



COMMENTS BY WILDLIFE CONSERVATION SOCIETY CANADA

ON

Environment and Climate Change Canada's Proposed
"Management Plan for Spiked Saxifrage (*Micranthes spicata*) in Canada"

Donald Reid, WCS Canada, Whitehorse
Maria Leung, Wild Tracks Ecological Consulting, Whitehorse
Tobi Oke, WCS Canada, Whitehorse

April 2022

INTRODUCTION

This document is the response by Wildlife Conservation Society Canada (WCS Canada¹) to the federal government's request for public comments on the Proposed Management Plan. We thank Environment and Climate Change Canada (ECCC) for the opportunity to comment and put forward our perspective. Collectively, we address this issue with backgrounds in conservation of species at risk in Yukon and other jurisdictions, the scientific modelling of the projected distribution of the species in question under climate change, and the assessment of the species in question with regard to the Key Biodiversity Area initiative funded by ECCC.

COMMENTS

We have organized our comments in this document to follow the format of the Proposed Management Plan, referencing section (bold type) and line number. Our recommendations are in bold and italics.

First, a general comment: the document frequently uses "pers. comm." as a form of reference. We think that these should be avoided if at all possible because they provide no opportunity for the reader to independently investigate and verify the information being presented.

Executive Summary

¹ WCS Canada is a national nongovernment organization of scientists conducting research on species and ecosystems to inform conservation decisions. Our role is to provide long-term, site-based, research and syntheses of science that inform policy and practice and that support the implementation of effective conservation measures. We do this by providing technical advice and by engaging relevant decision-makers at all levels, from local to federal. WCS Canada scientists have been working in Yukon since 2004 on land use and protected areas planning, land and water management, wildlife conservation research, and policy applications for conservation science.

96 The statement about genetic distinctiveness of the Canadian population is questionable given a lack of suitable reference and a potential contradiction with other published information (more detail at line 188 below).

99 The distinction between the two “habitats” occupied by the species is incomplete. One is described as “creek shores” and the other as “alpine and subalpine meadows”. The two categories are not independent, and are not differentiated using a single criterion: creeks occur in the alpine and subalpine, but the text does not indicate the general circumstances in which the “creeks” referred to here actually occur. The description requires explanation of which elevation zones (perhaps bioclimate zones) the “creek shores” occur in.

3.2 Species Population and Distribution

188 The statement that the Canadian population is “genetically distinct” from the Alaskan population is referenced to B.A. Bennett. This is an inappropriate reference for such a statement: Bennett is not a geneticist, and therefore is not a sufficient authority to be the origin of this information.

This statement requires reference from a published paper, or an appropriate authority who has done the research (e.g., the barcoding of life project, as referenced by COSWEIC 2015).

In addition, the statement would seem to be questionable for a species whose “sub-populations” (using the terminology in this document) are often widely separated in space (Figure 2 of the Plan), and so quite unlikely to all be part of an interbreeding “population”. What would make the international border some kind of barrier, or any more of a barrier, to gene exchange between Alaskan and Yukon plants compared to the large distances between many Canadian sub-populations?

The 2015 COSEWIC status report² includes the following text: *DNA barcoding uses short regions of DNA to uncover genetic differences between and within species (Saarela et al. 2013). Plants from throughout the range of Spiked Saxifrage (n=24) were surveyed at the ITS-2 region (internal transcribed spacer 2) and the results archived in the Barcode of Life Systems database (BOLD) (Ratnasingham and Hebert 2007). Neighbour-joining analysis uncovered two major clusters: one includes plants only from Yukon and the other includes plants from Yukon and Alaska. Though there was not enough evidence to support a designatable unit structure, there is evidence that the Canadian population harbours genetic variation not found in Alaska, and therefore the Yukon population contributes unique genetic diversity to the species.* This seems to be the most recent published information on the topic, and therefore a good interim reference though it is still second-hand regarding the data themselves.

To claim, as the current Management Plan text does, that the Canadian population is “genetically distinct” from the Alaskan population appears incorrect, based on this published evidence in the COSEWIC 2015 Report. The genetic evidence does not show that the entire Canadian population is substantially different from the Alaskan population; it shows that some Canadian “sub-populations” cluster with Alaskan ones, and other Canadian sub-populations are more distinct. It also contradicts the notion that all the “sub-populations” of the species in Canada are part of a single “population”. It also means that the Management Plan for this species should take this genetic structure within Canada into account in its approach (even though the clustering might not at this stage be sufficient to recognize designatable units).

² COSEWIC. 2015. COSEWIC assessment and status report on the Spiked Saxifrage *Micranthes spicata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 38 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).

If new information on the genetic structure of this species is available since the 2015 COSEWIC Report, then it needs to be included in this Management Plan with a direct reference to its origin and the kind of genetic information analysed (presumably the barcoding for life project). Such a reference should include a published paper or the website where the analysis is presented and explained. It should also include an explanation of how the genetic information referred to in the 2015 COSEWIC Report has changed.

Frequently, the Barcode for Life project is used to investigate within-species genetic differentiation (http://v3.boldsystems.org/index.php/Taxbrowser_Taxonpage?taxid=438242). As of early April 2022, this site indicates that 34 specimens of this species have been barcoded, with 7 being coded since 2015 (so augmenting information in the COSEWIC Status Report). However, this site specifically states that no BINs (Barcode Information Numbers) or clusters have been developed as a result of the sequencing. This is confusing, as the information in the Management Plan suggests some clustering (though with different geographic reference depending on what line of the Management Plan – lines 188, 205, 469). So, if there is clustering below the BIN level (as the Management Plan implies), who did that work and where is it represented?

We recommend that (i) the wording regarding genetic structure of the Canadian “sub-populations” and the Alaskan population be substantially increased and changed to bring to light the actual science behind what we know, what genetic information has been assessed, and how that knowledge has changed in recent years and how it might still change; (ii) that B.A. Bennett be removed as a reference for this information, and replaced with suitable scientific references (at a minimum the COSEWIC status report from 2015, but, if the Barcode of Life data are the source of information, then a geneticist with that Institute who has done and interpreted the sequence data and can explain any apparent clustering).

189 This sentence is grammatically confusing, because, as written, “all of which” refers to the global range, whereas it means to say that “all of the Canadian range is in Yukon”.

205 The text stating that the widely separated groupings of sub-populations in Yukon “...show some genetic differences”, and further research is required to determine possible designatable units. This is also referenced to B.A. Bennett as a pers. comm. First, the existence of genetic differences between many of these widely separated “sub-populations” is not surprising, and is to be expected given their geographic isolation. But why would it bring designatable units into question? What specifically has to be done to get more clarity on the question – barcoding specimens from more locations (and if so what locations)? Barcoding more specimens from certain locations? More information is required to make the text useful in the context of a Management Plan. Second, it is not clear that Bennett is a suitable reference for this. Did he do the genetic analyses to come to these conclusions? We wonder whether there are more pertinent references for the actual genetic outcomes.

We recommend, once again, that the wording regarding genetic structure be substantially increased to better explain what genetic information has been assessed, and what patterns currently exist. We also recommend that the original source of the genetic analysis be used as a reference.

209 This paragraph apparently includes data not included in the COSEWIC 2015 status report, but does not make that clear. Regarding the total population, the 2015 report (p. 24) estimates that “...it is unlikely the total will exceed 10,000”. This Management Plan gives an estimate of 32,000, but

references no survey work other than that reported in the 2015 COSEWIC report. This Management Plan, referencing the 2015 status report, states that other subpopulations were “only seen from the air”, but we can find no reference to those aerial sightings in that report.

We recommend that the Management Plan better explain what appear to be new survey data that are not reported in the 2015 COSEWIC status report, and appropriately reference the sources of information in this paragraph, and explain how aerial survey effort can locate this species.

3.3 Needs of the Spiked Saxifrage

238 Why is so much crucial information concerning habitat associations, based on recent surveys, referenced with “pers. comm.”? These surveys were often undertaken by ECCC, so it would be more appropriate to reference a Report. If no Report exists, then reference would better be to an agency where the information should be housed (e.g., ECCC unpublished data).

4.1 Threat Assessment

Table 3. The Detailed threats column for 3.2 states that 54% of the population is on active claims. What does this % refer to: a proportion of the estimated number of individual plants? A proportion of the set of discrete “sub-populations”? A proportion of the area occupied by the known sub-populations? This needs clarification.

Also, the current text - “This percentage could change quickly, based on the price of gold”, would be more useful if it were more specific as to how the risk operates. Active claims are not often relinquished with a drop in price of gold, but an increase in the price of gold may quite readily result in staking of new claims. So we suggest the following text: “This percentage could increase quickly if the price of gold increases”.

4.2 Description of Threats

279 Add “to” after “susceptible”

282 Threat 3. Mining. Throughout this section of text, reference is made to the overlap of the distribution or the sub-populations with current placer and quartz claims. However, there is no dated reference to the Yukon Government on-line mapping of claims, but instead repeated reference to the 2015 COSEWIC status report, which is now out-of-date. Consequently, the reader cannot be confident that the information is up-to-date. ***We recommend that this section be updated with direct reference to a recent (ideally current) and adequately referenced and dated viewing and spatial analysis of maps of claims (in GeoYukon at <https://mapservices.gov.yk.ca/GeoYukon/> with Placer and Quartz Mining layers activated) and their overlap with the species occurrences.***

300 How can a reference dated 2015 be used to support a statement regarding the state of affairs in 2019?

323 How can “Bennett pers. comm. 2012” be thought of as a suitable reference for a statement about current active placer claims in 2022? The situation has changed markedly in the intervening decade. Also, why would Bennett be used as a reference to mining activity when (a) this is not his area of expertise, and (b) when there is an actual public database on this information in GeoYukon that can

be accessed, analysed, and referenced? Also, why is “historical mining sign” even relevant to the discussion of current threats. ***We recommend that this pers. comm. reference be removed and replaced and updated with a suitable reference and source of original data that any reader can access to understand (notably GeoYukon at <https://mapservices.gov.yk.ca/GeoYukon/> with Placer and Quartz Mining layers activated).***

336 The text talks about likelihood of flash floods, and uses a pers. comm.. Once again, we recommend not using a pers. comm. The important point here is not how frequently flash floods occur (the inference from the Lipovsky reference), but instead the fact that they occur at all (with evidence provided in Cannings 2010), and that placer mining could make them worse because of downstream accumulations of sediment in the riparian zone (Pentz and Kostachuk 1999 Environmental Geology 37 (1–2) January 1999, and other references), and because such extreme events are predicted to be more frequent given a changing climate (Tabari, H. 2020. Scientific Reports volume 10, Article number: 13768).

350 This paragraph is mixing two quite different lines of thought. One is about the general influence of changing temperature regime as a risk, and of increasing risk of extreme events. These are overarching sources of change, and deserve to be introduced earlier in this section on climate change. They then lead on to the topics of fire and flood regimes, each of which deserves its own paragraph. The second theme in this paragraph is about changes in subalpine and alpine vegetation. That is a whole separate topic and deserves its own paragraph.

359 There is general mention of risks to spiked saxifrage resulting from change to alpine plant communities, but the text does not really explain what those might be. The Myers-Smith references talk largely about expansion of tall woody shrubs, and the increased shading that might result. There is also some potential for treeline to move to higher elevations, though this is not happening particularly fast or uniformly in Yukon³. These mechanisms need to be outlined, with a discussion of the likelihood that shrubs and trees would actually colonize the microsites occupied by alpine sub-populations of spiked saxifrage. But why would these processes be a threat to this species? This is a shade-tolerant species, so it is unclear that the risk is very high. This needs more discussion and explanation.

361 The “abrupt shifts in forest cover”, dealt with by the references listed for this sentence, pertain to lower elevation forests, not the alpine circumstances under discussion in this paragraph. Yes, this is a worthwhile issue to bring up, but it needs to be associated with the discussion on wild fires, in a different paragraph.

5 Management Objective

368 The stated Objective is to “ensure long-term persistence of all extant subpopulations in Canada, including any newly located or rediscovered subpopulations”. Although this objective is valuable as a

³ Danby, R., and Hik, D.S. 2007a. Evidence of recent treeline dynamics in southwest Yukon from aerial photographs. Arctic 60(4): 411–420. doi:10.14430/arctic198.

Danby, R., and Hik, D.S. 2007b. Responses of white spruce (*Picea glauca*) to experimental warming at a subarctic alpine treeline. Global Change Biology 13(2): 437–451. doi:10.1111/j.1365-2486.2006.01302.x.

Danby, R.K., and Hik, D.S. 2007c. Variability, contingency and rapid change in recent subarctic alpine tree line dynamics. Journal of Ecology 95(2): 352–363. doi:10.1111/j.1365-2745.2006.01200.x.

Dearborn, K.D., and Danby, R.K. 2018. Topographic influences on ring widths of trees and shrubs across alpine treelines in southwest Yukon. Arctic, Antarctic, and Alpine Research 50(1): e1495445. doi: 10.1080/15230430.2018.1495445.

starting point for a Management Plan, it is incomplete for such a Plan in the context of a rapidly changing climate and a time scale of 50-100 years (the definition of “long-term” that this Plan uses).

The words “newly located” in the management objective has a double meaning. It can either mean newly discovered, or recently established. Which of these is meant?

This species faces real threats from mineral exploration and development (placer and quartz). The Management Objective would appear to be unattainable for sub-populations occurring on claims (especially placer claims) that will be developed. We address this more at line 429 below.

The species also faces real threats from a changing climate, probably via four mechanisms: (i) increased incidence of erosive water flow (perhaps flash floods) in the streamside locations in lower elevation forests; (ii) increased incidence of forest fires that remove canopy trees and their contribution to cool, moist conditions along lower-elevation creeks at least in the short term and perhaps also in the longer term; (iii) more frequent permafrost melt, especially after fire, leading to slope collapse and loss of habitat; (iv) expansion of shrubs into alpine meadows occupied by this species and reduced vigour of alpine populations for as yet unclear reasons (competition?). Given the inexorable press of climate change, it seems unlikely that the Management Objective can be realised.

A useful paradigm for managers to assess when thinking about climate change is the question of whether to Resist, Accept, or Direct the effects of changing climate (Schuurman et al. 2022 *BioScience*⁴). The Management Objective, as currently stated, falls entirely within the Resist approach: actively manage the threats to maintain what you have. This is too risky an approach to rely on. Virtually all the lower elevation sub-populations are at risk from one or more of the processes related to climate change, and many are also under large threat from placer mining. The high elevation populations may also be at some risk from climate change. But the options available to actively manage or thwart any of those processes are virtually nil (except perhaps fires, by fire suppression). So, Resist is increasingly unfeasible, which means the Management Objective is in effect defaulting to Accept – i.e. climate change will have its ongoing effects incrementally through the next decades because we cannot do anything about it.

Rather than default only to Accept (i.e. let some local populations be extirpated), the Plan could prepare to Direct change, in this case by translocating plants from existing sub-populations or sites to new sites. The recent modelling⁵ (based on broad climate and soil parameters) of the projected possible distribution of this species under an intermediate climate change scenario indicates that large areas of northern Yukon (Ogilvie, Mackenzie, and Richardson Mountains, and the Peel watershed) will become suitable for this species in the next few decades (Figure 1). This augments the currently suitable but unoccupied habitat in the lower Peel watershed. There is therefore a large geographic region through which botanists could search for streams, and alpine meadows, with microsite characteristics suitable for individual plants to grow. The distribution of the species could be expanded to offset the relatively high chances of extirpation of some local sub-populations.

⁴ Schuurman, G. et al. 2022. Navigating Ecological Transformation: Resist–Accept–Direct as a Path to a New Resource Management Paradigm. *BioScience* 72: 16–29.

⁵ Oke, T.A., Stralberg, D., Reid, D. G., Bennett, B.A., Cannings, S., Willier, C., Cooke, H.A., Mantyka-Pringle, C.S. Warming drives poleward range contractions of endemic species at high latitudes (in review in *Diversity and Distributions*)

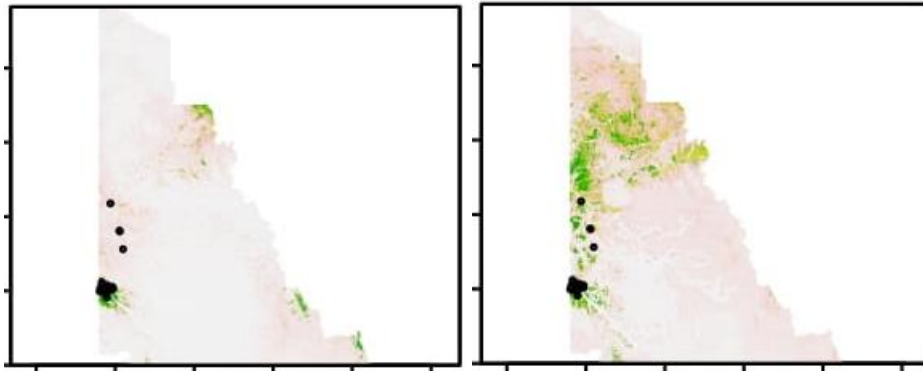


Figure 1. Projected current (left) and future (by the end of 2040—right) distribution for Spiked Saxifrage. The current projection was generated using the 1970 – 2000 historic climate baseline while the future projection was generated using CNMR-ESM2 General Circulation Model under the intermediate socio-economic pathway (SSP2-45). Black dots are currently known occurrences of this species.

We strongly recommend that the Management Objective be expanded to include a more forward-looking view on climate change adaptation by including preparation for and experimental implementation of the establishment of new local populations, in careful increments, to increase the chances that the species can withstand the direct and indirect impacts of a changing climate as well as threats from placer mining.

373 The possible genetic differences, if true, between two clusters of Canadian sub-populations needs to be reflected in the Management Objective, in particular because the “Yukon River” cluster is relatively uncommon but subject to more diverse and intense threats. This cluster deserves special mention for conservation action, for example when considering translocation (i.e. assisted migration).

374 Once again, using a pers. comm. reference from B.A. Bennett is inappropriate for a topic about which Bennett is not the origin of the information. This apparent fact, of genetic differentiation, is first referenced in the COSEWIC 2015 Status Report, and its origin appears to be the genetic barcoding website. This Plan would be stronger by providing a direct, and up-to-date, reference to the source of the information.

6 Broad Strategies

Table 4 and Narrative

429 **Land Management** This conservation measure is based on the view that the impacts of placer mining and mineral exploration and development can be mitigated with Best Management Practices. This might be possible in some situations. However, it requires much more detail as to what actually needs to be done, and how human behaviour and activity might actually change to accommodate the occurrences of the plant. Details seem to be deferred to future direction, which is unfortunate given the ongoing and current threats.

Our general assessment is that it is quite likely that any newly devised best management practices will not be sufficient to conserve sub-populations in drainages impacted by placer mining. Placer mining is so disruptive of the land surface and stream channels, that flow regimes and sediment loads are irrevocably changed, at the mine site and well downstream (to confluences with the Yukon River). It is

hard to imagine how management of mining itself can substantially reduce the risk of many individual plants dying when their survival depends on an intact riparian forest providing shade, and also on water quality that is low in suspended solids. ***We recommend that the Management Plan more realistically address the likely ability of interventions in the management of placer operations to ensure the persistence of sub-populations along streams that are mined.***

There are other specific activities regarding Land Management that could be included in this Management Plan. For example, Yukon lacks any regulatory tool to protect highly localized, valuable occurrences of species (or other occurrences of high value ecological and cultural elements). The most relevant, and currently available, tool is the Habitat Protection Area (HPA) designation under the Wildlife Act. However, this would require Special Management Area proposals to be brought forward by First Nations governments or other sanctioned bodies under the Umbrella Final Agreement, or through regional land use planning under the UFA (long and often unsuccessful processes). HPAs are generally much larger than would be needed to protect localized occurrences of Spiked Saxifrage, and are very difficult to put in place. This Management Plan needs to point out that Yukon lacks such a tool for protecting a rare occurrence. ***We recommend that a particular Conservation Measure under Land Management be that Environment Canada (ECCC) lobbies the Yukon government to put in place such a regulatory tool for protecting rare occurrences of a species at risk that is sedentary.***

Another approach to this dilemma is through the Yukon Department of Energy, Mines and Resources (EMR) for Class 1 Notifications, and through Yukon Environmental and Socioeconomic Assessment Board (YESAB) for Class 2, 3 and 4 exploration permits. EMR and YESAB could include the need to establish a spatial buffer around known occurrences of Spiked Saxifrage as one of the conditions they put in place and/or recommend to the decision body (in the case of YESAB) for issuance of mineral exploration permits. ***We recommend that a particular Conservation Measure to include under Land Management would be to work with Yukon government and YESAB to establish spatial buffers around known occurrences of the species and include these within the conditions on permits and licences.***

Legal and policy frameworks. As written, this section only addresses the question of emissions targets in the context of climate change. This is worth mentioning, but, unfortunately is unlikely to be impactful. Even meeting those targets will not substantially reduce the current threats from climate change as identified in this Plan (i.e. increasing extreme weather events, fires, and floods) in the long term (as defined in this Plan). The impacts are already with us, and will not abate for many decades.

This section lacks any mention of the big policy and regulatory gap in Yukon regarding protection for localized occurrences of species-at-risk (notably sedentary plants) and localized key habitats for a wide variety of species. As mentioned under Land Management above, the Territory needs to incorporate (ideally in legislation such as a revised Lands Act) a tool for mapping and communicating such occurrences and habitats, and for protecting them with an adequate spatial buffer from direct disturbance and encroachment. YESAB also needs to recognize these in a formal policy that mandates protection of such occurrences and habitats as conditions for project approval. ***We recommend that this Management Plan explicitly address the policy and regulatory gaps that exist in Yukon regarding protection for localized occurrences and habitats of high value, with actions that the federal government and others can take to try to address the gaps.***

Conservation Designation and Planning The Plan states the need to “consider” Spiked Saxifrage in land use planning processes. This is valuable, but could be more explicit. What is intended?

Presumably this means that some protected areas should be designated to include a number of known occurrences of the species, but this needs stating.

New protected areas are an important approach, because the tenuous future of this species in drainages affected by placer mining means that the most secure conservation agenda is the inclusion of many suitable low elevation streams and riparian habitats in protected areas. Without protection, the future of the lower elevation occurrences of this species is very uncertain; placer mining is so disruptive of riparian ecosystems with effects far downstream of the placer mining itself. Such protected areas do not have to be just within the area covered by the Dawson Regional Land Use Plan (i.e. the current low-elevation distribution). The recent projected possible distribution of this species under climate change⁶ indicates that the set of regions where this species could persist will expand markedly in the next few decades (Fig. 1). These regions include some existing protected areas (Ní'ínlíi Njik (Fishing Branch) Territorial Park, Wilderness Preserve, and Habitat Protection Area). They also include areas within planned but not yet formalized protected areas (Dàadzàii Vàn Territorial Park; southern Richardson Mountains, and tributaries to the middle and lower Peel River in the Peel Watershed Land Use Plan). In the search for new sites for translocation of this species, these protected areas need to be the first areas inventoried for suitable stream-side and alpine growing conditions. These offer hope for a broader suite of protected areas occupied by translocated populations of this species.

There are other tools that land use planning could put in place. For example, a land use plan could include, in General Management Direction, the formal establishment of spatial buffers around known occurrences of species at risk (as we suggest under Land Management and Legal Framework above).

We recommend that this section be expanded to provide more detail on what it means in actual activities and outcomes, and to include the need for land use plans to put spatial buffers in place around known occurrences of the species as recorded in the Conservation Data Centre.

Research and Monitoring

This whole section on Research and Monitoring misses a key need - research regarding translocation (i.e. assisted migration) -, and underemphasizes the need to understand the species' reproductive biology. As commented on under Management Objective above, this Plan falls short if it does not address the need to consider translocation of Spiked Saxifrage to currently unoccupied areas that modeling indicates have reasonable likelihood of being suitable under projected climate conditions. Research needs to address the whole question of translocation, and that requires more knowledge about the reproductive biology of *in situ* populations. Research needs to include experimental efforts at translocation. Key questions would be: what life history stage is best to use for translocation (seed, young plant, older plant) and at what time of year? How is this species pollinated, and does it require specific pollinator species that would also need to exist at a new site? How do seeds become viable (timing of seed set, cold stratification, optimum timing and conditions for germination)?

469 Once again, why is "Bennett pers. comm." used as an authority on the genetic information about this species? The reference should be to the source of the information, especially because it deals with evidence to support a ranking of High for more genetic research (Table 4). Also, the statement made here is different from other statements about genetics that are attributed to Bennett in this draft

⁶ Oke, T. et al. op. cit.

Management Plan, and different from the text of the 2015 COSEWIC status report. Which is correct? It is important to get right to the source of the information (for example, the barcoding for life project?).

7. Measuring Progress

The two measures listed are certainly useful, but do not completely capture the picture. Real progress in securing a future for this species, in light of the twin threats of climate change and mining, depend on the establishment and implementation of at least two other measures. They are: (i) new regulatory tools and conditions on permits for protecting known populations that could be impacted by mineral exploration and mining, and (ii) successful efforts to expand the distribution (which is the main adaptive means that most species have for dealing with the inevitable impacts of climate change) by translocation of Spiked Saxifrage to new locations. ***We recommend that demonstration of achievement of one or both of these additional two Measures be included in the Plan.***

The second bullet - Persistence or increase of present distribution of Spiked Saxifrage in Canada, as measured using “repeated reconnaissance surveys” – is rather difficult to interpret. First, what are reconnaissance surveys? This term has not been used in the Plan thus far. We presume it refers to the “Search for Additional Populations” in Table 4. This needs clarification. Surveys would have to be more than just reconnaissance (a term that denotes something done quickly and to get a general rather than precise sense of a situation). To be of any real value in addressing the measure itself, they would have to involve careful counts using an inventory method that can be replicated. This needs to be laid out carefully, with a suggested set of survey method(s) that would have statistical validity in assessing trend.

Second, an “increase of present distribution” may or may not result from activities of the Plan itself. If new surveys find new populations, then it is debatable whether that is a conservation success of the Plan itself. The existing distribution would not changed (“increased”), but, instead, our knowledge was incomplete. If translocation efforts successfully expand the distribution, then that is a conservation success that can more directly be attributed to the Plan and its identification of activities required to expand the distribution.