14. A Hot Spring or Thermal Spring

1) Definition

A hot spring or thermal spring means a source of water that is heated geothermally and comes to the surface as a seep or forming a pool of unspecified size or temperature (Figure 58).

Figure 58. Hot spring. (Photo: Hans Roemer)

2) Importance of Hot and Thermal Springs

The elevated water temperature, air temperature, and humidity surrounding hot and thermal springs create their own unique microclimates that support species exclusively adapted to such environments. Because the microclimate of the springs mimics warmer climatic conditions, these areas sometimes support populations of plants and animals that are disjoint from the rest of their species distribution further south. In some cases, species isolated and confined to hot or thermal springs evolve into new, endemic species that are found nowhere else in the world.

The heated water of hot and thermal springs often dissolves minerals from the surrounding bedrock. These mineral-laden waters create ecosystems that may support unique warm-water bacteria and, in some cases, invertebrates and fish species. The waters from hot and thermal springs often produce mineral deposits around the springs that are used by wildlife as mineral licks.

3) What to Look For

As geomorphic features, hot and thermal springs are unique, with no defined minimum sizes or temperatures for the heated water coming from the spring. The unique microclimates associated with hot and thermal springs often make the vegetation surrounding them appear conspicuously different than nearby areas. Many hot and thermal springs have lush, oversized vegetation surrounding them related to their higher humidity, warmer temperatures, and mineral-rich growing conditions. Other hot and thermal springs are devoid of much plant growth other than

brightly coloured algae; in these cases, the high mineral content of the waters or bacterial blooms may suppress growing conditions (Figure 59). Most hot and thermal springs are small seeps without pools that can be easily overlooked.

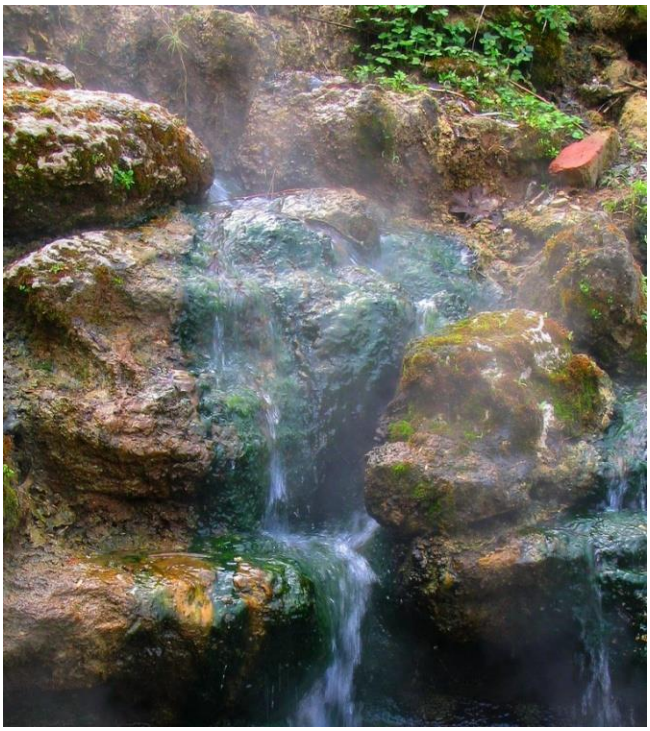

Figure 59. Hot spring. (Photo: Ken Lund)

Some hot and thermal springs emit unpleasant odours. Sulphur-bearing minerals dissolved in spring water often emit a rotten-egg odour (hydrogen sulphide), produced when these minerals are broken down by bacteria in the water. In winter, steam and running or open water are often noticeable around hot and thermal springs. Additionally, prominent tracks and trails may lead to the hot or thermal spring created by wildlife coming regularly to the mineral licks created by the springs.

Table 60 summarizes what to look for when identifying hot springs or thermal springs. Table 61 provides information to consider when conducting primary forest activities adjacent to springs.

Table 60. Hot or thermal springs: what to look for.

Description of a Hot or Thermal Spring
• Hot or thermal springs may form as distinct pools, or be small, inconspicuous streams that only pool when an obstruction or natural dam blocks the water flow. • Waters are often tainted by bright, unnatural-looking colours caused by bacterial blooms and mineral deposits. • Lush, dense and oversized vegetation surrounding the springs related to warm, humid microclimate, or devoid of much plant life because of noxious bacterial blooms. • Unpleasant odours (rotten-egg smell) emitted from bacteria breaking down mineralized waters. • Under frozen conditions in winter, steam and open or running water may be present. • Noticeable wildlife tracks and trails leading to mineral sources around the springs.

Table 61. Information to consider when conducting primary forest or range activities near hot springs and thermal springs.

Information to Consider

• Retain a vegetated buffer around the hot or thermal springs; this buffer will consist of the native vegetation (e.g., trees, shrubs, herbs, or bryophytes) occurring at the site at the time.
• Restrict all resource management activities (e.g., forestry, range, mining, etc.) within this buffer zone.
• Determine the source of water (when visible) feeding the hot or thermal springs. Karst springs can be recharged by diffuse infiltration through contributing karst catchments, by surface runoff from sinking/losing streams flowing off. Avoid restricting water flow by road construction or other activities; use appropriate crossing structures, if necessary.
• When rehabilitating roads and landings, or temporary access structures near a hot or thermal spring, restore natural surface drainage patterns as much as possible to maintain the quantity and quality of subsurface flows.
• In areas where cattle are grazed, avoid placing livestock attractants near hot or thermal springs; erect exclusion fencing in some areas to prevent cattle from damaging the riparian zone adjacent to identified hot or thermal springs.
• For hot or thermal springs located within a karst landscape and described as a "significant karst spring" maintain:
  ○ a minimum 20-metre reserve extending outward from the edge of the discharge point of the spring.
  ○ an adjacent management zone of an appropriate size to protect the reserve from windthrow.
• If the karst spring discharges into a stream channel or wetland, consult the default standards for riparian management as specified in the regulations supporting the *Forest and Range Practices Act*.
• Refer to the *Karst Management Handbook for British Columbia* for detailed information on managing karst springs (see Section 5).
• Consult a qualified professional biologist to assess site use by Red- or Blue-listed species; report occurrences to the B.C. Conservation Data Centre (see Section 5).

4) Regional Information – Kootenay Boundary

In this section, we provide specific timing windows and guidance on disturbance buffers for the Kootenay Boundary Region. This information may vary from provincial guidance and may not be applicable outside of the Kootenay Boundary Region because of regional specificity.

Hot springs and thermal springs are found throughout the Kootenay Boundary Region but are localized features with no known biogeoclimatic associations (Figure 60). Table 62 provides suggested minimum buffer sizes. Additional protection or alternative measures may be needed, depending on the nature of the disturbance, existing landscape, or other factors.

Hot springs and thermal springs create a unique microclimate that can support rare or highly specialized species and are sensitive year-round.

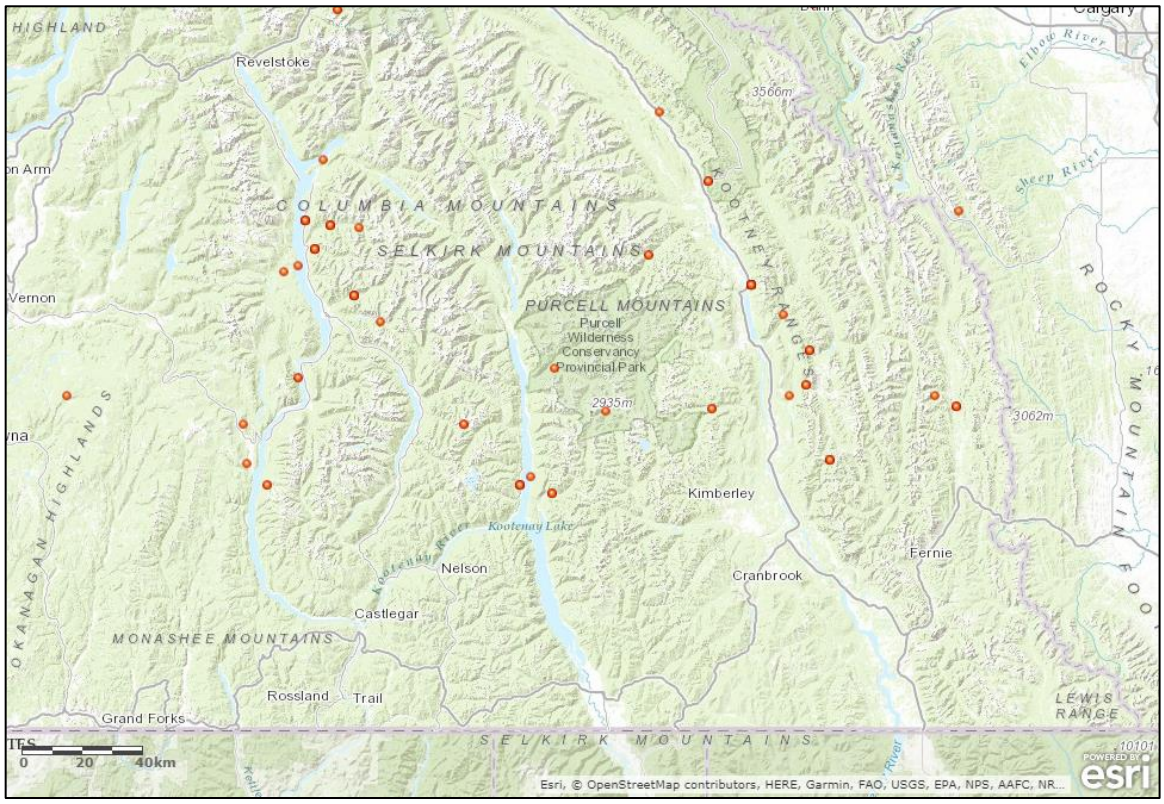

Figure 60. Locations of thermal springs in the Kootenay Boundary Region.[1]

Table 62. Guidance on disturbance buffers for a hot or thermal spring.

A Hot Spring or Thermal Spring – Guidance on Buffers
• Establish an undisturbed vegetative buffer of 30 m. If windfirmness or rare plants are a concern, consider extending this buffer. • Provide a buffer for water sources that may support the hydrology of the hot or thermal spring.

[1] From Canada Geothermal – ArcGIS Online (Spatial Layer; 2016).

5) Additional Information

B.C. Conservation Data Centre – Submit information on Red- or Blue-listed species associated with a hot or thermal spring to the Wildlife Species Inventory database:
http://www.env.gov.bc.ca/wildlife/wsi/incidental_obs.htm

Canada Geothermal – ArcGIS Online (Spatial Layer):
http://www.arcgis.com/home/webmap/viewer.html?webmap=cebc4e70ad4c48fd8314a681ae65f09c&extent=-180,36.9029,-59.1385,71.5063

Karst Management Handbook for British Columbia:
http://www.for.gov.bc.ca/hfp/publications/00189/Karst-Mgmt-Handbook-web.pdf

Identified Wildlife Management Strategy – Additional guidance concerning the management of any *Forest and Range Practices Act* species at risk associated with a hot or thermal spring:
http://www.env.gov.bc.ca/wld/frpa/iwms/accounts.html