



**DISTRICT OF METCHOSIN
AGENDA**

ENVIRONMENTAL ADVISORY SELECT COMMITTEE MEETING

January 23, 2024 at 7:00 p.m.
Council Chambers
Metchosin Municipal Hall

- 1. Agenda, Additions, Approval**
- 2. Presentations**
 - a) Ernie Chang, Metchosin Natural History Clubhouse Proposal
- 3. Public Participation**
- 4. Adoption of Minutes**
 - a) Environmental Advisory Select Committee, November 28, 2023 1
- 5. Receipt of Minutes**

Council & Standing Committee Minutes

<https://www.metchosin.ca/council/council-meetings/agendas-minutes>

- a) Council Meeting: October 23, November 6, November 20, December 4, 2023
- b) Special Council Meeting: October 12, December 11, 2023
- c) Finance Committee: September 11, October 23, November 20, 2023
- d) Environment and Natural Areas: October 16, November 27, 2023
- e) Public Works and Protective Services: October 16, November 27, 2023
- f) Community Planning Committees: October 16, November 27, 2023

Advisory Committee Minutes

<https://www.metchosin.ca/council/advisory-committees>

- a) Buffer Land Working Group: October 11, 2023
- b) Parks and Trails Advisory Select Committee, November 21, 2023

- 6. Business Arising from the Minutes**
- 7. Reports**
- 8. Correspondence**
- 9. Other Business**
 - a) Proposed natural history room in the old school 5
 - b) Mapping of potential sensitive areas in Metchosin
 - c) DRAFT B.C. Biodiversity and Ecosystem Framework 7
 - Email from Councillor Gray to biodiversity.ecosystemhealth@gov.bc.ca
 - DRAFT B.C. Biodiversity and Ecosystem Health Framework: Submission Guide
 - DRAFT B.C. Biodiversity and Ecosystem Health Framework
 - d) Dark Sky 35
 - Draft Proposal
 - How Blue is Your Night
 - International Dark Sky Community Program Guidelines
 - Royal Astronomical Society of Canada Dark-Sky Site Application Requirements
- 10. Adjournment and next meeting**

District of Metchosin

Minutes

Environmental Advisory Select Committee Meeting

Tuesday, November 28, 2023 at 7:00 p.m.

Council Chamber

Metchosin Municipal Hall

Present: Garry Fletcher (Chair), Councillor Steve Gray, Bill Cave, Merrilee Hoen, Ric Perron, Erin Van de Water, Andy MacKinnon (recorder)

Regrets: Anna Hall

The meeting was called to order at 7:05 p.m.

1. Agenda, Additions and Approval

Moved and Seconded by Steve and Merrilee that the Committee approve the agenda with these changes: move 9a up to after agenda item 2 (same issue); add 9g (Sue Big Oil) and 9h (Zero Carbon Step Code).

Carried

2. Presentations

a) Nitya Harris: Predator Strategies, Lessons Learned from other Communities

Peter Pauwels sends regrets. Nitya Harris is with 'Coexisting with Carnivores'. There were 7-8 cougars and 61 sheep, killed in Metchosin in June 2023. Nitya explained best management practices for avoiding conflicts between carnivores and livestock. She reviewed management plans and bylaws from various communities. All designed to reduce conflicts with carnivores. How can Metchosin better deal with this issue? This has been referred to AASC also.

Moved and Seconded by Andy and Ric that MEASC recommend to Environment Committee that they invite Nitya & Peter to make a presentation to them, and that Environment Committee (with the assistance of AASC and MEASC) develop a plan for dealing with this difficult issue.

Carried

3. Public Participation

Brent Donaldson, sheep farmer for >30 years. He emphasizes that whatever subcommittee is established consults closely with local sheep farmers. He believes that many of the actions suggested and discussed are impractical (logistically and/or financially).

4. Adoption of Minutes

Moved and Seconded by Ric and Steve that the Committee approve the minutes of the Environmental Advisory Select Committee meeting held on October 24, 2023.

Carried

5. Review of Minutes

a) Council and Standing Committee Minutes

Moved and Seconded by Steve and Erin that the Committee receive the Council and Standing Committee Minutes for information.

Carried

b) Advisory Committee Minutes

Moved and Seconded by Steve and Erin that the Committee receive the Advisory Committee Minutes for information.

Carried

6. Business Arising from the Minutes

a) Climate Action Plan

- Evaluation Framework for Metchosin's Climate Action Plan
- Action Plan Update

Merilee translated Priority Action Items into this monitoring spreadsheet. Bill provided comments on Merilee's spreadsheet.

Moved and Seconded by Andy and Steve that Merilee and Bill work together to revise Merilee's spreadsheet to incorporate Bill's comments. And that MEASC then pass the spreadsheet along to Environment Committee, emphasizing the considerable resources (people and dollars) that will be required to monitor the effects of implementing a Climate Action Plan in Metchosin.

Carried

Moved and Seconded by Ric and Garry that Environment Committee invite the ReImagine West Shore Community group to address Environment Committee.

Carried

b) BC Government 30% Protected Land by 2030 Commitment

- MEASC's Green and Blue Spaces Strategy
- Draft BC Biodiversity and Ecosystem Health Framework

Moved and Seconded by Steve and Erin that MEASC members send comments on Draft BC Biodiversity and Ecosystem Health Framework directly to the provincial government.

Carried

c) Tanker traffic in the Strait of Juan de Fuca

Steve gave us an update on development of an op-ed.

7. Reports

a) Bullfrog Management Project Results 2023

Moved and Seconded by Andy and Bill that we support Stan Orchard's recommendation that Metchosin continue bullfrog control work in 2024.

8. **Correspondence:** None.

9. **Other Business**

a) Human-Wildlife Conflict Prevention Strategies

See Notes under 2a.

b) Proposed Subdivision Application Referral, 4696 Beckingham Road

Erin recommended that all proof of water supply for potential well sites should be done during the summer months.

Moved and Seconded by Steve and Andy that all of the concerns identified in the environmental assessments (Swell Environmental Consulting and Cascadia Biological Services) be specifically addressed prior to development.

Carried

c) Fossil Fuel Non-proliferation Treaty

Moved and Seconded by Andy & Steve that MEASC encourage Council to support this Treaty.

Carried

d) Reducing Anchorages Outside the Port of Vancouver

Steve gave a brief update.

e) Invasive Species – Parrot’s Feather (*Myriophyllum aquaticum*)

Staff: Please put this on the next MEASC Agenda.

f) Riparian Area Regulation

Steve gave a brief update on the interaction between provincial legislation and municipal bylaws.

Moved and Seconded by Garry and Merilee that MEASC encourage Environment Committee to request staff to investigate whether Metchosin should have a specific riparian area bylaw.

Carried

g) Sue Big Oil

Steve gave us an update on this issue that has come before Council. Council decided not to pursue this.

h) Zero Carbon Step Code

Steve gave us an update on this issue that has come before Council. Council supports this.

10. **Adjournment and Next Meeting Date**

Moved and Seconded by Ric and Bill that the Committee adjourn the meeting at 9:13 p.m.

Carried

The next MEASC meeting will be held on Tuesday, January 23, 2024 at 7:00 p.m.

Metchosin Natural History Club House
Ernie Chang
Resident of Metchosin [REDACTED]

Introduction

I have lived in Metchosin since 2000, and have worked as a family doctor on the Westshore. Currently I am fully retired. I have also been qualified as a computer scientist. The vision is to have a room in the Metchosin Community Hub (formerly the Metchosin School), on an on-going basis, in which everyone can contribute, participate, and meet others who are passionate or just interested in the natural beauty, flora and fauna that is rural Metchosin.

This is not a society, nor a fee-based membership. Everyone is a member and can join in.

The Concept

This would be a drop-in site in which current focus of interest are displayed, either as photos, or slides, or posters, or microscope specimens, or as presentations of data relevant to the topic and to Metchosin.

For example, the topics on a monthly basis might be: shorebirds, fungi, perching birds, wildflowers, slime molds, the rocky shore, the sandy shore, backyard deciduous trees, evergreens, lichens and algae, backyard flowers, migrating birds, banded birds at Rocky Point, large mammals, small mammals, edible and medicinal plants, reptiles of Metchosin, and audio where appropriate. Clouds, waves, sunrise, sunsets, geology and hydrology of Metchosin would also be welcome. Combine them into ecologies. Natural History topics in art and sculpture.

To simplify, there could be four themes: Spring birds, Summer Flowers, Fall Fungi, Winter Rocky Shores within which these topics might grow or evolve organically.

Contributors would submit specimens, or photos, or posters about the topics of interest, and mark on a map of Metchosin where the reference points are. Education material (prevalence, identification, range, etc) would be encouraged. Metchosin schools might participate.

Equipment

Donations would be accepted (from me and others) of display equipment like computers, monitors, microscopes (where needed), audio equipment for sounds. Tables, chairs, couches, electrical extensions, etc would be needed.

Communication & Finances

Reach out to the community via the Metchosin Muse, and by word of mouth. This is not a commercial proposition, and the District of Metchosin is being asked to donate a room in the Metchosin Community Hub.

Administration, Organization and Security

As a fully retired person, I am prepared to offer my efforts to the organization and setup of displays for the first year. My hope is that as an open community effort, the Metchosin Natural History Club belongs to everyone, and that natural succession will follow. This is a topic that is close enough to the hearts of many rural residents that it should grow organically. Finances and contracts for a club would be hard.

From: Steve Gray

Sent: Monday, January 15, 2024 2:35 PM

To: biodiversity.ecosystemhealth@gov.bc.ca <biodiversity.ecosystemhealth@gov.bc.ca>

Subject: Input for consideration

Great headway!

Needs more specifics and a sense of urgency. Tighten up language so there is clarity for public and corporate interests.

Add ecosystem-based targets. In the case of forestry, targets linked to deferral areas. Commit and adopt strong species-at-risk and ecosystems-at-risk legislation with a specific timeline for passage and standards for protection without loopholes. The document needs specific timelines for implementation throughout. Not just maintain but enhance ecosystem health and biodiversity. Complement invasive species strategies. Add definitions for species at risk, ecosystem health and services, restoration. To enhance working together and inclusivity, increase capacity through training and building skills. Regular reporting.

Thanks,

Steve Gray

Councillor

District of Metchosin

Draft B.C. Biodiversity and Ecosystem Health Framework: Submission Guide

This document is designed to provide assistance for grassroots groups writing submissions to government on the Draft B.C. Biodiversity and Ecosystem Health Framework. Thank you to the subject matter experts who delivered the briefings from which this guidance is drawn:

Jessica Clogg, West Coast Environmental Law
Whitney Lafreniere Vicente, West Coast Environmental Law
Sarah Korpan, Ecojustice
Victoria Watson, Ecojustice

We have assembled several key points below for groups that want assistance in developing messaging. You can pick and choose from the below points in making your submissions, or add your own points that speak to what your group wants to see in the final Framework. Please put these points in your own words. We have also included a sample letter template at the bottom of this document for those who are new to the government submission process.

When and How to Submit:

- Access [the draft Framework](#) and provide comments no later than **January 31, 2024**. Send your submission by **January 31, 2024** to biodiversity.ecosystemhealth@gov.bc.ca.
- Please also forward your completed submission to support@organizingforchange.org. OFC will include your submissions in our briefing packets and use them to inform our future government relations efforts on this issue. You can also feel free to send us your submissions prior to the deadline if you have any questions or other support needs.

Key Positive Points:

- Exciting to see the release of this draft Framework.
- Proposed shift to ecosystem-based management, and BC's commitment to co-developing a new overarching Biodiversity and Ecosystem Health law has the potential to be transformative (but needs to be implemented properly).
- Glad to see groundwork being laid toward fulfilling Old Growth Strategic Review recommendation #2 (this has been a long-awaited policy priority).

Gaps to Highlight in Submissions:

Indigenous Leadership

- Gaps in the draft Framework:
 - No mention of Indigenous Protected and Conserved Areas (IPCAs)

- No specifics about Indigenous-led conservation and stewardship
- **Indigenous-led stewardship needs to be front and centre throughout the Framework and new legislation.**
- Partnership and co-development must be embedded in the entire Framework and implementation plan.
 - Groups may also wish to link the above points to Old Growth Strategic Review recommendation #1.
 - Groups may also wish to point out specifically that Pillar 2 of the Framework does not mention First Nations, despite calling for a whole-of-society approach.
 - Groups may also wish to point out specifically that Pillar 3 mentions science and local knowledge but not Indigenous knowledges.
- **Need to commit capacity funding for First Nations to lead/partner in implementation of the Framework.**
 - Should include funding to support Nations who wish to defer old growth logging in their territory, and the advancement of IPCAs.

Office of Biodiversity and Ecosystem Health

An important tool to promote and oversee a whole-of-government approach.

- **But, the Office must be set up with the powers necessary to give it teeth.**
- To achieve this, the “[n]ecessary powers and authority” mentioned in the draft Framework should be sufficient for the Office to fulfill its overarching, leadership role in ensuring the prioritization of biodiversity and ecosystem health across all government decisions and resource sectors, in order to overcome bureaucratic silos and counter industry influence.
- Concerns that the Office risks becoming merely symbolic.
- **Timeline for establishing the Office: should be established during this mandate.**

Linkages to BC’s 30 x 30 Commitments and on-the-ground protection

- Implementation needs to result in on-the-ground protection, not just new processes.
- **The Framework needs to better articulate the importance of an interconnected, representative network of protected and conserved areas (building on BC’s existing protected areas system through the addition of new IPCAs) that provides an ecological backstop of at least 30% protection as part of the new ecosystem-based management approach.**

Oversight and Accountability

- Lack of clarity on:
 - Oversight and accountability mechanisms (this will ensure implementation of the Framework is done properly and impartially).
 - Where mechanisms for Indigenous knowledges, laws and advice will fit into that structure and be relied on, respected and upheld.
- The BEH Office’s ability to carry out oversight and accountability roles could be supported through two forms of oversight:
 - Objective scientific and Indigenous knowledge-based oversight and advice to inform standards and objectives in a manner impartial to industry interests.

- External oversight and accountability on progress on implementation of the framework and law, such as a commissioner-type role.
- The oversight and accountability provisions should support Nations in enforcing their own stewardship laws and policies, not just the biodiversity and ecosystem Framework.

New Legislation and Amendments to Existing Laws

- **Positive to see a commitment to developing new legislation (critical to supporting the paradigm-shifting vision of the Framework).**
- New legislation *must*:
 - Include enshrined, cross-sector objectives and standards to ensure full realization of the necessary paradigm shift
 - Include provisions for species at risk
 - Be truly co-developed with First Nations
 - Comprehensively implement UNDRIP
 - Enable and fund Indigenous-led stewardship and co-governance
- Framework should prioritize new legislation over amending legislation in the implementation plan (this will help give effect to the priority of biodiversity and ecosystem health across all industry sectors).
 - Note: This could be accompanied by interim policy directives for implementation of the priority in the absence of the law.

New Tools and Designations

- **New tools are critical to the paradigm shift that the Framework envisions (new toolbox needs new tools!).**
- Need to see:
 - Greater commitment to co-developing new tools and designations as part of the Framework.
 - For example, current approaches under the Forest & Range Practices Act like Old Growth Management Areas aren't effective conservation measures. New designations need to apply across all resource sectors and prevent resource extraction incompatible with objectives.
 - Support and uphold IPCAs and Tribal Parks where they have been declared (in both the Framework and law).
 - Avoid greenwashing of adaptive management at all costs.
 - Require use of precautionary principle in decision-making, adaptive management, and planning.
 - Ensure metrics and objectives, and methods for achieving those objectives, will be adapted to various watersheds, ecosystems, critical habitats and species. Governance must account for this while still being inclusive and joint with First Nations.

Implementation and Immediate Actions

- **Interim measures and immediate actions are critical to ensure that steps are taken to protect biodiversity and ecosystem health while longer-term plans and**

- legislation are being developed.
- **Timeline for interim measures/immediate actions: need to be released and enabled when the Framework and implementation plan are finalized.**
 - **Key measure: a consultation and cooperation plan for timely, sufficiently-resourced co-development of a new biodiversity and ecosystem health law in full alignment with UNDRIP.**
 - Examples of other measures include:
 - Creation of the Office of Biodiversity and Ecosystem Health.
 - Legal orders made when the Framework is announced to require the immediate prioritization of biodiversity and ecosystem health in provincial decision-making across all sectors including in ongoing land use planning. This could be done through Cabinet orders under s. 7 of the Environment and Land Use Act.
 - Groups may also want to raise the potential use of s.7 orders for immediate protection of IPCAs or other areas of high conservation value (e.g., critical habitat).
 - Updates to the Biodiversity Guidebook, including policy direction for immediate implementation of these new targets and an ecosystem based management approach in all planning exercises (e.g., Forest Landscape Plans).
 - Accounting for gaps in existing commitments by immediately protecting the most at-risk old growth as recommended by the Old Growth Technical Advisory Panel.
 - **Need to also see an upfront commitment to provide funding to First Nations to implement immediate protections.**

Sample Letter Template

Groups are welcome to use the below template as a guide in drafting their submissions. Please put into your own words or tailor to your group as much as possible. We also recommend you put your submission on organizational letterhead if possible.

Thank you for the opportunity to comment on the Draft B.C. Biodiversity and Ecosystem Health Framework.

[Insert paragraph introducing your group. Points you may wish to put here include the issues you work on, the specific geographic area you work in, the reach of your group (i.e. if you represent a broad number of members), etc.]

We are very pleased to see the release of this draft Framework. This is a positive step with the potential to be transformative if implemented properly. [You may also want to insert why the Framework is important for your specific group. i.e. "As a group that has been engaging on forest issues for the past decade, we welcome the paradigm shift that the draft Framework offers, and hope to see it translate into urgently-needed on-the-ground change".]

[Insert feedback on the Framework: Feel free to use some of the points drafted above. It's best to keep your points concise and focussed on actions you want to see. If you're offering lots of feedback, you may want to use bullet points or headings to keep your submission easy to follow and to highlight key points.]

Thank you for your work on this draft Framework to date, and for the chance to engage with this process. We look forward to reading the final Framework, and to participating in further engagement as it is implemented. [You may also want to close with an ask to meet with government on this issue or be included in future meetings and discussion, and to receive a response.]

DRAFT B.C. BIODIVERSITY AND ECOSYSTEM HEALTH FRAMEWORK

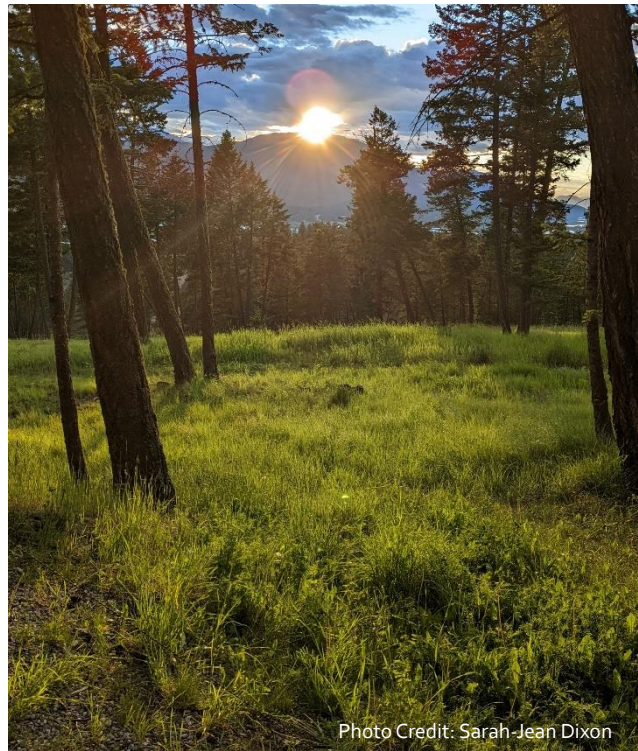


Photo Credit: Sarah-Jean Dixon

November 2023



Ministry of
Water, Land and
Resource Stewardship

Message from the Minister

British Columbia (B.C.) is known for the diversity of the land and water and is the most biodiverse province in Canada. However, the province's biodiversity and ecosystems are under threat. Healthy ecosystems and biodiversity are not only essential for our individual health and wellbeing, but they also ensure that ecosystems, economies, and communities throughout B.C. can flourish. Healthy ecosystems and biodiversity are vital for climate change resiliency and reducing the impacts and costs related to floods, droughts and wildfires brought on by changing climate and extreme weather events.

We are seeing the urgent need for unprecedented shifts in land and water management to ensure biodiversity and ecosystem resilience for generations to come at international, national, and local scales. Internationally, the Global Biodiversity Framework was signed in 2022. Nationally, Canada has committed to halt and reverse biodiversity loss and formally recognizes that every Canadian has a right to a healthy environment.

A collaborative stewardship approach that prioritizes the conservation and management of biodiversity and ecosystem health is needed in B.C. to address emerging environmental issues as well as support true and lasting reconciliation with Indigenous Peoples.

B.C.'s Biodiversity and Ecosystem Health Framework (the Framework) is an important step towards the provincial government's commitment to prioritize the conservation and management of ecosystem health and biodiversity, including the conservation and recovery of species at risk, which will align all existing related initiatives and set the path for co-development and implementation of new policies, legislation, and strategies.

In early 2023, we initiated engagement and the collaborative development of a draft Biodiversity and Ecosystem Health Framework with First Nations, local governments, interest groups and industry, in response to Recommendation 2 of the Old Growth Strategic Review. I want to thank everyone for their participation in the engagement and collaboration sessions, and the thoughtful input that was provided and incorporated in this draft Framework.

Through this draft Framework, we are committing to a collaborative stepwise approach to prioritizing healthy ecosystems and biodiversity, and to take a holistic approach to stewarding B.C.'s land and water resources, ensuring that they are healthy and resilient for the long term.

Sincerely,

Nathan Cullen

Minister of Water, Land and Resource Stewardship

Foreword

B.C. is the most biodiverse province in Canada. However, the province's biodiversity and ecosystems are under threat from habitat loss and fragmentation, climate change, pollution, unsustainable use, and invasive species. B.C. has experienced impacts from climate change such as wildfires, flooding, landslides, water shortages and heatwaves which have resulted in negative impacts (such as loss of life, infrastructure, property, revenue, and habitat for species). These negative impacts are expected to become more frequent with more significant impact unless action is taken.

The climate change and biodiversity crises are inextricably linked – climate change is threatening biodiversity in B.C. Conserving and restoring ecosystems is fundamental to mitigating and adapting to climate change. Our long-term economic prosperity depends on resilient biodiversity and ecological integrity.

B.C. has many examples of collaborative stewardship initiatives, in addition to provincial strategies which have been, and are being, developed to concurrently manage for ecological integrity and human well-being through ecosystem-based and adaptive management approaches. These approaches are helping to shift the ways land and water are managed across the province.

While all these initiatives are underway, the province would greatly benefit from a common vision related to biodiversity and ecosystem health that we can all work towards. The B.C. Biodiversity and Ecosystem Health Framework (the Framework) is proposing a vision and a cohesive, collaborative, and transparent provincial approach that will build off, align, and integrate ongoing work, and that is adaptable to diverse ecosystems, cultures, and ways of approaching stewardship across the province.

The Framework promotes an inclusive, partnership-based approach - founded on upholding Title and Rights of First Nations and advancing reconciliation. Through networks, governance structures partnerships, planning tables, forums, agreements and co-operation and various means of collaboration we can continue work together in concert, strengthening the relationships we have with one another and with the land, water, and all living things.

While much work is underway, the aim is to achieve the transformative change needed through the clarity of prioritizing ecosystem health and resilience. There is an incredible opportunity to seize this moment to show the world how working together with First Nations, local communities, industry, civil society, and others can help maintain biodiversity and ecosystem health and ensure healthy communities and prosperous resource-based economies for current and future generations, inspiring hope, and optimism for us all.

Contents

Statement of Intent	1
THE BRITISH COLUMBIA GOVERNMENT COMMITS TO THE CONSERVATION AND MANAGEMENT OF ECOSYSTEM HEALTH AND BIODIVERSITY AS AN OVERARCHING PRIORITY AND WILL FORMALIZE THIS PRIORITY THROUGH LEGISLATION AND OTHER ENABLING TOOLS THAT APPLY TO, AND CAN BE ACCESSED BY, ALL SECTORS.	1
1. Ecosystem Health and Biodiversity in B.C.	2
2. Purpose	4
3. Principles to Guide Our Shared Path Forward	6
4. Foundation	7
5. Actions	8
6. Conclusion and Next Steps	10

Statement of Intent

THE BRITISH COLUMBIA GOVERNMENT COMMITS TO THE CONSERVATION AND MANAGEMENT OF ECOSYSTEM HEALTH AND BIODIVERSITY AS AN OVERARCHING PRIORITY AND WILL FORMALIZE THIS PRIORITY THROUGH LEGISLATION AND OTHER ENABLING TOOLS THAT APPLY TO, AND CAN BE ACCESSED BY, ALL SECTORS¹.

The Framework is built on the foundation of upholding and enabling the articles set out in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and the requirements of the *Declaration on the Rights of Indigenous Peoples Act* (Declaration Act). This foundation supports three pillars:

1. Taking a whole-of-government approach that demonstrates vision, leadership, and integration: including setting ecosystem health and biodiversity objectives and standards that apply across sectors, and integrating and aligning provincial government decision-making, policies, processes, and legislation that affect ecosystems.
2. Fostering and supporting a broader whole-of-society approach that facilitates actions and initiatives by individuals, organizations, private sector, governments, and communities to conserve and manage ecosystem health and biodiversity and to advance sustainable communities and economies.
3. Adopting an open and transparent process through evaluation, reporting, continuous collective learning, and adaptive management.

The core drivers of success are working together to maintain and enhance biodiversity, ecological integrity, and their overall resilience to ensure the coexistence of healthy ecosystems and human communities and economies in B.C. for current and future generations.

¹The intention is that this priority applies to sectors (within provincial jurisdiction) that impact ecosystems, including forestry, agriculture, fisheries and aquaculture, energy and mines, oil and gas, tourism, recreation, transportation, and housing. The Framework is also inclusive of other sectors that benefit from biodiversity or play a role in supporting outcomes of this Framework, including health, finance, education, research, training, and innovation.

1. Ecosystem Health and Biodiversity in B.C.

B.C. is home to the greatest biodiversity of any province or territory in Canada, bordered by the arctic-alpine tundra on the north, the fringes of the prairies on the northeast, the Rocky Mountains along the length of the eastern boundary the arid valleys on the south and the rich waters of the Pacific Ocean on the west. The diverse climate and topography in B.C. contribute to complex and varied ecosystems, including mountains, plateaus, valleys and coastal plains and their associated forests, grasslands, wetlands, alpine, oceanic, and aquatic ecosystems^{iv}.

The health of an ecosystem can be evaluated by the degree to which it maintains biodiversity and other ecosystem benefits. Healthy ecosystems have the structures, functions, composition, and processes that maintain and support native biodiversity. This includes energy and nutrient cycling, natural disturbance processes, hydrologic cycles, and complex interactions among systems, both terrestrial and aquatic, above and below ground, forested and non-forested, biotic, and abiotic, at community and individual scales, and with humans and our surroundings.

Healthy ecosystems are dynamic and resilient. They are adapted to natural disturbances at scales that vary based on ecosystem attributes such as climate, species, topography, and soils. Healthy ecosystems also have a high degree of ecological integrity; they contain native species and communities, natural landscapes, and ecological functions that are characteristic of the region and ecosystem they occur within^v.

Healthy ecosystems and biodiversity provide a range of environmental, social, cultural and health benefits to British Columbians that are the foundation of our well-being. These benefits include providing clean air and water, supporting spaces for social activities and spiritual practices, provision of medicine (including social and psychological wellness), water security, flood and disease prevention, and food and nutritional security (particularly for Indigenous traditional ways of life). Healthy ecosystems and biodiversity underpin B.C.'s economy and are critical for key economic sectors, including tourism and recreation, forestry, agriculture and fisheries, and innovation for medical and pharmaceutical industries. They provide nature-based solutions for climate mitigation and adaptation and are a source of innovation via many types of social and environmental research.

Biodiversity and cultural diversity are inextricably linked. Evidence shows that human cultural diversity is associated with the remaining high concentrations of biodiversity, demonstrating the critical role Indigenous Peoples play in conserving biodiversity and ecosystems^{vi}. These unique relationships are embodied in the values, beliefs, worldviews, livelihoods, and knowledge of Indigenous Peoples. In B.C., there are more than 200 distinct First Nations, each with their own unique traditions and history, and each of which are closely tied to and shaped by their relationship to their lands and their inherent stewardship responsibility to those lands.

The need for unprecedented shifts in land and water management to ensure ecosystem health and biodiversity for future generations is being addressed on international, national, and local scales. Internationally, the Global Biodiversity Framework (GBF) was signed in 2022. Canada will revise the National Biodiversity strategy to align with GBF goals and targets and formally recognizes that every Canadian has a right to a healthy environment. Different levels of co-operation and alignment can lead to combined support and actions in B.C. for example, the

Marine Protected Area Network Action Plan for the Northern Shelf Bioregion was jointly endorsed with 15 First Nations, the B.C. Government, and the Government of Canada^{vii}.

Key terms are defined below to help guide the interpretation of the Framework.

Ecosystem Health – a concept or metaphor that describes environmental conditions in relation to natural/historical benchmarks for biodiversity and ecosystem structures, functions, and processes. Unhealthy ecosystems are degraded by human/industrial use.

Biodiversity (short for biological diversity) - the diversity of plants, animals, and other living organisms in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems, as well as the evolutionary and functional processes that link them.

Ecological Integrity - ecosystems that contain native species and communities, natural landscapes, and ecological functions that are characteristic of the region and ecosystem they occur within.

Ecological Resilience - the ability of ecosystems to absorb the effects of combined human and natural disturbance events by resisting and recovering from the disturbance, while still maintaining ecosystem composition, structures, functions, and processes.

Human Well-Being – the overall quality of life and satisfaction that individuals and communities experience. It encompasses various physical, psychological, social, and economic factors that contribute to a sense of contentment, fulfillment, and happiness.

Conservation – the protection, care, management and maintenance of ecosystems, habitats, wildlife species and populations, within or outside of their natural environments, to safeguard the natural conditions for their long-term permanence.

Ecosystem-Based Management - an adaptive approach to managing human activities that seeks to ensure the coexistence of healthy, fully functioning ecosystems and human communities. The intent is to maintain those spatial and temporal characteristics of ecosystems such that component species and ecological processes can be sustained, and human well-being supported and improved.

Adaptive Management – is a rigorous approach for designing and implementing management actions to maximize learning about critical uncertainties that affect recurrent decisions while simultaneously striving to meet multiple management objectives.

2. Purpose

The purpose of the Framework is to provide strategic direction that sets the course for changes in legislation and current practices that aligns the Province's commitment to UNDRIP with specific goals that are intended to maintain and enhance biodiversity and ecological integrity, protect and conserve priority areas, restore degraded ecosystems, and ensure healthy communities and economies for generations to come. It sets out desired outcomes, principles, and broad directions on which we can build the next steps required to deliver legislation, detailed policies, and actions necessary - jointly with First Nations and with involvement from all British Columbians. It will facilitate short-term shifts towards transformational changes.

Recognizing the many initiatives and programs that are already underway in B.C. that support healthy ecosystems and biodiversity, the Framework aims to create a coordinated and cohesive approach as well as fill gaps. It aims to strengthen and accelerate these existing initiatives, building on successes and wise practices that can be scaled and applied more broadly, while supporting a collective culture of learning and growth.

The Framework is living and flexible recognizing that many actions and ideas contained in this document are based on the current state and will continue to change as we progress reconciliation and adapt to a changing environment.

What does Prioritizing the Conservation and Management of Ecosystem Health and Biodiversity mean?

The Framework sets the stage for the desired transformational shift from a land management system that prioritizes resource extraction (subject to constraints) to a future that is proactive, prioritizes the conservation and management of ecosystem health and biodiversity, and is implemented jointly with title and rights holders (a paradigm shift). This shift recognizes that strong, stable, and prosperous communities and economies rely on healthy ecosystems.

This means that policies, decisions, and actions would first consider what ecosystems need to sustain themselves and the benefits they provide² across spatial scales (e.g., local, watershed, regional) through time, and then consider how they may be sustainably used to support communities and economies.

Ecosystem-based management (EBM) will be an important management approach to achieve this which looks to concurrently manage for ecological integrity and human well-being. Implementation of EBM will look different across B.C. (spatially and temporally) given the diversity and continuum of change in ecosystems, local communities, and Indigenous cultures and stewardship practices. It is expected that there will continue to be areas of more intensive development to accommodate population growth and increasing demands for food, fiber, and energy as well as areas of the landscape where there will be greater emphasis on ecosystem health, including protection of priority areas and restoration of degraded ones. It will require a

² Ecosystem benefits include, but are not limited to, clean air, water quality, species diversity, soil productivity, predatory-prey interactions, pollination, carbon sequestration and storage, flood and disease prevention, and provision of medicine, food, and fiber.

complementary transition toward a long-term view of economic health and community prosperity.

Prioritizing the conservation and management of ecosystem health and biodiversity includes^{viii}:

Shift from	Shift to
Individual species	Continue to advance holistic multi-species / ecosystems and threats-based approach*
Small spatial scale	Multiple scales
Short-term perspective	Long-term perspective
Humans independent of ecosystems	Humans as integral parts of ecosystems
Management separate from research	Adaptive management
Managing commodities	Enhanced production potential for ecosystem goods and services

* While managing for vulnerable individual species may always be needed, shifting to a multi-species / ecosystems focused approach can result in greater benefits across multiple species and reduce overall costs and effort on single species management.

Creating Conditions for Change

Managing for ecosystem health and biodiversity is a considerable shift, and it will be challenging to do. Success will require that:

- the right sets of laws, policies, and practices are in place;
- people have the necessary tools and support to work effectively;
- all voices are heard, valued, and considered in decision-making;
- all of society understands the change and why;
- full expression to the standards in UNDRIP is provided for;
- the transition is a just one that does not unfairly impact certain sectors or communities;
- there is a well-aligned vision of land use, stewardship and governance between First Nations and the Province.

The Framework is designed to help get this in place, and as part of its strategic direction fill policy gaps while working towards longer term legislation.

Desired Outcomes

The desired outcomes from implementing the Framework include:

- **Healthy ecosystems:** achieve a level of stewardship that maintains and enhances biodiversity, ecological integrity, and ecological resilience across the province.
- **Advances reconciliation:** implementation of the standards of UNDRIP; First Nations have the space and capacity to play an integral role in conserving ecosystems and biodiversity in their territories; and there are increased opportunities to exercise Indigenous rights and responsibilities, including right to harvest, and the responsibility to care for and respect lands and waters.

- **Effective stewardship:** approach is broadly understood, supported by, and meaningfully involves the broader public; there are respectful relationships; and holistic learning and knowledge sharing.
- **Resilient communities and economies:** achieves social and economic benefits for all; supports diverse and ecologically sustainable local, regional, and provincial economies; and fosters and attracts necessary skills, innovation and training with communities benefiting from secure, innovative jobs for generations to come.

The vision is that healthy and biodiverse ecosystems will be thriving, productive and resilient – and sustain community, social, economic, and environmental well-being in all ways for generations to come.

3. Principles to Guide Our Shared Path Forward

The following principles are intended to guide actions, decisions, and policy development to support implementation of the Framework, such as informing the co-development of legislation and guiding considerations for statutory decision-makers. These principles are in addition to, and designed to complement, existing principles that are related to the Framework. For example, the [Draft Principles that Guide the Province of British Columbia’s Relationship with Indigenous Peoples](#) will guide the Province-Indigenous relationship that is based on respect and recognition of inherent rights when implementing the Framework.

Shared Responsibility and Accountability	We are all responsible for managing and caring for the land and water together. We all have actions that we can commit to that will make a difference. Aligning levels of government and individual goals will amplify our success.
Respectful relationships	Success relies on respectful relationships with each other and the land and water. Partnerships and collaboration among governments and all British Columbians that embraces a diverse range of values and perspectives, and a spirit of learning and adapting will be key.
Sustainable and Inclusive Economies	Recognize that long-term stable jobs, and resilient and competitive economies, are only possible with a healthy environment.
Interconnectedness	Recognize that the connection between land, water and people are inseparable when it comes to stewardship and conservation.
Community/ Place-Based Decisions and Actions	Accounts for regional differences by emphasizing community empowerment and informed decision-making and supporting flexible local approaches (rather than top-down, one-size-fits all approaches).
Multi-generational	Ensure that decisions made today are sustainable for future generations and provide for intergenerational equity.

4. Foundation

The Framework is built on the foundation of upholding and implementing the articles set out the United Nations Declaration on the Rights of Indigenous Peoples and the requirements of the Declaration Act

First Nations in B.C. have stewarded their territories for millennia and have specific rights, interests, and connections. The uniqueness of each First Nation in B.C. is expressed, in part, through knowledge systems, cultural identities, and laws which are inextricably linked to the lands and waters in their respective territories. The Province recognizes and supports the fact that ecosystem health and biodiversity are core to inherent title and rights of First Nations in B.C.

Indigenous world views, cultural and economic practices have demonstrated success in maintaining ecosystem health and biodiversity. Sharing knowledge (Indigenous, scientific, expert, local) and learning together will strengthen the adaptive approach necessary to address the complex challenges we are collectively facing.

Implementation of the Framework will involve a distinctions-based approach to ensure that the unique rights, interests, and circumstances of Indigenous Peoples in B.C. are acknowledged, affirmed, and respected; that respects First Nations, Métis and Inuit peoples as distinct, with unique cultures, histories, rights, laws, and governments; and, which requires Canada and B.C.'s relationship and engagement with First Nations, Métis and Inuit peoples to include different approaches or actions with different outcomes; therefore this Framework involves First Nations as the Indigenous Peoples who hold title and rights to territory in B.C. through agreed upon governance structures and the exercise of First Nations rights to self-determination and self-government.

Commitments related to new biodiversity and ecosystem health legislation as well as amendments to existing land and water related provincial legislation to give effect to the Framework would be co-developed with First Nations. The Province is also committed to working in partnership with First Nations to advance territorial planning, which includes land use planning, to inform land use decisions that can support healthy ecosystems and biodiversity.

The Province recognizes that consistent capacity funding for Indigenous communities, governments and organizations will be needed to support readiness in the implementation of the Framework. Implementation of the Framework will entail working with Indigenous knowledge holders to uphold and support Indigenous knowledge meaningfully and respectfully.

5. Actions

Pillar 1: Taking a whole-of-government approach that demonstrates vision, leadership, and integration: including setting ecosystem health and biodiversity objectives and standards that apply across sectors, and integrating and aligning provincial government decision-making, policies, processes, and legislation that affect ecosystems.

A whole-of-government approach is essential to shift to mainstreaming concepts of ecosystem health and biodiversity across all relevant sectors including health, agriculture, forestry, mining, infrastructure, and finance. Changing our ways to maintain and enhance ecosystem health and biodiversity is complex and challenging and requires all government bodies at all levels to be actively involved to ensure government actions are complementary and not working at cross-purposes. It requires shared goals, backbone capacity and governance, and structural enablement through law and policy – all of which enables collective action and impact across sectors. B.C. will:

1. Establish an Office of Biodiversity and Ecosystem Health within the B.C. Public Service with the necessary powers and authorities to lead a coordinated and collaborative approach across government and in partnership with First Nations to implement the framework including:
 - a) Improving the collection, coordination and sharing of information on the status of ecosystem health, including biodiversity, and supporting informed decisions and continuous improvement.
 - b) Leading the development of ecosystem health and biodiversity objectives and standards for key ecosystems (e.g., forests, wetlands, grasslands) supported by guidance for all sectors, based in science and local and Indigenous knowledge, to account for multiple values, that can then be recognized in legislation.
 - c) Championing policies and approaches; and ensuring accountability to meet ecosystem health and biodiversity objectives and standards across government.
2. Co-develop with First Nations new legislation and amendments to existing land and water related provincial legislation to give effect to the Framework, including affirming First Nation jurisdiction, governance, and stewardship practices.
3. Integrate and align decision-making processes, policies, programs, with the priority of conserving and managing ecosystem health and biodiversity.
4. Incorporate ecosystem health and biodiversity objectives and standards (see 1 b) in all planning activities (e.g., Land Use Planning, Forest Landscape Planning, Watershed Planning), in a manner that enables First Nations and the Province to work together in an inclusive and transparent way to adjust the objectives and standards to meet the goals for specific areas. Planning activities will be based on ecosystem-based management principles to ensure:
 - a) Ecosystems are managed in a way that minimizes biodiversity risk and ensures ecological integrity is maintained.

- b) That cumulative effects of natural and human-caused disturbances are managed for the desired future conditions, informed by the range of natural/historic variability and the need to manage for resiliency to future climate conditions.
- c) Protected areas and other effective area-based conservation measures are established to protect, connect, recover, and maintain important habitat, riparian areas, and wildlife features.
- d) Restoration is included as part of planning activities and is used strategically to improve landscape condition.
- e) Ecosystems are managed to promote and enable sustainable economies and resilient communities.

Pillar 2: Fostering and supporting a broader whole-of-society approach that facilitates individuals, organizations, private sector, governments, and communities to conserve and manage ecosystem health and biodiversity and to advance sustainable communities and economies.

While many British Columbians are working hard to conserve ecosystem health and biodiversity, the value of this Framework is in connecting and unifying efforts and people to maximize long-term impact. Supporting connections between people and nature, with enabling mechanisms in place for all to actively contribute to protection, restoration, and sustainable use (e.g., governance, information sharing, and investment in skills, knowledge, capability, and capacity), are proven to have measured benefits on physical, spiritual, and mental health and well-being^x. B.C. will:

1. Support and connect societal initiatives and actions that are working towards achieving healthy ecosystems and biodiversity in B.C., address barriers and gaps, and evaluate these three supports.
2. Provide education and publicly available, accessible, and credible data and information on ecosystem health and biodiversity, while supporting Indigenous data sovereignty, to help enable informed local participation in decision-making.
3. Create or use financing mechanisms (e.g., conservation finance, tools and sustained long-term funds) to enhance stewardship capacity.
4. Create pathways (including fostering innovation, skills, and training) to achieve environmental, social, and economic benefits for all, this includes supporting sustainable and stable natural resource sectors that continue to be a source of good jobs and economic security for communities and creating new opportunities and benefits which accelerates diverse streams of revenues.

Pillar 3: Adopting an open and transparent process through evaluation, reporting, continuous collective learning, and adaptive management.

Our collective success depends on making sure we are on the right path to maintaining and enhancing ecosystem health and biodiversity. This requires a foundation of science and local knowledge, improved understanding of biodiversity, ecosystem health and related cumulative impacts, and enhancement of monitoring, evaluation, and adaptive learning. Tracking, reporting

on and celebrating progress will be important for maintaining momentum towards this transformational shift. B.C. will:

1. Develop an implementation plan to operationalize the Framework that identifies the necessary resources which will accelerate and integrate related initiatives and fill gaps.
2. As part of the implementation plan implement interim measures to ensure action is taken quickly and options are retained for long-term decisions.
3. Enhance oversight through compliance and enforcement such as by involving others (e.g., First Nations Guardian programs) and provide improved ability to tailor to region-specific needs.
4. Regularly and transparently report publicly on the state of ecosystem health and biodiversity and progress in implementing the Framework (including how we are tracking against ecosystem health and biodiversity objectives and standards), and adjust response where needed based on the results of monitoring and evaluation.

6. Conclusion and Next Steps

The Biodiversity and Ecosystem Health Framework sets out an important provincial commitment: “the conservation and management of ecosystem health and biodiversity as an overarching priority and formalizing this priority through legislation and other enabling tools that apply to, and can be accessed by, all sectors.” While the Framework provides the strategic direction and creates the structure for understanding and action, each of the commitments will have to be further designed, with analysis and policy choices made.

Along with that commitment, the Framework facilitates the short-term shifts towards transformational changes that are needed. It provides strategic direction, setting the course for changes in legislation and current practices that are grounded in the Provincial commitment to UNDRIP. With guiding principles, desired outcomes, and specific actions, it lays out a pathway to maintain and enhance biodiversity and ecological integrity, protect and conserve priority areas, restore degraded ecosystems, and ensure healthy communities and economies for generations to come.

The Framework is living and flexible, recognizing that many actions and ideas contained within it are based on the current state and will continue to change as we progress reconciliation and adapt to a changing environment. Our collective efforts, through co-operation and integration, will ensure we are learning, building, and implementing the transformational changes needed to build our shared future. This includes reviewing and renewing the Framework with opportunities for involvement in its evolution.

In the intervening time, once engagement on the draft Framework has drawn to a close, all feedback will be considered and used to inform the final Framework.

In addition, recognizing that the Framework sets out a pathways approach, the next steps will be to develop an implementation plan that identifies interim measures and the expected timelines for all measures, whether short, medium, or long term.

Appendix A: Background Information

The following information provides additional context on the various concepts introduced in this document.

Nature's value

- B.C. has the greatest diversity of species, ecosystems, and habitats of any province or territory in Canada.
- Healthy ecosystems support healthy environments that provide stable cultural, social, and economic benefits to people and communities throughout B.C.
- Ecosystem benefits include, but are not limited to, clean air, water quality, species diversity, soil productivity, predatory-prey interactions, pollination, carbon sequestration and storage, flood and disease prevention, and provision of medicine, food, and fiber.
- There is increasing recognition for the need and value of natural asset management, i.e., to ensure clean drinking water, healthy fisheries and waterways, and mitigation of floods, landslides, wildfires, and other risks.
- The economy is not separate and apart from nature but embedded within it: our prosperity is dependent on the dynamics in nature.
- There is a wealth of knowledge and case studies on the economic benefits of biodiversity from local economic studies, from other jurisdictions and internationally. Taking the full value of nature into account can lead to different types of opportunities, benefits and a more pragmatic assessment of decisions, unintended consequences, and their costs.

Our shared future: managing for different risks and uncertainty

- The climate change and biodiversity crises are inextricably linked – climate change is threatening biodiversity in B.C. Conserving and restoring ecosystems are fundamental to mitigating and adapting to climate change.
- Building healthy ecosystems is part of disaster risk reduction. For example, the Sendai Framework for Disaster Risk Reduction^x includes recommendations to: “strengthen the sustainable use and management of ecosystems” and “... preserve ecosystem functions that help to reduce risks.”
- Managing for uncertainty will require us to coordinate our collective efforts and action, build from the collective wisdom that incorporates different views and knowledge systems information, and to strengthen decision making and collaborative processes, through better communications.

Meaning of prioritization of ecosystem health and resilience

- Prioritization of the conservation and management of biodiversity and ecosystem health means to consider the restoration and maintenance of the natural range of variability of ecosystem characteristics across scales (local to regional) to promote ecosystem resilience and sustainable delivery of economic and social services.
- Conservation and management of biodiversity and ecosystem health is proposed to be based on an ecosystem approach, which includes ecosystem-based management. In some cases, where an ecosystem is severely degraded or at risk: that ecosystem may need protection, restoration, or enhancement efforts.
- As part of the UN Convention on Biological Diversity and decisions made under it, sustainable use has been recognized as a management objective as it is a way to promote conservation of biodiversity, providing incentives for conservation and restoration because of the social, cultural, and economic benefits that people derive from that use. It also means that sustainable use is connected to effective conservation measures^{xi}.
- Ecosystem-based management looks at long-term viability, ecosystem services benefits, functions, and use, and makes decisions in the context of people's relationships to those ecosystems. For example, for an ecosystem in a watershed, the erosion of soil and the water filtration function will be critical benefits that need to be considered along with other factors in deciding the use of that ecosystem. Management decisions will also entail consideration of the cumulative impact of activities on species or ecosystems in management decisions related to the species or ecosystem.
- Adaptive management works to deal with uncertainty, given that ecosystems are dynamic, complex and that decisions in relation to an ecosystem are not static. Adaptive management allows for learning from previous results. The Framework will facilitate learning from wise practices, cross-sector learnings, different knowledge systems including Indigenous knowledge and increased monitoring to strengthen adaptive management.
- There is a need to create a broader understanding on what conservation and management entails: a common assumption is that it is only preservation, but the actions are broader and can be tailored for a given situation and different ecosystem types in terms of protection, care, maintenance, or restoration.
- Many of the actions that span the scope of conservation and sustainable use are already underway in B.C., for example, consideration of the ecosystem and adaptive management. Having a cohesive and consistent approach may enable enhanced practices and procedures and provide broader certainty and clarity.
- The goal is to ensure that existing initiatives can be amplified and promoted, creating knowledge networks and exchanges, with learnings shared between sectors, reducing duplication of efforts.

Designing for Economic Resilience

The Framework is expected to:

- add to existing efforts in the StrongerBC Economic Plan to strengthen community resilience in the context of climate change nurturing talent, promoting investment, strengthening infrastructure, and fostering innovation in both traditional and new industries.
- strengthen and or create pathways towards inclusive and sustainable economic opportunities that can diversify revenue streams for local communities and explore opportunities to avoid additional costs and impacts on vulnerable and/or marginalized populations.
- enable the exploration and adoption of financial mechanisms to support outcomes and create initiatives that support early adopters and industry leaders in addressing biodiversity loss.
- support existing efforts to sustain sectors and jobs into the long-term based on the recovery and productivity of ecosystems.
- create the support and awareness for nature-based assets that could help communities to avoid costly local infrastructure spending, building more resilient local economies.
- bolster existing efforts designed to increase productivity by enhancing biodiversity, for example, strengthening food security through changes to soil health and advancing forest climate change strategies.
- build and prepare for the full range of future skills and training that will be needed to support the actions needed to maintain, restore, and enhance biodiversity.

Implementation

- The Framework will be implemented in various ways: from communications, to updates to existing policies, to increasing partnerships, agreements, and participation in existing processes in the short term. Many of the short-term activities entail increasing awareness, strengthening knowledge networks, and building relationships as preparation for dialogue and design of broader structural changes that are needed.
- Through a consultation and co-operation plan, further work will be outlined to co-develop the longer-term policy and legislative changes needed.
- The Framework will be implemented and supported through various initiatives already underway or in place that would further the outcomes in place, such as land use planning, protected area targets, other effective conservation measures, protected areas, watershed security strategy, the coastal marine strategy, to name just a few examples.

- The Framework would create a common frame of reference for all the related initiatives, enabling identification of shared goals and purpose, understanding where alignments are needed, improving communications, and identifying support needed.
- The Framework can catalyze the broader conditions (structural, relational, and transformational) that are needed to support a shared understanding and greater awareness, that will result in proactive measures, thus reducing the risk of costly reactive responses.
- Having a structured approach with clear outcomes and direction prepares and equips everyone better to deal with complex, dynamic environments that will require a broad range of appropriate responses.

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- ⁱ Convention on Biological Diversity, 2022, Kunming-Montreal Global Biodiversity Framework: <https://www.cbd.int/gbf/>
- ⁱⁱ Canada's 2030 National Biodiversity Strategy, 2023: <https://www.canada.ca/en/environment-climate-change/services/biodiversity/national-biodiversity-strategy.html>
- ⁱⁱⁱ Parliament of Canada, 2023: <https://www.parl.ca/legisinfo/en/bill/44-1/s-5>
- ^{iv} UBC, Biodiversity of BC: <https://linnet.geog.ubc.ca/biodiversity/>
- ^v Government of Canada, 2023, Ecological integrity of national parks: <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/ecological-integrity-national-parks.html>
- ^{vi} UNESCO, 2008, Links between biological and cultural diversity: <https://unesdoc.unesco.org/ark:/48223/pf0000159255>
- ^{vii} MPANetwork, BC Northern Shelf: <http://www.mpanetwork.ca/nap/>
- ^{viii} Adapted from: UNEP, 2017, Ecosystems Based Management: Markers for assessing progress: <https://www.unep.org/resources/report/ecosystems-based-management-markers-assessing-progress>
- ^{ix} Parks Prescriptions: <https://www.parkprescriptions.ca/>
- ^x Sendai Framework for Disaster Risk Reduction 2015-2030: <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>
- ^{xi} UNEP, CBD, April 2004: [cop-07-dec-12-en \(cbd.int\)](http://www.cbd.int/cop-07-dec-12-en)

Dark Skies for the District of Metchosin

Introduction:

Metchosin is a rural and rural-suburban municipality which is part of the Capital Regional District (CRD) on Vancouver Island. Other members of the CRD include the Cities of Victoria, Colwood and Langford which are highly urbanized. Metchosin, where farming is still a significant factor in the local economy, is perhaps the most rural member. Parks and undeveloped land still provide a haven for wildlife and a respite for humans from the ills of urbanization. It has a unique character much appreciated by residents and visitors alike.

This unique character is under threat. Increasing amounts of outdoor lighting are affecting wildlife populations and are also detrimental to human health. Ironically, studies have shown that security, often touted as the reason for excess lighting, is not improved by outdoor lighting. There is also some indication that excess light even reduces security by providing glare and shadows that assist the nefarious in their activities. Blue LED lighting, which is cheap and becoming common, reduces the production of melatonin in both humans and wildlife. As melatonin is profound regulator of sleep and circadian rhythms, the biological impact of its loss can be severe. Excess outdoor lighting causes sky glow which reduces the ability to see the night sky. For millenia the night sky has been a focus of cultural values for all peoples. Humans place their stories and history into the night sky in the form of the constellations. It is a practice which binds us all together since we all share the same night sky. Metchosin still provides a reasonably dark night so that people can still tell their children the stories of the night. But we are losing it fast.

Metchosin has an opportunity to reverse this trend. Most people are well-intentioned but often not well-informed. Education rather than regulation can be a more effective tool for change. And establishing a goal for a community could well provide a rallying point for Metchosin residents and help with developing a unique identity. An external certification can provide access to educational materials, and would provide an objective measure of the community's efforts to reduce light pollution and also confer significant bragging rights...

Certifications Available:

The Royal Astronomical Society of Canada (RASC) offers three levels of certification:

- **Dark-Sky Preserve:** Sites with very dark skies with minimal sky glow, and that are generally far from urban centres and therefore somewhat less accessible to astronomers and the public. These usually do contain public campgrounds.
- **Nocturnal Preserve:** Some dark sites are remote with few resources for active outreach programs, and are designated more for the protection of the night for flora and fauna than for public amenities.
- **Urban Star Park:** These are sites within, or close to, urban areas that are not consider "dark", but provide good access to the public.

- DarkSky International (DSI, formerly the International Dark Sky Association) offers the following designations:
 - **Dark Sky Sanctuary.** Public or private land that has an exceptional or distinguished quality of starry nights and a nocturnal environment that is protected for its scientific, natural, or educational value, its cultural heritage, and/or public enjoyment.
 - **Dark Sky Reserve.** Public or private land possessing an exceptional or distinguished quality of starry nights and nocturnal environment that is specifically protected for its scientific, natural, or educational value, its cultural heritage, and/or public enjoyment.
 - **Dark Sky Park.** Land possessing an exceptional or distinguished quality of starry nights and a nocturnal environment that is specifically protected for its scientific, natural, or educational value, its cultural heritage, and/or public enjoyment.
 - **Dark Sky Community.** A town, city, municipality, or other legally organized community that has shown exceptional dedication to the preservation of the night sky through the implementation and enforcement of a quality outdoor lighting ordinance, dark sky education, and citizen support of dark skies.
 - **Urban Night Sky Place.** A municipal park, open space, observing site, or other similar property near or surrounded by large urban environs, and whose planning and design actively promote an authentic nighttime experience in the midst of significant artificial light.

Metchosin most likely would qualify as a RASC Urban Star Park, a DSI Dark Sky Community and/or a DSI Urban Night Sky Place. The Town of Bon Accord, Alberta is a DSI Dark Sky Community and Oak Bay has a RASC Urban Star Park at Cattle Point. Both municipalities would likely be willing to share their experiences.

General Requirements:

Requirements for certification vary but in general fit under the following headings:

- **Municipal Outdoor Lighting.** Municipal lights must comply with Canadian Guidelines for Outdoor Lighting (CGOL) or equivalent. Metchosin's existing Dark Sky Policy is based on CGOL so this requirement may already be met or significantly met.
- **Accessibility.** The core area must be accessible by the public after the end of twilight. Metchosin's core is already accessible,
- **Quality of the Night Environment.** CGOL requirements as above must be met. In addition, light measurements must be taken and reported, usually on an annual basis.
- **Public Outreach.** Public outreach is required for visitors and residents. It can consist of raising awareness of the connection of dark skies to night ecology and raising awareness of stargazing or other night-time activities. This can take several forms including information pamphlets, public presentations and planned activities.
- **Advocacy.** There is an expectation that the certified community would engage in advocating reduction in light pollution with surrounding communities.

Cost to Metchosin

Metchosin has already undertaken a significant effort to reduce light pollution via it's Dark Sky's policy. Compliance with the current CGOL and any additional requirements such as the RASC-CGOL qualification may need to be reviewed. Most programs permit upgrades to meet compliance to be spread out over a period such as five years to allow better integration with ongoing maintenance programs. Some signage will need to be erected to identify Metchosin as a Dark Sky Community and direct visitors to the core area. Outreach materials are available from DSI and perhaps RASC including pamphlets, posters and videos. Locally oriented materials (see attached "How Blue is Your Night?") can be developed by volunteers. Monitoring of light conditions and sky quality can also be done by volunteers. Volunteers can also assist with the preparation of any reporting requirements. Presentations and events can be held in conjunction with the Victoria Centre of the RASC, Pearson College's Astronomy Activity Group and Metchosin volunteers. Properly managed, the impact on the District's budget should be minimal.

Recommendations:

It is proposed that the District of Metchosin create a Dark Sky Select Advisory Committee. The terms of reference for this committee are as follows:

- Review the options for Dark Sky certification and make a recommendation to Council as to how to proceed.
- If Council directs an application to be prepared work with staff to prepare such an application.
- Provide resources to help guide the application process such as collecting required information, data such as light measurements and recommending implementation plans.
- Assist with ongoing compliance requirements such as public outreach, light measurements and reporting.
- Review and recommend on dark sky issues going forward.

T.B.(Ted) White

Attachments:

IDSC_2018 Guidelines_Updated Sept2023 (2).pdf

RASC_PRESERVE_APPLICATION_REQUIREMENTS_2020_0.pdf

How Blue is Your Night.docx

How Blue is Your Night?

Ted White, R.P. Bio Ret.

Have you ever sat around a fire and felt warm, comfortable, and relaxed? And have you ever stayed up too late working on your computer or watching TV, and felt dragged out and tired the next day? If this sounds familiar, then you have experienced the sensitivity of your eyes and brain to light and its colour.

The comfort of a campfire may date back more than a million years. Archaeologists have uncovered traces of campfires at least that ancient. Staring at the fire for that long, in evolutionary terms, has done things to the hominin brain. The production of melatonin, our major sleep-regulating hormone, is strongly associated with warm light colours such as firelight and the golden light of sunset. Blue light, such as daylight, suppresses melatonin production. This makes perfect sense, given human history. We need to be alert and active during the day, and we need to sleep during the night. Once we learned to control fire and gained the first artificial light at night, our brains likely evolved a response to such light to help put us gently to sleep.

But now the light has changed. Until recently, lighting was provided by making things hot like our friendly campfire. Torches, candles, oil lamps and even tungsten-filament light bulbs all produce light by heating. Fluorescent lights and LED's do not. They make light by forcing electrons to jump around inside atoms. It takes less heating for more light; hence, better energy efficiency. The designers of such devices get to choose what colours they produce by choosing which atoms (elements) to use. Their natural tendency was to mimic daylight. After all, don't we want to see things as well at night as we do during the day? Offices were filled with cool-white, cheap-to-run fluorescent fixtures. People who complained were not generally taken seriously. Today, it's the blue-white LED's turn. At night, inside and outside of our homes, we are increasingly bathed in light that is not very good for us. Blue-white light has been linked to several not-so-nice medical problems, in addition to sleep disruption. There is some evidence linking such light to cataracts, macular degeneration and even cancer. The research continues, but it doesn't look good. There is an extensive database – over 4,300 references – on Artificial Light at Night (ALAN) at this link: <https://www.zotero.org/groups/2913367/alan> db/library for those inclined to dig a little deeper.

One of the ironies is that LEDs are often touted as a cost saver, since they have a long life and use less energy. But our eyes are most sensitive to yellow-green light at about 555nm wavelength. All other factors being equal, we are about half as sensitive to blue light (around 450nm). So, if your light source is more yellow, you can see better. Again, this makes sense as there is lots of light during the day when there is more blue light. When there is overall less

light at night, but it's a warmer colour, that sensitivity is an advantage. Moreover, since eye response is non-linear, the energy required for yellow light is many times less than just half that of blue.

So how much light do we really need? Illumination engineers use published engineering standards to choose the appropriate amount of light in buildings and outdoors. Even as we learn more about the health effects of artificial light, these standards are still being increased. Earlier recommendations for normal activities fell in the 100 to 300 lux range. Today, it's 500 to 1,000 lux. But where I am sitting right now during the day, in a house with good natural light, I measure 120 lux reflected from our white walls and 55 lux from my computer screen. The dog and I can see just fine.

So, what can we do? Get better informed about your own light environment.

1. Check the colour temperature of your light sources. Your smart phone can do it with the right app. Look for something that measures in degrees Kelvin. I use Color Temperature Meter Kelvin (<https://kelvin-meter.contecity.com/>) on my Android phone. The free version works just fine. There are many others (photographers use this quite a bit). For guidance, campfires are around 1,500 K and daylight is 6,500 K. Avoid anything above 3,000 K.
2. Check how much light is around you. Again, you can get a free light meter app (<https://photoworkout.com/best-light-meter-apps/#5-lux-meter>). Get one that reads in lux. Try to stay with the low end of the old standards. I am very happy with 100 lux during the day indoors and prefer much less at night.
3. Check your screens. TV is the bad one, as the standard is 6,500 K and at least some units are not adjustable. But your phone and computers are. Somewhere in your display settings you should find something about light at night. Turn it on. I set mine to 1,500 K at night (I do like a good campfire...) and have it come on gradually at sunset and off at sunrise. On my phone, I use the app "Twilight" (<https://twilight.urbandroid.org/>). I like it better than the built-in one.
4. Don't let your house be smarter than you are. Smart homes with lighting controls were designed to engineering standards, not health standards. And architects place light fixtures for effect (or ego) as much as function. This is particularly true for exterior fixtures. There are houses in our neighborhood with up to thirty exterior fixtures that come on automatically, whether they are needed or not. Who knows what's also happening inside the house?
5. And finally, spare a thought for your Neighbours, both human and non-human. If you don't need the light on, turn it off -- particularly if it's an exterior fixture. We are all in this together.

DARKSKY INTERNATIONAL

5049 E Broadway Blvd, Suite 105 - Tucson, AZ 85711-3646 USA - +1 520-293-3198 - www.darksky.org

*TO PRESERVE AND PROTECT THE NIGHTTIME ENVIRONMENT AND OUR HERITAGE OF DARK SKIES THROUGH
ENVIRONMENTALLY RESPONSIBLE OUTDOOR LIGHTING*



DarkSky

International Dark Sky Community Program Guidelines

**2018 Version
Updated September 2023**

TABLE OF CONTENTS

DEFINITION OF AN INTERNATIONAL DARK SKY COMMUNITY	3
GOALS FOR IDSC CREATION	3
DESIGNATION BENEFITS	3
ELIGIBILITY	4
MINIMUM REQUIREMENTS FOR ALL COMMUNITIES.....	4
PROVISIONAL STATUS.....	7
IDSC APPLICATION PROCESS	7
NOMINATION	7
STEPS FOR APPLICANT	8
TO BE INCLUDED IN IDSC APPLICATION PACKAGE	8
DARKSKY REVIEW PROCESS	9
POST-DESIGNATION REVIEW AND MAINTENANCE.....	9
REASSESSMENT OF IDSC DESIGNATIONS	10
REINSTATEMENT FOLLOWING SUSPENSION	11
REVOCATION.....	11

DEFINITION OF AN INTERNATIONAL DARK SKY COMMUNITY

An International Dark Sky Community (IDSC) is town, city, municipality, or other similar political entity that has shown exceptional dedication to the preservation of the night sky through the implementation and enforcement of quality lighting policies, dark-sky education, and citizen support of the ideal of dark skies.

GOALS FOR IDSC CREATION

- To identify communities with exceptional commitment to and success in pursuing dark sky preservation and restoration, and their promotion of quality outdoor lighting
- To promote improved outdoor nighttime quality of life for residents and visitors
- To support protection of human health, nocturnal habitats, public enjoyment of the night sky and its heritage, and/or areas ideal for professional and amateur astronomy
- To provide local, national, and international recognition for such communities
- To promote the ideals of DarkSky by encouraging communities to identify dark skies as a valuable community asset and aspiration

DESIGNATION BENEFITS

Achieving this designation brings recognition of the efforts made by the Community government, residents, and public and private organizations to protect the night sky and the nocturnal environment dependent on it. The IDSC designation enhances awareness of dark sky matters on the part of Community residents and visitors.

Designation as an IDSC entitles the Community to display the International Dark Sky Community logo in official publications and promotions and on signs at entrances or within the Community, and to retain the use of this logo by other groups within the Community when identifying the area itself.¹ DarkSky will promote and highlight ongoing Community efforts to protect night skies, and will maintain pages identifying and describing all IDSCs on its website.

¹ For instance, a Community can identify itself as “Flagstaff, the world’s first International Dark Sky Community” or other words to the same effect, or an organization within the Community can state “located in Flagstaff, an International Dark Sky Community.”

ELIGIBILITY

The Community must have some type of legal organization that is officially recognized by outside groups. This can be in the form of a town, city, municipality, or other legally organized community (such as urban neighborhoods and subdivisions), but need not be an incorporated entity. Unincorporated or otherwise informally organized communities are eligible for IDSC status if their governing jurisdictions enact public policy consistent with the requirements of “Minimum Requirements for All Communities” (below) that are legally binding in at least the territory of the Community.

MINIMUM REQUIREMENTS FOR ALL COMMUNITIES

- 1) A quality comprehensive lighting policy like the IDA-IES Model Lighting Ordinance (MLO)² that includes all of the following minimum standards for permanent lighting installations^{3,4}:
 - A) Full shielding⁵ of all lighting fixtures over 1,000 initial lamp lumens⁶
 - B) A limit on the emission of short-wavelength light through one of the following restrictions:
 - i) The correlated color temperature (CCT) of lamps must not exceed 3000 kelvins; *or*
 - ii) Allowed lighting must not emit more than 25% of its total spectral power at wavelengths <550 nanometers; *or*
 - iii) The scotopic-to-photopic (S/P) ratio of allowed lighting must not exceed 1.3.
 - C) A restriction on the total amount of unshielded lighting, such as a limit on lumens per net acre or a total site lumen allowance in unshielded fixtures (or equivalent wattages)
 - D) A policy to address over-lighting. This may be accomplished by limiting the average illuminance for any outdoor application, over the entire task area, to no more than 10% over the light levels recommended by, for example, the Illuminating Engineering Society (North America), the Society of Light and Lighting (United Kingdom), or other similar organization.

² Online: <https://darksky.org/resources/guides-and-how-tos/model-lighting-ordinances/>. (Accessed 2023 Sep 25).

³ More information on developing a lighting policy may be found on the DarkSky website: <https://darksky.org/resources/guides-and-how-tos/outdoor-lighting-for-policy-makers/>. (Accessed 2023 Sep 25).

⁴ Lighting required by law under the authority of any legal jurisdiction higher than that of the Community may be formally exempted from the requirements of this section.

⁵ “Fully shielded” is defined as a light source screened and its light directed in such a way that none is emitted above the horizontal plane passing through its lowest light-emitting part.

⁶ “Initial lamp lumens” is defined as the number of lumens of light emitted by a lamp when new and not counting any depreciation of output due to the age of the lamp. This information can be found in manufacturer data sheets.

- E) Regulations of new installations of publicly owned outdoor lighting:
- i) A provision that clearly indicates where, when, and under what circumstances new publicly owned outdoor lighting, including street lighting, is warranted, and will be permitted; *and*
 - ii) A provision that requires that adaptive controls⁷ and/or curfews⁸ be employed in all future installations of public outdoor lighting
- F) There must be restrictions on the installation and operation of illuminated signs,⁹ including *all* of the following:
- i) Luminance levels for operation between sunset and sunrise shall not exceed 100 nits (100 candelas per square meter, cd/m^2) as measured under conditions of a full white display; and
 - ii) During the first hour after sunset and during the last hour immediately preceding sunrise, sign luminance shall not exceed 100 nits (100 candelas per square meter, cd/m^2); and
 - iii) Signs may only be illuminated while the associated activity is taking place; for businesses, sign illumination must be extinguished completely during the hours the business is closed; and
 - iv) The luminous or illuminated surface area of an individual sign must not exceed 18.6 square meters (200 square feet).
- G) Outdoor recreational and/or athletic field lighting may be exempted from the strict shielding and short-wavelength emission requirements above provided that *all* of the following conditions are met:
- i) Illuminating Engineering Society (IES) lighting guidelines (RP-6) are followed according to the appropriate class of play
 - ii) Field lighting is provided exclusively for illumination of the surface of play and viewing stands, and not for any other applications
 - iii) Illuminance levels must be adjustable based on the task (e.g., active play vs. field maintenance)
 - iv) Off-site impacts of the lighting will be limited to the greatest practical extent possible
 - v) A strict curfew requirement (e.g., lights must be extinguished by 10 PM (2200 h) or one hour after the end of play, whichever is later) is observed
 - vi) Timers must be installed to prevent lights being left on accidentally overnight by automatically extinguishing them

⁷ “Adaptive controls” is defined as devices such as timers, motion sensors, and light-sensitive switches used to actively regulate the emission of light from light fixtures.

⁸ “Curfew” is defined as a period of time at night during which lighting must be significantly dimmed in output or extinguished in accordance with an expected decrease in human presence.

⁹ “Illuminated sign” is defined as any informational or advertising sign that is illuminated by either internal or external means. Descriptive terms are adjusted here according to the type of illumination.

- H) Affects an amortization period, applicable to *all* publicly *and* privately owned lighting, to end not more than 10 years from the effective date of the outdoor lighting policy, after which all non-conforming lighting extant at the time of enactment must be brought into compliance with the policy.
- 2) Community commitment to dark skies and quality lighting as shown by:
- A) City owned lighting conforming with, or committed to conforming with, the lighting policy (if the latter, a detailed plan with a timeline for completion in no more than five years); *and*
 - B) Municipal support of dark skies and quality lighting as demonstrated by city publications, flyers, public service announcements, funding of lighting upgrades, etc.
- 3) Broad support for dark skies from a wide range of community organizations such as chambers of commerce, local electrical utilities, DarkSky Chapters, lighting retailers, homeowners' associations, and others.
- 4) Community commitment to dark skies and education as shown by at least one of the following:
- A) Planning and execution of at least two community dark sky awareness events¹⁰ per year. This may be organized through a local astronomy club, municipality, school, etc.
 - B) Inclusion of dark sky awareness documents (DarkSky brochures or Community-created brochures) with other Community informational documents for residents and visitors.
 - C) Inclusion of dark sky education in Community schools and curriculum.
- 5) Success in light pollution control as demonstrated by at least one of the following:
- A) Examples of a number of construction projects appropriate to the Community population and amount of new construction and renovation activity, built under the lighting policy and demonstrating its effective application
 - B) Alternative evidence of success in light pollution control, to be discussed with the International Dark Sky Places Program Manager for compliance.
- 6) A sky brightness measurement program must be established and maintained either by the Community or by a public or private entity (e.g., university, research center, DarkSky Chapter, astronomy club) to follow the evolution of light pollution in the IDSC. Applicants are encouraged, but not required, to submit their measurements to the citizen science projects such as My Sky At Night (myskyatnight.com) and Globe At Night (globeatnight.org).
- 7) Once established, the Community must erect and maintain appropriate signage indicating the International Dark Sky Community designation along a roadway entrance, along a footpath entrance if no roadway exists, a public gathering place such as a square or common, or at a municipal government center such as a city or town hall. If

¹⁰ Note that astronomy education events such as star parties do *not* qualify as “community dark sky awareness events” unless the presentation explicitly includes a message relating to dark skies and outdoor lighting.

approved by DarkSky International, language as an alternative to “International Dark Sky Community” may appear on the signage and in Community communications regarding the IDSC status. Once the sign is erected, a photograph documenting it must be taken and sent to DarkSky International along with a description of its location.

PROVISIONAL STATUS

In some cases, a Community interested in the program may lack all of the resources required to achieve a designation outright. If resource unavailability otherwise hinders the progress of a Community’s application, that Community may apply for and be granted Provisional status at the discretion of the DarkSky Board of Directors. Provisional status recognizes the Community’s ongoing work to become an International Dark Sky Community and is intended as a leverage point to successfully enable actions such as lighting upgrades and retrofits.

Provisional status expires after three years. At any time before the end of this period, a Community may reapply for full status. Material submitted for the removal of Provisional status may be an addendum to the initial application as long as the material includes a current assessment of the goals, outreach efforts, and lighting policy listed in the original application and clearly demonstrates that any program requirements left unmet at receipt of the Provisional status have been satisfied.

To be considered for Provisional status, send a nomination package to DarkSky International that includes *all* of the following information:

- 1) Documented intent to create and support an International Dark Sky Community (IDSC)
- 2) An enacted and legally effective outdoor lighting policy, and summary of outreach efforts to date
- 3) A description of the circumstances that currently prevent the Community from meeting the minimum IDSC requirements
- 4) An action plan describing steps the aspiring Community will take to meet all program requirements in the specified Provisional status period

IDSC APPLICATION PROCESS

NOMINATION

The nomination may be initiated by a DarkSky qualified nominator¹¹ who has personally

¹¹ A “DarkSky qualified nominator” is defined here as an individual or organization holding a DarkSky membership in good standing at the time that the IDSC application is submitted. The Community itself may join DarkSky as an

reviewed a Community's outdoor lighting and commitment to night sky preservation. Nominators are encouraged to correspond with DarkSky International staff and the Community throughout this process. In addition, the application must include evidence, such as in the form of a letter of support, from the Community government (e.g., mayor, council) consenting to the nomination for IDSC status.

STEPS FOR APPLICANT

1. Make initial contact with DarkSky International by phone or email to discuss the process and receive recommendations, followed by continued communications to update DarkSky International staff on progress and receive continued assistance.
2. Designate a formal point of contact (POC) person, such as a project manager, and provide their telephone number, address, and email address to DarkSky International staff. Before and after designation, any changes to this POC, or their information, must be communicated to DarkSky International immediately in order to ensure accurate communication at all times.
3. Obtain a letter of nomination from a qualified DarkSky member nominator, as well as a supporting letter from elected representatives of the Community, such as the mayor and/or council of a municipality. Solicit additional letters of support from Community organizations, clubs, groups, universities, etc.
4. Upon completion, send the application to DarkSky International staff for review of the document at least one month before the chosen submission deadline date. DarkSky International staff will confirm that the application is complete and ready for submission or return it with suggestions for improvements.
5. Submit the final application packet electronically in PDF and/or Microsoft Word format to DarkSky International staff for formal review. Submit in plenty of time for staff to review and prepare your application to make the bi-monthly deadline that you prefer, as found on the DarkSky website. Requests to rush applications will *not* be honored; planning ahead is essential if the Community wishes to meet a specific deadline.

TO BE INCLUDED IN IDSC APPLICATION PACKAGE

1. Map of the Community clearly indicating its legal boundaries, and basic factual information about the Community; *and*
2. Letters of nomination support by DarkSky qualified nominator and elected representatives of the Community such as the mayor and/or council; *and*
3. The Community's lighting policy, meeting the minimum requirements as stated in the "Minimum Requirements for All Communities" section; *and*
4. Documentation of examples of Community commitment and construction or renovation projects demonstrating effective application of the lighting policy; *and*

organizational member and self-nominate.

5. Proposed alternative wording for the IDSC (e.g., Dark Sky Village, Starry Sky City), if desired, with a justification for the request.

DARKSKY REVIEW PROCESS

Six application submission deadlines occur in each calendar year, commencing in January and continuing every other month. Before the Community's final application is submitted, it is highly recommended that the Community be in regular communication with the International Dark Sky Places Program Manager to perfect the application by the next application deadline.

The International Dark Sky Places Manager will forward applications to the International Dark Sky Places Committee (DSPC) for review. DSPC review lags the submission dates by one two-month cycle. The total elapsed time between deadline and final IDSC designation approval is approximately 10 weeks.

Endorsement of applications by the DSPC is by a 2/3 supermajority vote; otherwise, the DSPC will return applications with reasons for denial of an endorsement and specific recommendations for improvement. If endorsed, the applicants will be notified, and the International Dark Sky Places Program Manager will present the application to the DarkSky Board of Directors (BOD) for final review and approval. A waiting period of 10 calendar days then commences during which the Board of Directors has the right to deny IDSC status should it determine that any problems with the application exist.

If the BOD registers no objection within the waiting period, the IDSC designation is considered immediately awarded by DarkSky. The Community has the right to choose when the designation is made public, but it must organize the announcement to be made at the same time as the DarkSky public notice unless otherwise agreed by both parties. Along with the announcement notice, DarkSky will publish the Community's application on its website; by submitting the application, the Community acknowledges in advance that the application will be made publicly available. If an application is denied final approval by the DarkSky BOD, a letter will be sent to the applicant outlining elements of the application that need improvement along with specific recommendations for ways to remedy any problems the BOD identifies. Applications may be resubmitted for future consideration after remediation is complete. Resubmitted applications will be considered without prejudice.

DarkSky realizes that certain circumstances surrounding an IDSC application may cause some potential authors of letters of support (or opposition) to feel uneasy about publicly declaring their opinions about the IDSC designation. In the interest of providing the DSPC with as full a picture of Community sentiment about applications as possible, certain letters may be suppressed from online publication if it is felt that making the letters publicly available will subject their authors to retaliation or harassment. A prospective IDSC seeking this protection for letter-writers must make a formal written request. The International Dark Sky Places Program Manager must approve suppression of publication of any part of an application. Note that suppression of online publication does not prevent either the DSPC or the DarkSky BOD from reading all submitted letters.

POST-DESIGNATION REVIEW AND MAINTENANCE

The IDSC designation is not awarded in perpetuity. Rather, it is subject to regular review by DarkSky and possible revocation if the minimum program requirements are not maintained. More details may be found in the “Reassessment of IDSC Designation” section below.

To ensure that Communities remain exemplary in their protection and restoration of natural nighttime darkness, DarkSky will periodically reevaluate each site in the International Dark Sky Places Program. This is done to confirm that the Community continues to meet the minimum requirements and is making adequate progress toward LMP compliance goals outlined in this document.

Each designated IDSC must submit to DarkSky International a written report of its activities related to the maintenance of its designation on or before 1 October of each calendar year. The report is a short (typically less than 10-page) synopsis of the Community’s activities and initiatives during the intervening year.¹² The report should include dates and brief descriptions of any interpretive events, lighting retrofit projects, outreach efforts, etc. Samples of printed materials and press articles should also be included, if available.

Annual reports should not be burdensome to produce, as they are intended as a compilation of information accumulated throughout the year. Annual reports and supporting documentation must be submitted electronically to the International Dark Sky Places Program Manager in either PDF or Microsoft Word format. If the annual report is not received by DarkSky International in a timely fashion, DarkSky may suspend the site’s IDSC status until the annual reporting requirement has been met (see the following section). On or about 1 August and 1 September of each year, the International Dark Sky Places Program Manager will remind local contacts at each IDSC of the pending 1 October annual report submission deadline.

A designated IDSC is exempt from the annual reporting requirement in the calendar year in which the IDSC designation was awarded. If the designation is received after 1 October of a given calendar year, the IDSC’s first annual report to DarkSky International will be due on 1 October of the following calendar year.

REASSESSMENT OF IDSC DESIGNATIONS

From time to time, DarkSky receives comments from visitors to Communities that raise concerns about the veracity and timeliness of information provided to DarkSky by site administrators. DarkSky may, at its discretion, investigate claims in which it is alleged that IDSCs are not adhering to commitments made to DarkSky and to the public in their applications to the Program. This section details the DarkSky procedure for carrying out such investigations, and the rights of IDSCs in such matters.

An allegation of impropriety concerning any of the elements of participation in the Program outlined in this document is subject to DarkSky investigation and potential remedial action

¹² Examples of acceptable annual reports are available on the individual IDSC pages on the DarkSky website.

including temporary suspension and/or permanent revocation of the IDSC designation. DarkSky International staff shall perform due diligence in gathering facts concerning such allegations it deems credible, and will prepare a report of its findings for consideration by the DSPC. The DSPC commits to weighing the evidence fairly and impartially, and to seek to resolve disputes whenever possible through dialog. A Community subject to an investigation shall be notified in a timely manner and solicited for evidence contrary to the specifics of the allegation at hand. The Community will be given an opportunity to correct any deficiencies with regard to the Program guidelines established by the DarkSky investigation within a reasonable time period to be prescribed by the DSPC.

Failure to achieve consensus through these means risks a DSPC recommendation for suspension or revocation of the IDSC designation. If made, such a recommendation will be forwarded to the DarkSky Board of Directors for formal ratification before coming into force. The Board's decision on any disciplinary matters involving an IDSC shall be considered definitive and binding.

Any IDSC so investigated has the right to review the allegations against it and all factual information collected by DarkSky pertinent to the allegations.

REINSTATEMENT FOLLOWING SUSPENSION

If the DSPC recommends a suspension of a Community's IDSC designation and the Board ratifies the suspension, the Community administration shall be immediately notified. The status of a suspended IDSC shall be changed to "Provisional" in all DarkSky communications until the designation is reinstated or revoked; however, the process of obtaining reinstatement of a designation is not the same as that outlined in the "Provisional Status" section of these guidelines.

To obtain reinstatement of a suspended designation, the IDSC must provide evidence to the DSPC's satisfaction that the specific issues identified by the DSPC as grounds for the suspension have been corrected and that all Program guidelines are once again met. The DSPC will consider the evidence presented by the IDSC and render a judgment to:

- Accept the reinstatement petition; *or*
- Reject the petition and recommend revocation; *or*
- Return the petition with further instructions and a defined deadline for an IDSC response.

REVOCAION

A suspension left unresolved after one year from the date of the Board's assent to the suspension automatically becomes a permanent revocation. Revocation entails removal of the IDSC from DarkSky's roll of approved International Dark Sky Places, and from mention on the DarkSky website and in member and external communications. DarkSky reserves the right to take legal action against any former IDSC whose designation is duly revoked but continues to use the DarkSky name or logo in advertising, communications, and/or signage.

Royal Astronomical Society of Canada

**Dark-Sky Site
Application Requirements**

Adopted by the RASC

March 2008

Revised Autumn 2018

Revised Summer 2020

**Edited by
Robert Dick**

TABLE OF CONTENTS

1.0 SCOPE.....	1
2.0 BACKGROUND	2
2.1 Applicable Documents	2
2.2 Abbreviations	2
2.3 Definitions	3
3.0 MANAGEMENT REQUIREMENTS.....	5
3.1 Outdoor Lighting	5
3.2 Accessibility	5
3.3 Quality of a Night Environment and Dark Sky	6
3.4 Outreach Programs	6
3.5 Nomination Process	6
3.6 Naming of the Preserve	7
3.7 Annual Reporting	7
3.6 Revision to Designation	7
4.0 APPLICATION REQUIREMENTS	8
4.1 Statement of Compliance to RASC-CGOL.....	8
4.2 Scale Map of Preserve and Surroundings.....	8
4.3 Zenith Sky Quality Measurements	9
4.4 Public Outreach	9
4.5 Municipal Outreach	9
4.6 Existing Luminaire Inventory.....	10
4.7 Lighting Plan	10
4.8 Images of Proposed Preserve.....	10
4.9 Memorandum of Understanding.....	10
4.10 Letters of Support and Commitment	11
5.0 ANNUAL REPORTING	12
6.0 REFERENCES.....	13
APPENDIX A - Memorandum of Understanding	14
APPENDIX B - Sample Table Current Luminaire Inventory	17
APPENDIX C - Scotobiology	18

1.0 SCOPE

This document provides the information necessary to assess the suitability of a site for a Preserve Designation. It describes the application procedure and states the contents of the Application.

The RASC recognizes the value of volunteers in establishing a Preserve. These Application Requirements will minimize administrative work for Park managers, local astronomy groups and the RASC.

The Royal Astronomical Society of Canada (RASC) is a national astronomy organization established in 1868 devoted to the promotion of astronomy and allied sciences. In this capacity, the RASC encourages the protection of the quality of the night sky by minimizing light pollution.

The goal of the RASC Dark-Sky Program is to promote the reduction in light pollution, to demonstrate low-impact lighting practices, to improve the nocturnal environment for plants & wildlife, to protect and expand dark observing sites for astronomy and to provide accessible locations for naturalists and the general public to experience the naturally dark night sky.

Currently, both urban and rural sites are contaminated to different levels by sky glow from artificial lighting. We thus distinguish levels of dark sky sites as follows, though the distinction is not always clear between the categories:

Dark-sky Preserve: Sites with very dark skies with minimal sky glow are generally far from urban centres and are therefore less accessible to astronomers and the public, though these usually do contain public campgrounds.

Nocturnal Preserve: Some dark sites are remote with few resources for active outreach programs, and are designated more for the protection of the night for flora and fauna than for public amenities.

Urban Star Park: These are sites within, or close to, urban areas that are not consider "dark", but provide good access to the public.

All three designations are herein referred to as Preserves.

By promoting the use of these protected areas after dark, Preserves should see increased support from the public and usage during non-peak hours.

2.0 BACKGROUND

There is a growing need to identify and protect accessible areas that permit the public, naturalists, novice stargazers and astronomers to enjoy the night sky. There is also a growing need to identify these areas and protect them from light pollution.

The goal of this RASC Dark-sky Preserve Program is to maintain or increase the quality and accessibility of dark observing sites and preserve the ecology.

Preserves shall be accessible to the public and all lighting fixtures within its borders are to comply with the RASC Guidelines for Outdoor Lighting (https://rasc.ca/dark-sky-site-guidelines/RASC-CGOL_2020.PDF). In some cases, where desired by the Applicant for special considerations and strict preservation, public access may be limited or denied within some portion of the Preserve.

Humans and wildlife are affected by light pollution. Many living creatures have evolved to require a day-night contrast to synchronize their biological rhythms. These organisms have adapted to variations in night illumination from a dark sky to the brightness of a full Moon. In contrast, illumination levels in typical urban areas far exceed the brightness of the Moon. Unfortunately public parks are usually illuminated based on "best practice" for urban areas.

The environmental impact of artificial lighting has been studied for many years. This research concludes that light can pollute the environment and fundamentally change the ecosystem and impact the health and survival of wildlife.

2.1 Applicable Documents

IESNA RP-08

RASC Guidelines for Outdoor Lighting (RASC-CGOL)

2.2 Abbreviations

ALAN Artificial light at night

CGOL Canadian Guidelines for Outdoor Lighting

DSP Dark-Sky Preserve

IESNA Illumination Engineering Society of North America

NP Nocturnal Preserve

RASC The Royal Astronomical Society of Canada

USP Urban Star Park

2.3 Definitions

Application - the document submitted by the Management of the proposed Preserve

Applicant - the Management authority of the Preserve

Buffer Zone - the region within the Preserve under control of the Preserve Manager. The Buffer is designed to prevent glare and light trespass from shining into the Core area. There may be more than one buffer zone in the Preserve but the total buffer area shall be a small proportion of the total area of the Preserve (typically <5%).

Core - the region under control of the Preserve Manager surrounded by the Buffer Zone. There may be more than one core in the Preserve.

Dark Time – a period after which scheduled outdoor activity has ended and visitors are expected to minimize the use of light to permit other visitors to sleep.

Dark-Sky Preserve (DSP) - the region that includes the DSP Buffer Zone and DSP Core that is under a single management with authority over policy, outdoor lighting and land use.

Filter – material that removes the spectral components <500 nm from light to produce amber illumination

Glare Zone - sector between the horizon (90° from nadir) and 10° below the horizon.

Illumination - the amount of light that shines onto a surface area of 1square meter (lumens/m², or Lux)

LPA - light pollution abatement

Luminaire - the assembly of the enclosure, lamp, optics, power supply and controls

Luminance - the amount of emitted light from a light source (cd/m²)

Nadir – the point on the ground directly beneath a luminaire

Nocturnal Preserve (NP) - the region that includes the NP Buffer Zone and NP Core that is under a single management with authority over policy, outdoor lighting and land use.

Observing Site - an area promoted as a good place to observe the sky. There may be several observing sites.

Photobiology – the study of the effects of light on biological systems

Photopic Vision – vision based on cone cells that have evolved for daytime vision and high illumination levels. Their peak sensitivity is at 555 nm.

Preserve - an area under single management that is to be designated by the RASC as a Dark-Sky PreserveTM, Nocturnal PreserveTM or Urban Star ParkTM

Scotobiology – the study of the biological need for periods of darkness

Scotopic Vision - vision based on rod cells that have evolved for night vision and low illumination levels. Their peak sensitivity is at 505 nm.

Sky Quality Meter (SQM) – a light meter designed specifically to measure a value for the brightness of the night sky. These meters are available from Unihedron, Inc., or via a short-term loan from the RASC.

Urban Star Park (USP) - the region that includes the USP Buffer Zone and NP Core that is under a single management with authority over policy, outdoor lighting and land use.

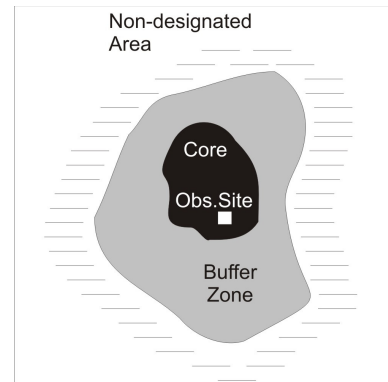
Zenith - a point directly overhead, or 90° up from the horizon.

3.0 MANAGEMENT REQUIREMENTS

The Preserve shall be under the management of a single entity to ensure full adherence to these Requirements and the RASC-CGOL.

A Preserve is a protected area with a Core and a Buffer Zone. The Buffer Zone prevents light from outside the Preserve from reaching the Core area. The Manager of the Preserve shall identify specific observing sites that will be accessible for night observing.

The establishment of a Preserve is a partnership between the Management, local stargazers and astronomers, and neighbouring municipalities, and it requires their active support. There are four principal requirements for a Preserve: compliance to the RASC-CGOL, accessibility, quality of the night sky and in the case of a DSP and USP, an active outreach program. NPs may not have the resources to provide an outreach program, but may do so if such resources can be provided by the park management.



3.1 Outdoor Lighting

The RASC-CGOL respects and protects the need for naturally dark nights, yet it allows sufficient lighting for safety and navigation within the Preserve.

These CGOL defines the spectrum (colour), brightness (illumination), shielding (extent of light) and the schedule (timing) for all artificial light that is used. These CGOL is free to be downloaded from the RASC website (https://rasc.ca/dark-sky-site-guidelines/RASC-CGOL_2020.PDF).

The Applicant shall ensure that all lighting in the Preserve complies with the RASC-CGOL. Compliant and non-compliant lighting shall be reported in the appropriate section of the Application. The Applicant shall also provide a schedule for all non-compliant luminaires to reach compliance.

If the Applicant believes specific luminaires cannot be compliant, an explanation shall be included in the Application. The RASC may choose to waive or amend any of these guidelines for a specific application provided that the integrity of the Preserve programme is not jeopardized.

3.2 Accessibility

The Applicant must ensure the core area remains accessible after the end of twilight. This will require that gates and parking lots remain open for visitors. If some areas are to be restricted from the public for reasons of ecological sensitivity, they should be identified in the Application.

There shall be appropriate signage to help visitors navigate the Core of the Preserve. This signage shall conform to the RASC-CGOL.

3.3 Quality of a Night Environment and Dark Sky

The illumination by artificial lighting in a Core and Buffer Zone shall comply with the RASC-CGOL (https://rasc.ca/dark-sky-site-guidelines/RASC-CGOL_2020.PDF).

All artificial lighting within the Core shall not affect the ecological integrity of the Preserve or the natural quality of the night sky in terms of diffuse sky glow, luminance (glare) and illumination (surface brightness). All luminaires shall be shielded to limit the extent of the luminance and illumination to only areas where needed for permitted human activity.

Photographic images of the horizon from the observing sites, and descriptions by experienced observers, shall be used to document the sky glow on the horizon and the impact of light fixtures. These data shall be recorded annually to assess and monitor the darkness of the sky above the Preserve (zenith) and shall be submitted to the RASC-LPA Committee every year approximately on the anniversary of the DSP Designation.

3.4 Outreach Programs

For, Management of Dark-Sky Preserves and Urban Star Parks shall develop and manage more than two outreach programs per year designed for public and municipal outreach.

Public outreach is for visitors to the Preserve and will consist of raising awareness of the connection of dark skies to night ecology and raising awareness of stargazing or other night-time activities. Knowledgeable staff or members of local astronomy clubs or other organizations may assist with these activities. Topics may include, but should not be limited to mythology, star tours, telescope observation, indoor presentations, walking tours after dark, experiencing sounds of the night and night wildlife and the explanation of how artificial lighting affects the ecology.

If volunteers are used by Management to assist in public outreach activities, a Memorandum of Understanding may be signed by all parties stating the terms of the voluntary service. See Appendix B for a suggested draft of a MOU. This may also may be regulated through normal programming contracts used by the park.

Management shall encourage the reduction the light pollution that is visible from the Preserve. Municipal outreach is to protect the Preserve from light pollution from neighbouring areas and municipalities by raising awareness of the Designation. This is an investment to protect the ecological integrity of the Preserve. In the course of this outreach, possible or planned development adjacent to the park that may degrade the quality of the night environment should be identified, and the Park shall promote properly designed and installed lighting that will minimize these impacts. Failure to reach some sort of mutual understanding of the effects of nearby development may effect certification or classification of the park and may require revision of the Buffer Zone boundaries and may cause the revoking of the Preserve designation.

3.5 Nomination Process

The Manager of the proposed Preserve may submit the Application for consideration to the RASC consisting of the documentation listed in Table 4.0 and defined within Chapter 4,

and other materials that may be requested by the RASC to help them judge the suitability of the proposed Preserve.

The RASC will acknowledge the receipt of the Application when it is received and will review it in a timely manner. Comments and questions will be transmitted to the Manager of the proposed Preserve. The decision of the RASC will be communicated to the Manager. The RASC will attempt to expedite their decision by a specific date if requested by the Applicant (i.e. for an official announcement).

Upon the award of the Designation, the Preserve should display a sign identifying it as a RASC DSP, USP or NP. The RASC will provide a logo graphic for use of the Preserve on their signage and communiqué, should the Applicant desire to use it.



3.6 Naming of the Preserve

The name of the Preserve shall be determined by the RASC in consultation with the Applicant. Generally, the Preserve will be named after the geographical region. In the case of existing Parks, the Preserve will be given the name of the park.

3.7 Annual Reporting

An Annual Report is required from the Manager of the Preserve to help the RASC monitor and promote the Preserve and it will help maintain communications between the RASC and the Park. It should document outstanding deficiencies from the Application or previous Report. The RASC will attempt to work with the Preserve Management to resolve these issues.

3.6 Revision to Designation

It may become necessary to review the Preserve designation due to changes in Park priorities, signatories of the MOU, or changes in the lighting within or beyond the Preserve boundaries.

If the Preserve is deemed to be no longer viable by the sponsors of the Park or the RASC, the Designation will be rescinded and a letter will notify the Manager. The Park will be required to remove signage referring to the Preserve Designation and the Park shall no longer promote itself as a Preserve.

4.0 APPLICATION REQUIREMENTS

This chapter presents the required content in the Preserve Application.

The designation as a Preserve is based on its current merits and the Application should reflect the current state of the site, not the future plan for the site. As such, the proposed Preserve should be compliant to the RASC-CGOL. The Preserve may be expanded, or reduced, as more area becomes compliant to the CGOL.

There are ten sections to the Application (see Table below). This information will help the RASC assess the status of the current property and will be used in promoting the Preserve to other organizations and the public. This information locates, defines, describes and documents the Preserve, including the sky quality and the state of the outdoor lighting. This information will also be used as a baseline to compare future state of the Preserve.

Preserve Nomination Documentation List

- 4.1) Statement of compliance to the RASC-CGOL
- 4.2) Location and description of the proposed Preserve
- 4.3) Zenith sky quality measurements (location of the reading marked on map)
- 4.4) Public outreach plan (education)
- 4.5) Municipal outreach plan
- 4.6) Existing light fixture inventory
- 4.7) Lighting plan
- 4.8) Images of the Preserve's observing sites taken during the for day and night
- 4.9) Memorandum of Understanding between all partners
- 4.10) Letters of support and commitment from neighbouring municipalities

4.1 Statement of Compliance to RASC-CGOL

This section assesses the Applicant's understanding of the RASC-CGOL and its readiness to become a Preserve. The CGOL was developed to minimize the contamination of the area by artificial lighting and addresses both the needs of wildlife and astronomers.

The Applicant must state whether the proposed Preserve is currently compliant to the CGOL. They should be specific about any non-compliances in their outdoor luminaire inventory. The basis for the acceptance will vary depending on the total application. The RASC may choose to waive or amend any sections of the CGOL for a specific application to ensure the integrity of the Preserve programme is not jeopardized.

4.2 Scale Map of Preserve and Surroundings

Where is the proposed Preserve? The RASC requires sufficiently detailed scaled and labelled maps and directions in order to promote the Preserve. These maps must show the regional context of the Preserve and the boundaries between the Buffer Zone and the Core. Applicants should plot the location of observing sites, including access roads, campgrounds (if any), and all other facilities that are mentioned in the Application. Additional larger scaled maps of areas within the Preserve may be used to provide more detail.

4.3 Zenith Sky Quality Measurements

The sky quality of the observing site(s) must be rated. The RASC or local experienced observers approved by the RASC, should report sky quality measurements, obtained with the Unihedron Sky Quality Meter, or equivalent. The locations where these readings were taken should be marked on a map of the Preserve. These readings should be listed in a table with cross-references to their location. Brightness readings shall be taken on clear nights after astronomical twilight ends, and with no Moon in the sky. The table will include dates and times when these readings were made since they will vary by time of night and season. These reading will also be used to benchmark sky glow in the area. Subsequent annual readings will document improvements over time.

4.4 Public Outreach

The RASC Preserve Program is designed to improve or restore a park to more natural darkness through appropriate use of outdoor light. This will improve the health and welfare of flora and fauna and will provide an improved visitor experience at night. This is achieved through changes in lighting practices and through educational programming. Visitors to the Preserve may not be aware of these topics and will benefit from the experience.

The DSP shall be open after dark so visitors can experience the night with stargazing, astronomy and night talks and night walks.

Literature should be made available to the public during these sessions and in kiosks (if available). Astronomy and light pollution information may be obtained from the RASC on a cost recovery basis.

There is a list of night programs the DSP may offer the public. It includes, but is not limited to the promotion of a healthy nocturnal environment and the relationship between the skylore of the First Nations and other cultures. Reference may be made to the new science of scotobiology and how it is changing our awareness of our need for periods of darkness. Management is encouraged to contact other DSPs for more ideas. Every Preserve is different, so some programs may be more appropriate than others.

4.5 Municipal Outreach

Urban growth outside Park boundaries can severely contaminate the night sky over the Preserve with artificial sky glow. An active Municipal Outreach Program should be attempted to protect the Preserve from increases in urban sky glow, and to improve the quality of the night sky into the future.

Managers, with the support and assistance of local astronomy groups environmentalists and scotobiologists, should give presentations to neighbouring municipalities to promote the use of CGOL-compliant fixtures with full cut-off shielding and low colour temperature lamps to protect and improve the quality of the night sky over the Preserve. These presentations will, as a minimum, inform surrounding municipalities of the pending Preserve and will register the request for the municipality to participate in active preservation efforts that will help retain the park as a Preserve. Advice and digital files of presentation materials may be obtained from the RASC.

Repeated reminders of the adverse impact of outdoor lighting on the environment and human health are more effective than a single-mention of it in the media. Therefore, Managers and local partners should regularly raise the issue of light pollution in the local and regional media and in the business community.

4.6 Existing Luminaire Inventory

This is perhaps the most time consuming part of the Application, but it is also one of the most important.

Light fixtures are regularly installed but rarely removed. They have been installed prior to any understanding of the impact they have on the night ecology. The site may have accumulated dozens or hundreds of outdoor lights - many of which are no longer necessary.

This inventory should be presented in tabular form (MS-Excel for example) that includes the location, quantity, wattage, shielding and lamp type (colour, HPS, LED, etc.) for all outdoor luminaires in the Buffer and Core areas of the Preserve. The luminaires should be plotted and referenced on supporting maps. This inventory must be updated and submitted to the RASC every one- to two-years.

4.7 Lighting Plan

This section presents the plan and schedule to make all luminaires compliant to the CGOL. It should schedule the removal, replacement and modification of all non-conforming lighting fixtures. This work should be scheduled and budgeted before the anniversary of the Preserve's designation. Explanations for the submitted schedule and any delayed compliance should be included in this section.

4.8 Images of Proposed Preserve

These images will be posted on the RASC Preserve Website to help promote the Preserve to potential visitors and will give them an indication of what to expect. There should be daytime and nighttime panoramas of the Observing Sites (stitched together from a series of images) showing the cardinal directions, tree line, bushes, buildings, etc. They should be presented with the same scale so they can be compared.

The night panorama will also document the existence of sky glow around the horizon. They will be used as a benchmark against which future images can be compared to show improvement or degradation of the site.

4.9 Memorandum of Understanding

The Applicant should obtain MoUs from all independent businesses or leasees operating within the Park who may have outdoor lighting. They should understand that they will also have to comply with the CGOL and perhaps other requirements of the Preserve.

An understanding from other park departments who supply buildings or lighting to the Park must also be informed that their lighting must also comply with the requirement of the Preserve. Furthermore, all electrical contractors or companies tendering work within the Preserve must be given a copy of the RASC-CGOL and required to comply.

Preserves with designations that pre-date the CGOL (2008) must upgrade their lights to the CGOL when replacing pre-2008 luminaires.

The Preserve should actively promote these outreach activities. If the Preserve staff are not familiar with stargazing or the nocturnal wildlife, the Management should reach out to local astronomy and wildlife groups to help in this endeavour. Letters of interest from partners should be included in the Application. A Memorandum of Understanding (MOU) between the Management of the Preserve and the volunteers may be used to clarify expectations and avoid disagreements (APPENDIX B).

4.10 Letters of Support and Commitment

Future protection of the Preserve depends on the policies of neighbours. The Applicant should attempt to solicit letters of support and commitment to reducing the light pollution from neighbouring municipalities. They should agree to implement policies or bylaws to help protect the Preserve in the future with, as a minimum, full cut-off shielded lighting and <3000K CCT luminaires. Use of amber light and automatic will also be helpful.

5.0 ANNUAL REPORTING

The Manager of the Preserve shall submit this Report so that the RASC may monitor the site and outreach activities. It should be submitted to the RASC National Office on or about each anniversary of the designation.

The contents of the Report shall include the following.

- 1) Name, title and contact information of the following personnel if applicable.
Preserve Manager (Superintendent or Commercial Park owner),
Facilities Manager and User experience Coordinator.

Rationale: The management personnel may change as they continue along their career paths. The RASC requires the current contact person responsible for the Preserve for communication on matters concerning the Preserve.

- 2) The revised audit of outdoor luminaires in the Preserve.

Rationale: The original Application contained a table of all outdoor lighting in the Preserve. These luminaires, and any others that were added after the designation should be monitored. This table can be an edited version of the spreadsheet file that was submitted in the original application. Generally after two years from the Designation, all initially non-compliant luminaires should have been modified, removed or replaced with compliant luminaires. Luminaires that remain non-compliant should be highlighted with the reason for continued non-compliance with the plan to bring them into compliance.

- 3) Sky Quality Readings. The quality of the sky is measured with a Sky Quality Meter (SQM, Unihedron, Inc.).

The SQM measures the brightness of the sky at the zenith. If left uncontrolled this sky glow generally increases with brighter and more extensive light pollution within a Park and from neighbouring municipalities. Long-term measurements will show the success of the Preserve in protecting the night environment.

To allow direct comparisons over time, readings should be made at the same locations that were measured in the original Application.

- 4) List and describe of Public Outreach Activities for night ecology and astronomy.

This should include the nature of the outreach event(s) and an estimate of the number of visitors taking part in the event(s), and the dates. It should also name the volunteer groups that contributed in the outreach programs. If the event is regularly scheduled, then they may be collapsed into a single entry and identified as recurring. The RASC will use this information to help guide the development of outreach resources that could be made available to Preserves to assist in the user experience.

- 5) List and describe Municipal Outreach Activities that concern light pollution.

The Preserve Manager is required to meet with neighbours to ensure the protection of the night environment in the park. The report on these meetings should highlight the discussions on outdoor lighting that may shine into the Park (glare or light trespass) or over the park as sky glow. (If sky glow over the urban area is visible from the Preserve, then it is affecting both the ecology of the Preserve and the user experience of the wilderness area.)

Municipalities play a significant role in maintaining the ecological integrity of a Preserve. However this information about the Preserve, and its needs, may not be passed on during the turn over in municipal staff. Neighbouring municipalities may economically benefit from the Preserve, so it is in the best interests of both parties to have semi-regular communications and meetings.

6) Annual Reports

Include, or provide a link to the Park's preceding Annual Reports that was prepared for their provincial or federal agencies. These have more extensive information that will put their current and future policies and activities into perspective. Commercial parks should also provide a copy of their corporate annual report, if applicable.

6.0 REFERENCES

RASC Guidelines for Outdoor Lighting

https://rasc.ca/dark-sky-site-guidelines/RASC-CGOL_2020.PDF

RASC Preserve Applications Requirements

<https://rasc.ca/dark-sky-site-guidelines/>

RASC_PRESERVE_APPLICATION_REQUIREMENTS_2020.pdf

Illumination Engineering Society of North America (IESNA)

IESNA Lighting Handbook, 10th edition

APPENDIX A - Memorandum of Understanding

These are two samples for MOUs for use between partners.

MEMORANDUM OF UNDERSTANDING

This agreement is between:

_____	_____	_____
Responsible Authority for the Facility Provider	Organization	Date

and

_____	_____	_____
Responsible Authority for the Outreach Contributor	Organization	Date

The Outreach Contributor agrees to provide outreach assistance to Facility Provider at a mutually agreed upon schedule and location.

In return for providing public outreach assistance from Outreach Contributor, the Facility Provider agrees to provide free access to the facility and campgrounds to the Outreach Contributors providing outreach assistance for the duration of the activity plus at least one night to prevent the need for late night travel.

The Facility Provider agrees to compensate the Outreach Contributor for travel expenses (gas and food) accrued in the course of providing the outreach assistance.

This Memorandum of Understanding (MOU) shall remain in effect if one or both a managing officers are replaced. This MOU shall be dissolved with mutual consent of both organizations.

If this MOU is dissolved, the Royal Astronomical Society of Canada shall be notified within one month of the dissolution so they may re-assess the Preserve designation.

It is the responsibility of the Facility Provider to promote the outreach event, and provide the following:

- A suitable site,
- Electric power,
- Public facilities,

and to inform the Outreach contributor what items will be supplied for the event.

The volunteers may promote the RASC and provide handouts to the public.

MEMORANDUM OF UNDERSTANDING**MANAGING AUTHORITY OF DSP (FACILITY PROVIDER)**

-and-

ASTRONOMY SERVICE PROVIDER (OUTREACH CONTRIBUTOR)

This agreement is made this _____ day of _____, 2017
WHEREAS, The FACILITY PROVIDER has applied to become designated as a Dark-Sky Preserve (DSP) by the Royal Astronomical Society of Canada, and
AND WHEREAS, a Memorandum of Understanding (MOU) between the FACILITY PROVIDER and the OUTREACH CONTRIBUTOR will outline the roles and responsibilities of the parties in order to become and maintain the DSP designation,
NOW, THEREFORE, BE IT RESOLVED THAT the FACILITY PROVIDER and the OUTREACH CONTRIBUTOR, collectively referred to as the “parties”, agree as follows:

1. Purpose.

The purpose of this MOU is to articulate the role and responsibilities between the parties in the accomplishment of adhering to the protocols of the RASC’s DSP Program as laid out in the Guidelines for Outdoor Light in DSPs (RASC-DSP-CGOL) in order to maintain the OUTREACH CONTRIBUTOR’s designation of the FACILITY PROVIDER as a DSP.

2. Statement of Mutual Benefit and Interests.

The parties recognize the importance of an exceptional dedication to the preservation of the night sky through the implementation and enforcement of quality lighting codes, dark-sky education, and citizen support for dark skies, and that achieving designation as a DSP provides many benefits to wildlife and the community including preservation of the night sky and reductions in night time light pollution.

3. Duties of the Parties.

The parties agree to work together to maintain the DSP designation and to uphold the tenets of dark-sky policies as described by the RASC’s DSP Program as laid out in the Guidelines for Outdoor Light in DSPs (RASC-DSP-CGOL).

4. General Provisions.

The parties agree to the following:

- The parties will consult on all installations of new outdoor lighting fixtures, retrofit and replacement or relocation of all existing outdoor lighting fixtures or increases in light intensity of any existing outdoor lighting fixtures on FACILITY PROVIDER properties;
- The parties will consult with the RASC Light Pollution Abatement Committee when determining proper adaptive controls and curfews on outdoor lighting fixtures where appropriate.
- The parties will work together to support dark skies and good lighting in public communications promoting the concepts of dark skies and good lighting.

- The parties shall work together to maintain a commitment to providing dark-sky education programs by:
 - Planning and execution of at least two community dark sky awareness events per year;
 - Inclusion of dark-sky awareness documents with other community informational documents that are made available to FACILITY PROVIDER volunteers and visitors;
 - Developing and presenting dark-sky events with activities tailored for school groups visiting the FACILITY PROVIDER and within its outreach programs.
- The parties shall work together to investigate and the possibility of establishing and maintaining a sky-brightness measurement program which might include the installation of light monitoring devices.
- The parties shall work together to prepare an annual report with basic information on the effects of the DSP designation on wildlife on the FACILITY PROVIDER.

5. MOU Effective Date and Termination.

This MOU between the parties takes effect upon the signature of both parties. The parties agree that January 1 shall be considered the "Anniversary Date" of this MOU. The MOU should be renewed annually on the Anniversary Date unless either party provides notice of termination to the other by September 30 of the prior year.

FACILITY PROVIDER
Management Authority

OUTREACH CONTRIBUTOR

CEO

CEO

APPENDIX B - Sample Table Current Luminaire Inventory

LOCATION	WATTAGE	No. UNITS	SHIELDING	LAMP	Comments
Administration					
Front door	125	3	Unshielded	HPS	To be replaced with FCO 2W Amber LED, 05/2013
Perimeter Lighting	3	5	FCO	amber LED	wallpacks (EcoLight) - Compliant
	35	2		LPS	not working
Maintenance Compound	100		Unshielded.	HPS	Replace with FCO in next maintenance cycle, 04/2014
Garage		1	Not shielded	Incandescent	To be replaced in next maintenance cycle, 04/2014
Campground	100	2	Not shielded	HPS	Replaced before this camping season, 05/2013
Showers	5	2	FCO	White LED	To be filtered this camping season, 05/2013
Toilet	2		FCO	Amber LED	Compliant
#1 Parking Lot	125	1		HPS	Currently burned out and will be replaced with FCO Amber LED
Access Roads	50			HPS	Use for special event only - safety
Gate Kiosk	35	1	FCO	HPS	Compliant

NOTES:

All shall be made to comply before the current camping season unless otherwise stated.

Current maintenance cycle - April 2013-November 2013

Next maintenance cycle - April 2014-November 2014

APPENDIX C - Scotobiology

STUDY OF THE BIOLOGICAL NEED FOR PERIODS OF DARKNESS

An outline for public information prepared by Dr. R.G.S. Bidwell, Wallace, NS, 2008

What is Scotobiology?

The concept of scotobiology as a science was developed at a conference on light pollution held in Muskoka, Ontario, in 2003. It was recognised that the underlying principle was the deleterious effect of light pollution on the operation of biological systems, ranging from their biochemistry and physiology to their social behaviour. Scotobiology is the study of biological systems that require nightly darkness for their effective performance; systems that are inhibited or prevented from operating by light.

Why is Scotobiology important?

Virtually all biological systems evolved in an environment of alternating light and darkness. Furthermore, the light/dark periods in temperate zones vary with the seasons. Organisms have evolved to use the variations in the length of day and night to integrate their physiological and social behaviour with the seasons. Many organisms measure specifically the length of the night, and light pollution may prevent them from determining the season, with serious or deadly consequences. For this reason light pollution is recognised as being a major component of global pollution, and scotobiology, the study of its specific effects on organisms, has now become an important branch of biological research.

Summary of specific scotobiological responses

Insects: Insects tend to fly towards light. Light pollution thus causes insects to concentrate around bright lights at night with several serious consequences. First, they become easy prey for birds and predacious insects. Insect numbers are reduced by their disorientation and death around lights, and also because they are concentrated where natural predators have an unnatural advantage to capture them. This reduction in insect populations has been found to affect the populations of animals not strongly attracted to light, including frogs, salamanders, bats, some birds and small mammals. In addition, the mating and breeding habits of some insects require darkness, so that light pollution can interfere or prohibit normal reproduction. Finally, the migration habits and paths of many insects are affected by light pollution with resulting population depletion. The huge piles of dead insects such as mayflies that are found under streetlights in springtime give some idea of the extent of damage such lights can cause.

Birds: Many birds are powerfully attracted to lights, and over a hundred million birds die from collisions with illuminated structures in North America alone every year. The actual loss of bird populations is hard to calculate, but it is significantly large. Furthermore, as with insects, bird migration patterns may be affected by light pollution because the birds may become disoriented and unable to follow their normal flight paths. Finally, the concentration of birds around lights also encourages animals and birds of prey that feed on smaller birds, resulting in still further reductions in the population numbers of migrating birds.

Animals: The behaviour of many animals is seriously affected by light pollution. Mating, hunting and feeding habits of wolves and other large animals are altered, with resulting decreases in population. Salamanders, frogs and other amphibians, many of which are already under serious threat from chemical pollution, are subject to impacts from even low levels of artificial night lighting on their physiology, ecology, behaviour and evolution. It is very likely that the behaviour of many if not most of our wild animals is similarly and negatively affected by even low levels of light pollution.

Plants: Plants are seriously affected by light pollution. Probably the most important aspects of a plant's reaction to and interpretation of darkness are expressed in its developmental behaviour: flowering, dormancy and the onset of senescence. The plant's ability to measure and respond to day length is crucial in enabling it to dovetail its developmental behaviour with the seasons. We are all aware of "long-day" and "short-day" plants. What is not so widely known is that plants do not measure or react to the length of the day. Instead, they measure and respond to night length, i.e. the duration of darkness. So short-day plants really require long nights, and should properly be called long-night plants. The problem for short-day/long-night plants arises from the fact that if they are illuminated briefly during a long night, they interpret the event as if they had experienced two short nights, rather than one long night with an interruption. As a result, their flowering and developmental patterns may be completely interrupted. Short-day plants normally bloom in the fall, as the days shorten, and they respond to the lengthening nights to initiate the onset of flowering. As the nights further lengthen, they begin a period of dormancy, which enables them to withstand the rigours of winter. Thus, if the nights are interrupted by light pollution, the consequences can be severe or deadly. Furthermore, the effect of successive experiences of nightly illumination is cumulative. It follows that light pollution, particularly if it is repetitive on a nightly basis, can seriously affect the development, flowering and dormancy – and so the very existence – of short-day (long-night) plants.

Human Health: Humans, like other animals, are affected by nightly light pollution, and human health is more severely affected by light pollution than is generally realised. Human hormone regulation, physiology and behaviour evolved in a diurnal pattern of day and night. The normal operation of wake/sleep cycles, hormone cycles, the immune system and other biochemical behaviour, depends on the daily alternation of light and dark, and may be severely damaged by nighttime illumination. It has been shown that the human immune system works more strongly during the day to produce antibodies that protect the body against microbial invasion, which is normally more likely to occur during the activities of the day. At night the immune system switches from a defensive to a repair mode, and killer cells then become more active in attacking tumours as well as infections that may not have been successfully prevented during the day. Light pollution may thus compromise the operation of human hormone and immune systems leading to increased incidence of cancer and other diseases, as well as to other physical as well as psychological disorders including mental illness, psychiatric instability, and such problems as seasonal depression (SAD). This means that even turning on a night-light or bedside lamp may have negative effects on a person's health. This may have little relevance to light pollution in parks, but it is important to note that bright lights in camp-sites may be unhealthy to humans as well as to the wildlife inhabitants of the park.

Sociology: Human sociology is affected by light pollution. It is now commonplace to be concerned by the fact that few people alive today have had the opportunity to experience the glory of the night sky. This is sad for citizens of “advanced” or wealthy countries, but it is a serious loss of the cultural heritage of aboriginal peoples and those who live (or lived) under natural and unpolluted conditions. The darkness of the night and the ability to commune with the natural beauty of the moon and stars and the glories of the aurora are necessary for the well-being and sociological wholeness of native peoples all over the world. Most of those who live in places like Canada and the United States of America can no longer experience the wholeness of dark skies. Parks that emphasise dark skies are thus an essential part of our human and environmental heritage.

Astronomy: It hardly needs to be mentioned that astronomy depends on dark skies and the virtual absence of light pollution. Both the importance and cost of astronomical research to our present society are very high, and are as important as environmental concerns for the control of light pollution.

Prospects for abatement of light pollution: the importance of public opinion

Public pressure is the surest way to reduce light pollution. This will assist releasing more funds for basic research in scotobiology, and for helping to develop legislation to control light pollution if that is found to be necessary. Light pollution can be controlled by reducing unnecessary lighting, focussing required lighting where needed rather than shining it in every direction, and the use of directional light shades where appropriate. Lower levels of illumination are often advantageous, and have been found to provide better safety and protection for pedestrians than the normally used bright streetlights. All these approaches are already being developed and put to use, but the continued application of public pressure is essential to reduce not only the actual light pollution and the cost in dollars for unnecessary lights, but also to reduce the environmental pollution that results from making the electricity to power them. Anything that can be done to stimulate public appreciation of the dangers and costs of light pollution will be well worth the effort.

If there are further questions about scotobiology, please contact:

Robert Dick, Canadian Scotobiology Group 613-283-0362, rdick@csbg.ca