

Waterton Glacier International Dark Sky Park 2017-2018 Annual Report

Acknowledgements: Mark Biel, Ashley Wruth, Jennifer Carpenter, John Stoesser, Nicholas Alexander, Bonnie Scott, Christy Gustavison, and Locke Marshall contributed content to this annual report.

General

Site contacts for Waterton Glacier Dark Sky Park:

Christy Gustavison,
Christy.Gustavison@canada.ca
(403) 859-5152
PO Box 200, Waterton Park, AB, T0K 2M0
Waterton Lakes National Park of Canada

Mark Biel
Mark.Biel@nps.gov
406-888-7919
PO Box 128, West Glacier, MT 59936
Glacier National Park, United States of America

Waterton Glacier International Dark Sky Park received Gold Tier Designation with provisional status from the International Dark Sky Association (IDA) in April, 2017. This report highlights progress on installing dark sky compliant lighting and delivering interpretation opportunities in 2017 and 2018.

Funding

Waterton Lakes National Park

Waterton Lakes National Park (WLNP or Waterton) is operated by Parks Canada, a federal government agency, and therefore there are no grants available. Funding for lighting improvements is incorporated into projects that include building improvements. For example, Waterton received Federal Infrastructure Investment (FII) funding from 2015 to 2020 to improve various assets and structures, like staff accommodations. The requirement for dark sky compliant lighting and the associated costs are included within this FII project budget. Any existing buildings not targeted under FII or other special projects, as well as interpretive and educational programs, must be funded through annual operational budgets.

Glacier National Park

Glacier National Park (GNP or Glacier) is operated by the Department of Interior, National Park Service, a federal agency. Limited federal dollars are available for replacement of

existing light fixtures with night sky compliant ones. The majority of funding for lighting retrofits comes from the Glacier National Park Conservancy (GNPC), the park's friends group. The Glacier National Park Conservancy is currently holding over \$95,000 to cover the cost of replacing and installing night sky friendly light fixtures and bulbs throughout the park.

Lighting

Waterton Lakes National Park

All project proposals go through an environmental assessment prior to the issue of permits. The *Parks Canada Waterton Lakes National Park General Project Best Management Practices* (attached as Appendix A) includes requirements for dark sky friendly compliance. This mitigation package is also applied to proposals made by proponents external to Parks Canada (e.g., lease holders). An example of text from the environmental assessment best management practices is inserted below:

3. Project Planning / Design

Project planning and engineering design for new projects or upgrades to existing infrastructure will incorporate consideration of environmental impacts of long term operation and the potential for Conservation Gains through improved design.

Lighting/ Dark Sky Compliance

3.1. The replacement or installation of new lighting must be dark sky compliant and follow the Parks Canada Guidelines and Specifications for Outdoor Lighting. Outdoor fixtures must be shielded, full cut off low intensity dark sky compliant lights. Interior lighting must be designed to reduce light trespass. The colour temperature of any new luminaires should be under 3000K, with amber LED or converted amber LED preferred.

Lighting at the park entrance gates was updated to be dark sky compliant. However further improvements are required to reduce sky glow. This highlights the challenge in finding appropriate fixtures that meet both requirements for IDA dark sky friendly compliance and building codes for safety.

The exterior lighting in WLNP's Operations Compound was replaced to be dark sky compliant in 2016, using yellow spectrum light bulbs and fixtures that cast light down. The complete list of lights upgraded is attached as Appendix B. This project was funded from a conservation and restoration project, aimed at improving the nocturnal wildlife corridor around the compound.

Dark sky principles have been incorporated into the planning process for all of Waterton's Federal Infrastructure (FII) projects, and all building improvements using FII funding since 2015 have included requirements for dark sky compliant lighting. Below is a summary of FII projects and the result of environment assessments for dark sky compliance:

- Repaving of Highway 5/6, fenceline rebuild, Akamina road upgrades, Red Rock road upgrades and parking, Crandell septic field, bison handling facility, Belly River culvert, and seawall construction projects were considered dark sky

compliant and no changes to the projects were made. No new lights were added to these areas. However, the peace park exhibit, at the seawall, had dark sky compliant lighting installed on the walkway (Figure 1).

- Cameron Lake day use area – dark sky compliant. No light fixtures were proposed in the initial design, so it was not considered a potential effect in the environmental analysis. Interior lights have since been added because the buildings were too dark inside for workers, but these lights are turned off at night. This site is seasonally operational from May to September, and is currently closed as a result of the Kenow Wildfire.
- Townsite campground washroom replacements – dark sky compliant. Full cut-off fixtures were installed.
- Townsite campground infrastructure improvements – dark sky compliant. Best management practices for lighting were applied wherever lights required replacing or installation.
- Staff house building developments – both new buildings are dark sky compliant with measures taken to shield external lights and reduce light trespass (Figure 2).
- Townsite water sewer – dark sky compliant. Where lights required replacing or installation (e.g., over by the sewer dump), attempts were made to source dark sky compliant fixtures. This project is slated for completion in fall 2018 so it is uncertain if the light fixtures have been installed at the time of this report.



Figure 1. Dark sky compliant light post installed along the walkway to the new seawall and Peace Park exhibit in Waterton Lakes National Park.



Figure 2. Dark sky compliant lighting on entrances of two new staff accommodation buildings in Waterton Lakes National Park.

Glacier National Park

All lighting project proposals go through an Interdisciplinary Team Review prior to work being initiated and/or any necessary permits being issued. However, due to over 300 of Glacier's buildings being historic, the Montana State Historic Preservation Office (MT SHPO) is required to review and approve all changes to these structures, in addition to the park review. The MT SHPO will review the park's Interdisciplinary Team recommendations and make a decision as to whether or not that recommendation fits with the historical context of the structure in question. The park has been, and continues, working with the MT SHPO in identifying night sky friendly light fixtures that are compatible with the variety of historic structures throughout the park. Once appropriate fixtures are approved, then purchasing through the GNPC will commence and a large proportion of offending light fixtures will be brought into IDA Night Sky Friendly compliance.

Exterior lighting on several new structures being constructed within the park meet IDA Night Sky Friendly requirements, for color, intensity, glare, and shielding. Glacier experiences the same challenges as Waterton Lakes staff when it comes to finding appropriate fixtures that meet both requirements for dark sky compliance and building codes for safety.

One of the projects currently under review by the MT SHPO is a project to replace all exterior lighting fixtures on park housing units in the St Mary, Many Glacier, and West Glacier areas. This would entail the installation or retrofit of several hundred offending fixtures. Another project currently being reviewed by MT SHPO is a joint proposal with Flathead Electric Cooperative, who owns several dozen street lights in the park Headquarters and Apgar areas. The park is responsible for the remaining street lights. In an effort to bring these historic, contributing fixtures to IDA compliance, the park and Flathead Electric have identified several night sky friendly options for these pole-mounted streetlights in order to make them all uniform in appearance and night sky compliance.

Dark sky principles have been written into the new contract for the park's largest concessionaire and they have been diligently replacing or retrofitting, as appropriate, light fixtures found on structures they are responsible for maintaining. All building improvements since 2015 have included requirements for dark sky compliant lighting, whether the project be for an NPS project or a concessionaire project.

To date we have completed night sky friendly changes at Fish Creek Campground Amphitheatre, Apgar Amphitheater, Multiple maintenance buildings located throughout the park, multiple concession buildings throughout the park, and several housing units in several areas of the park.

Waterton Park Community / External Proponents

The majority of the street lights within the Waterton Park community are owned and provided by Fortis Electrical Company. On-going work with this partner is required in order to update these lighting fixtures.

Dark sky lighting information, requirements and standards have been incorporated into any new lease holder and business development projects requested externally to Parks Canada.

The following external proponent projects within the Waterton Park Community had potential lighting issues identified as part of Waterton's environmental impact assessment protocol, and the Best Management Practices were applied as part of the development permits:

- 2015 – 1 garage rebuild, 1 backcountry cabin project
- 2016 – 1 trail lighting project, 1 garage, 1 accessory building, 1 hotel rebuild,
- 2017 – 3 cabin rebuilds, 1 playground, 1 garage rebuild,
- 2018 – 1 workshop rebuild, 4 cottage rebuilds, 2 weather station rebuilds, 1 shed project.

Sky Quality

Sky quality measurements for Waterton and Glacier were included in the application to International Dark Sky Association (IDA). No new measurements for dark skies, in either park, were recorded as progress to improve lighting is ongoing.

Conservation and Research

There are no active dark skies related research projects occurring in Waterton or Glacier.

Education, Interpretation, Arts and Culture

Waterton Lakes National Park

The IDA designation in 2017 coincided with Canada 150, with free entry to Canada's National protected areas, celebrating the establishment of Canada as a country. In

September, 2017, the Kenow Wildfire burned through approximately 40% of Waterton Lakes National Park with an unprecedented severity and multiple impacts to visitor assets/infrastructure and ecological resources. This presents an opportunity for further dark sky compliance as recovery actions move forward. Visitation to Waterton has been on an upward trend of more than 500,000 visitations per year (Table 1), with decreased visitation in 2018 following area closures as a result of the Kenow Wildfire. The majority of visitors experience Waterton in the summer, therefore interpretation programs and special events are planned for July through to Labour Day weekend in September.

Table 1. Annual and Summer Visitation Statistics for WLNP from 2016-2018.

Year	Annual Visitation	July & August Visitation
2016	538,463	253,003
2017	578,137	289,695
2018	377,533	168,622

A very small percentage of visitors participate in interpretive programs and special events. In 2017, Parks Canada staff and volunteers reported 4580 visitor contacts through attendance to our 45 minute theatre shows, point duty demonstration tables, the solar eclipse special event, and astronomy events (Table 2). A Blackfoot storyteller was also contracted to share cultural stories of the teepee's connections to the thirteen moons and Milky Way.

Waterton and Glacier encourages interpretive staff from both parks to present astronomy and dark sky objects at the astronomy special events and dark sky parties. Waterton presented dark sky objects through the telescope at Glacier's three Logan Pass Star Parties in 2017, recording the number of visitors engaging with Waterton's telescope, staff and volunteers.

Glacier park staff planned to attend Waterton's astronomy events in September 2017, though these were cancelled due to wildfire. Wildfires and associated smoke remain a challenge for both parks to offer night sky programs in August. In 2018, Waterton set up their telescope at one of Glacier's three star parties at Logan Pass.

Waterton interpreters connected with 756 visitor contacts through a variety of programming. *Star Stories*, a campground program, was offered at a small, remote campground in 2018. Lighting upgrades and dark sky compliance messages were delivered during *Sunset Stroll* guided walks. Point duty demonstration tables focussed on night sky importance for nocturnal animals were the most popular, and the offer was extended into weekends in September and October (Table 2, Figure 3).

The design and construction of a new, year round interpretive visitor centre in Waterton will create additional opportunities to connect visitors with dark skies. This new visitor centre will contain an exhibit highlighting night skies, nocturnal wildlife and Blackfoot cultural

stories relating to night skies. Dark sky compliance and light trespass mitigations are considered as part of the design. Construction is starting in 2019.

Table 2. Total visitor contacts and interpretation programs sharing night sky, astronomy or dark sky compliance messages that were offered by Waterton park staff and volunteers in 2017 and 2018.

Year	Summer Interpretation Programs & Events	Program Type	Visitor Contacts	Programs Delivered	Average Attendance	Volunteer Hours
2017	<i>Lights Out</i> - Night skies & nocturnal animals	Theatre show	1229	18	65	
2017	<i>Night Skies</i> theatre program at Many Glacier Hotel	Theatre show	775	8	97	
2017	Blackfoot Storyteller (13 Moons program)	Theatre show	120	2	60	
2017	<i>On Night's Wing</i> program (Night skies & Bats)	Point Duty	62	6	10	
2017	Parks Day Event - Solar Point duty with Lynn Powers	Special Event	67	1	67	6
2017	Solar viewing weekly programs	Point Duty	939	10	94	
2017	Solar viewing & Eclipse program practice	Point Duty	115	1	115	
2017	Dark Skies & Solar themed trail roves	Trail Roves	47	2	24	
2017	Special Event - August Solar Eclipse Viewing	Special Event	619	2	310	1.5
2017	Parks Canada Telescope @ Logan Pass Star Party, Glacier NP	Special Events	607	3	202	26.5
2018	Star Stories (Night skies and Blackfoot stories)	Campground Talk	45	7	6	
2018	Sunset Stroll Through Town	Guided Walk	37	7	9	
2018	Parks Canada Telescope @ Logan Pass Star Party, Glacier NP	Special Events	172	1	172	11.5
2018	Autumn Nocturnal Creatures & Dark Sky program	Point Duty	489	6	82	
2018	Autumn Sunset Stroll	Guided Walk	13	3	4	



Figure 3. Images from a *Night Skies* theatre program and the *Nocturnal Creatures & Dark Skies* point duty.

Glacier National Park

Visitation to Glacier has been on an upward trend of approximately 3 million visitations per year. Figures for 2018 visitation are still being collected but it is anticipated that there will be decreased visitation in 2018 following area and road closures on the west side of the park associated with the Howe Ridge Fire. The majority of visitors come to Glacier in the summer months (June to September), therefore interpretation programs and special events are typically planned for July through Labor Day weekend in September.

In 2018, Glacier National Park Interpretive staff reported 2,886 people attended night sky programs and star parties. Indigenous storytelling are delivered as part of the night sky parties. Those numbers do not include solar viewing, but do include the totals for the west side astronomy program.



Figure 4. Telescopes set up for astronomy viewing at Glacier's Logan Pass Star Party in July, 2018.

Waterton Park Community/ External Proponents

In 2017, Parks Canada approved a guided business licence for a company, Dark Sky Guides, to offer public tours in 2018. This community based business plans to provide fee-based tours year round. <https://darkskyguides.ca/>

The Waterton Park Community Association organizes annual Wildflower and Wildlife festivals, and occasionally contracts Alan Dyer to give a night skies presentation with telescope viewing for some events. <https://mywaterton.ca/events>

Outreach Programs

Glacier National Park conducts outreach programs with schools and partners on a variety of topics ranging from night skies to wildlife and wildfire.

Waterton Lakes currently does not engage in outreach programming with schools or other partners on dark skies.

Community and Media Relations

Waterton and Glacier worked together to jointly announce the new Waterton Glacier International Dark Sky Park designation by the IDA with a media release and social media posts in April, 2017. The Glacier National Park Media Release dated April 28, 2017, attached as Appendix C, was also used by Parks Canada. This story was covered by a number of local TV, radio and newsprint media in both Alberta and Montana (Table 3).

Parks Canada also released social media posts (Twitter and Facebook) announcing the designation, summarized in Table 4. Both parks also updated their websites with dark skies designation information:

- Stargazing (Waterton): <https://www.pc.gc.ca/en/pn-np/ab/waterton/activ/experiences/etoile-star>

- Designation information (Waterton): <https://www.pc.gc.ca/en/pn-np/ab/waterton/culture/designation>
- Night Sky (Glacier National Park): <https://www.nps.gov/glac/learn/nature/night-sky.htm>

A new poster was also developed to promote the Waterton Glacier International Dark Sky Park (Figure 5) and is for sale at various venues in Glacier National Park.

A film permit was issued to Travel Alberta in 2017 and the links to their promotional products are included below, which recognizes the IDA designation for Waterton Glacier International Dark Sky park:

- Travel Alberta Story - <https://www.travelalberta.com/ca/articles/2018/07/aurora-and-starry-nights-from-all-of-alberta-dark-sky-preserves/>
- YouTube video (unlisted 478 views) - <https://www.youtube.com/watch?v=g2aqj2kgR6M&feature=youtu.be>



Figure 5. Poster developed and released to celebrate the Waterton Glacier International Dark Sky Park.

Table 3. Summary of known media generated from the Waterton Glacier International Dark Sky Park designation.

W-G IPP Dark Sky Park media stories 2016 - March 2018							
Count	Date	Media Outlet	Reach	Location	Reporter	Link to the Media Story	Title or Subject Name
1	13/08/2016	News Talk 770 Am		Calgary	Daniel Stilwell	http://www.newstalk770.com/syn/110/121142	Southern alberta "dark sky desination" and meteor shower
1	13/08/2016	NEWS 880 AM		Edmonton		http://www.inews880.com/2016/08/13/78521/	Alberta park wants to preserve dark sky desination
1	17/08/2016	Pincher Creek Echo		Pincher Creek	Andrew McCutcheon	http://www.pinchercreekecho.com/2016/08/16/shooting-stars-over-waterton	Shooting stars over Waterton
		Post announcement					
1	28/04/2017	Montana Public Radio		MT	Nicky Ouellet	http://beforeitsnews.com/outdoors/2017/05/waterton-and-glacier-achieve-international-dark-sky-status-2475048.html	Stargazers win with dark skies designation for Glacier-Waterton
3	29/04/2017	CTV News/Global News/CBC		Canada	The Canadian Press	https://www.ctvnews.ca/sci-tech/waterton-glacier-parks-get-dark-sky-designation-1.3390580	Waterton, Glacier parks get dark-sky designation
1	29/04/2017	Pincher Creek Echo	450	Pincher Creek	Caitlin Clow	http://www.pinchercreekecho.com/2017/04/29/waterton-glacier-peace-park-named-international-dark-sky-park	Waterton-Glacier Peace Park named Internatoinal Dark Sky Park
1	30/04/2017	Lethbridge Herald		Lethbridge	J.W. Schnarr	https://app.infomart.com/newsletter/story/tn%7C124779%7C1bhd%7C20170430%7C272183399	Waterton-Glacier recognized for lighting work
1	01/05/2017	The Missoulian	80000	Missoulian, MT	Rob Chaney	https://missoulian.com/news/local/glacier-waterton-parks-earn-dark-skies-award/article_76b08be7-d21-5ffa-b5d5-5bdb8aa72a3e.html	Glacier, Waterton parks earn Dark Skies award
1	03/05/2017	Hungry Horse News		Montana	Chris Peterson	https://www.hungryhorsenews.com/article/20170503/article/170509976	WATERTON-GLACIER RECEIVES DARK SKY DESIGNATION
1	05/05/2017	Before It's News/ The Huckleberry Hiker (blog)	438000	Montana	The Smoky Mountain Hiker (blogger)	http://beforeitsnews.com/outdoors/2017/05/waterton-and-glacier-achieve-international-dark-sky-status-2475048.html	Waterton and Glacier Achieve International Dark Sky Status
1	12/05/2017	Prairie Post West		Pincher Creek	Rose Sanchez	https://app.infomart.com/newsletter/story/tn%7C124779%7Cprpw%7C20170512%7C273110813	Waterton -Glacier International Peace Park receives new IDA International Dark Sky Park Designation
1	16/05/2017	Great Falls Tribune	75,259	Great Falls, MT	Sarah Dettmer	https://www.greatfallstribune.com/story/outdoors/2017/05/16/glacier-after-dark/314656001/	Glacier after dark
1	17/05/2017	Fort MacLeod Gazette	1323	Fort MacLeod		https://app.infomart.com/newsletter/story/tn%7C124782%7Cawfm%7C20170517%7C273547302	Waterton-Glacier park awarded 'dark sky' designation
1	25/06/2017	The Spokesman-Review		Spokane	Bob Pennel	http://www.spokesman.com/stories/2017/jun/25/light-pollution-glacier-waterton-parks-see-friend/	Light pollution: Glacier, Waterton park seek friendlier skies for critters
16			595032				
<p>**Note: This is a quick snap shot, not an exhaustive or comprehensive review of all media stories on the W-G IPP Dark Sky Park designation announcement. Some stories may not be captured in this table. Reach figures are missing and approximate only.</p>							

Table 4. Parks Canada Twitter and Facebook Social Media posts in April, 2017.

Platform	Date	English	Français	Photo
Twitter (1/2)	April 28, 2017 (designation announcement day); 1:30 pm ET	The Waterton-Glacier International Peace Park has International Dark Sky Park status! @GlacierNPS @IDADarkSky XX_INSERT_LINK	Le parc international de la paix Waterton-Glacier a le statut de parc international de ciel étoilé! @GlacierNPS @IDADarkSky XX_INSERT_LINK	
Twitter (2/2)	April 28, 2017 (designation announcement day); 1:30 pm ET	The peace park is the first ever trans-boundary park designated as an International Dark Sky Park by @IDADarkSky	Le parc de la paix est le tout premier parc transfrontalier à être désigné parc international de ciel étoilé par @IDADarkSky.	
Facebook	April 28, 2017; 1:30 pm ET	Stars shine bright at night in the Waterton-Glacier International Peace Park. The International Dark-Sky Association has recognized the peace park with provisional designation as the first ever trans-boundary International Dark Sky Park! XX_INSERT_LINK	La nuit, les étoiles brillent de tout leur éclat au parc international de la paix Waterton-Glacier. L'International Dark-Sky Association a conféré au parc de la paix la désignation provisoire de parc international de ciel étoilé, une première pour un parc transfrontalier! XX_INSERT_LINK	