

The Cascade Caver

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CASCADE CAVER

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Meetings: 7:00 pm on the third Friday of each month at the University of Washington, Room 6, in the basement of Johnson Hall.

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Dues: Membership in the Cascade Grotto including subscription to the *Cascade Caver* is \$7.50 per year. Dues for additional family members is \$1.50. Subscription to the *Cascade Caver* only is \$7.50 per year.

Please note the date on your mailing label that indicates when your dues expire.

Overdue: David Becker 1/88, Dan McFeeley 1/88,

Due: Jeff Forbes 2/88

Coming Up: Alan Lundberg 3/88, Bruce Donohue 3/88, Thad Hahn 3/88,
Jim Harp 3/88, Shaun Larson 3/88, Roger Cole 4/88,
Richard Smith 4/88, Bob Brown 5/88, Peter Carter 5/88,
Gerry Thompson 4/88, Randy Vance 4/88, Richard Walter 4/88,
Mark Wilson 3/88

Correction: Adriyah Hanum's phone number listed in vol 26.9 should read 527-1681.

New Members: Rob Harrison; 1825 N. 54th Street, Seattle WA 98103 547-3666
Robert Jared; 5222 Mill Pond Road, Auburn WA 98002 939-3924

Cover: Drawing by Linda Heslop showing Peter Sprouse in Sistema Purificacion, Mexico, from a photo by Bull Farr and Carol Vesely.

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Upcoming Events

Feb 19	February meeting.
Mar 5	Trip-planning meeting at Mark Wilson's house.
Mar 18	March meeting.
Apr 15	April meeting.
May 20	May meeting.
May 28-30	Northwest Caving Association Regional meet on Vancouver Island.
Jun 27-Jul 1	NSS Convention at Hot Springs, South Dakota.
Jul 2-9	NCRI Jewel Cave work session.

Meeting Notes

The 1987 December meeting was attended by about 10 people, including 3 newcomers.

Changes to the Cave Protection Law, an issue which was discussed and tabled at the November potluck, was brought up

again. A committee consisting of Bob Martin, Rod Crawford and Dr. Halliday was appointed to review Dr. Halliday's proposed changes.

Dr. Halliday showed slides of his recent trip to Thailand (followed up by a report in this issue). Bill said that Bangkok was so pretty that he used up most of his film before he even got to the caves.

Rod Crawford followed with a presentation on phoretic mites, mites that include a special stage in their development cycle designed especially for hitching rides on other animals.

The January meeting was opened by Ben Tompkins, who announced the results of the grotto election. Congratulations to Mark Wilson, Dick Garnick, and Ben Tompkins on their new positions.

Included on the ballot were questions about preferred meeting nights and times with Friday and 7:00pm being the strong favorites.

The meeting was then turned over to Dick Garnick until Mark Wilson arrived. A trip planning meeting was set for Saturday, March 5, at Mark Wilson's house.

The Cave Law committee reported on its review of Dr. Halliday's proposals. They reached a consensus on all issues except that of the Freedom of Information Act. The grotto decided to continue supporting the Cave Protection Law in its current form, encouraging consideration of the proposed changes if and only if doing so does not hinder passage of the existing legislation.

Pete Carter finished the evening with a slide show on caving in Belize and Guatemala, which was enjoyed far more than these few words might imply.

Wind Cave Trip Reports

By Jim Pisarowicz

Submitted by Shaun Larson

Date: 12 December 1987

Participants: Steve Dunn, Marc Lamphere, Ed LaRock, Shaun Larson, Jim Pisarowicz, and John Sheltens.

Duration: 12 hours

The Silent Expressway represents the western edge of Wind Cave. For this reason it receives much attention from cavers as they discuss the possibilities of where new cave will be found. Unfortunately, a trip to Silent Expressway

is no small undertaking as the travel time for a fast group is often in excess of three or four hours one way. The last two trips into this area discovered no new cave. With these thoughts, we headed into Wind Cave on the long trek to Silent Expressway.

The plan for this trip was somewhat different from the previous trips to the Silent Expressway. Two years ago, on the last trip to map new cave in this area, Andy Flurkey was lowered down a pit with pack straps. At the bottom of the pit he indicated that he thought the passage continued but did not want to push it because of his precarious position so far into the cave. On our trip we were carrying a rope so that we could negotiate this pit.

Three hours after entering the cave we were rigging our rope at the top of the once-descended pit. After we had anchored the rope, I did a quick French arm rappel down the drop. Shouting up to the others that I intended to check ahead, I turned down the large fissure.

The fissure at my level quickly ended but continued up a climb. Chimneying up into the ceiling about 40 feet I encountered a hole going down again that had good air movement. I was really excited as I made my way down the tight hole, expecting at any moment to pop into the large passage that was responsible for all the air movement. The passage continued down and continued to blow so I headed back to get the others.

Meanwhile, John had found an upper level above the hole I had descended. We decided to follow the air first with Shaun and I pushing ahead while the others surveyed what we had discovered. This worked extremely well except that the passage shut down on us. All of the wind dissipated into small cracks and fissures that we could not get through.

We regrouped at this point and began pushing into the upper level leads that John had first entered. These were low, wide crawls with yellow clay floors. This area is a maze of this kind of crawl but there was time to survey and still

begin the long trip out meeting our trip time table.

This new area has pretty good potential, especially considering that the previous two trips out there did not uncover any new leads. I am sure that we will return and explore these new crawlways, following the wind to who knows where.

Date: 20 December, 1987
Participants: Shaun Larson, Greg Nepstad, Jim Pisarowicz, Darren Ressler, Karen Rosga.
Duration: 3.5 hours.

The trip of 16 December had surveyed to the bottom of Plummer's Pit but could continue no further up the "pit" for lack of technical rock climbing equipment. As Wind Cave has few drops or climbs that require much equipment it is generally not carried unless the explorers know that it will be required. This short evening trip was planned to climb the pit.

We began the trip by dividing up the climbing gear. We took a 150-foot climbing rope, a 150-foot caving rope, a dozen carabineers, half a dozen pitons, a piton hammer, an etrier, and a short aluminum rope ladder. Within half an hour of entering the cave we were stationed at the bottom of the pit.

Because of the severe rockfall problem in this area only myself as lead climber, and Shaun as belayer, stayed in the immediate Plummer's Pit area, which Shaun called the "Bowling Alley". The others went off checking leads in the vicinity of the Lonely Palace.

The first part of the climb went relatively smoothly. In 1959, the National Speleological Expedition to Wind Cave had placed an expansion bolt in the lower part of this climb as they attempted to make their way up the pit. Secured by the climbing rope and using carabineers, the etrier, and the aluminum rope ladder, I slowly ascended the hole in the ceiling of this room. Unfortunately the aid ended after only 25 vertical feet.

From the vantage point standing in the etrier I saw a shear chimney of flaky rock with a 2X6 jammed into the passage. I reached out to the board and literally stuck my finger right into the wood. It had rotted out over its years in the damp cave. After trying this climb I had almost resigned myself to heading down when suddenly thought I had the pitch figured out. I wedged myself across the void and chimneyed up and up and up. There was no place to put in protection but I soon crawled through a hole above me into a small room. The rock in this room is completely broken up and fractured so I decided to call it the Shattered Hall. The most surprising find in the Shattered Hall was a piece of newspaper dated 1895. The rotted 2x6 had probably been in the cave for almost 100 years.

I tried to shout down to Shaun but I was over 100 feet above him, too far for him to hear. I pulled up some slack in the rope, found a couple large rocks to anchor on, and then rappelled back down.

Since it was getting late, we decided that Shaun and I should re-climb the pit and rig the caving rope to be used by the others on a return trip the next day. While doing this Shaun and I found another climb continuing further up. This we will attempt on tomorrow's survey trip up Plummer's Pit to Shattered Hall and hopefully into a major new discovery.

Date: 21 December 1987
Participants: Shaun Larson, Jim Pisarowicz, Darren Ressler.
Duration: 3 hours

It sure seemed like a long day. We had a blowing lead and all of us could not wait to get back into the cave. Six o'clock finally rolled around and we were standing in the elevator building getting set for the next adventure up Plummer's Pit.

Shaun climbed the rope first into the Shattered Hall. Darren would go in the middle since he had never climbed a rope with ascenders. In this way we would have cavers both above and below him in

case he needed assistance. Everything went smoothly and before we knew it we were all standing in the Shattered Hall.

The climb out of Shattered Hall did not look as serious as the Plummer's Pit climb. I attached the climbing rope into my harness and with Shaun as belayer, began the climb. It was fairly easy and soon I was worming my way through the floor of another room. It was smaller than Shattered Hall but just as broken up. I called it the Shattered Sky.

The others scrambled up into the Shattered Sky but unfortunately the passage ended in this room. The ceiling was a breccia of red clay, limestone, chert, and sandstone but did not go.

We took out the survey gear and began mapping these rooms and the pits that led down to the level of the tour trail. This was the most interesting survey as we had to hang off our rope while we measured distances or red instruments. All the time we were doing this we were being showered by debris knocked loose from above.

Fortunately many of the shots were vertical and before long we were tying our survey into the previous point at the bottom of the drop. The only bad part about the day was that we had topped out Plummer's Pit.

THAILAND

Temple Caves and Tower Karst

By William R. Halliday, M.D.

From previous reports of various Cascade Grotto members and from reading travel literature, I had long been anxious to see the temple caves and tower karst of Thailand. Late in 1987 it happened. From December 5 to 13, Marcia and I made a rapid but extremely productive flying visit to central and south Thailand. The people, the country, the caves, and the karst turned out to be even greater than we had expected.

We arrived in Bangkok just before midnight on the eve of the king's

auspicious 60th birthday - a kind of July 4th, Christmas, and Easter all combined. We didn't see much of Bangkok but by merely looking around and walking into the grounds of the many temples one gets a bit of an introduction to the fervent Thai version of Buddhism which we were to be seeing underground. What you can see just by walking around Bangkok is overwhelming, anyway.

Early next morning we flew about two hours on a Thai Boeing 737 to Phuket Island, our first base camp. On the left as we landed we could see towering limestone spires, towers, and masses sticking up out of Phangna Bay where we were to go the next day, drowned tower karst indeed.

Phuket Island is an increasingly famous resort area for its west side beaches. Caves are present but are said to not amount to much. Our not-so-spartan base camp was a brand-new Holiday Inn across the road from touristy but pleasant Patong Beach, about 25 miles from the airport. I didn't get to the beach until dusk on our last evening - too much to do elsewhere.

The next day dawned cloudy and windy, not a good omen for our boat trip in Ao Phangna National Park, but we went anyway. An hour's ride on mostly good roads brought us to a boat landing in mangrove swamps where highly maneuverable but tippy "long-tailed" speed boats leave with loads of tourists at 15 minute intervals all morning. In the distance we already could see the first limestone towers, reminiscent of those which are famous in China's Guilin. Soon we were among the towers, first those arising from the mangroves, then those in the open bay.

A variety of trips is possible here, with several caves that can be visited by boat by special arrangement. We opted for the standard tour, boating through the famous Tham Lod or Lot, about 200 feet long and depicted on a Thai postage stamp. Tham means "cave" in Thai and Lod/Lot means "through". Tham Lod is about as common a name here as is Bat

Cave in parts of the United States. This one is a short remnant of an old throughway cave, 50 feet wide and 20 feet high, with impressive bulbous stalactites at both ends.

The tour included an excellent seafood lunch at a Malay fishing village built on stilts in the lee of a karst tower, then continued to Ko Khao Phing Kan (Ping Kan Island), now better known as James Bond Island since part of the Man with the Golden Gun was photographed here, including cave scenes. We visited only two of the caves. One is a high, narrow cleft formed by the partial collapse of one tower against the next; perhaps 50 feet high, 100 feet long and 20 feet wide at the floor. The other consists of a series of interconnected grottos running part way around the main tower a few feet above the tidal zone. Surprisingly large limestone terraces and a few bulky stalagmites are present. So are a few bats which somehow manage to coexist with tourist hordes.

Back to the mainland and the tour bus, we proceeded to Tham Suwanna Kuha, about 1 km north of Route-4 and about 1 km east of Phangna Agricultural College, 5 km west of Phangna town proper. This was our first temple cave, and a great introduction. About a century ago a wandering Buddhist monk came upon its spacious entrance at the foot of a jungle-covered, honeycombed limestone hill, and chose it as his meditation cell. Judging by his statue in an honored grotto above the main entrance, he meditated to the point of starvation. After his death the pious Phangnese dedicated the cave and the hill to him. In the spacious main chamber is a beautiful big reclining Buddha. Also present were many lesser shrines, cone-shaped ceremonial towers called stupas, other items of religious art, and a colony of bats.

At the far end of the main chamber are stairs leading up to another chamber, widely open to the exterior. Here are cartouches of the royal family of Thailand, with detailed explanations in Thai and Chinese. In the upper entrance is

another statue apparently of the same monk, together with some less sophisticated religious articles. And amid massive draperies in a semi-hidden grotto around to the right from the upper entrance, unmarked by any sign and missed by 99% of the visitors, are 3 large brass Buddhas with classical Thai features quite unlike those in the main cave.

Other caves are present in this conical hill. I ignored an overly-rickety ladder leading up into a hole which lead still farther upward in an area of massive cliff-side dripstone near the Buddha grotto. I never found the one indicated by a sign saying Bee Cave. A similar sign saying Kitchen Cave led to a sinuous little phreatic cave at ground level with a pleasant young monk tending a small fire in its mouth. I noted numerous wasp nests and termite trails, and this cave was obviously much visited by the local monkey population.

The next day saw us on another boat trip, this time to the Ko Phi islands and the extensive Viking Cave, famous for ancient pictographs. Here also was a shrine at the base of a huge, weathered stalagmite where sea gypsies burn joss sticks before making the dangerous ascent of a bamboo pole to collect swallows' nests for bird's nest soup.

This boat trip included some of the most beautiful scenery I have ever seen plus another excellent seafood lunch. But alas! The wind was too high for us to land at the cave and all we could do was photograph it from the boat against the light. We were taken instead to a protected bay nearby for some of the most pleasant snorkeling I have ever done, among fantastic coral and deep wave-cut niches in the littoral zone.

With one day free of tours in our "package trip", we hired a taxi for a return to Tham Suwanna Khuha and also to see the caves in Phangna Town itself. This clean little provincial capital is largely hemmed in by steep-walled limestone blocks and has isolated towers right in town that were honeycombed with intricate caves.

Tham Pung Chong (literally "Cave in the Elephant's Stomach") was a resurgence cave emerging at the base of Elephant Hill, behind a wat with a notable gate bearing a triple elephant head. Our taxi drove right into the main overhang. Small, unsophisticated shrines were present in at least two of the entrances. We did not attempt the water passage which traverses Elephant Hill.

In a pleasant city park, nearly in the center of town, were three adjacent towers. One contained the honeycomb-like Tham Russi Sawan (Hermit Cave), with a venerated statue of the hermit at one entrance. The next tower contained Tham Luk Sue, and the third had some interconnecting natural bridges, clearly all remnants of a phreatic spongework system. These caves were partially at the water table level and a city fire truck was refilling its water tank while we were there. Tham Luk Sue and the natural bridges were drive-in caves; one part of the former was inhabited by a troop of motorbikers who offered us their bottle of white Thai whiskey. Most notable here, however, was an irregular stalactite about 10 feet long with sizeable plants growing on its surface.

Not far away, a roadside sign pointed in the general direction of Tham Khao Ngun. This cave, a remnant of a throughway cave, extended about 50 yards completely through a karst tower. Although almost opposite Tham Phung Chung and behind the provincial law offices near the center of town, it was not easily found and was in rather dense jungle. The Phangnese respect an extensive archeological site at its entrance and rarely visit it. It had a beautiful column in partial daylight near the far entrance, the prettiest speleothem that I noted in Phangna.

Tham Tapan, in the eastern part of town, is another active resurgence throughway cave. It was about 1km east of the tourist office, around the bend at the only traffic island, and about 1km north of the main road. Inside its gaping entrance is a rather primitive shrine unlike

any other I observed in Thailand, being without clear Buddhist symbols that I could perceive. Apparently it is more animist than Buddhist. I again resisted the temptation to try a water passage and we returned to the hotel in time for a 20 minute swim at dusk.

The next day saw us back to the airport for the two-hour flight to Bangkok and eventually an hour in the famous temples of the Royal Palace compound just before closing time. Don't snicker, even a quick look is a remarkable experience. But go before 3:29 when we did. The entrance gate closes at 3:30 and the guards encourage visitors to leave by 4:30.

Probably the most famous temple cave in Thailand is Tham Khao Luang, near the town of Petchaburi, a 3-hour train trip from Bangkok. We visited it the next day. The trip was inexpensive, easy, and delightful. First the train ran through parts of the delta where beautiful canals had not yet been filled in to make new housing and roads. Karst towers appeared in the distance just before the town of Ratchaburi. Near the smaller town of Khao Yoi (Stalactite Hill) was an isolated bare tower reminiscent of those at Chillagoe, Australia.

The main entrance of Tham Khao Luang was almost atop a jungle-covered limestone hill. Concrete stairs wound down an enlarging shaft with large columns and a small shrine. Suddenly a huge chamber opened ahead, vaguely illuminated by a natural skylight and dim electric lights. From its tiled floor rose tall, white stupas and dimly-seen golden Buddhas. More and more Buddhas and their gilded attendant statues appeared everywhere in the shadows as the eyes adjusted, even in niches carved high on a massive stalagmite. Beyond a great reclining Buddha was a second temple chamber with further Buddhist works of religious art and multiple skylights. Hordes of visitors come on weekends; on Friday we had the cave almost to ourselves except for a friendly teenage volunteer guide. Truly a memorable experience.

Australian speleologist John Dunkley arrived in Bangkok at midnight that night. The next morning we all started for the caves of Kanchanaburi via an air-conditioned bus which was a bit short of leg room but otherwise much more luxurious than American busses. The area is also famed for the bridge on the River Kwai.

John is something of a one-man speleological survey of Thailand, especially in the Kanchanaburi area. He speaks more than a bit of Thai and soon hired a local open-sided taxi to hunt for a temple cave rumored to be about 40 km farther west in another province. On arrival we found another whole hill full of caves: Khao Ang Hin.

A sketch map painted on the gate showed 22 or 33 caves and shafts in the hill (Thai numerals can be a bit of a problem), but John suspects that several probably don't qualify as caves. Naive folk-art figures of humans and animals contrasted strikingly with an austere staring Buddha at the top of the entrance steps. Two of the caves were major: Tham Fuad (Dark Cave), and Tham Phi Song (Cave of Two Spirits). The electricity was off at the time and a young monk lead the way with a huge candle where skylights were inadequate. Inside, the religious art was again naive and folksy, but obviously sincere. One small stalagmite was slightly carved to emphasize its resemblance to an elephant's head. Bats were present as was considerable dripstone and a placid snake, about 6 feet long, semi-coiled in the center of one passage. Nobody bothered to determine its species. In spite of its out-of-the-way location, numerous Chinese tourist visit this cavernous hill, apparently in part for divination.

Near the "63 km" post on the return to Kanchanaburi we were surprised to see a large bucket sliding down a cable from a cave entrance high on one of the limestone hills. It was a guano mine in full production. About 1 km farther, 9 km or so west of the research station, was another prominent cave opening with a

Buddhist flag at the entrance. John planned to visit it on his next trip.

Our next cave was Tham Mangkhonthong, a well-known and comparatively touristy cave much visited by Asian tour groups. It is about 200 feet long. Previous caves in Thailand had offering boxes available but not emphasized, whereas here an admission fee was requested and it was the only place where children asked us for money. It was also the only commercial cave I have ever visited in which tourists had to crawl up and down to get out the rear entrance. The cave was well worth visiting despite these minor nuisances and having to climb about 100 steps to the entrance. The normally spartan meditation cells were richly decorated and the floor tiles were splendid.

Last on this spectacular afternoon was Tham Khao Laem, closer to Kanchanaburi but also well up a conical hill. A white Buddha rests serenely in the entrance grotto with a larger chapel beyond. Rickety, rotting ladders lead up and around and down into further sections of the complex cave where meditation cells are located.

We took a local bus 17 km up-river the next day, getting off just before the Kanchanaburi Teachers College. From there we hiked 10 minutes to Tham Phu Phra at the base of the nearby hills. To our surprise we found a sign in English reading "Welcome to cave". All other caves in this part of Thailand had signs only in Thai and Chinese. A legendary Thai personage is said to have studied magic in this cave and it is much visited by Chinese pilgrims from Hong Kong who find it especially auspicious. It had electricity and contained several artistic shrines. Its ladders were sturdy and its meditation cells were proper. I noted more ficus roots, bats, and crickets than most of the caves we visited. The temple bell at the cave entrance was photogenic and fragrant flowers lined the steps to the entrance.

We hiked back to the highway and soon caught another local bus to Nam Tok

in the Sai Yok District at the end the railway. High on a cliff, behind the village but not quite visible from the train station, sat a gilded Buddha gazing serenely at the valley from Tham Phra. This small but spectacularly located cave was a 10-minute walk and a 10-minute stair climb from the station. Behind the Buddha was a typical meditation cell but the only one found occupied in any of the caves we visited. Off to the left and ten minutes higher on a poor trail was Tham Yai (Big Cave) which was dark, gloomy, and spacious, containing only a tiny shrine.

Many other caves are located in this valley and those nearby but we had to catch a train to Bangkok where our plane would leave that night. So we turned homeward, toward the Bridge over the River Kwai, but not without seeing one

more cave from the train. Almost alongside a rickety trestle where the train slowed to 5 mph was Tham Lum Sum, where some Allied prisoners slept during the Japanese Army construction of the Burma railroad during World War II. It, too, had a small shrine.

John regaled us along the way with his vast lore on other Thai caves, some deep in virgin jungle and known only from aerial views of karst windows, caves with tiger tracks, caves with Roman coins found in post-World War II excavations. Not long ago, even some of the caves we had visited with such ease could be reached only on elephant back. Now excellent new roads push deeper and deeper into the jungle and Thailand is entering a new era. This is clearly the time to see Thai caves of every sort, from temple caves to the most sporting. I hope to return soon.

Cascade Grotto Map Library By Rod Crawford

The Grotto has a fairly large collection of topographical maps of Washington State. Here is a list of the maps that we currently have and the rules for borrowing them.

1) The loan period is the period from one Grotto meeting to the next. Maps borrowed between Grotto meetings are due on the second following meeting. Renewals will only be made in extraordinary circumstances (the object being to keep maps available to everyone).

2) The rental fee for members is \$.10 per map per loan period. Non-members may not borrow maps.

3) Anyone damaging map enough to greatly reduce its usefulness will be expected to pay for replacing the map (currently \$2.50).

4) Do not make any marks on maps or fold them in any way other than the way they are presently folded.

5) Do not remove maps from the plastic wrappers unless really necessary. (7 1/2' maps are folded so 1/2 of the map is visible; 15' maps, so that the entire map is visible through the plastic.)

6) The librarian will bring any maps to a meeting, that members have notified him they want to borrow. Members may borrow maps by mail so long as they pay postage (a 15' map weighs 1 oz.; a 7 1/2' map 1 1/2 oz.

The Grotto map librarian is: Rod Crawford, Museum (DB-10), U. of W., Seattle, WA 98195; (206) 543-9853 late evenings.

Maps are listed geographically by square degree of latitude and longitude. Each square degree is identified by the coordinates of the southeast corner.

15' QUADRANGLE MAPS
OF WASHINGTON

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Pysht, 1957
Cape Flattery, 1957
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Lake Pleasant, 1957
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Port Angeles, 1961
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Lake Crescent, 1950
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Ohop Valley, 1959
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- 46/121:
White Pass, 1962
Randle, 1962
Packwood, 1962
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Bumping Lake, 1962
Steamboat Mtn (30'), 1926

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Ellensburg, 1958

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Lookout Mtn, 1953
Bridal Veil, 1954

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Wind River, 1957
Husum, 1957

7-1/2' QUADRANGLE
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False Bay, 1954
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Riverside, 1981
Omak, 1981
Conconully East, 1981

48/118:
Bangs Mtn, 1969
Marcus, 1969
Bossburg, 1969
Kettle Falls, 1969
Boyds, 1969

48/117:
China Bend, 1969
Northport, 1969
Onion Creek, 1969
Deep Lake, 1952
Boundary, 1952
Leadpoint, 1952
Boundary Dam, 1967
Park Rapids, 1967
Metaline Falls, 1967
Metaline, 1967
Abercrombie Mtn, 1967
Echo Valley, 1952
Gillette Mtn, 1952
Spirit, 1952
White Mud Lake, 1952
Addy Mtn, 1965
Colville, 1952
Arden, 1965
Dunn Mtn, 1965

47/122:
Maple Valley, 1973
Issaquah, 1973

47/121:
Scenic, 1965
Blanca Lake, 1965
Skykomish, 1965
Baring, 1965
Stevens Pass, 1965
Grotto, 1965
Snoqualmie 2NW, 1961
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47/120:
Wenatchee Lk 2 SW 1965
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47/119:
Park Lake, 1975
Cooley City, 1965
Ephrata, 1956

47/117:
Pine City, 1964

46/124:
Cape Disappointment 1973

46/121:
White River Park, 1971
Mowich Lake, 1971
Chinook Pass, 1971
Cliffdell, 1971
Sunrise, 1971
Mt Rainier East, 1971
Mt Rainier West, 1971
King Mtn, 1971
Mt Adams East, 1970
Mt Adams West, 1970
Lone Butte, 1965
Burnt Peak, 1965
Sleeping Beauty, 1970
Trout Lake, 1970
Quartz Creek Butte 1965

46/120:
Weddle Canyon, 1971

45/122:
Lacamas Creek, 1970
Washougal, 1975