

NATURAL RESOURCES

nat·u·ral re·sources

noun

Materials or substances such as minerals, forests, water, and fertile land that occur in nature and can be used for economic gain.

This type of definition assumes that everything in nature exists for human's use – but in Hot Springs we find that although natural resources are used here, more often they are celebrated. The symphony of life in the Fall River valley includes the rugged red stone cliffs, the rugged evergreens on the bluffs with softer elms and willows in the bottom and pure natural warm mineral springs flowing through the heart of the valley. This creates the Eden we know as the setting for Hot Springs, which brings in all types of animals, birds and creatures to live among us.

Some natural resources such as timber, are renewable. Others like minerals and water are finite and must be managed and conserved so that generations after us will be able to enjoy the richness of the life we enjoy now.

Water – Hydrology

Water created Hot Springs. The main river that runs through Hot Springs is the Fall River. The Fall River is entirely spring fed from sources north of its confluence at Battle Mountain Avenue by Cold Brook and Hot Brook streams. As you can tell by their names, one branch is served by natural cold springs while the other is fed by warmer springs to the west.

With the river largely fed by natural springs you would think that its flow would be largely unchanged throughout the year - - not so. It is still subject to the large fluctuations in rainfall on narrow rock filled canyons that can create quickly forming and receding floodwaters.

Watershed

The Middle Cheyenne-Spring Watershed encompasses all of Hot Springs and a greater area surrounding the city.

Mineral Springs

Our pure natural warm mineral springs were once quite plentiful in the valley. A news report done in the 1900's suggested that in the Hot Springs section of the Fall River valley there were 86 identified springs and an additional 60+ more found along Cascade Road south to Cascade Springs. Many of those springs were lost or capped during the 1950's when we turned our back on water for what seemed a more lucrative natural resource – uranium. As of late the people of Hot Springs are returning to their roots and slowly the springs are being uncapped, natural spring water is being piped into hotels, spas, retreats and bed and breakfasts. An industry revolving around our special mineral springs is being reborn.

The Main Mineral Springs in Hot Springs⁵

- The Springer Ranch Springs – the main source of the municipal water supply

- Mammoth Spring – This spring was once used as a source for city water and is contained in a concrete tank. There is great interest in opening this spring up for public use.
- Veterans Administration Spring – The VA Spring seems to be coming from the same source as the Mammoth Spring and has been developed by the Veteran’s Administration for use by their facility. The spring is enclosed in a concrete tank and is piped across the river for use by the domiciliary.
- Lakota Spring – The Lakota Spring was never developed, although impacted by development, it is our last ‘wild spring’.
- Evans Spring – This is the main spring to supply water to Evan’s Plunge. The waters can be seen bubbling up through the loose stone bottom of the Plunge. Water flows through Evans Plunge at a rate of 5000 gallons per minute at a steady temperature of 86 degrees Fahrenheit.
- Braun Springs – The Braun Springs were once used by the Braun Hotel for baths and drinking water and arise from conglomerate beds in the bottom of the Fall River Valley. The Braun is currently opening these springs back up after years of being capped. The water temperature is 90 degrees.
- Minnekahta Spring – This is the main spring used by Indians who had hollowed out a rock basin into which the warm water ran to serve as a bathing tub. These springs were the reason the Hot Springs Hotel was built on the site where the springs discharge. The hotel was demolished in XXXX. A new entrepreneur has excavated the old hotel foundations and is using them as a backdrop to the historic springs to create a new mineral springs enterprise opening in 2018. The original stone tub is still visible at the spring site. The water temperature is 90 degrees Fahrenheit.
- Kidney Spring (also known as Hygenia Spring) – Kidney Spring is a small public spring on the west side of Fall River opposite the Evans Hotel. The spring issues from a heavy conglomerate rock on the Fall River Valley floor. Its waters issue at a temperature of 83 degrees Fahrenheit and is similar in chemical analysis as the Minnekahta Spring indicating there may be a common origin.

Aquifers

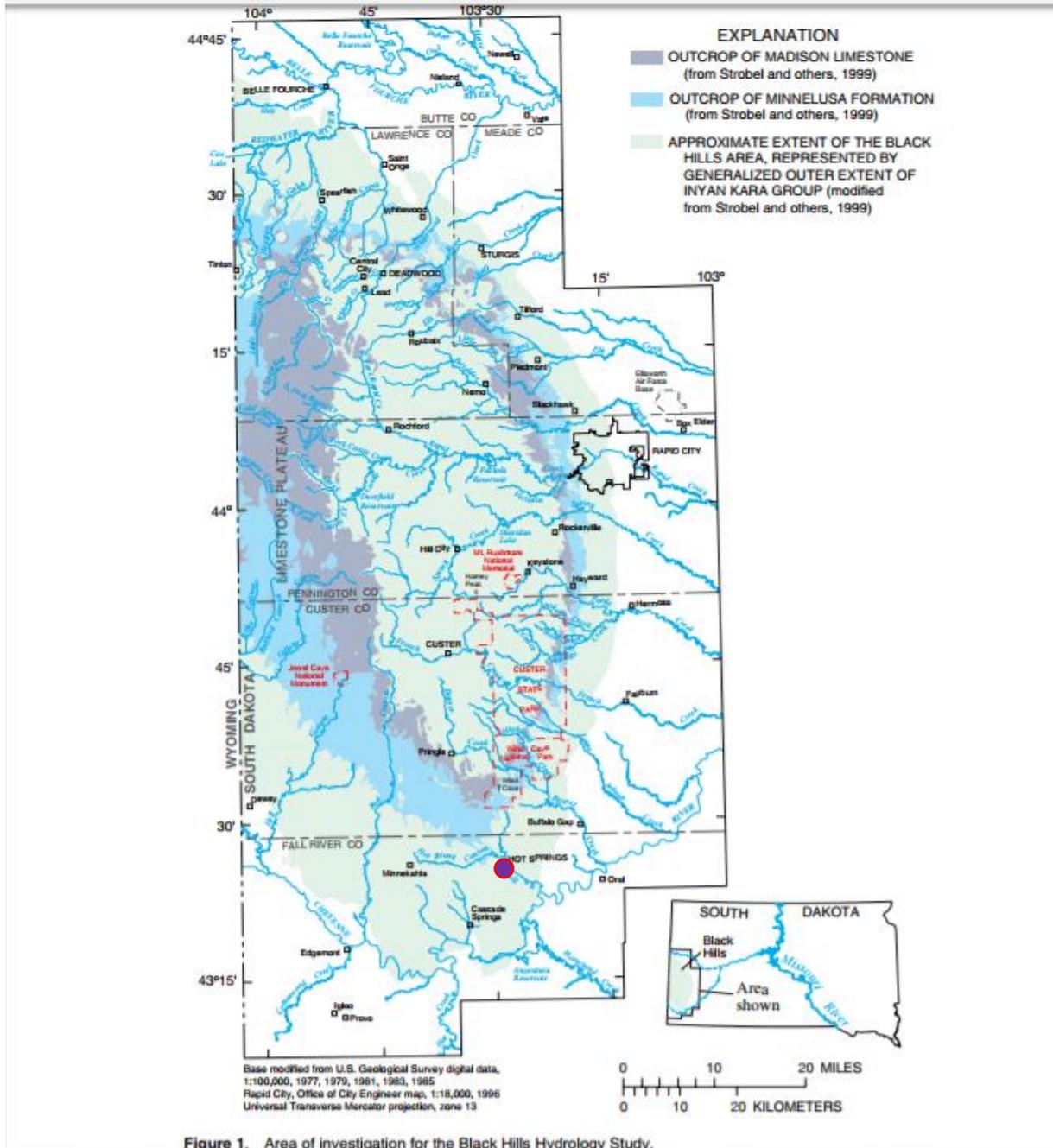
Ground and surface water resources in the Black Hills are highly interconnected. The quality of surface water can affect the quality of ground water and vice versa. Locally our main aquifer is the Inyan-Kara Aquifer. The Inyan Kara aquifer is composed of the sandstone beds of the Inyan Kara Group of Early Cretaceous age. The Inyan Kara Group is 81 to 475 feet thick. Water from the Inyan Kara aquifer may require treatment for gross alpha radiation, iron, manganese, sulfate, and hardness before use in public water systems. In some areas the concentration of sodium and bicarbonate may affect the use of water for irrigation, depending on the soil type.³

Known and predicted demands by municipal and industrial users for water in the Black Hills have increased interest in the potential ground-water supplies in the area. Since settlement in the area began during the early 1900's, the major users of water have been municipalities, many of which depend entirely on ground-water supplies, and agriculture.³

The City of Hot Springs serves more than 3,711 municipal water customers an average of 901,000 gallons of water per day. Our water is groundwater that we produce from local wells and springs. The

state has performed an assessment of our source water and they have determined that the relative susceptibility rating for the Hot Springs public water supply system is low.

The Springer Ranch Springs are the main source of the City water supply. They break out along Hot Brook canyon about a mile and half above and west of the confluence for Fall River. Water from these springs exit the ground at approximately 81 degrees Fahrenheit. The City can pump and keep even with the flow of springs by pumping approximately 1000 gallons per minute.⁵



Geology

“The Black Hills uplift is a northwest-trending, asymmetric, elongate dome, or doubly plunging anticline. Uplift began about 62 million years ago during the Laramide orogeny and probably continued in the Eocene period (Redden and Lisenbee, 1996). Large anticlines occur on the northern and southern flanks of the Black Hills and plunge away from the uplift into the surrounding plains. Numerous smaller folds, faults, domes, and monoclines also occur in the Black Hills. Igneous intrusions were emplaced on the northern flanks of the uplift during the Tertiary Period.”¹

While this is the technical description of the constructs of the geology in the Black Hills, in layman’s terms we live in the land of red rocks: sandstone (well-known as our town’s favorite building material), conglomerates and limestone. These mineral resources helped build the town we know today.

Fossils: Mammoths

Amongst the layers of rock are fossils and our most famous fossils are by far - the mammoths. At our very own Mammoth Site [<http://mammothsite.com>] 61 mammoths have been identified, along with the remains of a giant short-faced bear, camel, llama, prairie dog, wolf, fish, and numerous other plant and invertebrate fossils. The Mammoth Site houses the world’s largest Columbian mammoth exhibit, and a world-renown research center for Pleistocene studies. The site is enclosed and protected by a climate controlled building, the sinkhole and the in-situ exhibit of mammoth bones attracts visitors year round. The bones are displayed as they were discovered, in the now dry pond sediments for an “in-situ” exhibit. Walkways allow visitors a close-up view of the fossils.²

Soils

Soils is arguably the most important natural resource in Fall River County and in Hot Springs: it gives us the soils in which to grow our food or support growing grasses that help feed our livestock. The soils information presented here came directly from the Web Soil Survey.⁴ In it you can differentiate between different types of soils and their potential uses. The Hot Springs area is dominated by the following:

At 18%

P454E—Schamber-Eckley complex, 9 to 40 percent slopes

Map Unit Setting

National map unit symbol: 2rxvc

Elevation: 3,480 to 5,580 feet

Mean annual precipitation: 15 to 17 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 130 to 150 days

Farmland classification: Not prime farmland

At 12.5%

P388D—Rekop-Gypnevee, moderately deep-Tilford, dry complex, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2rwfj

Elevation: 2,950 to 4,400 feet
Mean annual precipitation: 14 to 24 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 150 days
Farmland classification: Not prime farmland

At 9.2%

P020A—Barnum silt loam, channeled, 0 to 2 percent slopes, occasionally flooded
Map Unit Setting
National map unit symbol: 2qt1z
Elevation: 3,440 to 4,400 feet
Mean annual precipitation: 16 to 18 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

And at 9.1%

P516B—Tilford silt loam, dry, 2 to 6 percent slopes
Map Unit Setting
National map unit symbol: 2s02b
Elevation: 3,280 to 4,400 feet
Mean annual precipitation: 16 to 22 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Please read the entire report to get a better understanding of the soils presented within the Hot Springs city boundary and outlying areas.

[Insert Soils Survey here]

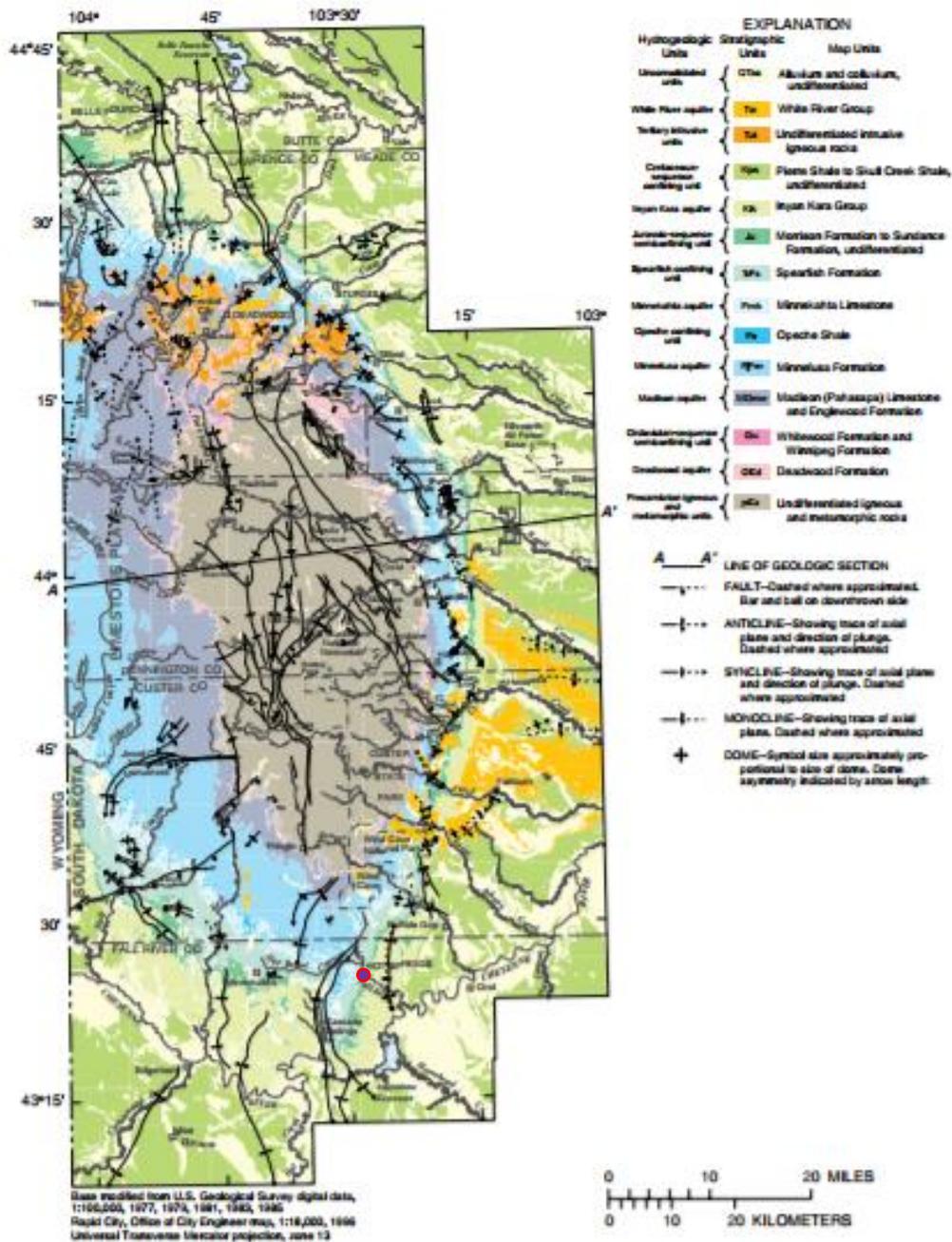


Figure 14. Distribution of hydrogeologic units in the Black Hills area (modified from Strobel and others, 1999).

Habitats

Habitat is a combination of food, water, shelter, and space arranged to meet the needs of wildlife. Within Hot Springs we have a limited variety of urban forest, native forest, wetlands, prairies and

estuarial habitats. The health and viability of each of these habitats are based in diversity of plant species, availability of water and shelter.

A note about 'pests' and 'weeds': the use of this term is anthropocentric meaning that it is from the view of humans only. We need to, as a species, learn to understand a plant or animal species place in the fabric of life and of an ecological system. The idea of 'pest' and/or weed is differentiated from 'alien' or 'invasive' species which refers to plant or animal species that have escaped from their normal territory or range and is thriving in a new environment, outperforming the native species.

Anthropocentric – (adjective) defining the state of believing that humans are the central aspect of reality, and that everything that is not human exists for humans.

Mammals:

The mammals are the favorite of species in any area due to their size and similarity with ourselves. The southern Black Hills are home to a variety of mammals. Those that can be found in Hot Springs are: White Tailed Deer, Mule Deer, Bobcat, Mountain Lion, Skunk, Coyote, Red Fox, Swift Fox, Red Squirrel, Gray Squirrel, Raccoon, Rabbit, Mink and various rodents.

Birds:

Greater Sage Grouse, Prairie Falcon, Red-naped Sapsucker, Hairy Woodpecker, Western Wood-Pewee, Cordilleran and Dusky flycatchers, Red-eyed Vireo, Warbling Vireo, Plumbeous Vireo, Blue Jay, Gray Catbird, Red-breasted Nuthatch, Yellow-rumped (Audubon's) Warbler, Ovenbird, American Redstart, Yellow-breasted Chat, Western Tanager, Lazuli Bunting, Black-headed Grosbeak and Bullock's Oriole. Look for White-throated Swift, Cliff and Violet-green swallows and Canyon Wren along the walls. Common Poorwills call from the canyon rim during summer evenings. Upper canyon: Wild Turkey, Mountain Bluebird, Townsend's Solitaire, Pine Siskin and Red Crossbill. In migration: Orange-crowned, Blackpoll, Black-and-white and Wilson's warblers.⁷

Reptiles/Amphibians:

Tiger Salamander, Woodhouse Toad, Western Chorus Frog, Bullfrog, Plains Spadefoot Toad, Northern Leopard Frog. Eastern Racer, Western rattlesnake, Gopher Snake, Bull Snake, Garter Snake. Snapping Turtle, Painted Turtle.

Fish:

Because the major water source in Hot Springs is fed by warm water springs, we have an aquatic environment unlike any other in South Dakota. There are no trout stocking programs and in fact we have issues with Jack Dempsey fish, an invasive Asian fish, which have thrived in our warm waters. However, we do have native fish such as the Plains Topminnow, Creek Chub, Longnose Dace, Sand Shiner, White Sucker and Mountain Suckers.⁶

¹ "Hydrology of the Black Hills Area, South Dakota", By Daniel G. Driscoll, Janet M. Carter, Joyce E. Williamson, and Larry D. Putnam, 2000

² <http://mammothsite.com>

³ “Geohydrology and Water Quality of the Inyan Kara, Minnelusa and Madison Aquifers of the Northern Black Hills, South Dakota, Wyoming and Bear Lodge Mountains, Wyoming”, By David P. Kyllonen and Kathy D. Peter, 1987

⁴ “Soils Survey of Fall River County, South Dakota”, US Department of Agriculture, Soil Conservation Service and the US Forest Service, 1982 and <https://websoilsurvey.sc.egov.usda.gov>

⁵ “Medicinal Waters of South Dakota”, Natural Resources Commission & the SD Geologic Survey

⁶ SD Parks and Wildlife Foundation and the SD Games Fish and Parks, Chelsey Pasbrig, Jake Davis and Silka Kempema, 2016

⁷ <http://ebirdhotspots.wikispaces.com> Birding in Hot Brook Canyon.

⁸ “A Checklist and Distribution Maps of the Amphibians and Reptiles of South Dakota”, by Royce E. Ballinger and Justin W. Meeker, University of Nebraska, 2000