STEAMBOAT SPRINGS, COLORADO

John W. Lund, Geo-Heat Center

INTRODUCTION

Steamboat Springs, a small community in northern Colorado, is known for its winter sports and to a lesser degree for its numerous warm springs along the Yampa River. The town got its name in the early 1800's from French trappers who heard a hollow, resonant "chugging" sound that they thought was a steamboat on the river. Instead it was a small underground chamber that expelled hot water at regular intervals. The town's founder, James Crawford, staked his land claim next to the spring in 1874. Even though the geysering, that once reached heights of 5 to 14-ft (1.5 to 4.3 m), was destroyed by blasting for the railroad in 1908, the town still retains the name. The original spring can still be found on the banks of the Yampa River along with the adjacent Black Sulphur and Narcissus/Terrace Springs. The spring is only at 78ºF (26ºC) and bubbles slightly from carbon dioxide gas. Black Sulphur Spring's color is due to the hydrogen sulfide, and the muds from Narcissus/Terrace Springs are thought by some to help skin disorders.

Steamboat Spring.

Black Sulphur Spring.

The other famous spring in the town is Heart Spring, used by the Yampatika Ute Indians for centuries. The Utes and the Arapahos are reported to have had many battles for domination over this sacred ground, as it was believed to be source of physical and spiritual healing. James Crawford, was the first European settler to use the springs, and in 1884 he built a log bathhouse over the springs. H. W. Gossard, who owned the property between 1931 and 1935, named the spring for its shape. He added a second story to the bathhouse and introduced the winter carnival, a tradition that continues today, and it featured a local man diving into the pool from atop a 100-ft (30-m) ladder. I have even seen a photograph of the spring showing a moose diving into the water, which I assume was not part of the carnival. The springs and pools were sold to the Health and Recreation Association in 1935 and are open to the public. The heart shaped pool is fed by gravity and then flows to the therapy pool, the large hot pool and then to the lap pool before flowing into the Yampa River. The 102ºF (39ºC) spring water consists of natural bicarbonates and lithium, along with the unique effervescence and other minerals provide bathers with a stimulating therapeutic experience. The water is mainly sodium, chlorides and sulfates with a pH of 8.0.

Heart Spring and hot pool.

HOT SPRINGS WALKING TOUR

A guide for a two-mile, seven-springs walking tour is available from the Historical Museum or the Chamber of Commerce in Steamboat Springs, and is illustrated at the end of this article. This tour takes you along both sides of the Yampa River and next to the famous Howelsen Hill ski jump that is even used in the summer using a roller system for the run. Iron Spring, the former Soda Spring, Sulphur Springs and Sweetwater/Lake Spring are located on the north side of the river, and Steamboat, Black Sulphur, Heart Spring lap pool, Narcissus/Terrace, Lithia Spring and Sulphur Cave Spring are located on the south side of the river. They are all in the 50° to 80ºF (10° to 27ºC) temperature

Heart Spring lap pool.

range. In addition, there are more than 150 hot springs near Steamboat, some on private land and are closed to the public, some as tiny seeps in hay fields.

Soda Spring was a place, where in the early 1900's, locals would bring sliced lemons on a hot summer day and make lemonade with the 55ºF (13ºC) carbonated water. Unfortunately, highway construction stopped the spring from flowing, but the spot is marked with a small gazebo. Lemonade was also made from Iron Springs, as the water was considered a tonic for "ailments of body and will." Sulphur Springs attracts animals such as deer, elk, black bears and horses, as they have a particular craving for the odiferous water. Lithia Springs, as its name would imply, contains a high content of lithium and is said to have many beneficial medicinal qualities – especially for treating manic depression; however, the lithium concentration is probably not high enough to provide any benefit. Legend of Sulphur Spring Cave tells that early Indians used this cave and its springs during rituals. It may have been used as an oracle, similar to those in Greece and elsewhere. An ancient mycelial fungus is found in the cave.

GEOLOGY

In the Steamboat Springs region, there is an absence of recent volcanic activity, thus the thermal water are probably heated meteoric waters that have circulated to depths of 12,000 to 15,000 ft (4,000 to 5,000 m). At this depth the waters are heated by conduction through the surrounding rocks, radiogenic activity, exothermic mineral reaction and the earth's geothermal gradient (about 2ºF per 100 ft or 3ºC per 100 m). The conduit for the thermal waters that rise due to lower density is believed to be through a sub-parallel and orthogonal network of faults and fractures that cross the region. One major fault system runs east-west parallel with the valley and just behind Howelsen Hill where there is an extensive travertine (calcium carbonate) deposit. Other northwest trending faults are found at Fish Creek and west towards the north side of town.

Travertine deposits along the Yampa River.

SNOW MELTING PROJECT

The City of Steamboat Springs through their Planning Department is investigating the use of geothermal water for a snow melt system at the Mt. Werner ski area just east of town. The pedestrian walk-way will consist of 200,000 square feet (18,600 square meters) of surface area. Unfortunately, there are no surface indications of a geothermal resource in the ski area, thus, it is proposed to drill a series of temperature gradient holes based on a geologic field investigation by Gerry Huttrer of Geothermal Management Company, Frisco, Colorado. Initial estimates are for a peak load of 125 Btu/hr/ft^2 (37 W/m^2) or 25 million Btu/hr (7,325 kW). Possible alternatives include using the geothermal waters directly, using a downhole heat exchanger, and using a geothermal heat pump, depending upon the temperature and flow rate encountered. Hopefully, by next season, more will be known about the potential geothermal resource and its best use.

On September 19th, the Steamboat Springs City Council approved the exploration for local sources of geothermal energy which could be used to heat the snowmelt systems. Funding for the project's estimated $2 million to $2.5 million cost would come from the city's urban renewable authority, or URA, which uses increases in property tax revenues from the base area to fund improvements to the area. The Council gave approval for the use of URA revenues to fund geothermal exploration, at an estimated cost of about $107,000. This funding will be used to drill four temperature gradient holes near the ski base to depths of 500 feet (150m) recommended by Gerry Huttrer. The City will be accepting bids from contractor to start drilling before winter.

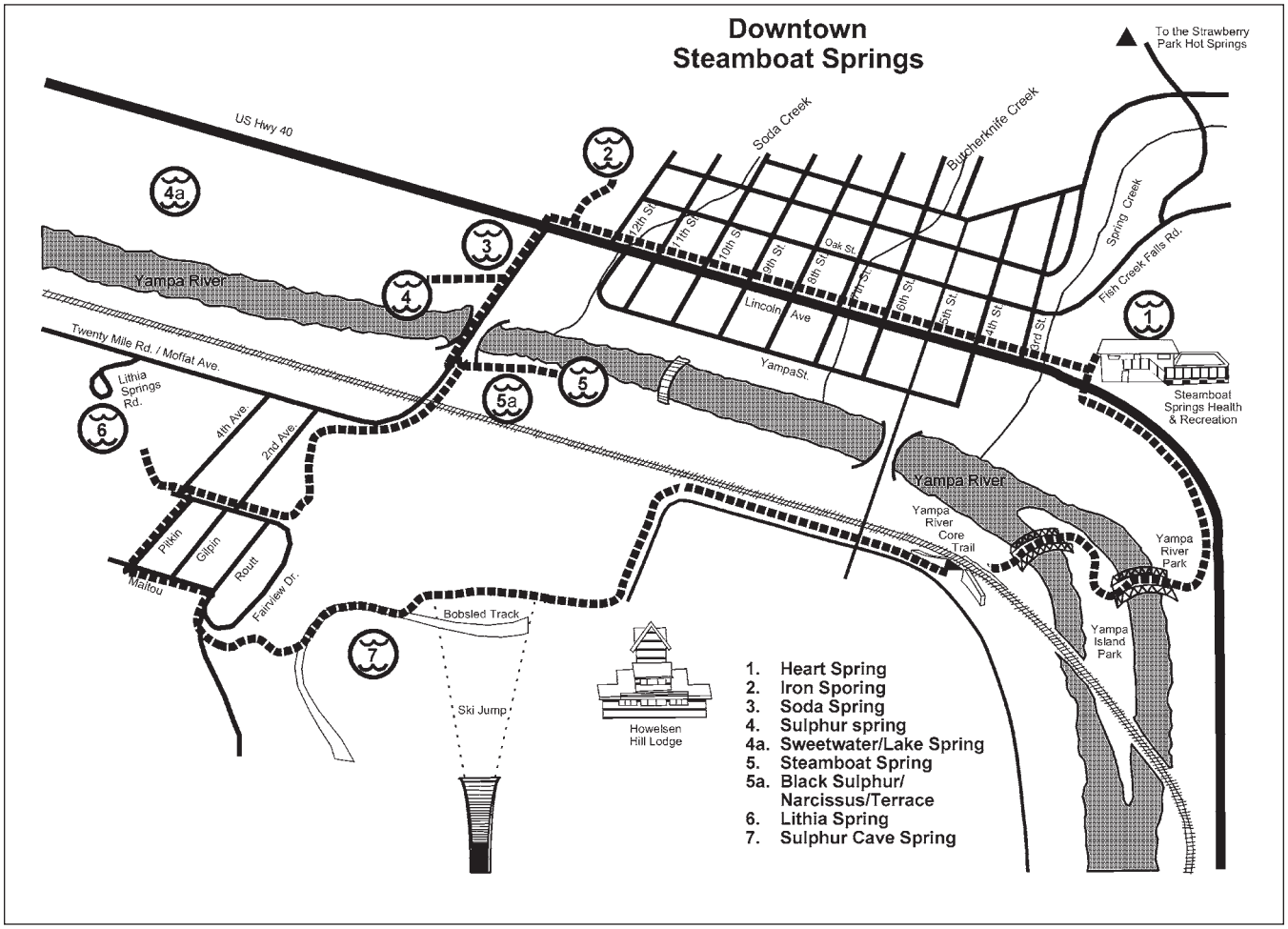
REFERENCES

Frazier, Deborah, 2000. *Colorado's Hot Springs,* Pruett Publishing Company, Boulder, CO (2nd edition), 165 p

Wambach, Carl, 1999. *Touring Colorado Hot Springs, A Falcon Guide,* Helena, MT, 135 p.

Huttrer, Gerald W., 2006. *Geothermal Reconnaissance Survey in the Vicinity of Steamboat Springs, Colorado – a Report of Findings with Recommendations for Future Work*, Geothermal Management Company, Inc., Frisco, CO, 15 p.

A Walking Tour of the Springs of Steamboat, pamphlet from the City Museum, (undated)



Seven-spring walking tour.