



*Note: The hyperlinks in this document link to definitions provided in the online encyclopedia, Wikipedia.com, and were accurate links at the time of this posting.*

The **Bortle Dark-Sky Scale** is a nine-level numeric scale that measures the night sky's and stars' brightness (naked-eye and stellar limiting magnitude) of a particular location. It quantifies the observability of celestial objects (significant naturally occurring physical entities, associations or structures which current science has demonstrated to exist in outer space) and the interference caused by light pollution and skyglow (wide scale illumination of the sky or parts of the sky at night). The most common cause of skyglow is man-made lights that give off light pollution. John E. Bortle created the scale and published it in the February 2001 edition of [Sky & Telescope](#) magazine to help amateur astronomers compare the darkness of observing sites. The scale ranges from class 1, the darkest skies available on Earth, through class 9, inner-city skies.

The table below summarizes Bortle's descriptions of the classes. The colors are from the **World Atlas of Artificial Night Sky Brightness**,<sup>[3]</sup> and are provided as a convenience to the reader. The correlation between the colors and Bortle classes is approximate at best.

| Class | Title                   | Color key | Naked-eye limiting magnitude | Stellar limiting magnitude | Description  |
|-------|-------------------------|-----------|------------------------------|----------------------------|--|
| 1     | Excellent dark-sky site | black     | 7.6-8.0                      | 19 at best                 | <a href="#">Zodiacal light</a> , <a href="#">gegenschein</a> , zodiacal band visible; <a href="#">M33</a> direct vision <a href="#">naked-eye</a> object; <a href="#">Scorpius</a> and <a href="#">Sagittarius</a> regions of the <a href="#">Milky Way</a> cast obvious shadows on the ground; <a href="#">Airglow</a> is readily visible; <a href="#">Jupiter</a> and <a href="#">Venus</a> affect <a href="#">dark adaptation</a> ; surroundings basically invisible. |
| 2     | Typical truly dark site | gray      | 7.1-7.5                      | 17 at best                 | Airglow weakly visible near horizon; M33 easily seen with naked eye; highly structured Summer <a href="#">Milky Way</a> ; distinctly yellowish zodiacal light bright enough to cast shadows at dusk and dawn; clouds only visible as dark holes; surroundings still only barely visible silhouetted against the sky; many <a href="#">Messier globular clusters</a> still distinct naked-eye   |

|   |                           |                 |         |              |   |
|---|---------------------------|-----------------|---------|--------------|---|
|   |                           |                 |         |              | objects.  |
| 3 | Rural sky                 | blue            | 6.6-7.0 | 16 at best   | Some light pollution evident at the horizon; clouds illuminated near horizon, dark overhead; Milky Way still appears complex; <a href="#">M15</a> , <a href="#">M4</a> , <a href="#">M5</a> , <a href="#">M22</a> distinct naked-eye objects; M33 easily visible with <a href="#">averted vision</a> ; zodiacal light striking in spring and autumn, color still visible; nearer surroundings vaguely visible.  |
| 4 | Rural/suburban transition | green<br>yellow | 6.1-6.5 | 15.5 at best | Light pollution domes visible in various directions over the horizon; zodiacal light is still visible, but not even halfway extending to the <a href="#">zenith</a> at dusk or dawn; Milky Way above the horizon still impressive, but lacks most of the finer details; M33 a difficult averted vision object, only visible when higher than 55°; clouds illuminated in the directions of the light sources, but still dark overhead; surroundings clearly visible, even at a distance. |
| 5 | Suburban sky              | orange          | 5.6-6.0 | 15 at best   | Only hints of zodiacal light are seen on the best nights in autumn and spring; Milky Way is very weak or invisible near the horizon and looks washed out overhead; light sources visible in most, if not all, directions; clouds are noticeably brighter than the sky.  |
| 6 | Bright suburban sky       | red             | 5.1-5.5 | 14.5 at best | Zodiacal light is invisible; Milky Way only visible near the zenith; sky within 35° from the horizon glows grayish white; clouds anywhere in the sky appear fairly  |

|   |                           |       |             |              |  |
|---|---------------------------|-------|-------------|--------------|--|
|   |                           |       |             |              | bright; surroundings easily visible; <a href="#">M33</a> is impossible to see without at least <a href="#">binoculars</a> , <a href="#">M31</a> is modestly apparent to the unaided eye.   |
| 7 | Suburban/urban transition | red   | 4.6-5.0     | 14 at best   | Entire sky has a grayish-white hue; strong light sources evident in all directions; Milky Way invisible; <a href="#">M31</a> and <a href="#">M44</a> may be glimpsed with the naked eye, but are very indistinct; clouds are brightly lit; even in moderate-sized <a href="#">telescopes</a> the brightest Messier objects are only ghosts of their true selves.             |
| 8 | City sky                  | white | 4.1-4.5     | 13.5 at best | Sky glows white or orange—you can easily read; <a href="#">M31</a> and <a href="#">M44</a> are barely glimpsed by an experienced observer on good nights; even with telescope, only bright Messier objects can be detected; stars forming familiar <a href="#">constellation</a> patterns may be weak or completely invisible.   |
| 9 | Inner-city sky            | white | 4.0 at best | 13 at best   | Sky is brilliantly lit with many stars forming constellations invisible and many weaker constellations invisible; aside from <a href="#">Pleiades</a> , no Messier object is visible to the naked eye; only objects to provide fairly pleasant views are the <a href="#">Moon</a> , the <a href="#">Planets</a> , and a few of the brightest <a href="#">star clusters</a> . |