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Dark Sky Park Application: Keweenaw Dark Sky Wilderness -- Ver 1.0

John Barentine <john@darksky.org>

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To: John Mueller <john@keweenawresort.com>

Cc: Mariah Summers <mariah@keweenawresort.com>, Ashley Wilson <ashley@darksky.org>

Hi John,

Today I read through your draft application carefully and compared it against our International Dark Sky Park program guidelines most recently revised in 2018. With a few exceptions, I found all the information for which I looked. I'm confident that this nomination can ultimately achieve success. There are a few items apparently missing, however, that speak directly to the program requirements. I also have a few other questions and concerns about the draft.

My usual approach to reporting the findings of applications reviews is to step through each of the program requirements and state what I do and do not find in the draft, as well as instances where the information is either unclear or ambiguous. My comments are shown **in red**. For each item, the relevant page and item number from the guidelines is referenced in parentheses.

First, here's what I do find in your draft:

Basics

Proposed park is a "protected public land" or "Private land whose owners consent to regular nighttime public access" ("Eligibility", item 1, p. 4)

"As part of the deed restriction on the property, along with the Lodge being on the national register of historical places, the resort is accessible to the public for lodging, dining, and outdoor activities, including stargazing." (p. 7); "In 2018 the resort was purchased by Keweenaw Resort, LLC, with a deed restriction that the resort be accessible to the public for a certain amount of days each year." (p. 10) But see the question further below about the access requirement.

Map(s) of the area to be designated ("To Be Included In IDSP Application Package", item 1, p. 14)

Maps are provided in several places in the document, including pages 7, 10, 13 and 14.

Letter of nomination from a qualified IDA member nominator ("To Be Included In IDSP Application Package", item 2, p. 14)

Letter of support from appropriate Park administrator ("To Be Included In IDSP Application Package", item 3, p. 14)

Your letter on page 6 serves as both.

Night sky quality report ("To Be Included In IDSP Application Package", item 6, p. 14)

The night sky quality report appears on pages 33-37. See notes below, however, about data quality concerns.

If applicable, documentation supporting Provisional designation ("Provisional Status", pp. 12-13)

n/a in your case.

Lightscape Management Plan

"The written policy meets or exceeds applicable agency or departmental policies regarding outdoor lighting and conforms to all local, regional, and national laws" ("Lighting Management Plan", item 1, p. 9)

"Our lighting meets or surpasses the lighting ordinances for Keweenaw County." An excerpt from the county code is reproduced in pages 32-33.

Full shielding of any fixture exceeding 500 initial lumens and evidence of limited impact of unshielded lighting through use of adaptive controls ("Lighting Management Plan", item 3, p. 9)

"When needed, outdoor lighting fixtures are fully shielded." (p. 27) "Outside lighting [must] be dark-sky compliant: fully shielded." (p. 32)

Correlated color temperature limit of 3000K or less, OR allowed lighting must not emit more than 25% of its total spectral power at wavelengths OR S/P < 1.3. (“Lighting Management Plan”, item 5, pp. 9-10)

“When needed, outdoor lighting fixtures are ... 3,000K color temperature or less.” (p. 27) “Outside lighting [must] be dark-sky compliant: ... 3,000K color temperature or less.” (p. 32)

Park commitment to dark skies and lightscape management

Lighting inventory (“Lighting Inventory”, pp. 10-12)

The inventory is summarized on pages 28-29 and the data appear in a table in pages 29-32.

Outdoor lighting compliance with LMP is $\geq 2/3$ at time of application (“Minimum Requirements for All Parks”, item 3B, p. 6)

The current compliance rate is 83.5% (p. 28)

Next, here’s what I don’t find in your draft:

Lightscape Management Plan

“Visitor activities with respect to the introduction of unnecessary artificial light at night into the park environment must be regulated” (“Lighting Management Plan”, item 6, p. 10)

This is not discussed in the lighting plan.

Illuminated signs are regulated: curfew between one hour after sunset to one hour before sunrise; single-color displays on black backgrounds; luminance < 100 cd/m²; surface area < 18.6 square meters (“Lighting Management Plan”, item 7, p. 10)

This is not discussed in the lighting plan.

“A policy governing the installation of temporary lighting requiring that any such installation will adhere to the LMP to the greatest possible extent and whose duration will be limited to the shortest possible time” (“Lighting Management Plan”, item 8, p. 10)

This is not discussed in the lighting plan.

Park commitment to public education

Dark skies/natural darkness and benefits of good lighting are to be part of Park interpretation/outreach programs (“Minimum Requirements for All Parks”, item 7, p. 7)

Dedicated programming occurs at least four times per year (“Minimum Requirements for All Parks”, item 8, p. 7)

You describe work with the Work with Marquette Amateur Astronomers, Michigan Technical University’s AMJOCH Observatory on outreach programming (pp. 37). However, except for a couple of events in April and May 2021, all are planned for the future (see table, pp. 38-39). You’ll need to get some of these under your belt before you can apply. Document the events as you hold them with information like attendance numbers, photos, etc.

And third, here’s what I find is unclear or ambiguous:

Basics

“The Park must provide the opportunity for public nighttime access, with or without supervision” (“Eligibility”, item 1, p. 4)

It’s unclear from the presentation whether public nighttime access to the site is preconditioned on visitors availing themselves of paid amenities such as lodge stays. (“Public access to public or private lands may be subject to a nominal entry fee, but must not be contingent on the required paid use of any other product, service, program or facility available at the site,” guidelines, p. 4) I suggest adding a clear statement about this on page 7 that clears up the apparent ambiguity.

Lightscape Management Plan

“The use of outdoor light at night is only prescribed when it is strictly needed, where it is needed, and in the appropriate amount for a specific task. The purpose of outdoor light allowed under the policy must be specifically to ensure public safety” (“Lighting Management Plan”, item 2, p. 9)

“Our overall philosophy of light management on the Lodge property is to only use lighting where and when it is needed, and when it is needed do so in an appropriate amount for the specified task required.” (p. 27) We need a clearer description of what constitutes a “need” for lighting and how the decision to use light will be made, as well as what guides decisions about how much light is “required” for particular tasks.

Park commitment to dark skies and lightscape management

Dark skies in park management documents (“To Be Included In IDSP Application Package”, item 4, p. 14)

This is not really clearly articulated. Do you have anything like a written management plan for the site that would suffice? Otherwise we need to figure out how to address this in a way that the Dark Sky Places Committee will accept.

If current compliance rate is <2/3, a plan to achieve 90% compliance within five years and 100% within ten years (“To Be Included In IDSP Application Package”, item 8, pp. 14-15)

Plans for retrofits are described in the notes on page 31, but there is no schedule given for completing the retrofits. Can you add something to the effect of “we will retrofit these lights in Year One, those lights in Year Two, ...” etc.?

Ongoing sky brightness measurement program (“Minimum Requirements for All Parks”, item 3D, p. 6)

This is not discussed in the application. A brief statement to the effect of “lodge staff will make ongoing night sky brightness measurements and report them to IDA” will suffice.

Evidence of a “restoration project” (“Minimum Requirements for All Parks”, item 5, pp. 6-7)

(A) Producing at least one “night sky friendly” lighting project that is publicly visible and interpreted, OR
 (B) Involving at least two external partners in dark sky restoration efforts (e.g. chamber of commerce, power utility, university research, tribal nations, environmental groups, conservation groups, natural history association), OR
 (C) Cooperation with at least two nearby municipalities that results in adoption of lighting codes that improve sky conditions in the Park, OR

A combination of the above or an alternative restoration project may be suggested.

The streetlight replacements near the lodge (pp. 22-27) qualify as a “‘night sky friendly’ lighting project that is publicly visible”, but it is unclear whether it is “interpreted” to guests. Can you discuss that further and/or come up with a plan for how to draw attention to the retrofits?

There are a few additional items from my notes:

1. Some of the maps (e.g., p. 10) are pretty small and difficult to read. Make these larger if possible to improve legibility.
2. We need a clear statement about the nature of public access to the property, in particular whether access is preconditioned on paying for services at the lodge.
3. I’m puzzled by your sky brightness readings (pp. 33-34). When plotted as a frequency distribution (see below), they are much more scattered than I expected them to be. While there could be user error – and measurements taken on some night (e.g., 2/18/21; 2/20/21) – I actually suspect that snow on the ground might be amplifying the lights on site and making the apparent night sky brightness higher than it expected. What were the other weather conditions like, besides temperature? Any clouds in the sky? Looks like it’s probably not moonlight interference. I think you measured correctly, but it just seems like the sky there should be darker than what you measured. So I encourage you to keep measuring, especially around the upcoming dark of the moon (~5 to 15 June), so we can understand better whether in fact snow was the culprit.
4. Did you use the SQM (big red button on the front) or the SQM-L (no big red button on the front) to make the night sky brightness measurements?
5. You mention on page 33 that the numbers reported in the night sky brightness measurement table are “median[s] of the readings, which included 3 to 6 each.” If you have the complete, raw data, please include them in the report for the record (i.e., not just the medians). The result will be better in a statistical sense. And if you can send those to me now, it would help with the analysis discussed above.

Please let me know if I have overlooked anything in the draft that affects the assessment, and whether you have any questions about any of the above. The next step would be to revise the draft based on these suggestions, and I’ll run

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another pre-flight check on the result. That may take some time (see, e.g., the comments above about the outreach piece and additional night sky brightness measurements).

With best regards,

John

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