

The Night Sky from Haliburton *by Geoff Byford*

Star gazing is an awe inspiring activity that invokes wonder, imagination and scientific curiosity about the evolution of life and humankind, and about the origin, history and future of the Universe. Our solar system with its eight planets (Pluto is now a recognized as a “dwarf planet”) and the 2000 plus stars that are visible to the naked eye on a moonless night, all reside in our home galaxy called the Milky Way. The Milky Way Galaxy is aptly named because the galactic plane of vast numbers of extremely distant stars appears to the eye as just a hazy band of white light.

The Milky Way is a spiral galaxy that is 100,000 light-years in diameter, 1000 light years thick on average, and it contains at least 200 billion stars (*i.e.*, enormously distant suns) and possibly 500 million planets situated in the habitable zone from their stars. Presently, scientists think that intelligent life has evolved on only one of these planets (!), although estimates of the number of advanced life forms in our galaxy could be in the range of 50 to 100. Our solar system and the Earth are situated close to the galactic plane about 25,000 light years from the galactic centre. The intense radio source Sagittarius A is recognized as a super-massive black hole that identifies the Milky Way’s galactic centre. As the Earth’s seasons change over the course of a year, about 6000 stars are visible to the naked eye from a position on Earth, most of which are within just 1000 light-years of our Sun. This visible near space represents less than 0.1% of the entire space in the Milky Way. The Milky Way is not unique in the Universe. There are over 100 billion or more galaxies in the 14 billion light years of space beyond our Milky Way!

Celestial wonders fascinated thousands of generations of our ancestors. Ancient societies’ explanations of the Universe involved myths, deities and monsters. Today, our generation is so fortunate to be the first to best comprehend scientific explanations of the creation and evolution of the Universe. Our ease of enjoyment of the spectacular nighttime firmament right outside the cottage, with the naked eye, binoculars or a small telescope and without the interference of significant light pollution, is likely an under-appreciated benefit of being situated here in Haliburton County. However, the preservation of **dark skies** in our neighbourhood is ever-more necessary

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Light pollution is defined as excessive and inappropriate artificial light that compromises the natural darkness of night skies worldwide. It threatens all wildlife, ecologically sensitive habitats and human wellbeing, and is a serious hindrance to amateur star gazing and to astronomical research observatories. Light pollution is sad evidence of costly inefficient and wasteful human energy usage. The four components of light pollution include urban sky glow (scattering of urban light by atmospheric particulates causing a brightness dome over inhabited areas situated mostly at lower elevations), light trespass (illumination of areas where light is not intended, wanted or needed), glare

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excessive brightness in the field of view that prevents eyes from dark adapting) and clutter (excessive clustering of light sources). Everyone can help to reduce light pollution. Cottagers should use light for a particular task in the most efficient manner possible. Strategies include:

- ✚ Purchase ‘glare free’ neighbour-friendly lights;
- ✚ Use lower wattage lamps to reduce glare from all outdoor lighting;
- ✚ Shield all outdoor lighting so that illumination is directed toward the ground where it is needed (*i.e.*, shielding prevents wasted light that is directed horizontally and skyward);
- ✚ Use only the illumination required to get the job done and avoid creating clusters of lights;
- ✚ Use timers, dimmers and sensors for lighting in outside areas;
- ✚ Use curtains or blinds to reduce light trespass from indoor living areas;
- ✚ Turn inside and outside lights off when not needed.

Nighttime lighting is essential for cottage safety and security. Good visibility on the ground where illumination is needed for safe walking should be the property owner’s primary goal. Glare distractions, poor placement of lights, and resulting deep shadows can mask dangers and afford concealment opportunities. Effective and efficient shielded lighting for safe ground illumination will minimize dangerous glare and shadows. Also, lights left on from dusk to dawn provide no alert or security advantage. Deterrence is achieved by smart lighting (e.g., timed on-off outdoor decorative lighting, motion or sensor activated ground lighting). Darkness forces would-be intruders to use flashlights or automobile headlights or other attention-attracting sources of illumination.



Glare from unshielded lights near lakes and rivers is made worse by reflections off the water, thereby reducing boaters’ abilities to see navigational hazards, other boats and docks. Glare-free shielded lighting improves visibility and enhances the aesthetic character of our waterfront neighbourhood. Turning unnecessary outdoor lights off will save electrical energy costs (!) and will help restore natural circadian rhythms in all living things (including humans) and natural habitats for wildlife, birds and insects. Thus preserved, Haliburton’s dark skies will continue to reveal magnificent celestial wonders that enthrall enthusiastic cottagers and star gazers.