Strengthening Biodiversity Protection: A Focus on Expanding BC's Protected Areas

Research to develop a strategic plan for the placement of protected areas in British Columbia

Prepared by : Maithili Devadas, UBC Sustainability Scholar, 2023
Edited by : Kephra Beckett, Conservation Coordinator, BC Nature
Prepared for : BC Nature's Board of Directors

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Cover photo by Maithili Devadas

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Executive summary

Biodiversity loss and climate change are intertwined crises that are deteriorating the health of the planet. Deforestation, overexploitation of resources, destruction and fragmentation of critical habitats are causing substantial loss of biodiversity worldwide. This is further exacerbated by the release of greenhouse gases into the atmosphere, causing extreme weather patterns that disrupt ecosystem resilience, species' survival, and reduce nature's ability to sequester carbon. These interconnected crises urgently need global attention.

Efforts for a comprehensive and coordinated approach to biodiversity loss and climate change are being undertaken. The Conference of Parties to the UN Convention on Biological Diversity (COP) 15 in 2022 held in Montreal, Canada concluded with the adoption of the Kunming – Montreal Global Biodiversity Framework. Four goals and twenty-three targets were established, including target 3 that aims to protect thirty percent of global land and water by 2030. Aligning with the global target, the Federal Government of Canada also committed to protect thirty percent of Canada's land and water by 2030 ("30 by 30"). Recently, the Government of British Columbia has also announced the same goals for the province.

As part of this ambitious plan to safeguard global biodiversity, BC Nature has undertaken a multi-year, federally funded initiative called the Municipal Protected Areas Project (MPAP), starting in early 2023. The project aims to collaborate with municipalities and other stakeholders in southern BC to identify areas that qualify as 'Protected Areas' based on the International Union for Conservation of Nature's (IUCN) definition of Protected Areas.

Southern BC is home to a high level of species at risk and sensitive ecosystems under threat, as well as the majority of the province's population. Municipalities in southern BC have a unique role to play in 30 by 30 as they own and manage much of the remaining natural areas within these densely populated areas. Municipalities have the chance to contribute to local and global conservation targets and show the public how efforts are being made close to home, allowing them to connect with 30 by 30 on a more personal level.

During this project BC Nature has successfully completed assessments of six sites within the first collaborating municipality. These assessments were conducted using the Decision Support Tool (DST) prescribed by the Canadian Council on Ecological Areas. Candidate sites that meet the criteria described in the DST will be registered in the Canadian Protected and Conserved Areas Database (CPCAD) and counted towards the 30 by 30 target.

The assessments concluded with all but one site eligible to be registered as Protected Areas. The DST is a powerful tool to assess policy and provide insights into how municipalities may enhance management and enable stronger protection for important areas. The addition of sites in the protected area network will also promote education and research, raise awareness on the 30 by 30 goal, and enhance collaborative efforts across the province. Well thought-out policy regarding protected and conserved areas is key to halting and reversing biodiversity loss.

I. Introduction

Climate change and biodiversity loss are intricately interconnected and are deteriorating the health of the planet at an unprecedented rate. Over centuries, anthropogenic pressures such as habitat degradation and fragmentation, introduction of invasive species, overexploitation of resources and hunting have increased species' extinction rates by 1000x the historical rate (Barnosky et. al, 2011). The effects of climate change are being increasingly witnessed, and this causes a major threat to biodiversity by causing changes at species, community and ecosystem levels (Foden et. al, 2013). The rising frequency of extreme weather reduce ecosystem resilience against the social, ecological and physical impacts of such events (Mahecha et. al, 2022). This interconnectedness further forms a dangerous feedback loop – biodiversity intensifies climate change, which further exacerbates biodiversity loss. The threats to biodiversity may be amplified as climate change and land-cover change interact in the coming decades (Jetz et. al, 2007). Integrated strategies that tackle both these issues are necessary for a sustainable future.

There are many global conventions that play a role in shaping global conservation policies and fostering international cooperation such as the Convention on Biological Diversity (CBD), United Nations Framework on Climate Change (UNFCC), Ramsar Convention on Wetlands, and Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). These conventions bring together countries, organisations and stakeholders to collaborate and take collective action against persisting challenges. The COP15 is a United Nations Convention which was held in Montreal Canada in 2021. It concluded with the adoption of "Kunming-Montreal Global Biodiversity Framework" (see II. Background) which consists of four overarching goals and twenty-three targets. Following this, Canada has also announced its commitment to these global goals and has pledged to reach these targets at a national level.

These goals, targets and commitments align with BC Nature's mission to "know nature and keep it worth knowing." As a federation of naturalists clubs, BC Nature sees the Municipal Protected Areas Project (MPAP) as an opportunity to bring together naturalists, municipal staff, and other stakeholders to tackle local conservation efforts that contribute to global goals. This report focuses on how BC Nature has begun working on the MPAP and how federal commitments from the COP15 in Montreal Canada can be met by municipalities who join the project.

II. Background

The 15th Conference of Parties (COP15), a United Nations convention on biodiversity was held in Montreal, Canada in 2022. The event successfully concluded with the adoption of the "Kunming-Montreal Global Biodiversity Framework" (GBF) to target global biodiversity loss, facilitate restoration of critical natural ecosystems and promote the sustainable use of natural resources. Among the four overarching goals and twenty-three targets, Target #3 aims to ensure that at least thirty percent of global terrestrial, inland water, coastal and marine areas are effectively conserved and managed through protected areas. Target three, more popularly phrased as "30 by 30" has gained widespread recognition and is vital to manage the interconnected crises of biodiversity loss, climate change and ecological degradation (CBD, 2022).

The leading causes of biodiversity loss across the globe are habitat loss, fragmentation, and over-exploitation of resources. Thus, policy regarding protected and conserved areas are key solutions to halting and reversing biodiversity loss (Watson et al., 2019). Aligning with the global targets mentioned above, Canada has also committed to protect twenty-five percent of its land and water by 2025, and thirty percent by 2030. With stalling biodiversity loss being the primary objective, the focus also involves promoting Indigenous participation, knowledge systems and cultural practices in decision making (CBD, 2022). Conserved areas include Protected Areas (PAs) and Other Effective Area-based Conservation Measures (OECMs) (Fig. 1).

At the end of 2022, the Government of Canada stated that 13.6% of its terrestrial area had been conserved (i.e., land and freshwater), with 12.7% within protected areas. Similarly, 14.7% of its marine territory had been conserved, with 9.1% falling under protected areas. It is worthy to note that the distribution and size of these conserved areas vary across the country. There tends to be more terrestrial conserved areas in Northern Canada, since the prominence of intensive land use for agriculture, settlements and infrastructural development is low. Larger marine conserved areas are in offshore areas or again, in Northern Canada (ECCC, 2023).

Within Canada, the province of British Columbia is the most biologically and ecologically diverse. Habitats spanning from temperate rainforest to dry pine forest to alpine meadows can be found (Ministry of Forests, 2003). In BC, 15.4% land base and 3.2% of its water are within protected areas. To be more specific, 15% of the terrestrial area is protected under provincial and federal parks, and the remaining 0.4% are protected under other designations such as Wildlife Management Areas, National Wildlife Areas and other private lands. The representation of ecosystems within protected areas varies across the province. For instance, more than forty percent of the Gwaii Haanas, Chilcotin Ranges and Eastern Hazelton Mountains are

protected but less than ten percent of the Fraser Basin, Fraser Plateau and Thompson – Okanagan Plateau regions are protected (Government of BC, 2016).

Biogeoclimatic Zone (BEC) representation also varies within protected areas. For example, thirty percent of BC's Boreal Altai Fescue Alpine habitats and a mere five percent of Coastal Douglas-fir habitats are protected. Aligning with the national trends, high elevation and mountainous terrains such as the Spruce – Willow – Birch and Mountain-heather Alpine Zones are protected more than the provincial average. Low elevation and warm areas tend to be underrepresented in the PA network. Apart from the obvious benefits of biodiversity conservation and climate change mitigation, protected areas in BC contribute largely to the province's economy through park visitation and job opportunities (Government of BC, 2016).

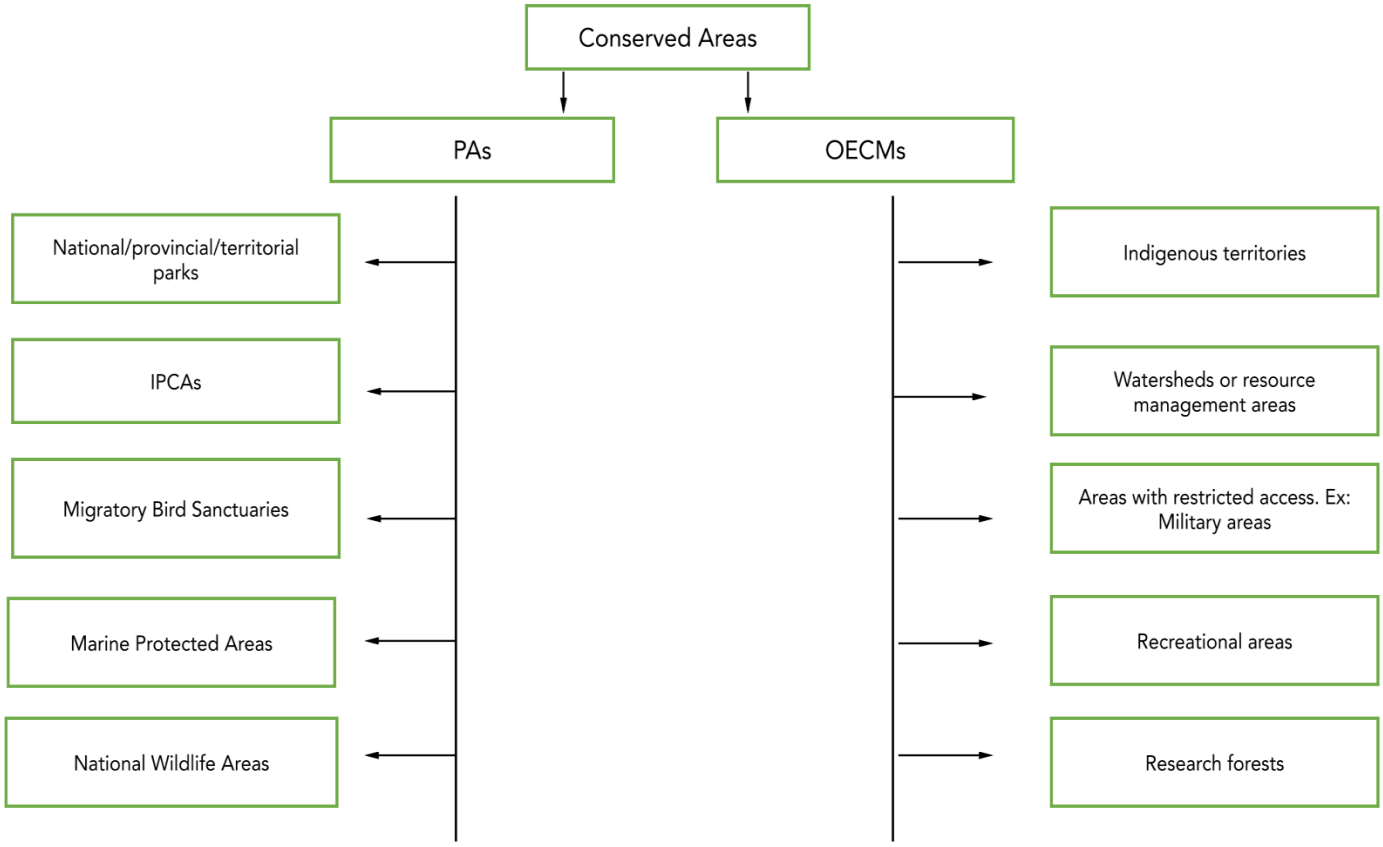

Figure 1: Example categories of PAs and OECMs

III. Evolution of the concept of Protected Areas

Canada is the second largest country in the world. It harbors a rich natural heritage that spans over vastly varied geography. While some species assemblages and ecosystems remain intact, there are a vast number of species and ecosystems that are endangered, and in need of protection. As mentioned above, the southern part of Canada sees a higher number of species and ecosystems deteriorating and in need of higher protection (Kraus & Hebb 2020).

The existence of Protected Areas signifies the social values many countries and societies derive from them worldwide. In the past forty years, there has been evolution to these social values, the way protected areas are conceived and managed. The number of categories of PAs remained the same after the 2008 iteration, however, the categories are now differentiated in greater detail (Dudley et. al, 2010).

There have been amendments to the definitions and categories to Protected Areas and their role as a conservation tool.

> The 1994 definition for PAs read as follows (Dudley, 2008):
> An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.

The recent change in the definition of PAs (Section V) focuses on nature conservation, long-term security and management effectiveness. The current system as shown below, typifies PAs based on the management objectives. These categories have increasingly been used for policy, planning and legislation (Dillon, 2004)

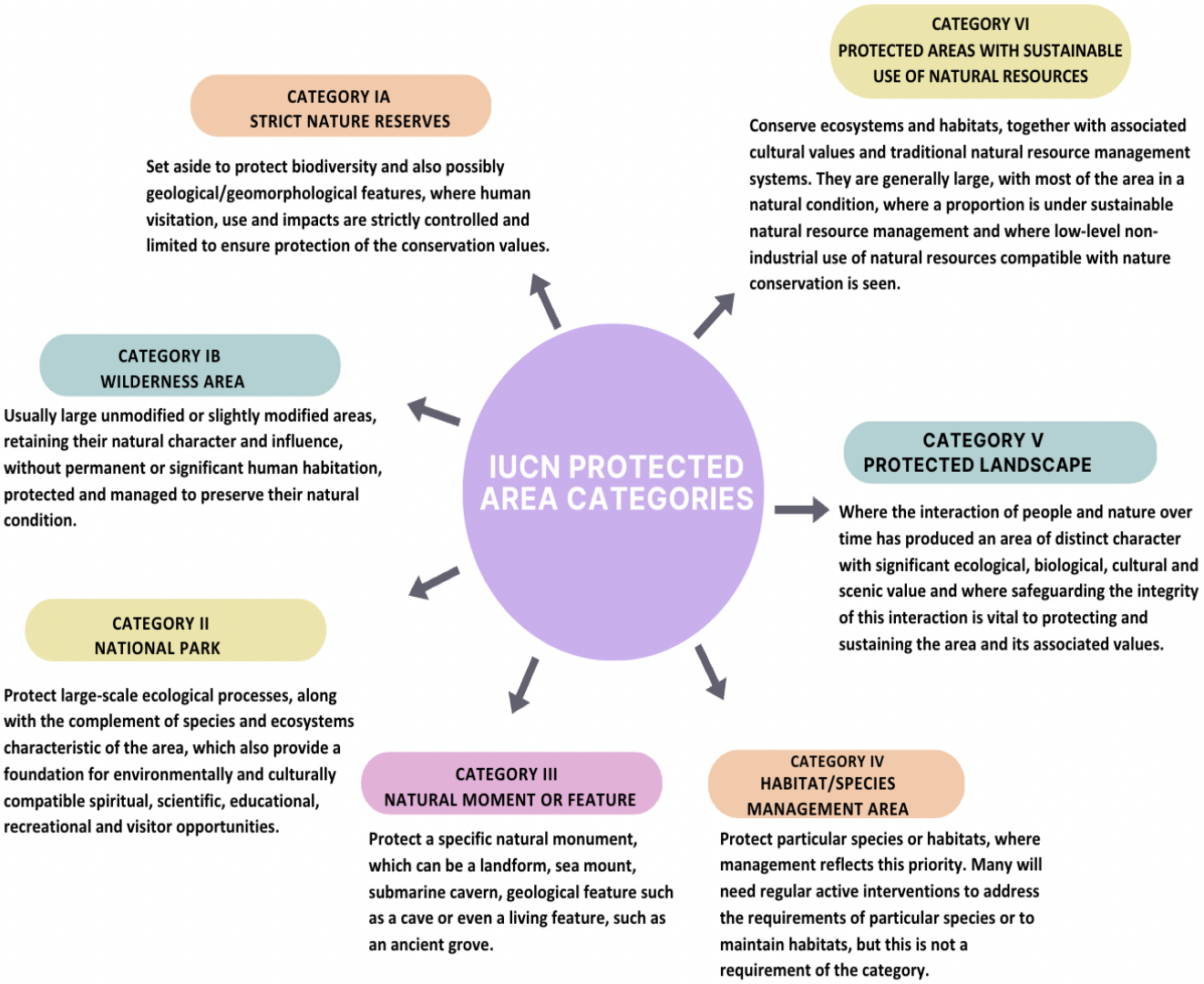

Figure 2: IUCN Protected Area categories

According to the IUCN, areas that have nature conservation as their main objective can be considered as PAs. In case of multiple objectives, nature conservation must still be a priority, and no other objective must cause conflict with this primary objective. (Dudley, 2008). This requirement by the IUCN also recognises that many PAs will often have multiple objectives of equal importance, from different stakeholders' points of view (for example, cultural values associated with the land). However, nature conservation must always take precedence.

Over the years, there have been discussions on whether management objectives are the best way to categorise PAs (Boitani et al., 2008). Another possibility that has been

talked about is conservation-based outcomes. However, the World Commission on Protected Areas has supported the objectives-based management due to its practicality. It is now recognized that management and biodiversity outcomes do not have to be mutually exclusive. Both these criteria have secured a place in PA classification schemes and provide direction for management tools.

There are now generally four potential typologies to define PAs:

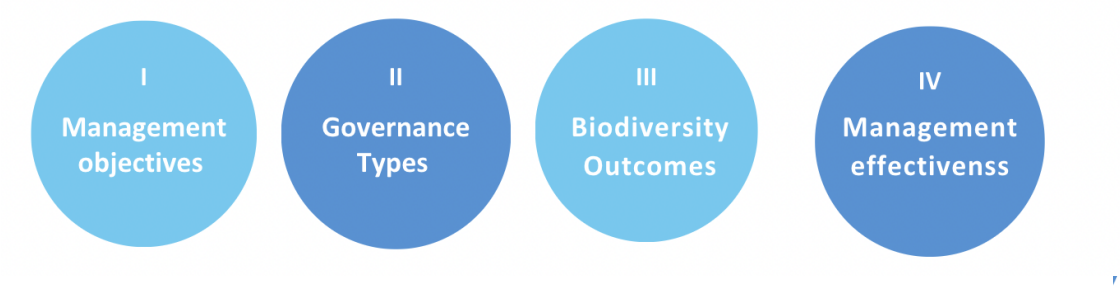

Figure 3: Potential typologies to define PAs

With respect to Indigenous lands, there is no separate category but instead an acknowledgement of a different governance structure (i.e., Indigenous Peoples' protected areas and territories). (Dudley et al., 2010)

IV. Municipal Protected Areas Project

BC Nature is an organisation that works to protect and educate naturalists, the public, and decision makers about the natural history of BC, including its biodiversity, species at risk, parks and other natural areas. BC Nature strongly supports Canada's 30 by 30 goal and has initiated the first of its kind project in the province called the 'Municipal Protected Areas Project'. With greater protection of many important natural areas, the project also aims to contribute towards the overarching goal of biodiversity conservation and inspire more stakeholders like watershed agencies, land trusts, environmental NGOs and other community partners to engage in this undertaking.

The Municipal Protected Areas Project is a multi-year initiative started in early 2023. The main objectives involve collaborating with municipalities, identifying their needs and recognizing potential areas suitable for PA or OECM assessments. If areas pass the assessment, they can be registered on the Canadian Protected and Conserved Areas Database (CPCAD). BC Nature also aims to encourage new protection of natural areas that are important but do not qualify the criteria for designation through

suggestions to existing municipal policies. By updating current management plans or policies and working with associated municipalities, this feedback could allow municipalities to contribute even more area to the federal target and achieve greater protection of natural areas.

Additionally, BC Nature works to raise awareness among the general public regarding this conservation action. As mentioned above, certain ecosystems of BECs are underrepresented in the province's PA network. The warmer, lower elevated regions such as those in southern BC are less protected because of competing land uses and greater human access. These areas could be good candidates for PA/OECM designations since much of the at-risk species and ecosystems in Canada are present in Southern BC. Since municipal lands are rarely seen on the CPCAD, it is a perfect opportunity to now recognise these important natural areas and gain a better understanding of Canada's current percentage of protected land. Without accurate knowledge of how much Canada has protected and where, we cannot coordinate the best, most effective efforts for further protection.

Not only will this greatly benefit the biodiversity crisis, but also the populations living around these natural areas. The benefits of green spaces are many, including climate change adaptation and increased resilience, flood mitigation, better air quality, noise reduction, provision of ecosystem services and better human health (Government of Canada, 2021). The persistence of these natural areas holds significant cultural value, and people living in and around these areas connect to them on a personal level. We believe collaborating with municipalities is an efficient way to reach the federal goal for conservation since municipalities hold power on most development projects and have mechanisms for protection of their natural areas. Thus, the MPAP is suitable as it explores how municipalities can use their power to achieve federal goals and these goals will resonate with the general public on a deeper level.

The MPAP also opens opportunities for dialogue with Indigenous groups and local communities and offers a platform to demonstrate strong leadership. The establishment of new PAs/OECMs will help protect important socio-cultural values associated with the lands as well as conserve important species and ecosystems at risk.

V. Definitions and the Decision Support Tool

The IUCN defines a protected area as follows (IUCN, 2019):
"A clearly defined geographic space, recognized, dedicated and managed through legal or other effective means, to achieve long-term conservation of nature with associated ecosystem services and cultural values."

Areas that do not fit perfectly under this definition but contain important habitat or biodiversity, can be classified under OECMs.

The IUCN's definition for an OECM is as follows (IUCN, 2019):
"A geographically defined area *other* than a protected area which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity with associated ecosystem functions and services where applicable, cultural, spiritual and socio-economic, and other locally relevant values."

The core difference between a PA and an OECM is its primary conservation objective. For an area to be designated as a PA, it is essential that the primary objective is in-situ conservation of biodiversity. An OECM can differ in its primary management objective but deliver effective in-situ biodiversity conservation because of this protection. An example of this would be existing watershed management policies and management that may result in the protection of different species of flora and fauna and important ecosystems despite the primary objective is not conservation (IUCN, 2019).

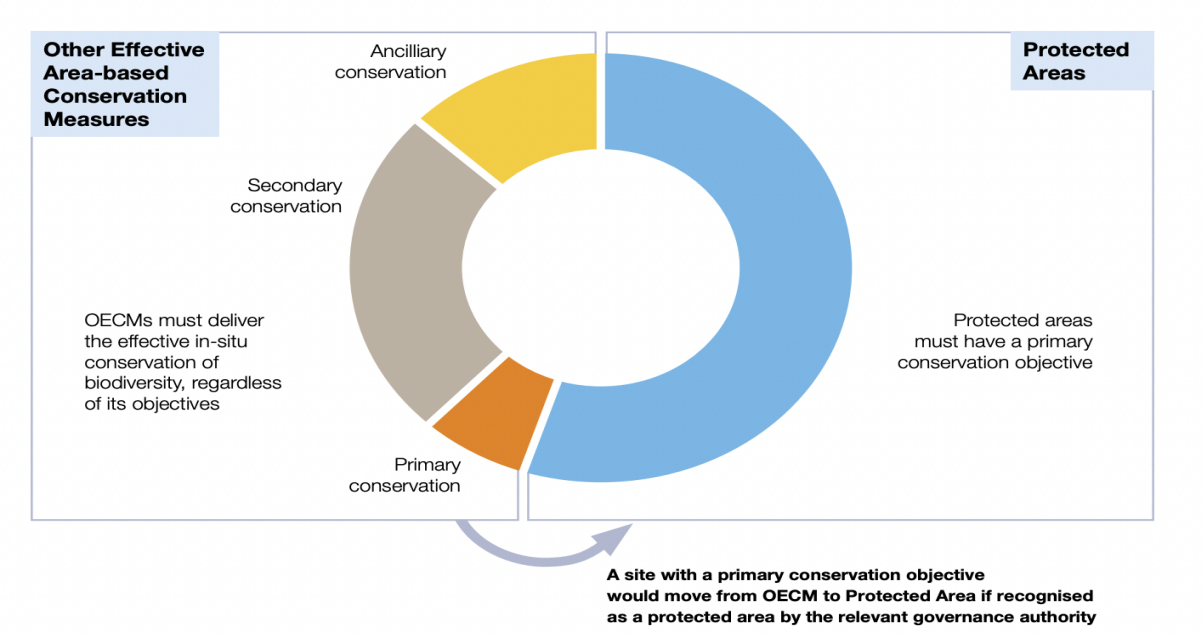

Fig 4: Relationship between OECMs and PAs
Source: (IUCN, 2019)

For more information on OECMs, their different management approaches and designations, refer to IUCN, 2019.

In alignment with the IUCN definitions, the Decision Support Tool (DST) was formulated as a guide to promote consistency and transparency in identification of these conserved areas. Originally developed for a previous federal target (17% by 2020), the DST was made by the Canadian Council on Ecological Areas (CCEA) and was further modified through a collaboration with Pathway jurisdictions, CCEA and other working groups. The DST takes into consideration the different contexts that exist in Canada and is used as a standard tool to recognize important conserved areas. The areas that qualify each criterion set by the DST are then registered to the Canadian Protected and Conserved Areas Database (CPCAD) by the corresponding jurisdictions. Irrespective of the type of governance, including areas governed by Indigenous groups, federal/provincial/municipal levels of government, private or shared lands, this tool can be used to assess the appropriateness of these areas under relevant designations.

Va. The criteria

Below are the criteria at a glimpse. For more detail, see Table 4 and 5 in the Appendix.

Table 1: DST criteria at a glimpse

Criteria	Screening Tool
Geographical space	Does the site have clear boundaries through signage, fencing, GIS or other mechanisms?
Effective Means	Are there mechanisms in place to curtail activities incompatible with in-situ biodiversity conservation and can the compatible activities be effectively managed?
Long-term	Is the site managed with the intention for long-term protection and conservation?
Timing	Is the site intended to be protected all year round?
Scope of objectives	Do the objectives have the scope to result in in-situ biodiversity conservation?
Primacy of objectives	Is the primary objective conservation of biodiversity?
Governing authorities	Are the governing authorities instrumental in achieving biodiversity objectives?
Biodiversity conservation outcomes	Is biodiversity being conserved in-situ?

Site assessments must demonstrate how each criterion is met in order to receive a designation. Information on clear site boundaries (through GIS, fences, signage etc.), mechanisms to manage and prevent activities incompatible with in-situ

biodiversity conservation, evidence of intent for year-long, long-term protection are required for a site to qualify as either a PA or an OECM. To corroborate the eligibility of a site against each criterion, management plans, Official Community Plans, policies and relevant by-laws at the municipal or provincial level can be referred to. If sites do not qualify these criteria from Table 1, the assessment is ceased.

Further criteria such as scope of objectives, primacy of objectives, who the governing authorities are and what the biodiversity conservation outcomes look like determine whether sites are either a PA or an OECM.

To understand the DST in-depth, and to learn how to carry out assessments, visit: https://www.conservation2020canada.ca/additional-accounting-resources

VI. Building Bridges: The communication process

BC Nature is a federation of 57 naturalist clubs across the province and celebrates the knowledge and local connections each club has with their natural areas. BC Nature began this project by reaching out to members of federated clubs with an aim was to spread awareness about the project, identify municipalities willing to participate, and provide opportunities for input and collaboration. This was done through interviews and consultations. The initial engagement process led to the identification of one stand out municipality [identity is still confidential at this point] in terms of their enthusiasm and eagerness to be the first candidate for the MPAP.

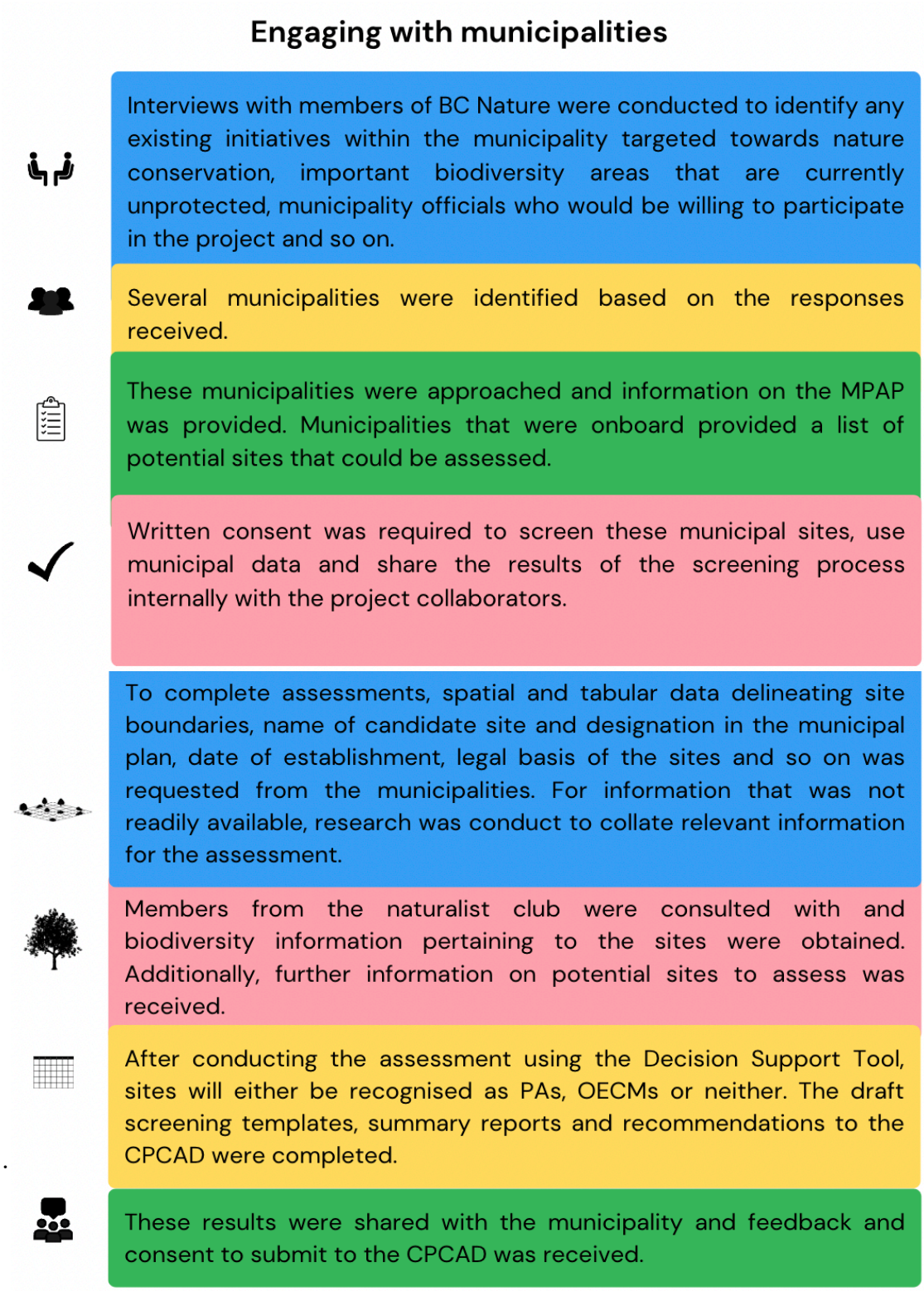

Figure 5: Process involved in engaging with municipalities to complete assessments

VII. Using the Decision Support Tool

Once the municipality was identified through interviews and a written consent was received with additional information, the assessment began. During the appointment of the Sustainability Scholar at BC Nature, assessments were conducted for several sites for this municipality with all but one site qualifying as Protected Areas (Category Ib). The assessments are being reviewed at the municipality level and supporting documents have been prepared to submit to the CPCAD. If the reviews are successful, these sites will be registered into CPCAD as federally recognised protected sites. For further information and any questions on the process, reach out directly to BC Nature (conservation@bcnature.ca).

VIII. Assessments in Retrospect

After completion of the assessments, we concluded that the DST is a powerful tool and primarily focuses on site governance, management objectives and legal mechanisms to achieve in-situ biodiversity conservation. Efforts are focussed in understanding the by-laws, policies and acts that apply to each of these sites. These are used to corroborate each criterion from the DST and thus, elucidate whether sites qualify as PAs or OECMs.

Although there are biodiversity considerations such as 'biodiversity conservation outcomes', the DST does not consist of specific quantitative criterion for biodiversity to evaluate a site's importance in terms of the biodiversity it consists of, be it species or ecosystems. It could be useful to include another layer of information with regards to the biodiversity a site harbours. This would emphasise on a site's importance particularly from the lens of species and ecosystems. This additional layer of information will uplift the standards of the assessments submitted to the CPCAD and ensure that sites important in terms of species and ecosystems are recognized (and identify, if necessary, conservation tools are employed). This will also encourage assessors and municipalities to document site-specific information and prioritise site protection when required.

It could be beneficial if sites submitted to the CPCAD do not just have mechanisms for protection in place but include important biodiversity elements present. We also believe that the greater number of criteria a site qualifies, the lesser possibility of status reversal.

IX. Integrating Key Biodiversity Areas into the DST

Interestingly, the municipality that BC Nature collaborated with was also interested in navigating through other conservation tools that would not only benefit the CPCAD assessments, but also contribute towards the protection of biodiversity and help with other initiatives being undertaken.

It has been observed that the designation of Protected Area is not dependent on biodiversity metrics and hence, to fill these gaps, we considered explicit, measurable and repeatable targets for biodiversity conservation in this process (Rodrigues et. al, 2004a, Eken et. al, 2004). The ability to now use analytical tools makes it possible to record information on land use and land use change, species ranges, species at risk and so on (Jenkins et al., 2015). A tool that could do this would be useful to catalogue site-specific species and ecosystems information, and thus help in strengthening our assessments as well as contribute to the greater goal of biodiversity conservation.

Recognising important sites could help in better land-use planning and prevent activities that are harmful for the biodiversity in the area. It would also promote species and ecosystem specific conservation and monitoring programs which is a desirable outcome.

Following the understanding to add a stronger biodiversity element to the assessments, we concluded that using the Key Biodiversity Areas standards might be the path to adopt.

Key Biodiversity Areas (KBAs). KBAs are defined as "sites that contribute significantly to the global persistence of biodiversity."

The KBA standard identifies important sites for different taxonomic, ecological, and thematic subsets of biodiversity, such as Important Bird and Biodiversity Areas (IBAs), Alliance for Zero Extinction (AZE) sites, and Important Plant Areas (IPAs), all of which already exist in Canada. The KBA framework provides a" quantitative criteria and associated thresholds for identifying KBAs in an objective, repeatable and transparent way".

The standard for KBA demonstrates that these sites contain rare or threatened species/ecosystems, and attract large congregations of species to feed, reproduce or seek refuge. These areas can be completely undisturbed by industrial development and can contain intact species assemblages and unhindered ecological processes.

This process is an effective site-based conservation tool that helps mitigate loss of species and ecosystems. The benefit of the KBA standard is that it groups many different values together such as species, taxa, ecosystems etc. under one framework and provides a robust and quantitative approach to identify important areas (IUCN, 2016). As touched upon earlier, KBA designation can provide additional benefits such as supporting conservation planning and priority setting at national and regional levels and providing local and Indigenous communities with opportunities for employment, recognition, economic investment, societal mobilization and civic pride (IPBES, 2021).

The "Global Standard for Identification of Key Biodiversity Areas" was approved in April 2016 by the IUCN council. This framework can be applied across all taxa and levels of biodiversity. In the global standard, there are 11 criteria, grouped under five categories (Fig. 6).

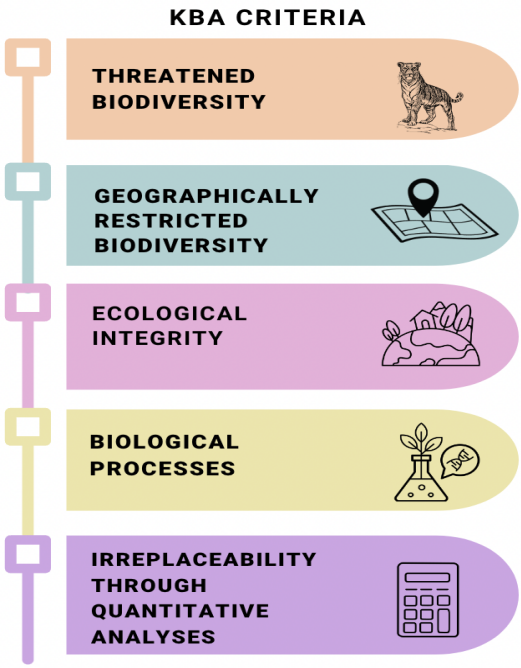

Figure 6: Five overarching KBA criteria in the Global Standard Framework

It is important to note that identification of KBAs is a scientific process and is not related to a site's legal status or governance. All KBAs are not necessarily protected under a PA designation and possibly utilize other site-specific conservation tools. However, in some countries the placement of PAs has been largely driven by KBAs. Additionally, PAs have been created for the exact values identified in the KBA criteria (Dudley et. al, 2010). Thus, this approach in tandem with the MPAP could prove to be useful.

Adding the KBA framework as an extra layer of information to the assessments does not mean that sites must qualify as KBAs in order to be designated as PAs. However, we believe it will provide crucial information when available. Biodiversity criteria in the DST is somewhat open ended, and its inclusion will strengthen site choices and their assessments. It might also lead to easier approval of sites into the CPCAD.
It is understood that PAs are established for a myriad of conservation purposes (for example, ecological representation, connectivity purposes, bio-cultural values and so on.) and if a site does not qualify as a KBA, it does not imply that it is not worthy for conservation purposes. KBAs often vary in the degree of legal protection (some are partly or entirely inside protected areas), ownership and management. KBAs that are not protected under the PA designation vary widely in their management regimes. This is an incentive to protect significant ecological areas under uniform, higher legal standards.

As mentioned above, the Global Standard for KBAs contains five categories and 11 criteria. A site that qualifies one or more criteria is designated as a KBA.
Adapting from the Global Standard, Canada follows the National Standard for KBA identification. In 2019, Canada became the first country to adopt a National KBA standard for KBA identification. See Table 6 in the Appendix for the global and national standards in detail.

Aligning with the municipality's interests, BC Nature briefly looked into the KBA framework to understand whether the sites qualified, and whether this could be an added component to the assessments.

The municipality's naturalists have done a remarkable job at cataloguing information within its jurisdiction. There is comprehensive information available on species at risk, and threatened ecosystems. The Whistler Biodiversity Project has recorded over 4000 species across different taxa so far and conducts a BioBlitz program annually. However, site-specific information is not so widely available which makes it difficult to understand whether the site is a KBA or not. It would be beneficial if a site-specific component be added to the surveys, in order to strengthen the CPCAD assessments by manifold and also make it easier to conduct KBA assessments. The Municipality has shown great enthusiasm and willingness to review additional conservation tools to afford higher protection to its sites.

X. Future steps:

BC Nature aims to conduct its first webinar in the fall of 2023, showcasing the assessments to encourage greater participation from new municipalities. Through discussions and consultations with our stakeholders, we hope that more municipalities see value in this process and work hand in hand to improve protection of sites that contribute towards the province's ecological and biological diversity, as well as offer invaluable socio-cultural values that must be preserved and passed onto future generations.

We also aim to bring greater awareness of the project and share exciting updates with club members, without which this project would remain incomplete. This could lead to additional municipal engagement that was not gained in the municipal webinar. To continue with the progress on the project, BC Nature aims to conduct at least one set of assessments each quarter.

Cataloguing the way forward 📋

Cataloguing important PAs across Southern BC has several benefits and will help us move closer to the 30 by 30 national and provincial goal. Understanding which sites qualify as PAs and which do not are essential to guide future management and funding plans.

- **More opportunities for collaboration:** This process will encourage collaboration between municipalities, local communities, NGOs and other stakeholders, fostering stronger community conservation initiatives.
- **Long-term protection:** Having records of protected areas and of important species and ecosystems they include will make sustained protection and planning more feasible.
- **Tailored conservation strategies and effective monitoring:** By cataloguing site-specific information, threats faced by certain species and ecosystems can be recognized and managed.
- **Research and education:** The catalogued information will give rise to more research opportunities surrounding impacts of human activities, trends on species populations in protected areas, migratory patterns and so on. Informative material produced from this research such as reports, maps, interpretive resources etc. can raise awareness on the current threats to biodiversity amongst the general public.
- **Awareness:** Communications and celebration of this work will make the public more aware of both the current biodiversity crisis we are facing, and the efforts local governments are taking to help.
- **Policy and legal compliance:** Cataloguing important information can help in developing evidence-based policies and regulations. Following the legal requirements of reporting, monitoring and documenting protected areas will ensure transparency and accountability throughout the process.
- **Funding:** Cataloguing important PAs will also give rise to funding opportunities in areas that demonstrate high ecological value and are threatened.

XI. Conclusion

The unprecedented rates of biodiversity loss and effects of climate change have given rise to global coordinated efforts to halt or reverse the crises. Canada has joined the global commitment to protect thirty percent of its land and water by 2030. More recently, the BC Government has pledged the same.

BC Nature has begun a multi-year initiative to help municipalities recognize the importance of local governance in the 30 by 30 goal, focusing on identifying and adding sites into the existing protected area network. This work is a great opportunity to identify areas that are dense with species at risk and sensitive ecosystems, and provide feedback to municipalities on how to strengthen current policy for greater protection (even beyond assessed sites).

During the scholar's appointment, assessments using the Decision Support Tool were completed for one municipality in Southern BC. All but one sites qualified as Protected Areas. These assessments, along with supporting material will soon be submitted to the CPCAD upon the municipality's approval.

As part of the process, BC Nature also engaged with affiliated club members, knowing this is a wonderful way to include crucial local knowledge and facilitate collaborations with multiple stakeholders. One suggestion provided in the report would be to add a layer of information with respect to biodiversity in the area. A possible framework that could be used is the Key Biodiversity Areas (KBAs). This would strengthen the process of cataloguing in the region and help prioritize areas based on the information noted.

Overall, the first set of assessments were a success and BC Nature hopes to expand this work throughout southern British Columbia.

References

Barnosky, A. D., Matzke, N., Tomiya, S., Wogan, G. O., Swartz, B., Quental, T. B., ... & Ferrer, E. A. (2011). Has the Earth's sixth mass extinction already arrived?. *Nature*, *471*(7336), 51-57.

BC, Government. (2016) *Land & Forests*, *Protected Lands & Waters - Environmental Reporting BC*.
Available at: https://www.env.gov.bc.ca/soe/indicators/land/protected-lands-and-waters.html#fn2

Boitani, L., Cowling, R. M., Dublin, H. T., Mace, G. M., Parrish, J., Possingham, H. P., ... & Wilson, K. A. (2008). Change the IUCN protected area categories to reflect biodiversity outcomes. *PLoS Biology*, *6*(3), e66.

Canada, E. and C. C. (2023, June 29). *Canada's Conserved Areas*. Canada.ca. Available at: https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/conserved-areas.html

Canada, P.H.A. (2021) *Commentary – Climate change, health and green space co-benefits*, *Canada.ca*. Available at: https://www.canada.ca/en/public-health/services/reports-publications/health-promotion-chronic-disease-prevention-canada-research-policy-practice/vol-39-no-4-2019/climate-change-health-green-space-co-benefits.html (Accessed: 14 August 2023).

Convention on Biological Diversity. (2022, December 19). *COP15: Nations adopt four goals, 23 targets for 2030 in landmark UN Biodiversity Agreement*. COP15: Nations Adopt Four Goals, 23 Targets For 2030 In Landmark UN Biodiversity Agreement. https://www.cbd.int/article/cop15-cbd-press-release-final-19dec2022

Dillon, B. E. N. I. T. A. (2004). The use of the categories in national and international legislation and policy.

Dudley, N. (Ed.). (2008). *Guidelines for applying protected area management categories*. Iucn.

Dudley, N., Parrish, J. D., Redford, K. H., & Stolton, S. (2010). The revised IUCN protected area management categories: the debate and ways forward. *Oryx*, *44*(4), 485-490

Eken, G., Bennun, L., Brooks, T. M., Darwall, W., Fishpool, L. D., Foster, M., ... & Tordoff, A. (2004). Key biodiversity areas as site conservation targets. *BioScience*, *54*(12), 1110-1118.

Foden, W. B., Butchart, S. H., Stuart, S. N., Vié, J. C., Akçakaya, H. R., Angulo, A., ... & Mace, G. M. (2013). Identifying the world's most climate change vulnerable species: a systematic trait-based assessment of all birds, amphibians and corals. *PloS one*, *8*(6), e65427.

IPBES (2021) *Policy Support Tool - Key Biodiversity Areas*, *IPBES secretariat*. Available at: https://www.ipbes.net/policy-support/tools-instruments/key-biodiversity-areas (Accessed: 14 August 2023).

IUCN, A. (2016). A global standard for the identification of key biodiversity areas, version 1.0.

IUCN-WCPA Task Force on OECMs. (2019). Recognising and reporting other effective area-based conservation measures. *IUCN Gland Switzerland*.

Jenkins, C. N., Van Houtan, K. S., Pimm, S. L., & Sexton, J. O. (2015). US protected lands mismatch biodiversity priorities. *Proceedings of the National Academy of Sciences*, *112*(16), 5081-5086.

Jetz, W., Wilcove, D. S., & Dobson, A. P. (2007). Projected impacts of climate and land-use change on the global diversity of birds. *PLoS biology*, *5*(6), e157.

Kraus, D., & Hebb, A. (2020). Southern Canada's crisis ecoregions: identifying the most significant and threatened places for biodiversity conservation. *Biodiversity and Conservation*, *29*(13), 3573-3590.

Mahecha, M. D., Bastos, A., Bohn, F. J., Eisenhauer, N., Feilhauer, H., Hartmann, H., ... & Wirth, C. (2022). Biodiversity loss and climate extremes–study the feedbacks. *Nature*, *612*(7938), 30-32.

Ministry of Forests (2003) *British Columbia's Forests and their Management*. Available at: https://www.for.gov.bc.ca/hfd/pubs/Docs/Mr/Mr113/forests.htm (Accessed: 15 August 2023).

Rodrigues, A. S., Akcakaya, H. R., Andelman, S. J., Bakarr, M. I., Boitani, L., Brooks, T. M., ... & Yan, X. (2004). Global gap analysis: priority regions for expanding the global protected-area network. *BioScience*, *54*(12), 1092-1100.

Links within text

Decision Support Tool:
https://static1.squarespace.com/static/57e007452e69cf9a7af0a033/t/5c94cb199140b7492eaad735/1553255193848/Pathway+to+Target+1_Decision+Support+Tool+%28EN%29.pdf

"A Global Standard for Identification of Key Biodiversity Areas"
https://portals.iucn.org/library/sites/library/files/documents/2016-048.pdf

"National Standard for the Identification of Key Biodiversity Areas in Canada"
https://kbacanada.org/wp-content/uploads/2022/07/National-KBA-Standard.pdf

Appendix

Detailed DST criteria as prescribed by the CCEA, in alignment with the IUCN definition of PAs and OECMs. From Table 4, PAs and OECMs both, would meet all the criteria in Column A. Areas that meet all criteria in Column B, can be a potential PA or an OECM. Further assessments are required to determine this designation. Similarly, if the area falls under Column C for one or more criteria, it is not suitable for the conserved area designation until efforts are made for the area to meet all the criteria. Table 5 helps distinguish clearly whether a site is a PA or an OECM.

Table 4: Standards common to Protected Areas and Other Effective Area-Based Conservation Measures (Source: Decision Support Tool, see link)

Criteria	Intended Effect of Criterion	Standards for Criteria		
		A. Clearly meets the standard for PA or OECM	B. May meet the PA or OECM standard but requires further evaluation in order to make a decision	C. Does not meet the standard for PA or OECM
Geographical Space	Demarcates the area to facilitate the *in-situ* conservation of biodiversity.	The geographical space has clearly defined and agreed-upon borders.	The geographical space is intended to be clearly defined but may not be easily or widely recognizable.	The geographical space is not clearly defined.
Effective means -1	Activities incompatible with the *in-situ* conservation of biodiversity do not occur and compatible activities are effectively managed.	The mechanisms provide the ability to prevent incompatible activities and manage all other activities within the area, such that the *in-situ* conservation of biodiversity can be achieved.	The mechanisms provide the ability to prevent, control and/or manage activities within the area such that the *in-situ* conservation of biodiversity can be achieved.	The mechanisms do not provide sufficient ability to prevent and/or manage activities within the area that are likely to have impacts on biodiversity.
Effective means -2		The mechanisms compel the authorities to prohibit activities that are incompatible with the *in-situ* conservation of biodiversity.	The mechanisms do not compel the authorities to prohibit activities incompatible with the *in-situ* conservation of biodiversity but incompatible activities are not likely to occur.	The mechanisms do not compel the authorities to prohibit activities incompatible with the *in-situ* conservation of biodiversity and/or incompatible activities are being allowed or are likely to occur.
Long-term	The area is permanently protected or conserved and the mechanism is not easily reversed.	The mechanism(s) is/are intended to be in effect for the long term and not easily reversed.	The mechanism(s) is/are expected to be in effect for the long term and not easily reversed.	The mechanism(s) is/are not intended or expected to be in effect for the long term or may be easily reversed.
Timing	Biodiversity is protected or conserved year-round.	The mechanisms are in effect year-round.	Seasonal mechanisms are combined with other mechanism(s) to result in the year-round *in-situ* conservation of biodiversity.	The mechanisms are not in effect year-round.

Table 5: Standards that differ between Protected Areas and Other Effective Area- Based Conservation Measures (Source: Decision Support Tool, see link)

Criteria	Intended Effect of Criterion	Standards for Criteria				
		A. Clearly meets the standard for PA	B. May meet the PA standard but requires further evaluation in order to make a decision	C. Clearly meets the standard for OECM	D. May meet the OECM standard but requires further evaluation in order to make a decision	E. Does not meet the standard for PA or OECM
Scope of Objectives	Objectives have sufficient scope to result in the *in-situ* conservation of biodiversity..	The objectives are for the *in-situ* conservation of biodiversity as a whole, or for Indigenous values maintained through the *in-situ* conservation of biodiversity.	The objectives are for the *in-situ* conservation of a subset of biodiversity or Indigenous values, such as particular species or habitats, accomplished through the *in-situ* conservation of biodiversity.	The area has objectives consistent with, whether intentionally or otherwise, the *in-situ* conservation of biodiversity.	Even though biodiversity conservation is not necessarily a management objective, the area delivers *in-situ* conservation of biodiversity as a by-product of management.	The objectives are neither for, nor consistent with, the *in-situ* conservation of biodiversity; or objectives do not exist.
Primacy of Objectives	Objectives result in the *in-situ* conservation of biodiversity.	Conservation objectives are stated as primary and overriding of other objectives.	Based on evident intent (e.g., management intent, stated or implied conservation objectives, allowable and prohibited activities), conservation objectives are primary and overriding, or are given priority when there is conflict among objectives.	Primary and overriding objectives are clear and not in conflict with the *in-situ* conservation of biodiversity.	Based on evident intent (e.g., management intent, stated or implied objectives, allowable and prohibited activities), primary and overriding objectives are not expected to result in adverse impacts on the *in-situ* conservation of biodiversity.	Based on evident intent the *in-situ* conservation of biodiversity is likely to be compromised by conflicting objectives, or objectives do not exist.
Governing Authorities	The *in-situ* conservation of biodiversity is not jeopardized by relevant governing authorities.	All relevant governing authorities acknowledge and abide by the conservation objectives of the area.	While not all relevant governing authorities are bound by the conservation objectives, the area is being managed in a manner likely to continue achieving *in-situ* conservation of biodiversity.	All relevant governing authorities acknowledge and abide by a management regime that delivers the *in-situ* conservation of biodiversity.	While not all relevant governing authorities are bound by a management regime that delivers the *in-situ* conservation of biodiversity, the area is being managed in a manner likely to continue achieving the *in-situ* conservation of biodiversity.	Not all relevant governing authorities acknowledge and abide by the conservation objectives of the area or by a management regime likely to result in the *in-situ* conservation of biodiversity. As a result, the area is not managed in a manner likely to deliver the *in-situ* conservation of biodiversity.
Biodiversity Conservation Outcomes	Biodiversity is conserved *in-situ.*	The area is achieving the conservation objectives.	The area is being managed with the intent of, and is likely achieving, the conservation objectives.	The area is being managed in a way that delivers the *in-situ* conservation of biodiversity.	The area is being managed in a way that is likely to deliver the *in-situ* conservation of biodiversity.	The area is not being managed in a way that achieves the conservation objectives or is likely to deliver the *in-situ* conservation of biodiversity.

Note that the National Standard has been adapted with a few modifications. Four out of eleven criteria have not been included, namely: B2, B3, C and E as they do not apply uniformly across the country.

Table 6: Criteria used in the Global Standard and National Standard for KBA identification. 1 Reproductive Unit = 1 female and 1 male.
(Source: National Standard for the Identification of Key Biodiversity Areas in Canada)

A. Threatened Biodiversity

Sub-Criterion	Trigger Biodiversity Element		Pop. or Extent Threshold	Reproductive Units
	Global KBA	National KBA		
A1. Threatened species				
a	CR or EN species	Taxon nationally[10] threatened at level 1	0.5%	5
b	VU species	Taxon nationally threatened at level 2	1%	10
c	Species assessed as CR or EN due only to population size reduction in the past or present		0.1%	5
d	Species assessed as VU due only to population size reduction in the past or present		0.2%	10
e	CR or EN species	Taxon nationally threatened at level 1	Entire population	-
	Site where a CR(PE) or CR(PEW) species is most likely to occur worldwide	Site where a taxon that is possibly extinct or possibly extirpated in Canada is mostly likely to occur in Canada	-	-
A2. Threatened ecosystem types				
a	CR or EN ecosystem type	CR or EN ecosystem type	5%	-
b	VU ecosystem type	VU ecosystem type	10%	-

B. Geographically Restricted Biodiversity

Sub-Criterion	Trigger Biodiversity Element		Pop. or Extent Threshold	Reproductive Units
	Global KBA	National KBA		
B1. Individual geographically restricted species				
-	Any species	Any taxon	10%	10
B2. Co-occurring geographically restricted species				
-	Several restricted-range species from the same taxonomic group: either ≥2 species OR 0.02% of the global number of species in the taxonomic group, whichever is larger		1%	-

B3. Geographically restricted assemblages				
a	Several ecoregion-restricted species from the same taxonomic group: either ≥5 species OR 10% of the species restricted to the ecoregion, whichever is larger		0.5%	-
b	Several bioregion-restricted species from the same taxonomic group: either ≥5 species OR 30% of the bioregion-restricted species known from the country, whichever is larger		-	5
c	Part of the globally most important 5% of occupied habitat for each of ≥5 species within a taxonomic group		-	-
B4. Geographically restricted ecosystem types				
-	Any ecosystem type	Any ecosystem type	20%	-

C. Ecological Integrity

Sub-Criterion	Trigger Biodiversity Element		Pop. or Extent Threshold	Reproductive Units
	Global KBA	National KBA		
-	One of ≤2 sites per ecoregion characterized by wholly intact ecological communities	- Deferred pending methodology development	-	-

D. Biological Processes

Sub-Criterion	Trigger Biodiversity Element		Pop. or Extent Threshold	Reproductive Units
	Global KBA	National KBA		
D1. Demographic aggregations				
a	Aggregation of a species over a season and during one or more key stages of its life cycle	Aggregation of a taxon over a season and during one or more key stages of its life cycle	1%	-
b	One of the 10 largest aggregations known for a species worldwide	One of the 10 largest aggregations known for a taxon in Canada	-	-

D2. Ecological refugia				
-	Aggregation of mature individuals of a species during periods of past, current, or future environmental stress	Aggregation of individuals of a taxon during periods of past, current, or future environmental stress	10%	-
D3. Recruitment sources				
-	Propagules, larvae, or juveniles maintaining ≥10% of a species' global population size	Propagules, larvae, or juveniles maintaining ≥10% of a taxon's national population size	-	-

E. Irreplaceability Through Quantitative Analysis

Sub-Criterion	Trigger Biodiversity Element		Pop. or Extent Threshold	Reproductive Units
	Global KBA	**National KBA**		
-	Irreplaceability of ≥0.90 (measured by quantitative spatial analysis) AND regular presence of any species	Deferred pending methodology development	-	10
	Irreplaceability of ≥0.90 (measured by quantitative spatial analysis) AND regular presence of EN or CR species		-	5