CERTIFICATION OF MINERAL SOIL PADS IN THE BOREAL REGION – DECISION FRAMEWORK AND SUPPORT TOOLS: STAKEHOLDER REVIEW AND FIELD VERIFICATION

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REPORT PREPARED FOR
PETROLEUM TECHNOLOGY ALLIANCE CANADA
Reclamation Remediation Research Committee

20-RRRC-05_4a
June 2022

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CITATION

This report may be cited as:

Powter, C.B., N. Shelby-James, B. Xu and K. Renkema, 2022. *Certification Of Mineral Soil Pads in The Boreal Region – Decision Framework and Support Tools: Stakeholder Review and Field Verification*. Prepared for the Petroleum Technology Alliance of Canada, Calgary, Alberta. Report 20-RRRC-05_4a. 40 pp.

ACKNOWLEDGMENTS

The authors would like to acknowledge the financial contributions provided by the Alberta Upstream Research Fund (AUPRF) Program as well as the guidance and support provided by the technical project champions Sonia Glubish, Lisa Warren and Jason Desilets and the technical steering committee members Jill Kaufmann, Shane Patterson, and Nadia Cruickshank. The contributions from the knowledge transfer and training session participants are greatly appreciated. Special thanks to the practitioners who did the field verification work, and to the industry members, practitioners, Alberta Energy Regulator staff and Alberta Environment and Parks staff who participated in the Decision Framework and Tools feedback working sessions.

EXECUTIVE SUMMARY

Preliminary Decision Support Tools (DST) were presented at a working session in December 2019 to facilitate a discussion involving industry (oil and gas and environmental practitioners) and government (Alberta Environment and Parks [AEP] and Alberta Energy Regulator [AER]) related to change in land use requests. Subsequently, a draft decision framework incorporating recommended revisions to the Decision Support Tools was prepared and released by PTAC – *Certification of Mineral Soil Pads in the Boreal Region – Decision Framework and Support Tools*. This report presents the results of a stakeholder review of the draft *Certification of Mineral Soil Pads in the Boreal Region – Decision Framework and Support Tools* report and a field verification trial by practitioners.

A Knowledge Transfer webinar was held June 7, 2021, by PTAC with presentations by Dean MacKenzie, Vertex, and Bonnie Drozdowski, InnoTech Alberta. Workshops with selected industry, practitioner and government stakeholders were held February 10, 2022 (35 industry/practitioner attendees) and February 16, 2022 (18 AEP and AER attendees), to solicit additional feedback.

Five practitioners and one energy company identified a total of 122 sites for potential field verification spanning northern Alberta. Sites were constructed from 1972 to 2008 and abandoned from 1988 to 2021. The nominations were for a mix of sites that had been either: submitted to AEP and rejected; submitted and approved; submitted and awaiting a decision; or pending submission. Comments from the practitioners or energy company about the site and the AEP decision were summarized.

Nine of the nominated sites from two practitioners working for two energy companies were tested using the Decision Framework and Support Tools. In seven of the nine cases, the Decision Framework and Support Tools led to the same conclusion as AEP – five sites were approved for a change in land use and two were rejected (both fens). In the eighth case (also a fen), an application for a change in land use had been submitted but a decision had not been made at the time of this report. In the ninth case, the site required use of Table 7 modifications which led to a tie between the modified Peatland Rating and the modified Upland Rating. The draft report didn't state what to do where a tie occurs so the revised version of the report will indicate that a tie results in a final site recommendation of Candidate for Peatland Reclamation; however, in this case, both the practitioner and AEP agreed that the pad should remain in place (Candidate for Upland Reclamation). Comments about use of the Decision Framework and Support Tools from the practitioner were summarized.

The draft report will be revised to incorporate the stakeholder feedback and the results of the field verification trial. At a minimum, the revised report will include the following changes:

- A new section will be added to describe caveats related to the use of the Decision Framework and Support Tools and a screening tool will be provided to assist practitioners in deciding if the DST Framework and Support Tools should be used.
- A more detailed description of the Decision Framework and Support Tools will be provided.
    - Add defined terms to better explain how the Decision Support Tools are used and how the calculations are made. The terms defined in the Glossary in this report will inform the update.
    - Explain that partial pad/access removal is implied as an option wherever pad/access removal is mentioned.
- In the draft report there was no clear explanation of how the DST supporting tables are to be used. The update will clarify that the tables are meant to assist practitioners in deciding whether to answer Yes or No to specific Decision Nodes.

- In the draft report there was no guidance on how to use Table 7 to modify the Site Rating when the difference between the Peatland Rating and Upland Rating was less than 3. The update will clarify that **every row** in the Table must have a score to avoid practitioners selecting those modifications that agree with their view of what the final recommendation should be.
- In the draft report guidance was provided on how to use the Site Rating modifications made from Table 7 however there was no indication on what to do when the modifications lead to a tie (as was the case in one of the sites in the field verification trial). The update will indicate that in the event of a tie the site will be deemed to be a Candidate for Peatland Reclamation.
- In the draft report there was no mention about the implications of below-pad liners to the decision process. This will be mentioned in the update under the Site-specific Considerations DST.
- In the draft report there was no guidance on what information to provide as backup documentation for the change in land use request made to AEP. The update will provide recommendations for the types of information to be provided.

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GLOSSARY

Decision Node

Each Decision Support Tool is presented as a flowchart with multiple Yes/No decision nodes.

Decision Path

The sequence of decision nodes in a DST that leads to the end land use recommendation.

Decision Support Tool

A flowchart consisting of several statements requiring the practitioner to answer Yes or No. The sequence of Yes/No responses leads the practitioner to a recommendation for the site to be a Candidate for Peatland Reclamation or Candidate for Upland Reclamation.

Decision Support Tool Rating

A numeric score assigned to either Peatland or Upland based on the recommendation arrived at by following the flowchart for each Decision Support Tool. The weighted scores have been assigned as follows:

- Adjacent and Regional Impacts = 3
- Site Specific Considerations = 3

- Access = 2
- Borrow = 1

Key Decision Point

A specific Yes/No decision in a Decision Support Tool. The Key Decision Points for each Decision Support Tool are shown as numbered blue circles in the DST flowcharts.

New Site

A site that will be assessed and applied for in the 2021 field season.

Old Site

A site that has already been applied for and has received a decision from Alberta Environment and Parks that will be retroactively tested using the Decision Support Tools.

Peatland Rating

The sum of the Candidate for Peatland Reclamation Ratings.

Process Decision Support Tool

A graphic representation of the process for determining the Site Recommendation. The Process Decision Support Tool is supported by an Excel spreadsheet that automates the calculations.

Site Recommendation

A recommendation for the site (or part of a site) to be a Candidate for Peatland Reclamation or Candidate for Upland Reclamation based on the difference between the Peatland Rating and the Upland Rating. Where the difference in the ratings is at least 3 the final recommendation is the greater of the Peatland Rating or Upland Rating. Where the difference in the ratings is less than 3 the ratings will be modified based on answers to additional questions. Once the modifications are made, the final recommendation is the greater of the Candidate for Peatland Reclamation or Candidate for Upland Reclamation.

Upland Rating

The sum of the Candidate for Upland Reclamation Ratings.

ACRONYMS

AEP	Alberta Environment and Parks
AER	Alberta Energy Regulator
AUPRF	Alberta Upstream Research Fund
DST	Decision Support Tool
PTAC	Petroleum Technology Alliance Canada

1.0 BACKGROUND

1.1 PROJECT OVERVIEW

In 2018, the Petroleum Technology Alliance Canada (PTAC) put out a request for proposals entitled *Reclamation Practices on Upland and Peatland Well Sites*. The project was established in response to challenges experienced by practitioners, regulators and industry related to reclamation certification of legacy sites. The specific sites in question are those that were constructed using imported mineral soil pads in peatlands, and upland sites that that have had natural vegetation encroachment. These sites generally present one or more reclamation deficiencies according to the applicable wellsite criteria and cannot receive a reclamation certificate without additional scrutiny and justification under current regulatory criteria and policies. The **goal of the overall project** is to provide recommendations for an acceptable framework/decision support tool(s) to assist industry and regulators in making decisions around appropriate management and certification of these sites that ensures that functioning ecosystems are developed and that there is a process that outlines eligibility for reclamation certification. To date the project has been conducted in two stages. This report describes the work in Stage 2 related to sites that were constructed using imported mineral soil pads in peatlands (a separate Stage 2 report has been prepared dealing with upland sites).

When dealing with peatland sites, the question arises of whether to remove mineral soil pads in peatlands. There has been inconsistency in how decisions about these sites are being made (i.e., different levels of reclamation effort have been applied) and in how reclamation criteria are interpreted and applied in terms of defining what are acceptable conditions for certification. Historically, industry and regulators have agreed that in certain site-specific circumstances, sites with mineral pads in peatlands can be certified without the removal of the pad or with partial removal of the pad. There has been a recognition that sites can be deemed to be on a trajectory towards developing a sustainable plant community from an ecological perspective, and to not be causing off-site impacts, without further disturbance/reclamation. A consistent and standard method to define and address these circumstances has been difficult to discern within the current regulatory and policy framework.

Stage 1 of the project identified that there is limited guidance on how decisions are being made to accept or reject requests for a change in land use and that there are *misperceptions* associated with why requests are being made (from the government/regulator perspective) and how the requests are being evaluated (from the industry/practitioner perspective) (Tokay et al. 2019). It was determined that these perceptions must be addressed before meaningful change can occur. Stage 1 also identified the key factors to consider when assessing the ecological implications of a change in land use request (hydrology, cumulative effects and regional considerations, upland function, status of the borrow pit, site location, and land use considerations) and several knowledge gaps which should be addressed to confirm the effectiveness of a decision support tool and framework. However, consultation with Alberta Environment and Parks (AEP) and Alberta Energy Regulator (AER) regarding the findings from Stage 1 was recommended before developing a framework and research project to address the knowledge gaps to ensure resources are allocated appropriately.

1.2 DECISION SUPPORT TOOL DEVELOPMENT

Preliminary Decision Support Tools (DSTs) were presented at a working session in December 2019 to facilitate a discussion involving industry (Oil and Gas and Environmental Practitioners) and government (AEP and AER) related to change in land use requests. A summary of the working session and recommendations for changes to the preliminary DSTs is provided in Drozdowski et al. (2020a).

Subsequently, a draft decision framework incorporating recommended revisions to the Decision Support Tools was prepared and released by PTAC (*Certification of Mineral Soil Pads in the Boreal Region – Decision Framework and Support Tools*; Drozdowski et al., 2020b [the "draft report"]). A summary of the draft report content is provided in Appendix A. Readers are encouraged to review the summary to understand the stakeholder comments, field verification results and recommended changes.

This report presents the results of a stakeholder review of the draft report and a field verification trial by practitioners.

2.0 STAKEHOLDER FEEDBACK

PTAC held a Knowledge Transfer Session webinar on June 7, 2021. During the session Dean MacKenzie, Vertex Professional Services Ltd., and Bonnie Drozdowski, InnoTech Alberta Inc. provided an overview of the *Certification of Mineral Soil Pads in the Boreal Region – Decision Framework and Support Tools* and the *Guide to Variance Justifications for Reclamation Certification of Wellsites and Associated Facilities* (Mackenzie and Drozdowski, 2021); 128 people (practitioners, energy companies, AEP, and AER) viewed the presentation on YouTube as of March 20, 2022

At the webinar, and on the associated PTAC website[1], stakeholders were asked to provide feedback on the draft report via a form. Minimal feedback was received so working sessions with selected industry, practitioner and government stakeholders were held February 10, 2022 (35 industry/practitioner attendees) and February 16, 2022 (18 AEP and AER attendees), to solicit feedback.

2.1 COMMENTS FROM THE WORKING SESSIONS

Comments received during the working sessions are noted below; they have been edited for clarity and brevity.

General

- The document is helpful and step in the right direction.
- Need to emphasize that changes in land use are expected to be infrequent rather than common or the norm.
- Need to emphasize that this is a two-step process – change in land use (AEP) and site certification (AER). Therefore, if a change in land use is granted the site must still be able to meet the Forested Land Criteria (with or without a variance) which means the site vegetation is old enough to be able to show the site is on an acceptable trajectory to a forested ecosystem.
- Need to clarify that it is acceptable for full or partial reclamation to set a site back a few years if it will mean a better environmental outcome.
- Need to change wording of the Decision Framework and Support Tools to remove any potential misinterpretation that it is a regulatory document and/or is accepted by AEP/AER. In the same vein, need to clarify that the result from the Decision Framework and Support Tools, particularly the recommendation for a change in land use to Upland, does not automatically guarantee AEP acceptance.
- Need to clarify that the Decision Framework and Support Tools is for use by industry and practitioners to support an application for a change in land use, rather than a tool for AEP to make their decision.

Decision Framework

- Add in section with list of caveats and pre-requisites to the use of the Decision Framework and Support Tools.
- Need to address at-risk or sensitive species more directly (e.g., caribou, grizzly bear) and/or requirements associated with subregional plans (including those in development).

[1] See https://auprf.ptac.org/evaluation-of-reclamation-practices-on-forested-upland-and-peatland-well-sites-2/

- Need to emphasize that the change in land use approval is only for pads in peatlands (i.e., not for the *Guide to Variance Justifications for Reclamation Certification of Wellsites and Associated Facilities on Forested Land* (Tokay et al., 2020).

DSTs – Logic and Flow

- Need to emphasize that an existing borrow pit must have a functioning wetland ecosystem vs. just filled with water and some wetland vegetation. Marsh/slough is not a functioning wetland ecosystem. Data and supporting evidence are required to show functioning wetland ecosystem, rather than a statement of professional judgement.
- Additional reasons why accessing a site would cause more damage: need to cross multiple fish-bearing streams, reclamation work would result in unacceptable soil compaction.
- Acknowledge that borrows are often progressively reclaimed (a good thing) resulting in unavailability for future return of borrow material.
- Saying a borrow is "too far away" to return the material is not an acceptable rationale – it wasn't too far away when the material was needed.

Knowledge Gaps

- Would be good to have a system in place to monitor reclaimed sites after certification to see if the sites develop as expected; variances from expected performance could lead to changes in the Decision Framework and Support Tools.

Recommended Application Content

- Clarify that any suggested application content is a recommendation not the accepted requirements or the minimum information required to support the change in land use application.
- Add need for company to document what the original reclamation requirement in the lease was in terms of the end land use; if peatland, then more rationale is needed for a change in land use.
- State that general, regional ecology information isn't needed; application should focus on the site-specific reasons for a change in land use.

Editorial

- Consider using accepted process flow symbols in the DSTs.

2.2 POST-SESSION COMMENTS

Five set of comments, presented below, were received as follow-up communications after the workshops; they have been edited for clarity and brevity.

General

- Happy to have these tools.
- Document made sense.
- These documents will be very useful for novice practitioners and I'm happy to see that the information is being shared. Too many sites are re-disturbed for very minimal gain due to practitioners' lack of experience or fears of losing reclamation certificate applications. Hope

these documents will give practitioners more confidence to trust their intuition when they are determining whether sites require additional reclamation work.

- Professional experience is hard to compile into a single document, but I do think this will help younger professionals.
- No need for future guidance / tools.
- Maybe like the Subsoil Salinity Tool, there should be a certification that a practitioner should go through to be qualified to use the DST? Could we find an organization willing to provide training, courses, updates, and renewal courses?

Outcomes Bias / Fairness

- Perhaps slightly biased towards Candidate for Upland Reclamation.
- The question asking whether a borrow could be modified to meet reclaimed mineral wetland criteria in Figure 5 (Borrow DST) biases toward deciding for upland reclamation. Most borrow sites can be modified to potentially meet reclaimed mineral wetland criteria which provides an easy out to leave a pad in place.
- There seems to be too much emphasis on access, available borrows associated with the site, and cost to complete the work – it should be more heavily weighted on larger area context and ecological outcomes.

DST Framework

- Could the initial description of the framework (on page 2) be reworked a bit. It was very unclear to me as I first read it. It started to become clearer later in the document, but it could have been explained more clearly at the outset.
- Concern that using the "Modified Ratings" in Table 7 for the final decision will enable able a lot of sites – even future sites – to be left as upland (pad remains in place).

DSTs – Logic and Flow

- No issues with technical content and logic.
- Overall, the supporting tables are helpful.
- The decision question in Figure 2 regarding whether successful peatland reclamation is likely is a serious weak point of the Adjacent and Regional Impacts DST. The accompanying table emphasizes this by the number of knowledge gaps listed. However, given that the pad exists in a wetland, and the range of research completed to date that indicates reclamation success is common provided suitable hydrologic conditions area established, it would be better to work under the assumption that reclamation success is likely provided that the practitioners know what they are doing. Prefer not to give too much subjective wiggle room here.
- The definition of "Modified Reclamation" in the Site Specific Considerations DST[2] is too broad, and will result in an upland recommendation for atypical sites.
- Like inclusion of the Opportunity to Coordinate Reclamation Work in the Access DST.

[2] Modified Reclamation: Any reduction in all or part of the traditional reclamation steps (i.e., recontouring, replacement of subsoil and topsoil, revegetation) required to meet the forested land criteria without applying for a variance to criteria.

- Further clarification on restricted access – most pads are winter accessible; AEP has never considered this as a reason to leave a pad. Northern Alberta is mainly winter access.
- Have questions regarding the rationale for some of the supporting information in Table 4 (Access Decision Support Tool Supporting Information):
    - Why would winter-only access preclude reclamation to wetland? Peatland reclamation may actually require winter-only access in some circumstances.
    - Similarly, don't understand why the access road length is critical to this decision. If a pad is accessible by any road that does not have vegetation that meets criteria, shouldn't that pad be considered for peatland reclamation?
    - Do not understand the logic of the access road vegetation box for making the site a Candidate for Peatland Reclamation. Although my bias is for reclaiming to peatland, there may be other very good reasons to reclaim to upland even if the road is poorly vegetated or not vegetated at all.
- A common AEP concern regarding borrow pits is stability and meeting the 3 to 1 slope.

Process Decision Support Tool

- Took a little while to figure out the rating systems.
- Wasn't initially aware that the weightings were self-populating.
- Weightings are OK.
- Table 7 – Additional factors for rating modification
    - The borrow pit and pad/access vegetation factors seem redundant. Could these not be built into the original factor ratings?
    - Again, just because the pad and/or access road are not vegetated with acceptable forest vegetation does not preclude other good reasons for reclaiming to uplands.
    - The partial peatland reclamation appears to be a separate option (i.e., Option 3) that might have been considered all through the framework. After all, partial peatland reclamation will still require change of land use on the non-peatland portions, no?
    - Uncomfortable with placing cost thresholds on the reclamation decision. Is this cost incremental to the upland reclamation? For instance, if site circumstances would require $200K to reclaim to upland, would increasing the cost to $250K or even $300K be that much to ask? How was this number arrived at? How and when will it be adjusted with inflation, etc.?

Knowledge Gaps

- Think we need further evidence to support long term hydrology and possible cumulative effects to help support leaving certain pads in place.

Editorial

- Writing on the DST flow charts wasn't legible.
- The DST acronym is the same as the AER's drilling DST (drill stem test).

3.0 FIELD VERIFICATION TRIAL

3.1 BACKGROUND

The goals of the field verification trial were to:

- Test whether the DSTs work in the field
  - Are they easy to use?
  - Do they give the expected result?
  - Do they give the correct result?
- Recommend changes to the DSTs and supporting guidance if required

The trial consisted of three main activities:

1. Nomination of sites by practitioners and energy companies
   a. *New Sites*: List of sites to be assessed and applied for in the 2021 field season
   b. *Old Sites*: List of sites that have already been applied for and have received a decision on that will be retroactively tested using the DSTs
2. Compilation of the results of the field verification work done at each site
3. Survey of user feedback on the use of the DSTs in the field trials (practitioners) and the value of the DSTs as supporting information for justifying a change in land use in reclamation certificate applications (AEP decision-makers).

A training session was held June 18, 2021 to convey to practitioners, energy companies and decision-makers what was expected in each of these three activities (presentation slides are in Appendix B).

3.2 SITES NOMINATED FOR FIELD VERIFICATION

Five practitioners and one energy company identified a total of 122 sites for potential field verification covering northern Alberta. Sites were constructed from 1972 to 2008 and abandoned from 1988 to 2021. The nominations were for a mix of sites that had been either: submitted to AEP and rejected; submitted and approved; submitted and awaiting a decision; or pending submission.

3.2.1 *Learnings from the Site Nominations*

Most of the site nominations included background information and comments about the sites and the request for a land use change application process. These provided some key learnings relative to the use of the DSTs:

- A site visit/aerial tour may be required before approval is granted (i.e., not just a paper exercise).
- Approval to leave a pad (or padded access) in place may be granted with conditions such as:
  - Additional work is required onsite to restore drainage.
  - Remove or unplug culverts on access.
  - Fill planting to meet Forested Land Criteria.
  - Further weed management required.
  - Release granted prior to recontouring/pad ripping.
  - Complete bank stabilization work in the borrow pit.
  - Partial pad removal recommended.
- The most common reason identified for approving pad release was that there was good forest cover of advanced growth of woody and herbaceous species.
- Pads of different thicknesses have been approved for release, ranging from 40 to 100 cm.

- A variety of reasons may be given for refusal of the land use change request, including:
  - Leaving a pad in place in a wetland leaves the risk of unknown long-term impacts to the surrounding wetlands.
  - The agreement at the time of application was for the Company to return the borrow material and not create an alternate end land use.
  - Lands officer cited the abundant noxious weeds as rationale for pad removal.
  - Monoculture of vegetation present and a lack of woody regeneration (aerial inspection).
  - Impeded drainage evident.
  - Drainage, compaction, and vegetation concerns.
- Specific issues relative to the Borrow DST were identified, including:
  - Location has been flagged as a possible source of fill material for construction/road improvements.
  - Associated borrow pit has been certified.
  - No associated borrow pit; access was built with V ditch methods and cut slopes.
  - Borrow pit was constructed on lease.
  - Unknown borrow pit location.

3.3 RESULTS OF THE FIELD VERIFICATION

Nine of the nominated sites from two practitioners working for two energy companies were tested using the Decision Framework and DSTs. Table 1 summarizes the key features of the sites; all the sites had the entire pad remaining in place. Six of the sites were bogs and three were fens.

Table 1. Characteristics of the nine validation sites.

Site	Location	AER Office	AEP Office	Construction	Abandonment	Peatland Type	Change in Land Use
1	77-08 W5M	Slave Lake	Slave Lake / High Prairie	1991	1992	Bog	Approved
2	94-12 W6M	High Level	Peace River	2001	2009	Fen	Refused
3	97-09 W6M	High Level	Peace River	2002	2003	Bog	Approved
4	97-09 W6M	High Level	Peace River	2005	2010	Fen	Refused
5	98-05 W6M	High Level	Peace River	1993	2010	Bog	Approved
6	97-10 W6M	High Level	Peace River	2006	2012	Bog	Approved
7	77-26 W4M	High Level	Slave Lake	1991	2006	Bog	Approved
8	81-10 W5M	High Level	Peace River	2003	2008	Fen	Pending
9	72-05 W5M	Slave Lake	Slave Lake	2001	2015	Bog	Approved

Table 2 summarizes the Decision Path and DST Ratings for each site. It is interesting to note that:

- Six of the nine sites were Candidates for Peatland Reclamation based on the Adjacent and Regional Impacts DST
- Two of the nine sites were Candidates for Peatland Reclamation based on the Site Specific Considerations DST
- Seven of the nine sites were Candidates for Peatland Reclamation based on the Access DST
- One of the nine sites was a Candidate for Peatland Reclamation based on the Borrow DST
- When the DST results were combined, two of the sites were Candidates for Peatland Reclamation

Table 2. Decision Flow Path and Site Ratings for the nine validation sites.

		Adjacent and Regional Impacts								Site Specific Considerations								
Site	Location	1	2	3	4	5	6	7	Outcome	8	9	10	11	12	13	14	15	Outcome
1	77-08 W5M	N		Y		N	Y		Upland	Y		Y		N	N			Upland
2	94-12 W6M	N		Y		Y	N	Y	Peatland	Y		N	Y		Y		N	Peatland
3	97-09 W6M	N		Y		N	N	Y	Peatland	Y		Y		N	N			Upland
4	97-09 W6M	Y	Y	Y		N	N	Y	Peatland	N	N							Peatland
5	98-05 W6M	N		Y		N	N	Y	Peatland	Y		N	Y		N			Upland
6	97-10 W6M	N		Y		N	N	Y	Peatland	Y		N	Y		Y		Y	Upland
7	77-26 W4M	N		Y		N	Y		Upland	Y		Y		N	N			Upland
8	81-10 W5M	N		Y		N	Y		Upland	Y		Y		Y	N	Y		Upland
9	72-05 W5M	N		Y		N	N	Y	Peatland	Y		Y		N	N			Upland

Site	Location	Access					Borrow						
		16	17	18	19	Outcome	20	21	22	23	24	25	Outcome
1	77-08 W5M	Y	N	Y	N	Upland	Y		Y				Upland
2	94-12 W6M	Y	Y			Peatland	Y		N			N	Peatland
3	97-09 W6M	Y	Y			Peatland	Y		Y				Upland
4	97-09 W6M	N		Y	Y	Peatland	Y		Y				Upland
5	98-05 W6M	Y	Y			Peatland	Y		N			Y	Upland
6	97-10 W6M	Y	Y			Peatland	Y		N			Y	Upland
7	77-26 W4M	Y	Y			Peatland	N			N			Upland
8	81-10 W5M	N		N		Peatland	Y	N			Y		Upland
9	72-05 W5M	N		Y	N	Upland	Y	N			Y		Upland

Figure 1 to Figure 4 provide visual representations of the Decision Paths for Site 3.

Table 3 summarizes the results of the Process DST. Three of the nine sites required use of Table 7 modifications – all three had Peatland Ratings of 5 and Upland Ratings of 4.

In seven of the nine cases, the Decision Framework led to the same conclusion as AEP – five sites were approved for a change in land use and two were rejected (both fens) (Table 4). In the eighth case (also a fen), an application for a change in land use had been submitted but a decision had not been made at the time of this report. In the ninth case, the site required use of Table 7 modifications (from the draft report) which led to a tie between the modified Peatland Rating and the modified Upland Rating. The draft version of the Decision Framework and Support Tools didn't state what to do where a tie occurs so the revised version of the report will indicate that a tie results in a final site recommendation of Peatland; however, in this case, both the practitioner and AEP agreed that the pad should remain in place (Candidate for Upland Reclamation).

Additional information from the practitioner about the final recommendation is summarized in Table 4.

3.3.1 *Comments from the Field Verification Trial*

The following issues and comments were noted by the practitioners testing the Decision Framework and Support Tools:

- General – The wellsite would likely regenerate over time however the part that pushed this over to a change in land use vs. pad removal was the amount of time and money it would take to produce a similar ecosystem function; no real gain for removal.
- General – while most of the Decision Paths will likely result in a straight numerical sequence (e.g., 12-13-14), the Site Specific Consideration DST for Site 8 resulted in a Decision Path of 8-10-**12-14-13** Candidate for Upland Reclamation.
- Decision Node 8 (Site Specific Considerations) – Access to the site is restricted: Selected yes because it is not currently possible to drive to the location; however, it would not take much to gain access.
- Decision Node 15 (Site Specific Considerations) – Can the limitations be mitigated: Compaction was thought to be an issue on a grass-dominated site – this "could" be mitigated by ripping/decompaction, however battling grasses has proven to be extremely difficult hence the NO decision.
- Use of Table 7 (from the draft report) – Used modification ratings to move the location from a pad removal to change in land use request. Pulling the pad likely will not result in any increased performance of the already functioning ecosystem. This location had previous work completed – liner pulled, and the site was deep ripped and left prior to a release being granted. AEP did indicate concerns regarding the borrow pit's bank stabilization.

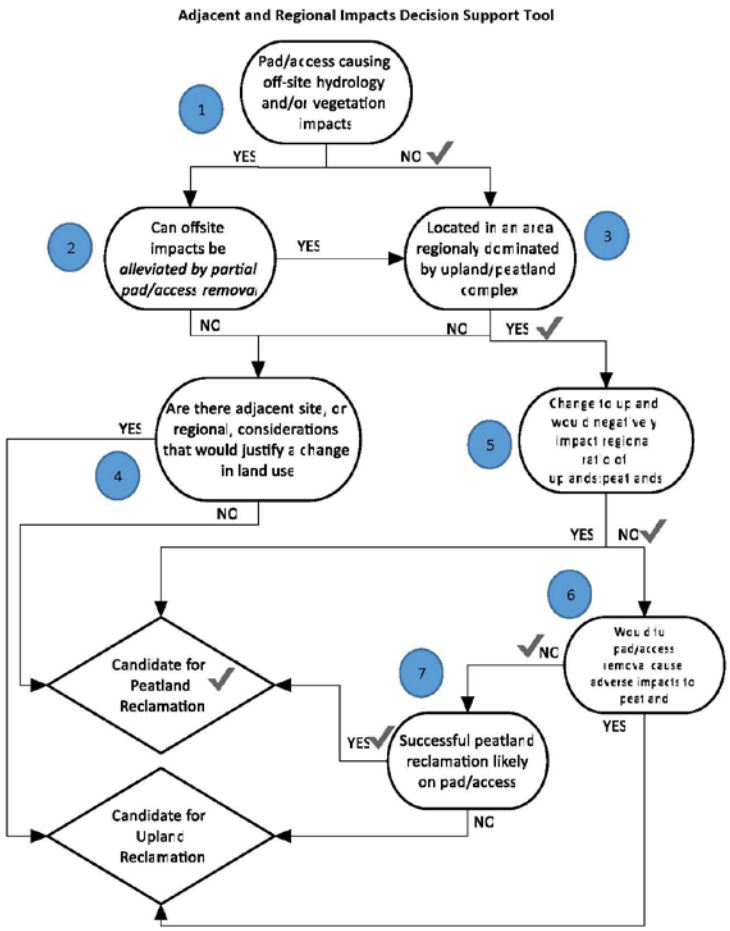

Figure 1. Visual representation of the Adjacent and Regional Impacts DST Decision Path for Site 3.

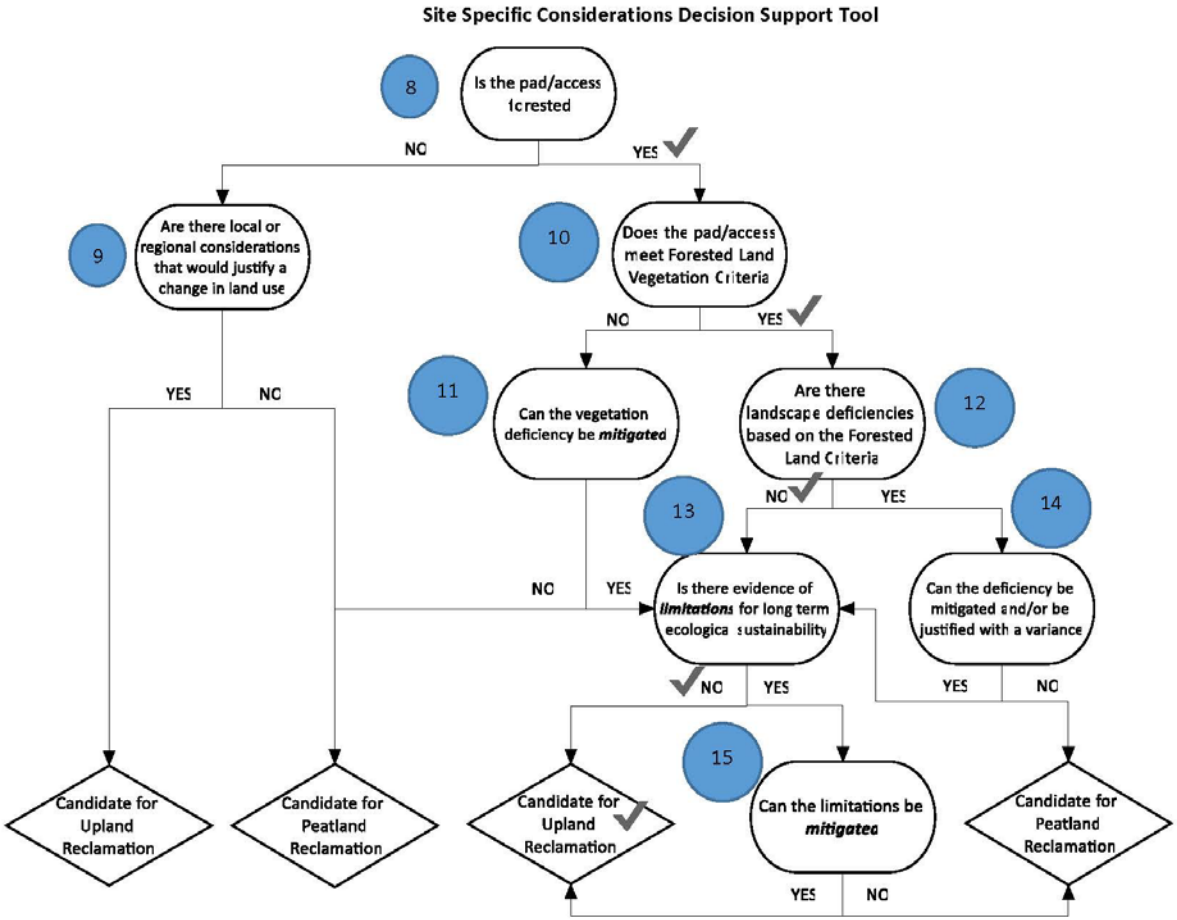

Figure 2. Visual representation of the Site Specific Considerations DST Decision Path for Site 3.

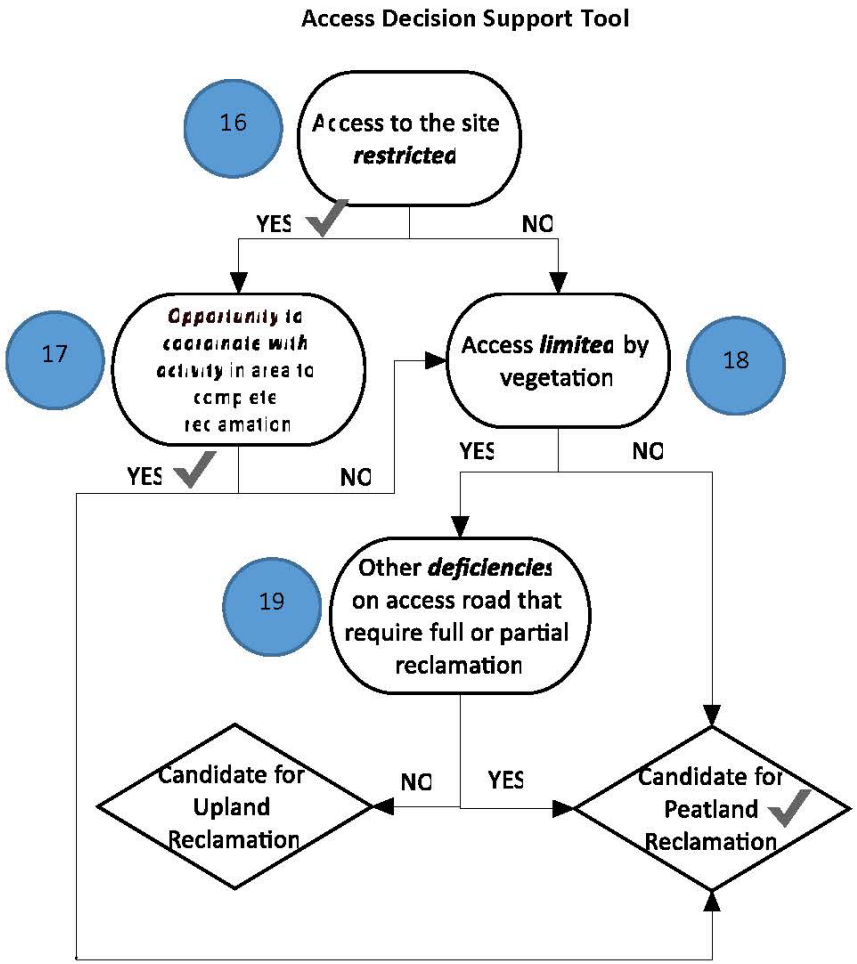

Figure 3. Visual representation of the Access DST Decision Path for Site 3.

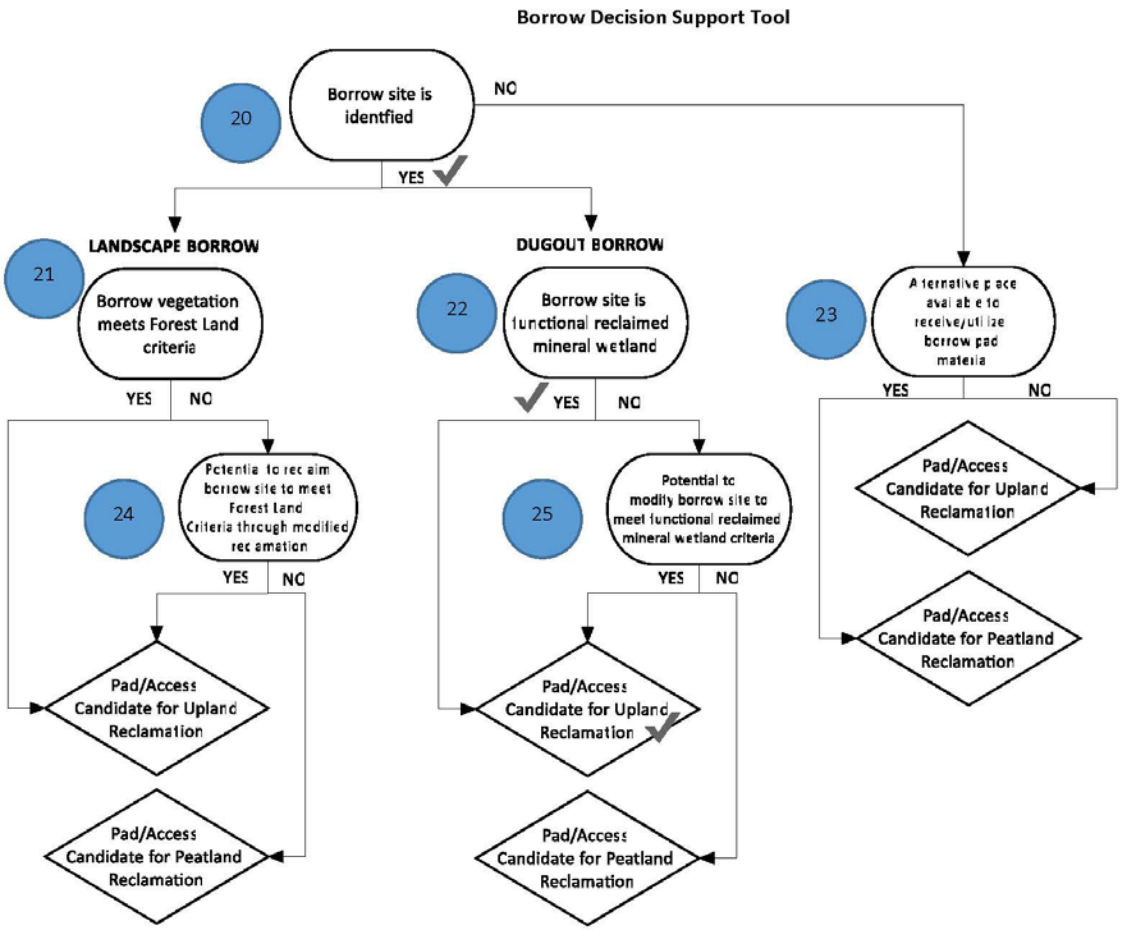

Figure 4. Visual representation of the Borrow DST Decision Path for Site 3.

Table 3. Results of applying the Process DST to the nine validation sites.

Site	Location	Peatland Score	Upland Score	Site Recommendation	Need Table 7	Table 7 Used Anyway	Peatland Modifier	Upland Modifier	Revised Peatland Score	Revised Upland Score	Difference	Final Result
1	77-08 W5M	0	9	Upland	No							Upland
2	94-12 W6M	9	0	Peatland	No	Yes	2	2	11	2	9	Peatland
3	97-09 W6M	5	4		Yes		1	3	6	7	1	Upland
4	97-09 W6M	8	1	Peatland	No	Yes	3	2	11	3	8	Peatland
5	98-05 W6M	5	4		Yes		2	3	7	7	0	Upland
6	97-10 W6M	5	4		Yes		1	4	6	8	2	Upland
7	77-26 W4M	2	7	Upland	No							Upland
8	81-10 W5M	2	7	Upland	No							Upland
9	72-05 W5M	3	6	Upland	No							Upland

[1] **Note:** The practitioner decided to apply the Table to see if it would affect the Recommendation. This option is not part of the Decision Framework and Support Tools.

[2] **Note:** The final result is listed as Peatland based on the proposed changes to the Decision Framework and Support Tools to address the case where there is a tie between the Peatland Rating and Upland Rating after the modifications are applied.

Table 4. Comparison of Decision Framework and Support Tools results to AEP decisions.

Site	Location	Final Site Outcome	AEP Decision	Practitioner Comments
1	77-08 W5M	Upland	Accept	AEP granted approval with conditions of further weed management.
2	94-12 W6M	Peatland	Refuse	This site was rejected as AEP suspected potential compaction due to the monoculture of agronomics/heavy grasses and the adjacent wellsite was padded and still required abandonment work. I feel this site could have been fixed by ripping and planting and left as Upland.

Site	Location	Final Site Outcome	AEP Decision	Practitioner Comments
3	97-09 W6M	Upland	Accept	
4	97-09 W6M	Peatland	Refuse	This site was rejected due to proximity to the road, borrow pit and the visible hydrology issues that were not known before the flyover. The project manager assumed that removing the geotextile without consulting AEP would be sufficient; however, they failed to restore drainage during reclamation. I agree with the DST/AEP based on the current condition – this one should be peatland. However, this pad could have remained in place if drainage was addressed during reclamation.
5	98-05 W6M	Peatland	Accept	AEP granted release with condition of fill planting to meet Forested Criteria.
6	97-10 W6M	Upland	Accept	Release granted for ripped padded wellsite. Planting required and borrow pit requires bank stabilization work due to erosion concerns.
7	77-26 W4M	Upland	Accept	AEP approved padded wellsite, fill plant required to meet Forested Criteria.
8	81-10 W5M	Upland	Pending	
9	72-05 W5M	Upland	Accept	

4.0 NEXT STEPS

The draft report (Drozdowski et al., 2020b) will be revised to incorporate the stakeholder feedback and the results of the field verification trial. Several items of feedback agreed with one another while others were contradictory. The authors will use their best judgement when revising the report to address opposing views and provide compromises where needed.

At a minimum, the revised report will include the following changes:

- A new section will be added to describe caveats related to the use of the Decision Framework and Support Tools and a screening tool will be provided to assist practitioners in deciding if the DST Framework and Support Tools should be used.
- A more detailed description of the Decision Framework and Support Tools will be provided.
    - Add defined terms to better explain how the Decision Support Tools are used and how the calculations are made. The terms defined in the Glossary in this report will inform the update.
    - Explain that partial pad/access removal is implied as an option wherever pad/access removal is mentioned.
- In the draft report there was no clear explanation of how the DST supporting tables are to be used. The update will clarify that the tables are meant to assist practitioners in deciding whether to answer Yes or No to specific Decision Nodes.
- In the draft report there was no guidance on how to use Table 7 to modify the Site Rating when the difference between the Peatland Rating and Upland Rating was less than 3. The update will clarify that **every row** in the Table must have a score to avoid practitioners selecting those modifications that agree with their view of what the final recommendation should be.
- In the draft report guidance was provided on how to use the Site Rating modifications made from Table 7 however there was no indication on what to do when the modifications lead to a tie (as was the case in one of the sites in the field verification trial). The update will indicate that in the event of a tie the site will be deemed to be a Candidate for Peatland Reclamation.
- In the draft report there was no mention about the implications of below-pad liners to the decision process. This will be mentioned in the update under the Site-specific Considerations DST.
- In the draft report there was no guidance on what information to provide as backup documentation for the variance request made to AEP. The update will provide recommendations for the types of information to be provided.

The update will be released in spring 2022.

The update should continue to be viewed as a living document that may require additional changes as more experience is gained by both practitioners and regulators.

5.0 REFERENCES

Drozdowski, B., C.B. Powter, H. Tokay, D. MacKenzie and B. Xu, 2020a. Certification of Mineral Soil Pads in the Boreal Region – A Path Forward. Working Session Summary. Prepared for the Petroleum Technology Alliance of Canada, Calgary, Alberta. 47 pp. https://auprf.ptac.org/wp-content/uploads/2021/05/Deliverable-3_PTAC18_19-RRRC_09-Working-Session-Summary-Report-05-05-2020-DRAFT.pdf

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