

# A multi-stakeholder approach for developing mine reclamation guidelines

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## Abstract

*The Cumulative Environmental Management Association (CEMA) is a multi-stakeholder organisation that is a key advisor to the provincial and federal governments and is committed to respectful, inclusive dialogue to make recommendations for the management of the cumulative environmental effects of industrial development on air, land, water and biodiversity in the Athabasca oil sands region. There are five working groups within CEMA: the Reclamation Working Group (RWG), Land Working Group, Surface Water Working Group, Air Working Group, and Groundwater Working Group.*

*The RWG produces and maintains guidance documents that provide recommendations regarding mine reclamation practices. These guidance documents steward towards the overall goal that reclaimed landscapes meet regulatory requirements, satisfy the needs and values of stakeholders, and are environmentally sustainable. RWG focuses on soil salvage and placement practices, revegetation activities, development of reclaimed wetlands and end pit lakes, and the integration of closure landscapes within the region. RWG, through the CEMA Board, submits the guidance documents as recommendations to the provincial government.*

*This paper describes the history and structure of RWG, including a brief description of the sub-groups and the task groups that report to RWG. We review the list of recommendations made to government by the group, including how they are currently used or are expected to be used within the regulatory process. Information regarding current projects that support the update of existing guidelines or development of new guidelines is also reviewed (including end pit lake guidance and reclamation certification criteria and indicators).*

## 1 Introduction and history

The Cumulative Environmental Management Association (CEMA) is a planning forum for municipal, provincial and federal levels of government, other regulatory bodies, environmental groups, local health authorities, First Nations and Métis communities, and industry stakeholders in the regional municipality of Wood Buffalo in north eastern Alberta. Its purpose is to facilitate discussions and consensus-driven decision-making on issues related to cumulative environmental effects in the Athabasca oil sands region. CEMA accomplishes its work through technical working groups, including the Reclamation Working Group (RWG).

RWG existed prior to CEMA as the Reclamation Advisory Committee. This committee joined CEMA in May 2001, in part to address the newly created regional sustainable development strategy for the Athabasca Oil Sands Region (Alberta Environment, 1999). The provincial government Department of Environment (Alberta Environment) created the strategy document in 1999 for the purpose of providing a framework to address Alberta's commitment to sustainable resource and environmental management in light of increased oil sands mining activities. CEMA was created, in part, to address the issues outlined in the strategy document.

RWG and its sub-groups operate in a manner that is consistent with the principles, rules, policies, and procedures adopted by CEMA ([www.cemaonline.ca](http://www.cemaonline.ca)).

## 2 Purpose and objectives

RWG produces and maintains guidance documents that provide recommendations and best practices which ensure that reclaimed landscapes within the Athabasca oil sands region meet regulatory requirements, satisfy the needs and values of stakeholders, and are environmentally sustainable. RWG provides these guidance documents to the CEMA Board which, following acceptance by the Board, are submitted as recommendations to the Government of Alberta. Information on how these recommendations are used by the regulators is presented in Section 4.

RWG provides guidance for reclamation in the Athabasca oil sands region on the following:

- Appropriate design, construction, integration, reclamation and maintenance of landforms and landscapes.
- Reclamation certification.
- Leading practices for conservation and reclamation.
- Re-establishing biodiversity of the reclaimed landscape.
- Riparian ecosystem establishment.
- Land capabilities for forest ecosystems on natural and reclaimed lands.
- Forest vegetation (ecosystems) establishment.
- Wetland and aquatics establishment.
- End pit lake establishment.
- Other reclamation guidance as agreed upon by RWG and the CEMA Board.

Some of the work done within RWG has relevance to in situ oil sands extraction; however, currently the primary focus of RWG is on oil sands mine disturbances.

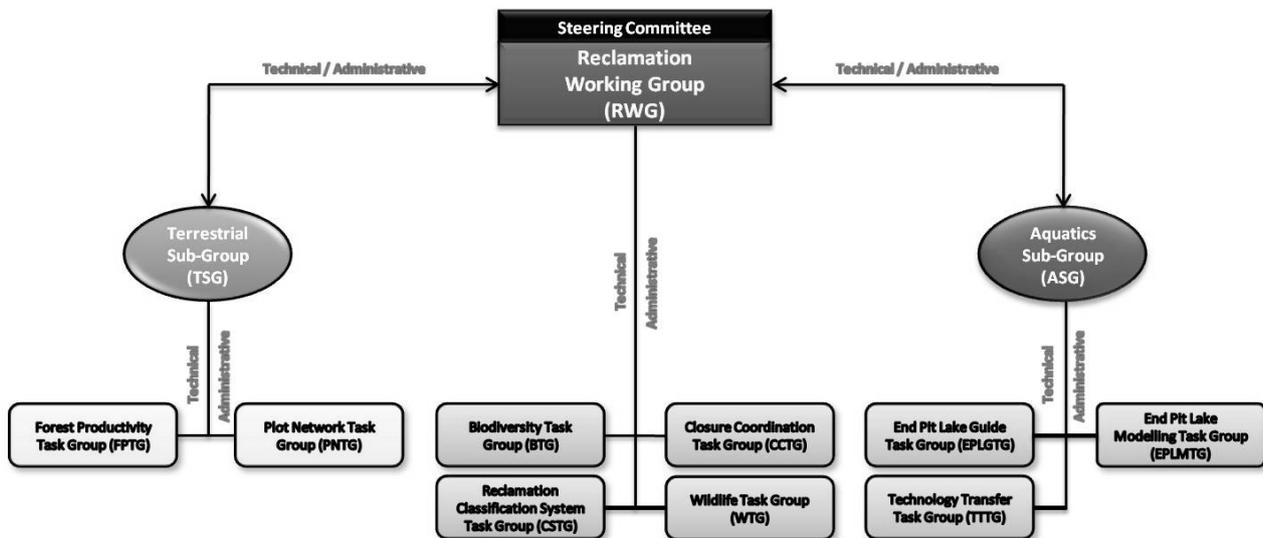
## 3 Structure and membership

### 3.1 Structure

RWG provides direction, leadership and oversight to two sub-groups separated by theme (terrestrial and aquatics). It also directs specific task groups to take on projects on its behalf. RWG is meant to be a higher level, less technical governing body. As such, it is typically comprised of managers and coordinators from its membership rather than scientists or technical experts.

A very important component of ensuring RWG and its task groups function effectively is the administrative oversight provided by the CEMA secretariat. As well, since the initial installation of technical program managers in 2007, the RWG work plan has evolved to become more effective and efficient.

Figure 1 outlines the RWG organisational structure, showing the linkages between RWG and the Aquatics and Terrestrial Sub-Groups, and the task groups directed by RWG itself. Each sub-group is tasked with specific responsibilities, tied to the RWG terms of reference, and each sub-group has its own terms of reference. Each task group is assigned a mandate letter by its parent group. The mandate letter of a task group is limited to the specific project assigned to that task group, and once the project is complete, the task group is dissolved.



**Figure 1 Reclamation working group structure**

### 3.2 Membership

Any member of CEMA is eligible to join RWG and its sub-groups or task groups. RWG seeks to maintain a broad and consistent stakeholder representation. RWG has a diverse membership, including all oil sands mine operators in the region, some in situ oil sands operators in the region, three provincial regulatory agencies, and one First Nation. There is intermittent participation by Métis communities at RWG meetings; however, their community participation in specific projects (e.g. biodiversity) has been significant. One university based research organisation has recently joined RWG. Each member organisation has their own reason for participating at the RWG level, but perhaps the greatest incentive is that RWG is the primary forum for the development and update of reclamation related guidelines that the operators are required to follow. Participants are able to contribute their own experience and knowledge to the development of guideline documents, and in doing so, they gain a greater understanding of the documents as they are developed.

In the past, more First Nations communities and environmental organisations have participated, but due to reasons beyond RWG, some of them withdrew their membership from CEMA. In order to increase transparency, develop trust and build relationships, RWG would welcome the return of these groups as active participants in the RWG as it continues to develop and update guidelines.

Chairpersons are nominated by RWG membership and are selected by consensus. It is the intent that at any given time, one co-chair is from industry and one co-chair is from a government, aboriginal, or non-government organisation. An RWG member is expected to be able to attend and participate on a regular, consistent basis; be fully informed and up-to-date about the subjects to be discussed at meetings; contribute to meetings; and accept and abide by CEMA's policies and guidelines.

It should be noted, the representatives of member organisations who participate in RWG sub-groups and task groups, do so as only one component of their role within their individual organisations. Their participation in RWG is directly linked to their operational experience, knowledge and expertise. The RWG work plan is comprehensive and extensive which can present member organisations challenges for maintaining full and consistent participation at all sub-group and task group levels.

## 4 Key deliverables

RWG, through its approval of each sub-groups terms of reference, assigns the development and update of very specific reclamation guidelines to each sub-group. The sub-groups complete the work, gain consensus on the final product, and recommend the product to RWG. RWG may then approve the guideline and / or seek additional information. RWG seeks to gain consensus within its membership, and then recommends the guideline to the CEMA Board for recommendation to the Government of Alberta. Only key deliverables, or

guidelines, are forwarded from RWG to the CEMA Board for recommendation to the Government of Alberta. A large number of technical reports are produced within RWG that serve as reference material for updating guidelines in the future and are available to the public on CEMA's website.

Guideline documents that have been accepted and published by the GOA in the past include:

**Land Capability Classification System (LCCS) for Forest Ecosystems in the Oil Sands, 3rd Edition. Volume 1: Field Manual for Land Capability Determination (Alberta Environment, 2006)**

The LCCS (Alberta Environment, 2006) is a working document intended to facilitate evaluation of land capabilities for forest ecosystems on natural and reclaimed lands in the Athabasca oil sands region. The LCCS is based on an integration of numeric values assigned to soil and landscape characteristics that are known to be fundamental to ecosystem productivity. Parameters considered include soil moisture regime, soil nutrient regime and soil physical and chemical properties that are potentially limiting to plant growth.

The first edition of the LCCS was developed in 1996 and was revised in 1998 based on results from field testing. The Soils and Vegetation Sub-group (now the Terrestrial Sub-Group) of RWG updated the document that was approved by the Government of Alberta in 2006. The research and monitoring required to support the development of subsequent versions of the guideline will be undertaken primarily through RWG.

Because the link between LCCS rating and forest productivity is currently undemonstrated, the LCCS is now considered only one in a suite of tools for site evaluation and reclamation planning, rather than a comprehensive system that alone will ensure replacement and documentation of equivalent land capabilities. Reclamation certification e.g. for a commercial forest use site, will ultimately be evaluated based on above-ground measures of site productivity as well as on the LCCS rating, and on other landscape characteristics.

The LCCS is referenced in the approvals issued to oil sands mine operators by Alberta Environment and it is used by the operators for soil placement planning and assessment and revegetation planning. The reclamation classification system (Section 5.1) is the next step in advancing the knowledge gained through the development and implementation of the LCCS.

**Guideline for Wetland Establishment on Reclaimed Oil Sands Leases, 2nd Edition (Alberta Environment, 2008)**

This guideline is referenced in the approvals issued to oil sands mine operators by Alberta Environment. It is used in the research and development of various types of wetlands at oil sands mines and it provides guidance for the creation of wetlands on the reclaimed landscape. The wetland reclamation plan developed by each oil sands mine operator must comply with this guideline, and the plan is reviewed and authorised by the regulators for implementation.

This second edition of the guideline provides information on ways to create wetlands e.g. peatlands, marshes and shallow ponds, in areas affected by oil sands mine development. The guideline includes up-to-date research on general wetland establishment, establishment of peatlands (muskeg), and a section on water movement (hydrology) and plant growth in wetlands. It describes an integrated approach to the planning, design, construction, monitoring and adaptive management of reclaimed wetlands.

The research and monitoring required to support the development of subsequent versions of the guideline will be undertaken primarily through RWG. The marsh technology transfer project being completed by the Aquatics Sub-Group will transfer the results of decades of research into practical application to inform wetlands reclamation. This will be the main vehicle for updating the guideline.

**Guidelines for Reclamation to Forest Vegetation in the Athabasca Oil Sands Region, 2nd Edition (Alberta Environment, 2010)**

This guideline is used by oil sands mine operators in the development of revegetation plans for reclamation of terrestrial ecosystems. The Revegetation Plan developed by each oil sands mine operator must comply with this guideline, and the plan is reviewed and authorised by the regulators for implementation. The revegetation planning guidance provided in this 2nd Edition is based on two approaches, the ecosite / site type approach and the end land use approach. Both approaches require determination of the soil moisture and soil nutrient regimes as described in the LCCS (Alberta Environment, 2006). Indicators of revegetation success and methods to assess these indicators on the reclaimed landscape are also discussed.

The guideline provides direction on planting vegetation for wildlife habitat and traditional uses, as well as where issues such as salinity are present. The fact sheets on native plants provide direction on propagation and establishment. Using salvaged forest floor as a source of plant propagules is also discussed.

The research and monitoring required to support the development of subsequent versions of the guideline will be undertaken primarily through RWG.

**Table 1 Key RWG deliverables and timelines from RWG's terms of reference**

<b>Deliverable</b>	<b>RWG's Completion Timeline</b>	<b>Group / Sub-Group Responsible</b>
Guideline for the establishment of wetlands on reclaimed oil sands leases	Reviewed every five years and updated as necessary. Next revision expected Q2 2014. Versions include 1999 and 2007.	Aquatics Sub-Group (ASG)
End Pit Lake technical guidance document (for oil sands mining)	Reviewed every five years and updated as necessary. Next revision expected Q2 2012.	Aquatics Sub-Group (ASG)
Guideline for Reclamation to Forest Vegetation in the Athabasca Oil Sands Region	Reviewed every five years and updated as necessary. Next revision expected Q4 2014. Versions include 1998 and 2009.	Terrestrial Sub-Group (TSG)
Land Capability Classification System for Forest Ecosystems in the Oil Sands, Volume 1: Field Manual for Land Capability Determination	Reviewed every five years and updated as necessary. Next revision expected Q4 2013. Versions include 1998 and 2006.	Terrestrial Sub-Group (TSG)
Best Management Practices for Conservation of Reclamation Materials in the Mineable Oil Sands Region of Alberta	Reviewed every five years and updated as necessary. First version completed in 2011.	Terrestrial Sub-Group (TSG)

## **5 RWG task groups**

Below are the mandates assigned to each of the task groups that fall under RWG.

### **5.1 Reclamation classification system task group (RCSTG)**

The RCSTG is working to develop and validate a conceptual model of a reclamation classification system (RCS) for the oil sands region. The guidance documents developed by CEMA provide information for determining chemical, physical and biological features of a particular point on the landscape, but do not provide guidance for integrating this information to produce a spatial representation of the landscape i.e. for generation of homogeneous polygons for reclamation planning and assessment purposes. For terrestrial ecosystems, a method to predict soil moisture regime and potentially other factors (e.g. soil nutrient regime, water salinity) at a polygon level is required to improve the capability to estimate and plan for ecosite / wetland development on reclaimed areas. For aquatic and wetland ecosystems, an understanding of the hydrology of reclaimed systems is required to understand which nutrients and other chemical elements are important and how chemical elements are carried by water across the reclaimed areas. The hydrology of the terrestrial ecosystems influences aquatic and wetland ecosystems (and vice versa) and the hydrologic relationship between terrestrial reclaimed areas and reclaimed aquatic / wetland areas is poorly understood, at least with respect to generation of reclamation polygons. The RCSTG is conducting a global literature review to gather information on classification systems used for disturbed landscapes and how these systems may inform the development of a RCS for the oil sands region.

## **5.2 Biodiversity task group (BTG)**

The BTG mandate is to evaluate and establish the linkages between RWG's research, recommendations, reports and guidance documents within a hierarchical framework of biodiversity. It is the position of the BTG that biodiversity on reclaimed landscapes can be considered as "an emergent quality resulting from management actions" or, in other words, biodiversity is an output from other groups with other mandates, proceeding to do their work i.e. soil salvage, storage and placement techniques. The BTG project work includes developing a framework for implementing the reference condition approach as an experimental design model for designing monitoring programs in the oil sands region; conducting a biodiversity traditional knowledge study using participatory research methods; and, reviewing management frameworks originating from other CEMA working groups and government initiatives underway in the region to determine how they may affect biodiversity outcomes.

## **5.3 Wildlife task group (WTG)**

The mandate of the WTG is to discuss and address recommendations on reclamation techniques for re-establishing wildlife habitat capability and methods of assessments for documenting the re-establishment of wildlife habitat on reclaimed landscapes in both terrestrial and aquatic ecosystems. This mandate has linkages to other RWG work, including completing an assessment of the proposed RCS as it relates to supporting wildlife monitoring programs, habitat construction, and completing a review of the Wildlife Habitat Design Appendix in the Guidelines for Reclamation to Forest Vegetation in the Athabasca Oil Sands Region (Alberta Environment, 2010).

## **5.4 Closure coordination task group (CCTG)**

With seven approved oil sands mines in the Athabasca oil sands region, and another mine expecting regulatory approval in 2011, the mandate of the CCTG is to discuss and address issues associated with mine closure coordination. The CCTG will advance the discussion on the definition of an integrated boundary, describe the current oil sands mining closure system/process, explore criteria development and regional objectives for closure planning, undertake activities to communicate expectations for closure planning, and make recommendation to address structural limitations of cross boundary closure plans.

The CCTG has a limited work plan for 2011. It is expected to reinstate its work plan in 2012, after the oil sands mine operators submit their updated reclamation and closure plans to Alberta Environment on December 31, 2011. This coordinated regulatory requirement will provide the opportunity for assessment of closure integration across the region, and from there, the CCTG can better identify the information necessary to fulfil its mandate. As members of the CCTG the regulators will be able to share the results of their regulatory review of the updated plans to forward the work of the CCTG.

## **5.5 Riparian guide task group (RGTG)**

The mandate of the RGTG was to oversee and complete the peer review of the Riparian Classification and Reclamation Guide (Geographic Dynamics Corp., 2009) and its accompanying tools, which was developed through an external source and provided to RWG for its consideration as a future guideline document. A recommendation regarding the Riparian Classification and Reclamation Guide is expected by mid 2011. The hope is that this guide can become a tool for operators to use in reclamation planning, whether it becomes a formal recommendation to the government or not. This group recently completed its work and the go forward plan for the guide will be addressed directly by the RWG.

## **5.6 Other projects**

The RWG also undertakes cross-discipline projects, such as producing reclamation syntheses and general planning and design tools. These documents may be presented to the CEMA Board, who may then choose to advocate for their adoption by government, or they may be retained as RWG documents, to be used by operators but not recommended to the government for formal adoption. For example, the landscape design checklist (Cumulative Environmental Management Association, 2005) is a CEMA document used by oil sands mine operators for reclamation planning. The checklist is a concise and comprehensive checklist of design objectives for creation (design, construction, reclamation, and maintenance) of landforms and

landscapes in the Athabasca oil sands region. The checklist is intended to provide an overall framework for design and assessment of all reclaimed landscapes and landforms in the region. Multi-disciplinary landscape design teams, including specialists in geotechnical engineering, mine planning, surface and groundwater hydrology, geology, soils, vegetation, wildlife and traditional environmental knowledge, use their skills and professional judgement to satisfy the checklist with due diligence.

One very significant deliverable expected by the end of 2012, is the development of criteria and indicators for reclamation certification. Recently, the Government of Alberta provided support for a report recommended to them by CEMA, entitled “A Framework for Reclamation Certification Criteria and Indicators for Mineable Oil Sands” (Poscente, 2009). The framework provides a foundation for populating a list of criteria and indicators for oil sands mine reclamation certification, and to develop rules for their use. The proposed criteria and indicators framework is based on a goal – objective – criteria – indicator – standard – method hierarchy. This project is very important to RWG and to the Government of Alberta, and because of that, the RWG membership has great interest in working to complete this as a directly managed project.

The Government of Alberta has made reference to this criteria and indicators framework as a part of their progressive reclamation strategy. The intent is that this forms a part of a package of work completed by regulators, industry and stakeholders regarding various conservation and reclamation issues. Using RWG as a forum to develop the goals, objectives, criteria, and indicators that will then inform expectations for certification allows for input by regional stakeholders, if they choose to participate in the CEMA forum.

## **6 Terrestrial sub-group (TSG)**

### **6.1 Purpose and objectives**

At the direction of RWG, TSG develops guidance documents and tools that facilitate the establishment of sustainable terrestrial ecosystems on the reclaimed landscape within the Athabasca oil sands region. TSG develops recommendations that support establishment, assessment, monitoring, criteria and indicators for certification, and adaptive management of reclaimed terrestrial ecosystems on oil sands leases in the region. These guidance documents support the creation of a range of sustainable terrestrial ecosystems in reclaimed landscapes.

### **6.2 TSG task groups**

The following task groups were established by the TSG to fulfil specific mandates associated with the TSG work plan.

#### **6.2.1 *Alternative regeneration standards task group (ARTG)***

In November 2009 TSG initiated ARTG to develop a recommendation on forest regeneration standards to be used by oil sands mine operators. Alberta Sustainable Resource Development (ASRD) of the Government of Alberta informed TSG that the development of alternative regeneration standards for oil sands mines should be initiated, as the previously published government-issued regeneration standards would no longer be applicable to the region after May 1, 2010. The ARTG has completed the field data collection protocols for establishment and performance surveys for reclamation areas targeted to commercial forestry at the oil sands mines. The protocols have been submitted to the CEMA Board as a recommendation to ASRD. The development of the administration process for the regeneration standards for the oil sands mines will be completed once ASRD has received and reviewed the field data collection protocols. This task group has completed its mandate and has been dissolved.

#### **6.2.2 *Plot network task group (PNTG)***

TSG is tasked with understanding the capability that reclaimed landscapes have to return to forest cover patterns and processes equivalent to pre-disturbance conditions. In 2000, as part of this task, the TSG established a long-term plot network (LTPN). The purpose of the long-term monitoring program is to measure soil, vegetation and forest parameters to provide an assessment of change over time in reclamation and natural sites. The reclaimed sites include a variety of soil and planting prescriptions that have changed

over time based on advancements in best management practices. This program includes both natural and reclaimed plots. The mandate of the PNTG is to manage the LTPN. This includes annual field monitoring; review and assessment of the monitoring protocols and experimental design of the plot network; assessment of the data to develop information for the guidance documents; and identification of research gaps.

### **6.2.3 Best management practices task group (BMPTG)**

BMPTG was initiated in 2008 to develop best management practices (BMPs) or guidelines for soil salvage and placement in the mineable oil sands area (Cumulative Environmental Management Association, 2011). The BMPs were developed with input from stakeholders to provide leading practices that will help operators optimise the use of available reclamation materials on a site-specific basis. The document provides background to aid operators with current and planned reclamation activities in order to facilitate continuous improvement. The BMPs provide a reasonable level of guidance on practice for activities representing moderate risk, based on information available from operational experience, fundamental scientific principles, research projects in the oil sands region, and identification of uncertainties due to knowledge gaps.

The final document, Best Management Practices for Conservation of Reclamation Materials in the Mineable Oil Sands Region of Alberta (Cumulative Environmental Management Association, 2011), was recommended to the CEMA Board in April 2011 and approved in June 2011 as a document to be recommended to the Government of Alberta.

The final document is expected to be accepted and published by the Government of Alberta to be used by the operators in developing annual soil salvage and placement plans, mine reclamation plans, and life of mine closure plans as required by the approvals issued by Alberta Environment. Approvals issued since 2007 were forward-thinking in that they referred to this document before it even existed, requiring the operators to consider “any guidelines prepared or provided by the director related to soil salvage and placement strategies” when developing their plans. These plans are reviewed and authorised by the regulators prior to implementation.

This task group has completed its mandate and has been dissolved.

### **6.2.4 Forest productivity task group (FPTG)**

In 2008, the FPTG completed a contract documenting the ability of the LCCS (Alberta Environment, 2006) to predict site index on natural and reclaimed lands based on data collected from the long-term soils and vegetation plots. Based on the results of this study, the mandate of the FPTG is to investigate methods to measure and predict forest productivity on reclaimed landscapes in the oil sands region. In 2011, the FPTG recommended an ecosite areas summary table to the CEMA Board as a new methodology for addressing oil sands mine EPEA approval conditions relating to timber productivity ratings (TPR) and forest resource plans (FRP). The table was approved by the CEMA Board and is expected to be recommended to the Government of Alberta in 2011 to be used by operators in their reclamation and closure planning. To further understand forest development on reclaimed landscapes, the FPTG 2011 work plan will assess early stand mortality on reclaimed landscapes and investigate options for developing a modelling approach to predict functional forest development and understorey vegetation on reclaimed landscapes.

## **7 Aquatics sub-group (ASG)**

### **7.1 Purpose and objectives**

ASG develops recommendations that support establishment, assessment, monitoring, criteria and indicators for certification and adaptive management of reclaimed aquatics ecosystems on oil sands leases in the Regional Municipality of Wood Buffalo. These guidance documents will support the creation of a range of sustainable aquatic ecosystems in reclaimed landscapes. The ASG will provide these guidance documents as recommendations to the RWG.

## 7.2 ASG task groups

The following task groups were established by the ASG to fulfil specific mandates associated with the ASG work plan.

### 7.2.1 *Technology transfer task group (TTTG)*

The mandate of the TTTG is to complete a marsh technology transfer project that will transfer the results of decades of research into practical application to inform wetlands reclamation. This will be the main vehicle for updating the Guideline for the Establishment of Wetlands on Reclaimed Oil Sands Leases (Alberta Environment, 2008).

### 7.2.2 *End pit lake guide task group (EPLGTG)*

The focus of the EPLGTG is to work closely with end pit lake expert authors, through a systematic peer-review process, to produce a comprehensive guidance document that provides an accurate representation of the current state of knowledge and which can serve as a template to be updated as new information becomes available. The mandate of the EPLGTG is to develop a document that is updated in content, clear in style, and tailored in format to practitioners' needs of focusing on design guidance. Goals for the guidance document are to provide regional design guidance to reclamation engineers and communicate to stakeholders the issues and processes associated with the design of end pit lakes. Ultimately, another goal will be to seek acceptance by the Government of Alberta as a regional reclamation guidance document.

### 7.2.3 *End pit lake modelling task group (EPLMTG)*

The EPLMTG mandate includes completion of a peer-reviewed modelling project that investigates the chemical REDOX gradient within modelled end pit lakes and their contributions to sediment oxygen demand associated with fresh water capping of mature fine tailings. EPLMTG will also look at actual substrate and water quality impacts on dissolved oxygen consumption with the pelagic zone of an end pit lake, so that predictions and modelling of oxygen levels and their limitations on biota viability within aquatic reclamation systems can be predicted. Work to date has focused on physical parameters such as pit lake size, depth, filling period, residence time, inflow salinity and volume of tailings. The next stage of modelling will focus on biological parameters and their effects on lake water quality.

## 8 Conclusion and recommendations

RWG produces and maintains a number of guidance documents as listed in this paper that provide recommendations and best practices to help ensure that reclaimed landscapes within the Athabasca oil sands region meet regulatory requirements, satisfy the needs and values of stakeholders, and are environmentally sustainable. RWG has provided several guidance documents to the CEMA Board, which have been submitted as recommendations to the Government of Alberta and incorporated into the regulatory process. As a key group within CEMA, RWG will continue to follow its mandate to improve the understanding of reclamation and the knowledge of how to return disturbed lands to ecologically functioning units that are in tune with the regions ecosystems.

The multi-stakeholder model used by CEMA may be an appropriate model to use in other regions dominated by complex, large-scale mining operations. At the RWG level, a substantial amount of work is accomplished each year with the assistance of consultants, members, and hired staff. It has often been said that even if CEMA were to cease to exist, oil sands mine operators would likely ensure funding continued so that RWG could continue its work. This kind of support for a program can only be built upon active participation, trust, value, and integrity. Where opportunities exist in other regions to build a multi-stakeholder technical group like the RWG, serious consideration should be given, as it's a place where the regulators and operators can work with regional stakeholders to develop appropriate guidance documents that are supported by all who are affected by the development.

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