THE GEYSER GAZER Sput

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GOSA

INSIDE THIS ISSUE

Sawmill Geyser on Jan. 12, 2023. Photo by Graham Meech.

THE GEYSER GAZER
Sput

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Letter from the President

By Micah Kipple

Spring has Sprung, Geyser Gazers!

The thaw hasn't quite made it to Yellowstone yet, with a slightly snowier and cooler winter than average across the Northern Rockies and Yellowstone National Park, but more water across the landscape may mean more or different geysers this season! What geysers can we hope for this year aside from the usual suspects? Park opening is right around the corner, and I'm excited to see the first in-basin, summer-season reports come flooding in.

The Old Faithful Streaming Webcam has been down since March 27, 2023, as of the time of this writing. Before the webcam went down, several fun events were logged, both thermal and nonthermal. The thermal events included an eruptive series by Dilapidated Geyser in the Pipeline Meadows Group. Two series occurred in February and one series occurred in March.

Then, in mid-March, a bison died east of Dragon Spring on Geyser Hill. This event allowed for some uncommon wildlife viewing. A grizzly bear, wolves, coyotes, and bald eagles were all seen on the cam for several days prior to the cam freezing.

As I was checking GeyserTimes during the process of writing this letter, I was quite surprised to see a report by user Caleb Dye on April 1, 2023, of an unnamed, unknown (to my knowledge) geyser erupting in the Sulphur Springs area of the Valles Caldera of New Mexico. The Valles Caldera is a large resurgent dome caldera complex in the same vein as Yellowstone and, as with Yellowstone, its shallow magma chamber heats and provides genesis for several thermal areas around the caldera's resurgent dome. On the outflow of the main creek draining the caldera, there is even a travertine dam and natural bridge, similar to, but much smaller than, the one that sits just a short distance away from where this letter is being typed (Tonto Natural Bridge State Park in Arizona).

Caleb's report said that he and another party observed the crater fill and erupt to 1.5 feet for at least 18 minutes. Since Sulphur Springs is a mere 7 hour drive from my location, compared to the 16 hours for Yellowstone National Park, I am already in the preliminary stages of preparing for a trip to see if I can find and observe this feature for myself in the near future. There are other smaller thermal areas throughout the caldera that I may try to visit as well if time and conditions commit, but at 8,000 feet in elevation, it may just be too snowy this time of year.

Gazing season is almost upon us! Go Steamboat, Go Anemone! And I'll see you on the boardwalks.

Left photo: The geyser in the Sulphur Springs Area of the Valles Caldera in New Mexico. Snap from a video taken on April 1, 2023, by Caleb Dye. Look for an article on the Sulphur Springs thermal features in the next Sput.

Little Cub Geyser Reactivates in February 2023

By Caleb Dye

I have exciting news! As some of you may know, Little Cub Geyer reactivated! There have been no reported eruptions since Oct. 30, 2022, but in the morning hours of Feb. 22, 2023, it was seen for the first time in 114 days on the webcam by Jarno Overwijk! The eruptions on Oct. 30, 2022, were also very weak compared to normal eruptions and were classified as "Minors" by Bryce Bradshaw (SantaFe108) who was in the basin that day.

Little Cub is in the Upper Geyser Basin in the Geyser Hill Group. From the Lion Geyser viewing benches, Little Cub is the farthest left geyser of the Lion group. On the webcam it sits between the dormant Big Cub and Lioness geysers on its left, and Lion Geyser (active) on its right.

Little Cub erupts to heights of 10 feet as described in *The Geysers of Yellowstone*. "Little Cub historically erupted every 50 to 90 minutes with little variation [...] Little Cub has science reverted to its historically normal interval." (Bryan p. 76). Currenly the Interval Between Eruptions (IBE) was much lower than this, but was trending upwards, as seen in the graph with this article.

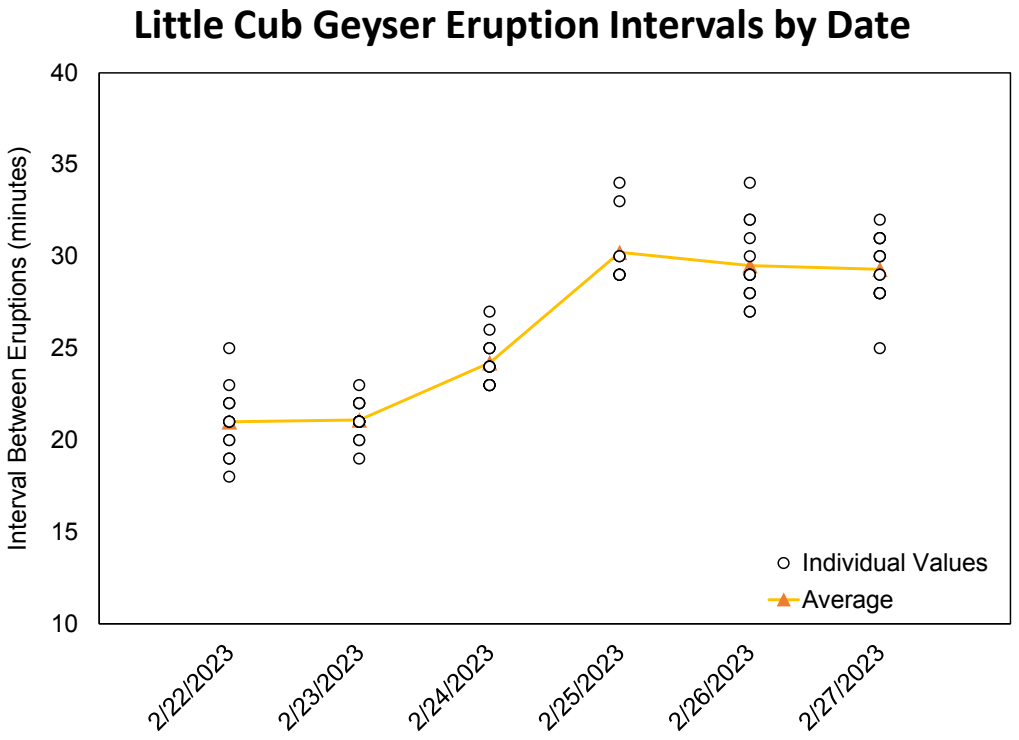
Little Cub's intervals were predictable at 18-25 minutes. The interval was slowly increasing, with the first night having an average interval of 21 minutes that eventually stabilized at around 30 minutes. The eruptions were around 3-to-7 minutes long with the tallest bursts during the first one to two minutes of the eruption.

As an example, the 7-minute eruption at 1542 on Feb. 24 had an IBE of 23 minutes, while the next eruption was three minutes long and had an IBE of 23 minutes. Also, Little Cub appeared to have "active phases" and "quiet phases." It is hard to determine the length of these phases because the webcam does not always have Little Cub in view, but the active phases can last up to around 20 hours, as seen on Feb. 23. The longest observed quiet phase was seven hours, but most are shorter. It will be fun to see Little Cub's changes in the coming months.

References

Bryan, T. S. *The Geysers of Yellowstone*, 5th ed. Colorado University Press, 2018.

Little Cub Geyser, *GeyserTimes.org*, **geysertimes.org/geyser.php?id=Little%20Cub&n=300**



Little Cub Geyser erupting on March 12, 2023. Photo by A.J. Ferrara.

Geyser Gazer News

By Steve Gryc

GEYSER GAZER NEWS
by Steve Gryc

New **FR**IENDS **O**F THE **G**EYSERS
Donald Nicholson of Hannibal, MO
James Riley of West Yellowstone, MT

BIRTHDAY LIST
The TADPOLES
April and May TADPOLES have matured into NEWTS.

The NEWTS
Korben Cooper, May 15, age 17; favorite geyser: Beehive
Thomas Schaffer, June 7, age 17
Alexandra Catherine Keller, June 18, age 16; favorite geyser: Anemone

And the adult FROGS
Larissa Mullen, April 17; favorite geysers: Clepsydra and Sawmill
Cristi Gower, April 28; favorite geysers: Whirligig, Vixen, Grand, and The "Queen" Bee
Susan Leany, May 1; favorite geysers: Fan and Mortar
Will Johnson, May 4
Genean Dunn, May 4; favorite geysers: Beehive and Morning
Jodi Lynn Lawson, May 16
Craig Corless, May 21; favorite geyser: Fountain
Tom Dunn, May 21; favorite geyser: Lion
Sam Welleseck, May 21; favorite geyser: Tilt
Liz May, May 23; favorite geysers: Fan and Mortar
Will Boekel, May 24; favorite geysers: Fan and Mortar
Richard Glasser, May 28; favorite geysers: Grand and Oblong
Theresa Fisher, June 3; favorite geyser: Sawmill
Bryce Bradshaw, June 5; favorite geyser: Sprinkler
Clark Murray, June 10; favorite geyser: Giantess
Art Haeussler, June 11; favorite geysers: Beehive and Steamboat
Sarah Miller, June 12; favorite geysers: Fan, Mortar, and Beehive
Michael Goldberg, June 16
Mario Durrant, June 17; Favorite geysers: Beehive and Sawmill
HAPPY BIRTHDAY ALL!!

ANTICIPATED PARK VISITATION

Dan Schaffer	April 21 to 28
Graham Meech	May 15 to July 3
Clark Murray	May 27 to June 3
Pat Snyder	May 26 to June 3
Mike Jacka	May 31 to June 3
Clark Murray	July 16 to 23
Clark Murray	September 3 to 11

BIG SPLASHES

Bill Johnson, former operator of the GOSA Store, sent the following happy news: "Our son, Peter Johnson, a Ph.D. geologist with a professional as well as avocational interest in Yellowstone and the geysers, has announced his engagement to Hiroe Ito. They'll tie the knot on August 18 in Portland, Oregon, as things now stand. Hiroe has never been to Yellowstone, so we'll try to give them the grand (or at least Grand) geyser tour when schedules permit. Meanwhile, Emily and I will be in Iceland during September, exact dates to be decided, but to include Sept. 10, 2023, through Sept. 18, 2023.

"Regards to all the gazers. This is a complicated year for us, for medical reasons as well as the wedding, but we'll try to get there; we feel it calling to us," Bill said.

Big Splashes are noteworthy accomplishments by FROGs. So if you have important news concerning GOSA Associates, let me know. Items may include events such as births, marriages, military deployments, important awards, election to political office, publications or other signal accomplishments.

Send me updated information on favorite geysers as well as any additions or corrections to the birthday lists. Please email gazer-related information for "Geyser Gazer News" to sgryc@comcast.net.

IN MEMORIAM

Ginger Starck sent us the sad news that her husband, **David Johl Starck** of Payson, Arizona, died of heart failure on March 2 in Holyoke, Massachusetts, at the age of 66. David visited Yellowstone no fewer than 25 times. Ginger wrote: "The last time we visited Yellowstone was July of 2021. He was too weak to hike to his beloved Fountain Geyser on that trip but we did see it erupt a couple of times from the road. We were also able to experience watching two wolves cross the road in the Hayden Valley. Yellowstone was, by far, his most favorite spot and he enjoyed GOSA and interacting with the 'geyser gazers' when we were in the park. The joy he felt when he was in the park or doing something related to the park while at home is immeasurable. Thanks for being part of that."

Genean and Tom Dunn contributed this photo taken in 1995 of Dave Starck (left), then the Dunn's son Chris Dunn (center), and Jeff Davis. The photo is at Grotto Geyser in Yellowstone National Park.

Genean Dunn wrote of David Starck: "It had been many years since we were in the park at the same time, but we remember his love of the park, especially the Fountain complex. In fact, he sent us a large (about 100 pages) printout of his data. The monograph is titled, "Notes on the Geyser Eruptions in the Lower Geyser Basin of Yellowstone National Park During the 1990's." He indicated the data was 'As recorded by David Starck.' The earliest of David's data records began in 1994 and the last data was for August 17, 2000." We send our condolences to the Starck family.

Ellwood (Ellie) Lee Monteith passed away on Feb. 9, 2023, in Spokane Valley, WA.

After graduating from Lewis and Clark High School in 1949, Elwood received his B.A. in economics and accounting from Eastern Washington University in 1954. This same year on June 19, 1954, Elwood marrried his high school sweetheart, Nancy Jean Clark, with whom he celebrated 68 ½ years of loving companionship. For many years, Elwood was a self-employed Public Accountant serving small businesses and individuals throughout the Spokane area.

Ellie and Nancy loved travel, which included many trips to Yellowstone National Park to watch the geysers with their son, David Monteith, who is a long-time GOSA volunteer and former GOSA President.

From Nancy Monteith and Dave Monteith:

My dad always loved Yellowstone. He enjoyed the scenery, wildlife, and, of course, the geysers. But most of all, he loved the geyser gazers. He always enjoyed seeing friends in Yellowstone and always appreciated the welcome he received from the gazer community.

From Lynn Stephens:

Ellie and Nancy enjoyed watching geysers. I spent several hours with them at Grand and Great Fountain. Ellie and I shared professional experiences as well. He graduated with his degree in accounting from Eastern Washington University, which is where I taught accounting for many years. We would occasionally attend the same meetings of professional organizations in the Spokane area, where we tended to talk about Yellowstone instead of accounting. Ellie always seemed to have a wide smile on his face that lit up his eyes and made the world around him brighter.

Ill health prevented Ellie from coming to Yellowstone in recent years; now he can enjoy all the geysers he wants to see.

From Pat Snyder:

I had the good fortune to spend

many hours in Yellowstone visiting with Ellie and Nancy, and fondly remember taking shelter in the Lower Ham Store with them during inclement weather and talking geysers over a hot bowl of chili. They were there for several of my most memorable geyser eruptions including Butterfly Spring (see article in this issue) and my first Fan and Mortar. Ellie and Nancy's enthusiasm for the geysers and all things Yellowstone was infectious and I loved hearing about their park adventures during the years before I started gazing. I wish deep condolences to Nancy and Dave; I am sure Ellie will be greatly missed.

We send heartfelt wishes to the Monteith family. Ellie's full obituary can be read here: **https://www.legacy.com/us/obituaries/kxly/name/elwood-monteith-obituary?id=43776092**

From left, Ellie, Nancy and David Monteith at Grand Geyser. Photo by M.A. Bellingham.

Letter from the Editor

By Pat Snyder

Happy Spring, Geyser Gazers!

As I write this note, my home in Portland, Oregon, is continuing its wet, soggy spring weather. While the rain is good for wetlands and snowpack, it is becoming a bit tiresome. I am longing for a sunbreak and visit to the Columbia Gorge wildflower bloom in the near future.

Meantime, we have some GOSA website additions to share, thanks to the volunteer efforts of Webmaster Art Haeussler.

First, Ginger Starck gave permission to publish and share five **Fountain Geyser Monographs** compiled by David Starck between 1994 and 2000. These monographs are packed with data on the Fountain Group, and are available free to GOSA Associates at the weblink here: **https://gosa.org/fountain-monographs/**

A huge thank you goes to Genean Dunn for scanning the paper documents and providing them to GOSA for distribution. Note that these documents are in pdf format and are fairly large in size, so be patient while downloading them.

Second, the **GOSA website now has a link for making donations** outside of subscribing to the *Sput*. If you wish to make an in-kind donation, you can use this link: **https://gosa.org/donate.**

Big thanks go to all of this issue's contributors, too. After a rather "thin" previous issue, several authors contributed excellent articles to this one!

As I had mentioned in the previous issue, two geyser gazers, Heinrich Koenig and Suzanne Strasser, returned from a lengthy New Zealand visit, and Heinrich wrote a fascinating round-up of their visit to the North Island thermal areas, along with providing wonderful photos of the geysers and other thermal features.

We also welcome new contributor Caleb Dye, who reported on Little Cub Geyser's reactivation in February. And thank you to Graham Meech for the winter trip report and photos.

Additional photos in this issue were provided by M.A. Bellingham, Tara Cross, Janet Jones, Genean Dunn, Caleb Dye, A.J. Ferrara, Scott Bryan, Suzanne Strasser, and Clark Murray. Thank you all!

20th Anniversary of Butterfly Spring's Rare Eruptive Activity

A Compilation of Photos and a Memory

By Pat Snyder

Geyser gazers visiting Yellowstone in May 2003 observed a rare treat: Butterfly Spring, a medium-sized, perpetually spouting pool on Geyser Hill, began a series of major eruptions. With intervals from 9 hours to as short as 4.5 hours, some Butterfly Spring eruptions reached more than 50 feet tall, and most were at least 30 feet tall until the final eruption on May 31, 2003. Regular play lasted about 3.5 minutes (Bryan p. 64).

During Butterfly Spring's activity, both Dome Geyser and Plume Geyser were dormant. It is not known if Butterfly's activity caused the dormancy; however, Dome (which is located near Butterfly Spring) did not return to regular activity until February 2006.

When Butterfly Spring began its eruptive episodes, the eruption water was muddy with a dark brown color. As the eruptive series continued, the water cleared some but never became the clear white water seen in most geyser eruptions.

Butterfly Spring also provided a welcome opportunity for gazers to gather along the boardwalk and visit while waiting for the next eruption. One particular memory stands out for me. It was late afternoon during Memorial Day week, and at least a dozen gazers or more were waiting for the next Butterfly Spring eruption when we noticed a marmot slipping in and out of the rock pile to the right of Dome Geyser. Soon a coyote appeared near the trees behind the rocks and remained absolutely still while watching the marmot's every move. Suddenly, the coyote shot out and nabbed the marmot, and, I swear, the coyote paraded his catch in front of us. We all stood there quite stunned and very speechless. Soon, Butterfly Spring erupted, but we all remember that wait as much for the coyote catch as for the geyser!

To this day, every time I walk past Dome Geyser, I take a quick peek up the hill to see if anything is happening at Butterfly Spring. Not likely, but it would be awesome to have it enter an eruptive series again!

Paul Strasser's Video of Butterfly Spring erupting:
http://geysers.org/wordpress/2020/10/01/butterfly-spring-2003/

References

Bryan, T. S. 2018. *The Geysers of Yellowstone*, 5th ed. Boulder: University Press of Colorado.

Bryan, T. S. 2003. "Butterfly Spring—The Major Eruptions of May 2003." *GOSA Transactions*, Volume VII.

Butterfly Spring, *GeyserTimes.org* **https://www.geysertimes.org/geyser.php?id=Butterfly%20Spring**

Tara Cross was one of the first geyser gazer observers of the newly erupting Butterfly Spring. Above, Tara's photo of an eruption and the subsequent runoff (left) on May 4, 2003.

Two historical photos showing the shape that gave Butterfly Spring its name.

Top photo: a Haynes postcard published in Germany (thank you Steve Gryc and Genean Dunn for this image).

Middle right photo: an undated photo of Butterfly Spring from the Keystone-Mast Collection, UCR/California Museum of Photography, University of California at Riverside. Photo provided via a link shared by Scott Bryan and Tara Cross.

Bottom right photo: Butterfly Spring erupting during Memorial Day weekend. Photo by Clark Murray.

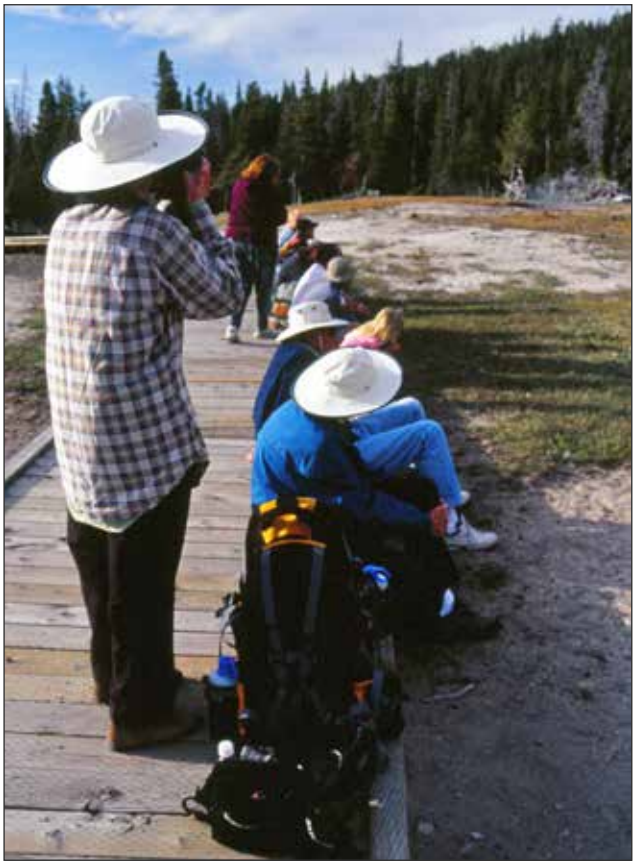
Below, Butterfly erupting on May 24, 2003. Photo by Scott Bryan.

KNOWN BUTTERFLY SPRING ERUPTIONS, FROM TRANSACTIONS VIII

DATE	TIME	INTERVAL	COMMENT
May 1	(1925)		Minor; first report, muddy to 1-2 feet
May 2	1253		First known major eruption (?)
May 3	1327ie 1848	 ~5h 21m	
May 4	1059 1725	 6h 26m	Paul Strasser's video is of the 1725 eruption
May 5	1151 1941	 7h 50m	
May 6	0840 1502	 6h 22m	d = 2m07s d = 2m20s
May 7	1520		
May 8	1512 ie		
May 10	1633		
May 12	1221		
May 15	0713 1222 1821	 5h 09m 5h 59m	
May 17	0848 1752	 9h 04m	
May 21	1103 2020 "nite"	 9h 17m	 Meaning next calendar day?
May 22	1237 1713	 4h 36m	
May 23	0735 1511 2004	 7h 36m 4h 53m	
May 24	~0550 1103 1625	 ~5h 10m 5h 22m	Runoff was heavily steaming at 0600
May 25	0817 1405 1927	 5h 48m 5h 22m	
May 26	0102 0611 1149	5h 35m 5h 09m 5h 38m	 d ~ 3¼ min
May 27	0824 1330 2042	 5h 06m 7h 12m	 d > 2½ min
May 28	0916 1429 2015	 5h 13m 5h 46m	
May 29	0823 1903	 10h 40m	 Definitely a single, closed interval
May 30	0534 1153 1852	 6h 19m 6h 59m	 d > 3 min
May 31	0838 1555	 7h 17m	 Last major eruption

Butterfly Spring erupting on May 29, 2003, in early morning (top) and later the same day. Photos by Pat Snyder.

Butterfly Spring erupting on Memorial Day weekend 2003. Photo by Clark Murray.



Geyser Gazers waiting for Butterfly Spring. Top photo: Sue Schroeder, George Schroeder, Scott Bryan and unknown gazers. Pat Snyder photo. Right photo: Dave Goldberg, Dave Leeking, Nancy Monteith, Bill Warnock, Andrew Bunning, and Dave Monteith. Mike Newcomb photo contributed by Genean Dunn.

Right photo: from close to distant, Mike Newcomb, Dave Goldberg, Bill Warnock, Ellie Monteith, on the boardwalk, Rocco Paperiello, and Clark Murray in chairs, Nancy Monteith, Dave Monteith, and Kitt Barger standing behind, and Andrew Bunning far right. Tara Cross photo.

New Zealand Geysers Trip Report: March 2023

Article and pbotos by Heinrich Koenig

For Suzanne Strasser and I, our third try at a second trip to New Zealand finally succeeded. But we were on the South Island a month and the North Island for another week before we finally visited a thermal area for a total of nine days from 04-12 March. During that preliminary time we did get one night to hear the penguins nesting under the house we were staying in, we saw a mob of over 18 kea birds on and around some houses in Arthur's Pass, we had multiple nights of glowworms for free at a small glen across the road from our Hokitika accommodations, and we had a week of anxiety when multiple Cook Strait ferry sailings were being cancelled. We managed to avoid all of the bad weather, having maybe five days total where we had to adjust our schedule, although north of Auckland there were still several road and trail closures due to the storms.

Here is a summary of the geyser observations. Videos can be found at **http://geysers.org/wordpress/2023/04/14/new-zealand-2023-postings/**.

WHAKAREWAREWA

We saw the features from four vantage points: up close from the Te Puia side, from the Whakarewarewa Village viewpoint, from the Whakarewarewa Forest overlook, and through the fence at the end of Fenton Street. The last was where we stopped the first full day of our stay in Rotorua, just to see if anything was visible since the old hotel was torn down since our last visit. There was a dirt pile that allowed a couple of people to get up high enough to be able to have some idea of the activity. From there we also managed to see all of the active geysers, at least their steam clouds.

Pohutu

When we observed it, Pohutu was quite predictable. It would be quiet for about 20 minutes, and then Te Tohu/Prince of Wales Feathers would start and erupt for about 20 to 25 minutes. It would build in strength, then Pohutu would slowly start, and then it would take a minute or so for Pohutu to reach full height. Sometimes Pohutu would have a slight roaring sound from the power of the eruption. The full height phase would only last a few minutes, then it would drop down to about eight meters maximum height for a total eruption duration of about 40 minutes.

Kereru

We saw at least one eruption of Kereru every time we were able to observe the Whakarewarewa geysers, and seven eruptions total. Of the three intervals, they were 1h05m, 1h57m, and 1h43m. Only from Te Puia were we able to see the activity from the vent and the smaller minor eruptions. Large minors, especially the tall ones right after a major eruption, could be visible from the Whakarewarewa Village viewpoint.

At Te Puia, the activity seemed to be similar to what we observed four years ago. Kereru was quiet before a major eruption. After the major eruption, with its flood of water, there were a series of minors about three minutes apart. Some of the early minors were quite large and tall, but they never put out the flood of water that characterizes the start

Above: Pohutu Geyser erupting, 2023 March 06 11:49. Te Tohu/Prince of Wales Feathers on left. Photo by Suzanne Strasser.

Left: Kereru Geyser erupting with Pohutu starting in front of it, 2023 March 12 15:00. View from overlook in Whakarewarewa Forest.

of a major. Eventually the minors would end. There was about a half hour of quiet before we saw the second major eruption that day at Te Puia. After that eruption, we watched it for almost 2-1/2 hours (when the area closed), and the minor eruptions were continuing as we left. On the other days a similar pause seemed to occur in the puffs of steam that were visible from the minors.

Considering how many eruptions we saw in the limited time we observed it, Kereru is either quite active or we got extremely lucky.

Mahanga

According to one of the guides from the Whakarewarewa tours, this geyser reactivated about eight months ago.

For the first two observation series, from Te Puia and then from the Whakarewarewa Village viewpoint, the activity was quite consistent. There would be a series of eruptions over a ten-minute period. The eruptions would come about 45 seconds to one minute apart. The first eruption of the series was short and weak, while the next eruption was full sized. The heights of some of the bursts were about five meters. The last eruption or two of a series could be of any size. Then there was about a half hour of quiet until the next series started.

The last series of observations, from the Forest overlook, seemed to be different than previous days, in both length of series and in interval between series. One series was long, about 16 minutes, followed by almost 40 minutes of quiet. The next series was only a few weak splashes, as seen from that distance, and then more inactivity for 15 minutes. The next series duration was almost 20 minutes long, and Mahanga had not restarted by the time we left a half hour later.

Most interesting is that the formations are still yellow in large patches from the sulphur deposits.

Top photo: Kereru Geyser eruption, Te Puia, 2023 March 06 14:05.
Bottom photo: Mahanga Geyser eruption, Te Puia, 2023 March 06. Pohutu erupting in background.

ORAKEI KORAKO

We saw eruptions of Sapphire and Cascade almost immediately after our arrival, so we decided to continue on to the Golden Fleece Terrace and Artist Palette and miss an eruption or two. We were quickly able to determine the current activity at the terraces and then spent the afternoon watching Sapphire and Cascade.

Cascade Geyser

Cascade was having longer intervals than our previous visit, consistently 19 to 20 minutes apart. Otherwise it seemed unchanged from four years ago. The start was sudden. My usual way of catching the start on video was to start recording just before 19-minute mark, and wait.

Some of the durations seemed longer, up to 45 seconds, but I noticed that these were the eruptions we were seeing from the high observation platform on the northwestern side of the terrace area. From there we could see directly into the cavern from which Cascade erupts, and we were probably seeing the initial and final splashing of an eruption which were hidden from below.

Sapphire Geyser

Sapphire was having shorter intervals than four years ago, when the intervals were over an hour long. This time, it was consistently erupting every 35 to 40 minutes. Between major eruptions, every three minutes or so,

there would be a short minor eruption episode. At first these consisted of heavy, noisy steam, but as the major interval progressed, these steamy minors would turn into weak splashing lasting maybe five seconds. The start of the major eruption almost immediately appeared different and stronger compared to the preceding minors.

The eruptions usually lasted about 1m30s to 1m45s, but some were as short as 1m16s and one eruption had some late splashes pushing the duration past two minutes. As with Cascade, the longer intervals came when we were at the observation platform, so this might be an artifact of the better view down into the vent.

Cascade has a distinctly pink runoff channel running down the terrace (same color as Pink Cone), but I do not remember a similar pink runoff from Sapphire four years ago. The color was obvious this visit.

Bush Geyser

During the morning and early afternoon I did not see much from this feature. The area is much more open and visible than it was four years ago, when I walked past it and did not realize there was even a feature at that location. In the early afternoon, at best, I caught some rumbling noises and maybe a droplet or two. Then I witnessed a full eruption lasting nearly six minutes. Some of the bursts were well over a meter high, but it never really discharged any water; it just splashed within the vent most of the time.

Diamond Geyser

This geyser is dormant, as it was four years ago.

Soda Spring

This feature appeared unchanged from four years ago. There was heavy boiling and splashing with a steady stream running out a well-defined runoff channel.

Kurapai Geyser

We did not see this feature during the little time we were on the west bank of the lake. At one point while we were on the observation platform watching Sapphire and Cascade, I did see some steam up high in what was probably its vicinity. Most of the time I never noticed steam there. So it may have been active, and that was an eruption.

Wairiri Geyser and the New Features

This area has changed from four years ago. The boardwalk changes made when the new features appeared beneath the boardwalk have been made permanent, so, of course, the features appear to have gone quiet, so much so that the plant life has started to encroach upon them. Nearby, Wairiri Geyser, which was a warm, dark scummy pond, was now boiling and surging continously to up to a meter high, and discharging a fair amount of water. Like the last visit, I did not see any evidence of activity in nearby Dreadnaught and Cauldron Geysers.

Artists Palette Features

This area was a great disappointment. Four years ago, it was mostly dry, with just an area of blue pools and geysers to the left as seen from the overlook (#773, #774, #764). Now those pools and geysers were completely drained, down as much as five meters. Palette Pool was also still empty. The only real pool on the entire terrace was Square Spring (#742), which was previously drained, but was now near overflow.

Above photo: Bush Geyser in eruption, Orakei Korako, 2023 March 08.

Left photo: Wairiri Geyser, Orakei Korako, 2023 March 08.

Over at the base of the Pyramid of Geysers, #812, which had been a perpetual spouter erupting a thin jet to a couple of meters from the middle of a broad pool, was now a non-discharging geyser that was empty when not erupting. The only eruptive feature in the area was #735, which was continuously throwing water about a meter or two high, but rising and falling every minute or so.

Four years ago there was a small waterfall down the Golden Fleece fault scarp just behind Dreadnaught Geyser. That area was now completely dry.

WAIOTAPU

Waiotapu Geyser

The trail past Waiotapu Geyser was gated off and closed, blocked off on both ends by gates. This was disappointing, not just because of the loss of access to the geyser, but the alternate route to the southern end of the area requires a lot of steps up and down.

We did find an overlook where the geyser vent is visible below. The area around the vent appeared to be dry, and we saw no evidence of any splashing or steaming. Based on our experience four years ago, we concluded that there had not been a recent eruption, and the geyser was at least several hours from the next eruption.

Primrose Terrace

Four years ago the terrace was completely dry. This visit there was some overflow from Champaigne Pool down the terrace, mostly concentrated on the far side from the walkway.

Lady Knox "Geyser"

We chose to not see the induced eruption this visit. Instead, we took advantage of the fact that most other visitors would be over there and the thermal area would be mostly empty. For about an hour, it was a great time to take videos without a lot of talking or noise in the background.

The Waiotapu area is only open four days a week, Friday to Monday. I do not know if this feature is being induced or if it is having natural eruptions during the closure days.

Mudpots

On the whole, the area seemed a lot more watery. There were areas of thicker mud islands, in the middle of which the mud would explode up to a couple of meters high. The longer the pause, the more powerful the explosion. Plants along the edges were coated with mud to a height of a couple of meters.

WAIMANGU

Last year I learned that a guiding company was offering kayak trips on Lake Rotomahana to see the features of the Steaming Cliffs. **https://www.paddleboardrotorua.com/steaming-cliffs-kayaking**. Despite never having been in a kayak before, I knew that I needed to try this. In our previous visit, we took the boat tour of the lake. We only got a few minutes passing through that area, once up close and once from a distance. We saw only one eruption of the Pink Terrace Geyser, and the boat started leaving before it was finished.

The kayak trip was a success. We were out for about two hours, and

Top left photo: Western portion of Artist's Palette, Orakei Korako, 2023 March 08. Square Spring is to the left.

Bottom left photo: North-central portion of Artist's Palette, Orakei Korako, 2023 March 08 Square Spring to Right, #735 is above the empty crater of Palette Pool, in the center.

Left photo: Pink Terrace Geyser eruption, Steaming Cliffs/ Rotomahana, Waimangu, 2023 March 07. Photo by Suzanne Strasser.

we got to see most of the shore from a few meters away. The weather was nearly perfect, with the lake calm with a slight breeze. It was sunny and I got moderately sunburned on the top of my feet.

Pink Terrace Geyser

We saw four eruptions from the kayak, and Suzanne managed to get video of two of the eruptions. Because of the nature of the visit, we did not get accurate timings, but the intervals were about ten minutes, with the eruptions lasting about two minutes. The water column was easily 15 meters high at times. The eruptions were preceded by a minute or so period of overflow. The vent itself is hidden from kayak view because it is up on the cliff slope.

Iodine Spring

This feature is next to the bus road which is off limits to hikers. But we did find a location on the trail where observation of the eruptions was possible. For the five intervals we saw, it was erupting at intervals of almost exactly eight minutes, with durations just over 1m50s. The spring started splashing a minute or so before the eruption started. The eruption height was around three meters, with a jet distinctly angled to the right.

Left photo: Taumatapuhipuhi Geyser eruption, Tokaanu, 2023 March 04.

Inferno Crater

The water level in Inferno Crater rises and falls several meters over a 38-day cycle. When we were there it was down at least three meters. The runoff channel still had some brown, stagnant pools in it, but I have no idea how long ago the previous overflow was. The pool was calm with its normal, milky-blue color. On the far shore, in a gray debris fan, a small but noisy feature was erupting, maybe a couple of meters below the high-water mark, to a height of about 1/2 meter. The debris fans all had many wave-cut terraces on them, each maybe a centimeter or two higher than the previous terrace.

TOKAANU

Taumatapuhipuhi Geyser (#13)

The last geyser we saw four years ago was Taumatapuhipuhi, and it was the first geyser we saw this trip. It does not seem to have changed much since then.

We were able to observe seven intervals of Taumatapuhipuhi, but we did not observe all of the eruptions for a variety of reasons. The first of the series was blocked from view and

only heard. A couple of others were either missed or in eruption thanks to the activity at Hoani Pool.

The intervals started long. We had to wait almost 36 minutes to see the eruption after the one I heard. From then on, the intervals decreased so that the last interval we saw was 21 minutes. The durations of the eruptions varied from 10 to 26 seconds, with the other three durations being about 20 seconds. The heights were about two meters, and the eruptions were wide. I got splashed once standing about three meters from the rim. The wet area around the vent seemed a bit larger than four years ago.

Top photo: Hoani Pool about 45 minutes after end of eruption, Tokaanu, 2023 March 04.

Left photo: Hoani Pool erupting, Tokaanu, 2023 March 04.

Hoani Pool (#31B)

Near the end of the Tokaanu Reserve walkway loop, just before Taumatapuhipuhi, are some hot pools. The first time I walked past, I noticed that one, whose name I determined is Hoani, was extremely hot, probably boiling. It is a wide, deep clear pool. The central pit is about five meters across, and I could not see any bottom to it. It is located in a broad, tannish-colored sinter sheet depression.

I did not remember any such feature from our visit four years ago. After our first seen eruption of Taumatapuhipuhi had finished, we decided to head back along the trail to look at a few features which we had rushed past, and we immediately noticed the 30 to 40 cm high boiling on one side of the the crater of Hoani. This boiling built up to well over a meter and then subsided. This activity cycled and continued for at least 1h15m. We probably saw it near the start of the boiling. At one point, we saw some surges that could have been two meters high, and there were several different boiling centers. The activity was much like an Artemisia eruption.

The walkway was not built with an erupting, boiling spring like this in mind. There were times when I was walking along it that the fog from the eruption was almost scaldingly hot. Due to the general humidity of the morning, this steam was condensing on some of the trees above the walkway, producing a rain below. Once we noticed the activity, we tried to time our visits to Taumatapuhipuhi and spend the rest of the time observing Hoani, which is why we missed a couple of Taumatapuhipuhi eruptions.

It was after one of the Taumatapuhipuhi eruptions, as we were thinking of leaving, that we noticed that the pool was quiet again. Previous pauses had lasted only a few seconds, but this one stretched into a minute and more. Then we noticed that the pool was dropping. By the time we left the area, 45 minutes later, Hoani was down 30 to 40 cm, with the outer rim already drying in spots.

Early on during the eruption phase a family walked by, and one of the older members mentioned to the rest of the family that he did not remember having seen that sort of boiling before.

Based on the boiling and variations in overflow amount and water levels, I would classify the feature as a geyser. I have read some reports saying that years ago there was some sort of erupting geyser in this area, but the few details implied it was not this particular feature, but another feature on the other side of the walkway, which seemed to be some sort of a drain this time.

OTHER THERMAL AREAS

Tikitere

At the entrance complex, with its spas and mud baths, is an artificial fumarole. We did not visit this area previously, and there is probably no need to revisit. It is an extensive area filled with acidic pools, some of which were spouting up to a meter high.

Karpiti

The subsidence craters in this area are impressive in both size and depth. There were a couple of weak mudpots, and the replacement feature for the Blowhole on the hillside was putting out a strong, noisy jet of steam with condensing droplets.

Te Kopia

The walkway to the boardwalk overlooking the mudpots has become overgrown, so there is not much visitation here. The features themselves were pretty soupy, with little to no convective activity or bubbling, and a definite blue color I have not seen in mudpots before.

Waikite

One large boiling pool, Te Manaroa, and a couple of smaller pools feed a spa here. The large spring is at the bottom of a deep alcove, just below the road, pouring out water at a rate of 50 or so liters per second, according to the information sign. It was difficult to see with the steam, swirling air currents, humidity, and profuse plant life. But on occasion we could see it boiling up well over a meter. The discharge itself did not seem to vary. There is another small boiling spring just downstream, perched above the runoff channel, and a runoff channel from a third spring not visible from the walkway.

Kuirau Park

Not much change here. The boardwalk around Kuirau Lake is closed. It appears this is because the walkway was not much above the water level, and has been undermined by the boiling water. Also, if the lake has risen slightly, it would be above the bottom of the boards.

We visited the western area where resurgent springs undermined several homes. The concrete pad of what appears to have been a garage stands near a boiling spring on one lot. This is also where the only spring showing eruptive activity, #712, Parekohoru, is located. This feature was frequently boiling up to about 30 cm, but the water level well below any sort of discharge.

Top photo: Vent of Kuirau Spring #721, 2023 March 10. This feature erupted to the height of over 100 meters for fifteen minutes on the afternoon of 2001 Jan 26.

Left photo: Mudpots at Te Kopia, 2023 March 05.

Rotorua Lakeshore

This is another area of acid sulphate springs, extending out into a flat along the lakeshore, and a nesting area for various birds.

Wairakei Thermal Valley

We did not visit this site where there is paid access (price unknown) to the valley where all of the big geysers destroyed by the power plants were located. We turned around at the sign on the road announcing that the area was closed due to storm damage. I was not too upset about this, as I figured seeing all those exgeysers full of plant life would not be enjoyable.

For more information, Dirk Niermann has an extensive writeup on the features there, along with numerous photos of the current state of the vents and with summaries of past

activity: <**http://www.volcanic-springs.com/index.php?section=NewZealand&newzealandsection=wairakei**>.

Whakarewarewa Forest Preserve

On our last day we took the trail from the bicycle park through the forest to a free overlook where one can see the geysers of Te Puia. After three hours of observations, we looped back past a single mudpot in the middle of the forest. The mudpot activity itself was nothing unusual, but it was the setting, overgrown by ferns in a dense forest, that made this feature interesting.

Top photo: Angel Wings Formation, Steaming Cliffs/Rotomahana, Waimangu, 2023 March 07.

Left photo: Overlook view of vent of Waiotapu Geyser (center, above railing), Waiotapu, 2023 March 05.

OTHER OBSERVATIONS AND COMMENTS

Of the paid thermal areas, Te Puia was the most disappointing. It was the most expensive, and all visitors were required to attend a 1-1/2 hour long cultural tour of the Maori Arts Institute before being dumped off at Pohutu. I much preferred the situation four years ago where one could get in at opening and spend the day watching geysers, and skip the tours. At least they did not force us to leave once they were officially closed at 16:00, but we voluntarily left after seeing a final start of Pohutu about 15 minutes later.

At Whakarewarewa, the only way to visit the boiling springs (Parekohoru and Korotiotio) used for cooking and bathing is to take the village tour. But this is less objectionable, as you do get to see boiling thermal features and how they have been used and modified over the centuries. We were also told when we purchased our tickets that the village tour was the only way to get access to the Te Puia overlook.

The guides at Whakarewarewa reported that the issue of the gate between their village and Te Puia may be resolved soon with a court ruling. It will be interesting to see how that changes access to the thermal area. Whakarewarewa does have a Geothermal Tour option in which you can just walk the trails and not take the guided tour of the village. It would be nice if a gateless Whakarewarewa would allow thermal access to both areas.

Waiotapu was disappointing in its closure of the trail past their only active natural geyser. Since we did not attend the eruption of Lady Knox, we were not able to ask what happens during the three days of the week that Waiotapu is closed.

Tikitere/Hell's Gate was worth a visit, but I see no need to go back. Karapiti/Craters of the Moon is uninteresting except for the steam vent remnant of the original Karapiti Blowhole. At NZ$4, the price for Waikite and Te Manaroa is actually quite reasonable. (Access to the thermal walkway is also included as part of the price of using the spa pools, too.)

In general, it seemed that visitation/tourism was way down from four years ago. We rarely saw bus tours at any location, and it was obvious that organized Chinese tours were non-existent. At Te Puia, there were usually 15 to 20 minutes between the tours in which we were the only observers around the geysers. Suzanne was able to spend a considerable amount of time alone in the Kiwi House, where four years ago the place was mobbed when we tried to visit.

Winter Yellowstone Trip 2023

Article and photos by Graham Meech

I had an 8-night trip to Old Faithful from Jan 8 to Jan. 16, 2023. It was probably the warmest and cloudiest trip I have had, with very few sunny hours. The snowpack was better than most years with some snowbanks up to the top of the bridge railings. Here's a summary of the geyser activity I saw.

In the Upper Basin, Sawmill Geyser continued its domination of the group, having many long eruptions and deep drains, followed by short eruptions from 1 minute to an hour long. During the deep drains, Penta Geyser had some steam phase eruptions and at least two eruptions overnight, both probably mixed phase. Oval Spring continued its activity with high pool eruptions possible about an hour into a Sawmill eruption, and sometimes Oval had more than one eruption.

Spasmodic Geyser had a couple of high-pool eruptions, which went into overflow, and there were eruptions of Thumping Hole and Dog Bone at those times too. Given the limited observation time in winter, this may mean that the high pools were more frequent than they were in the summer. Slurp Geyser was active with steam phase or full eruptions like last summer. Crystal Spring and Belgian Pool both had normal-to-high water levels, and I didn't see any low pools.

Top photo: A stunning winter sunrise over the Upper Geyser Basin on Jan. 9, 2023.

Left photo: The Red Spouter area near the Fountain Paint Pots on Jan. 10, 2023.

Churn Geyser was surrounded by snow most of the time, except once I saw the far runoff channel clear, which is odd because it's usually the last of the runoff channels to fill.

The biggest change from the summer was that "Bulger's Hole" had eruptions, even though I didn't see any eruptions of Rift Geyser during the entire trip. (Last summer we needed to see Rift erupt for a chance for Bulger's Hole to erupt). Eruptions were on January 9, 10, 11, 15, and 16, with one interval of just 28 minutes. All eruptions were during major eruptions of Bulger Geyser. Grand Geyser eruptions were nearly all one burst, shooting up into the grey sky.

I saw a few extended fills at North Goggle Geyser, but none lead to real attempts to erupt. The bacterial mat looks to be close enough to the cone to indicate no recent eruptions that would have likely killed the close-in bacteria. Beehive Geyser was fairly uncooperative with most of its eruptions overnight, but I did manage to see a couple of eruptions up-close.

I spent a little time watching Fan and Mortar geysers, and some cycles were long with pretty good water levels, while others were short and uninteresting. There was evidence of prior eruptions this winter based on ice layers on the boardwalk snow and occasional webcam reports, but they did not erupt while I was there.

I was able to stay at the Fountain Group for a few hours and, of course, Fountain erupted as I was walking back to the snowcoach. Since other visitors were interested in seeing the eruption, we returned to watch 10 minutes of Fountain in poor lighting conditions. The unusual thing was seeing Clepsydra Geyser's side pool full of water and splashing a lot the entire time I was there. In the past it would usually have been empty and slowly filling, accompanied by small splashes. This time it was completely full and more vigorous than usual. Super Frying Pan, Jet, Spasm, Twig and Clepsydra Geysers were all active during my observations.

The wildlife highlight was a bobcat on a deer carcass in the Firehole Canyon. It was speculated that the deer had fallen off the cliff and died, with additional speculation that the bobcat dropped down with it too. The bobcat had the carcass all to itself for multiple days and drew quite a crowd of visitors and photographers because the cat was in the same place and easily viewed from the roadway across the narrow canyon near the Madison Junction. That was my first ever bobcat sighting.

It was interesting driving the new roadway up to Mammoth and through two of the temporary sections into Lamar Valley. I could see the windy road up to Mammoth being a challenge with RV's in the summer and some delays going to Lamar with single lane access, but overall the NPS has done a great job providing access for the winter season. I am now looking forward to the summer season and hoping for better weather than we had last spring!

Top photo: The bobcat guarding the dead deer in Firehole Canyon.
Bottom photo: Old Faithful seen erupting from Geyser Hill on Jan. 11, 2023.

Geyser Activity Summary

By Craig Munson Jr.

FEBRUARY 2022 through MARCH 2023

If you are reading this, congratulations! You made it! (Well almost.) The next time I write one of these, the park will be open for the 2023 season. Many roads (weather permitting) open on April 21, 2023, per the National Park Service. I would like to thank everyone who added their observations to GeyserTimes. I would also like to thank those who watch the webcam to give us updates on the Upper Geyser Basin.

As with all winter geyser summaries, they tend to be a little sparse. This one is no exception. However, the last four days of March, the Upper Geyser Basin webcam experienced technical difficulties. I track a few statistics (especially Castle Geyser's major/minor eruption ratio) so it is important to know that these statistics are missing about 5% of the reporting period's data. The camera returned to operation on April 11, 2023.

UPPER GEYSER BASIN

Old Faithful Group

Old Faithful Geyser was primarily erupting in long-interval mode, with an occasional short-mode eruption. **Split Cone** was active with a handful of eruptions recorded.

Geyser Hill Group

Little Squirt Geyser had 9 eruptions observed. **Beehive Geyser's** intervals remained relatively steady, with eruptions that occurred around the 16-to-24-hour mark with a notable exception of a more than 3-day interval in February. Out of the 49 **Beehive Geyser** eruptions during the reporting period, 41 were preceded by **Beehive's Indicator. Beehive's South Bubbler** was active during the reporting period. **Beehive's Close-to-Cone Indicator** was observed 3 times in the reporting period, once in February and twice in March.

Depression Geyser was observed in eruption 7 times. "**Marmot Cave Geyser**" was active during the reporting period. **"Marmot's Tail"** (**UNNG-GHG-18**) was observed twice in the reporting period. **Little Cub Geyser** was active during the reporting period. **Lion Geyser** continued to be active with an increase in eruptions per series: Lion series had 5 or more eruptions during this observation period than the previous one.

There was one report of **Plate Geyser** erupting on March 18. **Giantess Geyser** still has not graced us with an eruption since August 2021.

Dome Geyser had 3 observed eruptive series and the average

Beehive Geyser erupting on Jan. 12, 2023. Photo by Graham Meech.

interval between series was around 13 days.

Finally, to mark a rather unfortunate anniversary, it has been officially more than 10 years since the last observed eruption of **Plume Geyser**. **Plume** may be dormant on Geyser Hill, but is active in our hearts.

Castle Group

Castle Geyser continued to be more predictable with only 16.6% of eruptions occurring in the reporting period being minor eruptions. Last reporting period it was 22.6%. **Tilt's Baby** was active.

Sawmill Group

Most of the Sawmill Group features—**Sawmill, Tardy, "Nifty," Old Tardy,** and **Spasmodic**—erupted during February and March. **Penta Geyser** erupted twice during reporting period. **Slurp Geyser** was active during the reporting period. **Bulger Geyser** was active with minor and major eruptions. **"Bulger's Hole"** was observed twice during the reporting period. **Twilight Spring** had 2 recorded eruptions during the reporting period, which were the first eruptions seen from Twilight since October 2022.

Grand Geyser Group

Rift Geyser had one observed eruption during the reporting period. **Grand Geyser** continued to be active. The intervals for **Grand Geyser** have been hovering around the 6-to-7-hour mark with one-burst eruptions being the most common.

The Giant Group

Oblong Geyser was active during the reporting period. **Giant Geyser** has not been seen since early 2019.

The Grotto Group

Grotto Fountain Geyser, South Grotto Fountain Geyser, and **Grotto Geyser** were active in February and March. **Rocket Geyser** had one confirmed major eruption on March 3.

Riverside Geyser continued to erupt like clockwork with intervals of about 6 hours, 30 minutes despite occasional double or triple intervals being missed due to the winter season.

The Daisy Group

Daisy Geyser's intervals lengthened by about 10 minutes on average when compared to the previous reporting period. A typical interval was around the 2h 10m mark.

Morning Glory Group

Fan and Mortar had one in-basin confirmed eruption reported on February 23 at 1406 ie wc. A second possible eruption was noted on March 22 at 1413 via the Old Faithful webcam.

Lion Geyser erupting with Heart Spring in front on Jan.13, 2023, one of the nicer days of Graham Meech's winter Yellowstone trip. Photo by Graham Meech.

Cascade Group

Artemisia Geyser and **Atomizer Geyser** were both active during the reporting period.

LONE STAR GEYSER BASIN

Lone Star Geyser was active during the reporting period with 4 eruptions recorded in February.

MIDWAY GEYSER BASIN

Till Geyser and **Flood Geyser** were both reported as active.

LOWER GEYSER BASIN

Fountain Group

Fountain Geyser was active during the reporting period with occasional in-eruption reports from tour guides and others passing through the area.

NORRIS GEYSER BASIN

Back Basin

Steamboat Geyser had no major eruptions during the reporting period; however, few observers were in the area and the seismographs for the Norris Museum and Norris Ranger Station were offline.

Vixen Geyser was active during the reporting period with 2 eruptions recorded and it was noted that one of the eruptions began from a low pool *(thank you M.A. Bellingham)*. **Corporal Geyser** was active and erupting.

Porcelain Basin

Whirligig Geyser was active with many minor eruptions and an occasional full eruption as reported from the data logger for **Constant Geyser. UNNG-NPR-8** was found in eruption, cycling between weaker and more vigorous activity. **Collapsed Cave Geyser** was observed once in the reporting period. **Fireball Geyser** was active during the reporting period.

Top photo, Fan and Mortar geysers with snow on them, but Graham Meech (who took the photo) said ice on the boardwalks provided evidence of previous eruptons. Middle photo, Doublet Pool on March 12, 2023. Bottom photo: Pump Geyser, March 12, 2023. Doublet and Pump geyser photos by Janet Jones, Snowmoon Photography.

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Pohutu Geyser erupting, 2023 March 12. View from overlook in Whakarewarewa Forest. Photo by Heinrich Koenig.