported opening that entrance with the help of others. The entrance was not evident from surveying the slope outside, so with one caver inside, a voice connection was established and it was later dug out. The reason for the exhumation was what lay behind the sealed entrance: a passage adequately named the Hibernaculum.

As reported in Heaton and Grady (2003), in 1992, two years after the initial discovery of the passage and its contents, paleontologists studied the complete skeleton of a black bear, the remains of a brown bear, wolverine, and red fox (as well as the remains of smaller animals such as long-tailed voles). Carlson (1994) states that the Hibernaculum contained at least four black bears and three brown bears. The bones range in age from 6,400 to 12,300 years old, indicating that the passage closed sometime after 6,400 years ago.

Heaton and Grady (2003) classify different portions of El Capitan Cave as either den sites or natural traps. While the Hibernaculum was most likely a den site, providing shelter from the elements and a constant temperature, the main entrance of El Capitan Cave is still used by non-humans. People had a hard time believing me when I told them that river otter used scent-trails to navigate deep into the cave to den; but the hair stuck to the gate (installed to protect bat habitat and to keep vandals out) was more convincing.

Natural traps are places where animals get trapped. These are most likely sinkholes, a karst feature that forms when the ceiling of a passage can no longer support the weight above it, so it collapses. Sinkholes frequently have vertical (or near vertical) walls that animals cannot climb back out of. Portions of El Capitan Cave contain natural trap deposits, which is where Heaton and Grady (2003) reportedly found a caribou radius, and other bones. The openings of these traps have closed since the deposition of the bones.

In related research, in 1991 Carlson (1994) investigated two black obsidian points about 300 feet from the entrance, as well as flecks of charcoal on the ground from the use of a torch. Test digging in the area led Carlson to find a juvenile river otter "sandwiched between fragmented cedar bark" (p. 15). The otter dated to 3,290 B.P., and these cumulative findings led Carlson to believe that "3,330 or 4,000 years ago the cave was visited by humans who left behind the obsidian points and may have left the body of the juvenile otter" (p. 15). To date, there is no oral history in any of the Alaskan Native communities to support this.

Although no human remains have been found in El Capitan Cave, Heaton (2002b) identified the pelvis, lower jaw, and stone tool of a human that dated to about 10,300 years old in On Your Knees Cave, located north of El Capitan Cave. Forest Service Archaeologist Terry Fifield met with and gained the permission of the Alaskan Native groups (Tlingits and Haidas) to excavate and date the remains. This occurred in 1997, a year after the initial find. These are the oldest human remains found in Alaska or Canada.

Findings in caves are reshaping the human migration theory. It was previously thought that humans migrated from Asia along an inland, non-glaciated route. Animal remains found in caves indicate that the area must not have been glaciated during the time when the bones were deposited. Coupled with the evidence locked in flowstone deposits, experts can retrace glacial cycles. The emerging theory is that humans may have migrated along a non-glaciated coastal route. This theory is hard-proved: however, most of the evidence is underwater because of relative sea level rise. Therefore, findings in caves are crucial to understanding human migration to North America.

Other priceless entities exist inside El Capitan Cave. Aside from being the habitat for two species of bat (the Little Brown Bat and the California Bat), river otter continue to use the cave as a den site. Cave-adapted species of worms and mites also live in the cave. Many of the formations along the tour route have been destroyed either by carelessness or vandalism. However, the deeper into the cave one ventures, the more exquisite the formations become.

I had the opportunity to go to the Alaska Room, a room larger than a football field. The way there is difficult, either through a tight pinch, or a descent that requires gear, through a passage that intermittently floods, and then inevitably up an ascent that also requires gear. No signs of vandalism occur past these obstacles. Visitors asked why the formations along the tour route were so small compared to caves they had visited elsewhere. The sad truth is that these formations were once very spectacular, as they still are in the deeper portions of the cave.

Guiding tours through El Capitan Cave was not the highlight of my summer. It was learning all about the Cave that made my summer outstanding. I arrived with an appreciation for karst; I left with a passion. El Capitan

(continues on page 13)

A FOCUS ON...EL CAPITAN..., continued from page 12

Cave is an incredible resource, protecting palentological, archaeological, and geological treasures for generations to come. Sharing a part in peoples' summers many vacationers allowed me to educate them about karst as a resource that must be respected and properly managed. Adults approached me in the grocery store, asking me to explain something they had been thinking about since the tour, and I knew I instilled in them the importance of karst. I was even told by children, weeks after they took the tour, that they were making dioramas of caves. Could anything be more honoring?

ACKNOWLEDGMENTS

I would like to sincerely thank, in no particular order, the SCA for sending me to Alaska; Jennifer MacDonald for selecting me, and granting permission to go to the Alaska Room; Jim Baichtal and Terry Fifield for the field trip early on in the season, and for Kosciusko Island; Don McCully and David McNay for being my caving buddies and David especially for supplying gear; Emily Bennett for multitudes of priceless photos and for covering for me during my trip to the Alaska Room; and Carlene Allred for helping with some of the specifics of this document. Thank you to all those who taught me this summer, for you have increased my understanding of Southeast Alaska's karst. Thank you for helping to make it all happen. △

## CAVING GROUP GETS TOGETHER ON PRINCE OF WALES

by Johanna Kovarik

In December of 2007 community members on Prince of Wales Island were invited to attend the first official meeting of the Prince of Wales caving club. Flyers were distributed across the island, from Whale Pass down to Craig. Johanna Kovarik, Glacier Grotto member, organized this first meeting. "This group presents an opportunity for local people of all ages to get involved in the world-class caves on their island, and hopefully to raise awareness in Alaska about cave conservation". Also assisting in the organization of the group was Mary McGhee of Thorne Bay, who works during the summers as the lead cave guide at El Capitan cave.

The group's first meeting attracted ten people, three from Craig, two from Klawock, one from Whale Pass, and four from Thorne Bay. Caving experience in the group ranged from novice to those with prior SRT experience. At the meeting, Glacier Grotto information sheets were passed out to those interested in joining. Information concerning the NSS and other cave conservation groups was also handed out. Copies of the *Alaskan Caver* and the *NSS News* were on hand for members to peruse, and a slide show was given with photos of caving in southeast Alaska. Those attending were eager to get underground as soon as possible, and the first caving day was scheduled for January 26th with a trip planned to Wingate Cave and surrounding karst features. Other activities in the near future include SRT training rope days in the Thorne Bay gym and cave survey classes.

Kovarik and McGhee also have plans in the works for a Kid's caving club on the island. Several teachers from the Southeast Island School District have voiced their support for such a group and have volunteered to help with rope training events and caving outings. Members of the new "adult" caving club have also volunteered to help out. Teaching cave conservation, good caving practices, and ultimately going caving will get kids excited about their resource, and will also provide them with the skills and experience to get involved in earth science on a national or even global scale!

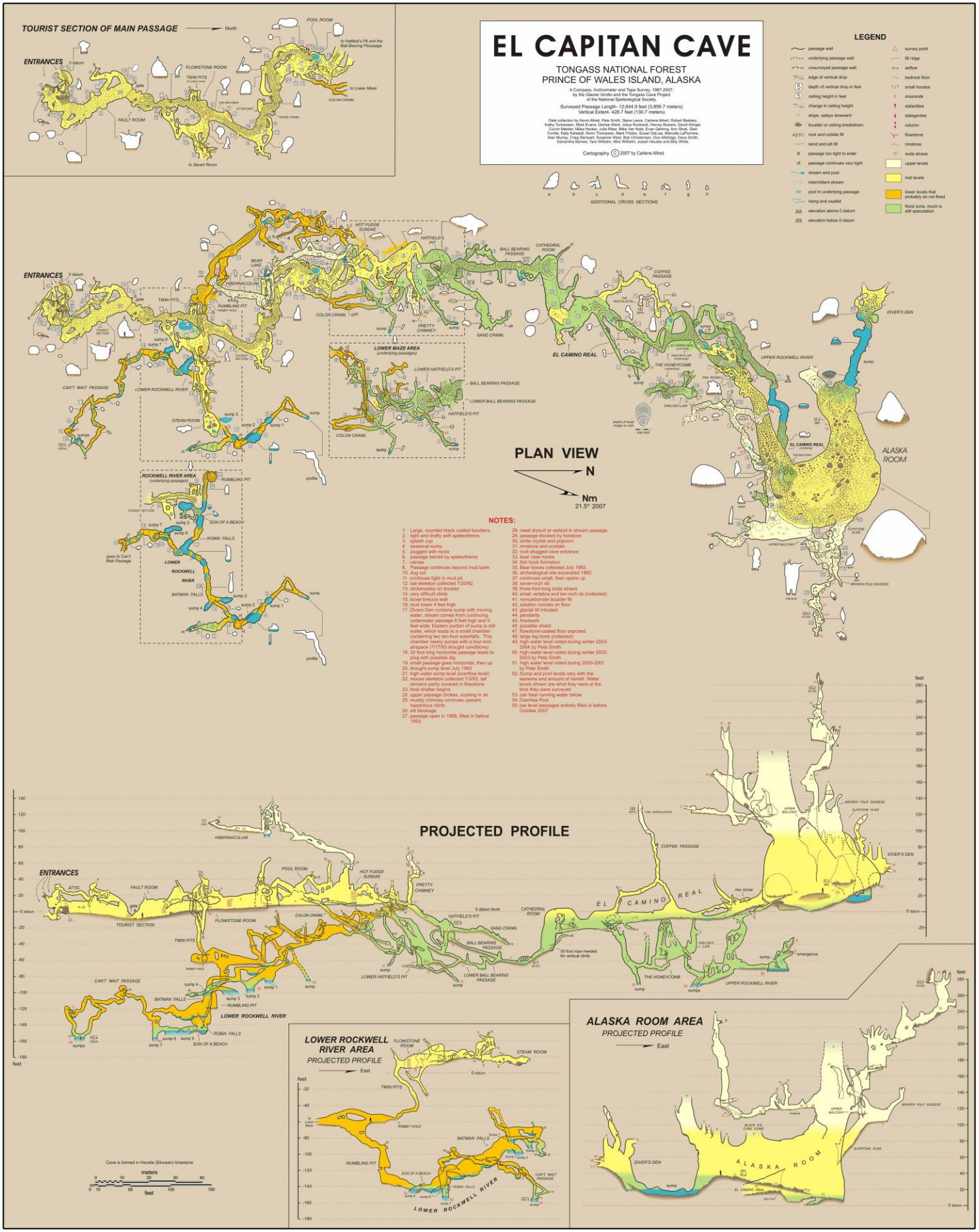
The National Forest Service has cited karst as well as "Getting Kids into the Woods" as two of its top priorities in 2008. Along those lines, the Forest Service has agreed to provide use of helmets, lights and rope to the new caving club. In addition, the Thorne Bay Ranger District has also allowed the group to use its facilities for meetings.

No regular meeting time has been decided upon as of this printing. For more information or to join the group's email list please contact Johanna Kovarik at 907 828 3224, or email at ravishingplum@yahoo.com. △

... EL CAP ADVENTURE, continued from page 8

could, and were bathed with spray. By now we were all chilled and we turned back to head for the surface. Climbing back down the waterfall was another story, for the rushing water soaking me as I tried to find hand and foot holds. We dunked back under the low spot to get back to the dry cave. The return trip upward was a blur as we took turns climbing up the inclines. Kevin and I were the last to go up the last ascent, and emerged with Carlene taking photos of us. As we walked out of the cave we noticed that the rushing water had made our suits cleaner than they had been when we went in. The late afternoon sun in the trees showed an amazing green, unseen in the cave, and we happily walked down the mountain, the awe of our journey and excitment for tomorrow running loose in our thoughts. △

*Taira Wilhelm ascends out of Twin Pits after a cold, wet adventure in the Lower Rockwell River passage.*


TOURIST SECTION OF MAIN PASSAGE
North
ENTRANCES
POOL ROOM
to Hatfield's Pit and the Ball Bearing Passage
FLOWSTONE ROOM
TWIN PITS
to Lower Maze
COLON CRAWL
FAULT ROOM
to Steam Room
EL CAPITAN CAVE
TONGASS NATIONAL FOREST
PRINCE OF WALES ISLAND, ALASKA
A Compass, Inclinometer and Tape Survey, 1987-2007,
by the Glacier Grotto and the Tongass Cave Project
of the National Speleological Society.
Surveyed Passage Length- 12,644.9 feet (3,856.7 meters)
Vertical Extent- 428.7 feet (130.7 meters)
Cartography © 2007 by Carlene Allred
LEGEND
passage wall
underlying passage wall
unsurveyed passage wall
edge of vertical drop
depth of vertical drop in feet
ceiling height in feet
change in ceiling height
slope, splays downward
boulder or ceiling breakdown
rock and cobble fill
sand and silt fill
passage too tight to enter
passage continues very tight
stream and pool
intermittent stream
pool in underlying passage
rising and swallet
elevation above 0 datum
elevation below 0 datum
survey point
fill ridge
airflow
bedrock floor
small hoodos
moonmilk
stalactites
stalagmites
column
flowstone
rimstone
soda straws
upper levels
mid levels
lower levels that probably do not flood
flood zone, much is still speculation
ADDITIONAL CROSS SECTIONS
ENTRANCES
HOT FUDGE SUNDAE
HATFIELD'S PIT
BALL BEARING PASSAGE
CATHEDRAL ROOM
BEAR LAKE
HIBERNACULUM
COFFEE PASSAGE
TWIN PITS
RUMBLING PIT
COLON CRAWL
PRETTY CHIMNEY
SAND CRAWL
LOWER MAZE AREA
(underlying passages)
LOWER HATFIELD'S PIT
LOWER BALL BEARING PASSAGE
EL CAMINO REAL
DIVER'S DEN
UPPER ROCKWELL RIVER
CAN'T WAIT PASSAGE
LOWER ROCKWELL RIVER
STEAM ROOM
THE HONEYCOMB
ALASKA ROOM
ROCKWELL RIVER AREA
(underlying passages)
SON OF A BEACH
ROBIN FALLS
LOWER ROCKWELL RIVER
BATMAN FALLS
PLAN VIEW
N
Nm
21.5° 2007
NOTES:
1. Large, rounded black coated boulders.
2. tight and drafty with speleothems
3. splash cup
4. seasonal sump
5. plugged with rocks
6. passage barred by speleothems
7. varves
8. Passage continues beyond mud bank
10. dug out
11. continues tight in mud pit
12. bat skeleton collected 7/20/92
13. slickensides on boulder
14. very difficult climb
15. loose breccia wall
16. mud tower 4 feet high
17. Divers Den contains sump with moving water; stream comes from continuing underwater passage 6 feet high and 9 feet wide. Eastern portion of sump is still water, which leads to a small chamber containing two ten-foot waterfalls. This chamber nearly sumps with a four-inch airspace (7/17/93 drought conditions)
18. 30 foot long horizontal passage leads to plug with possible dig
19. small passage goes horizontal, then up
20. drought sump level July 1993
21. high water sump level (overflow level)
22. mouse skeleton collected 7/3/93, tail remains partly covered in flowstone
23. frost shatter begins
24. upper passage chokes, sucking in air
25. muddy chimney continues upward, hazardous climb
26. silt blockage
27. passage open in 1988, filled in before 1993
28. need drysuit or wetsuit in stream passage
29. passage blocked by hoodoos
30. white crystal and popcorn
31. rimstone and crystals
32. rock-plugged cave entrance
33. bear claw marks
34. fish hook formation
35. Bear bones collected July 1992
36. archeological site excavated 1992
37. continues small, then opens up
38. seven-inch rib
39. three-foot-long soda straws
40. small vertebra and ten-inch rib (collected)
41. noncarbonate boulder fill
42. solution runnels on floor
43. glacial till intruded
44. pendants
45. frostwork
46. possible shield
47. flowstone-coated floor exposed
48. large leg bone (collected)
49. high water level noted during winter 2003-2004 by Pete Smith
50. high water level noted during winter 2002-2003 by Pete Smith
51. high water level noted during 2000-2001 by Pete Smith
52. Sump and pool levels vary with the seasons and amount of rainfall. Water levels shown are what they were at the time they were surveyed
53. can hear running water below
54. Diarrhea Pool
55. low level passages entirely filled in before October 2007
PROJECTED PROFILE
ENTRANCES
ATTIC
FAULT ROOM
TOURIST SECTION
FLOWSTONE ROOM
COLON CRAWL
TWIN PITS
CAN'T WAIT PASSAGE
BATMAN FALLS
RUMBLING PIT
LOWER ROCKWELL RIVER
ROBIN FALLS
SON OF A BEACH
HIBERNACULUM
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HOT FUDGE SUNDAE
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HATFIELD'S PIT
CATHEDRAL ROOM
SAND CRAWL
BALL BEARING PASSAGE
LOWER HATFIELD'S PIT
LOWER BALL BEARING PASSAGE
30 foot rope needed for vertical climb
EL CAMINO REAL
COFFEE PASSAGE
FAN ROOM
THE HONEYCOMB
UPPER ROCKWELL RIVER
emergance
DIVER'S DEN
BROKEN POLE SQUEEZE
SUPSTONE SLIDE
UPPER BALCONY
LOWER ROCKWELL RIVER AREA
PROJECTED PROFILE
East
STEAM ROOM
RABBIT HOLE
ALASKA ROOM AREA
PROJECTED PROFILE
East
ALASKA ROOM
BLACK ICE CAVE DOME
Cave is formed in Heceta (Silurean) limestone
meters
feet

The Alaskan Caver
2525 Fourth Ave.
Ketchikan, AK 99901

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