

Biodiversity Risks from Tar Sands Development

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The Royal Society of Canada (RSC) expert panel report of December 2010 provides an important summary assessment of environmental and health impacts

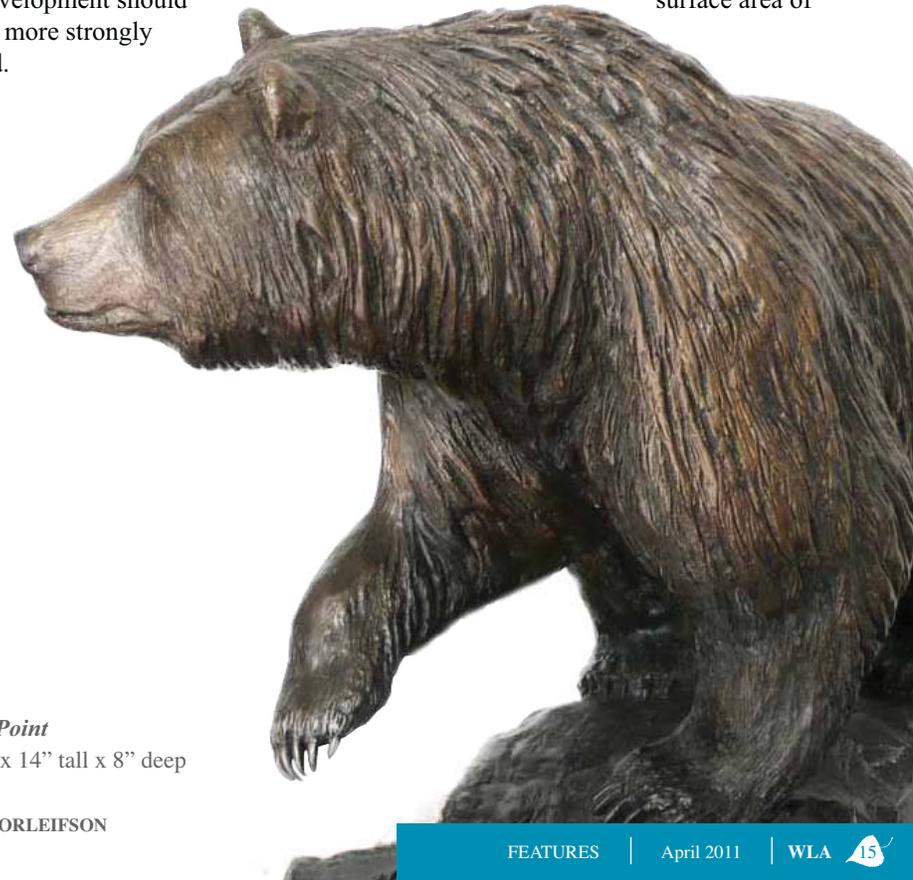
of Alberta's oil sands development. The panel worked for over a year and examined available evidence and knowledge gaps covering an extensive range of issues. This article focuses only on the report's findings on land disturbance, reclamation and species diversity.

Overall, the RSC report is disappointingly restrained in its conclusions about species diversity, citing many "unknowns" about outcomes decades from now. However, the research it summarizes confirms AWA's previous assessments that impacts to boreal ecosystems will be profoundly negative for an unacceptably long time horizon, and that cumulative effects of oil sands development should be much more strongly managed.

The post-mining landscape

The RSC "Report Findings in Brief" on land disturbance are that "reclamation is not keeping pace with the rate of land disturbance but research indicates that sustainable uplands reclamation is achievable and ultimately should be able to support traditional land uses... Reclamation and management options for wet landscapes derived from tailings ponds have been researched but are not adequately demonstrated." The problem with this relatively benign description is it does not reflect, as the research details do, how greatly diminished will be the diversity of habitats, vegetation and animal life that are likely to be supported in this "reclaimed" landscape.

Most of the RSC report's land disturbance review relates to impacts of mines. These operations strip-mine bitumen deposits less than 70 metres deep and create tailings ponds of toxic wastewater. The "mineable" oil sands region contains 20 percent of recoverable bitumen reserves and covers a land surface area of



Turning Point

15" wide x 14" tall x 8" deep
Bronze

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A cleared tar sands site is dewatered before strip mining. Wetlands reconstructed in a post mine landscape have so far had much less species diversity and abundance than pre-disturbance wetlands.

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about 4,700 square kilometres (km²), which is 3 percent of Alberta's defined oil sands region area and 1 percent of Alberta's boreal forest region. It extends north from Fort McMurray about 100 kilometres along both sides of the Athabasca River.

According to research summarized in the RSC report, variable and diverse soils of the pre-mined landscape will be homogenized. This loss of variability "could have consequences for biodiversity since patchiness is an inherent requirement of biological diversity for both flora and fauna." Deeper ground layers will be a mix of the original natural "overburden" and could also include tailings sand; they have high saline and sodium content that inhibits re-vegetation. These salts tend to percolate up in shallow groundwater flows. Land contouring and various "cover" soil layers can help protect plant roots from these salts. On better-drained upland soils, salt flushing will likely occur over five to 50 years, after which time it is not expected to significantly affect plant growth.

Upland areas replanted with only

grasses, the standard practice for decades, still have only minimal colonization by native shrubs and trees. Recent regulations to use seed-rich forest floor "litter" as cover has led to much better re-establishment of native species. So far, reclaimed plant communities are less diverse and abundant, though the Panel cautioned that many decades are needed before plant community development can be expected to be similar.

Peat wetlands are fully 40 percent of the undisturbed Athabasca oil sands landscape. According to the RSC report, "reclamation of peatlands (fens or bogs) after mining in the Athabasca boreal region has not been demonstrated. Since peatlands became established naturally over several thousands of years, many consider it unlikely they can be developed in the 80-100 years considered for reclamation." The report suggests that peat forming plants and water flows have been very successfully introduced in mined peatlands in regions outside Alberta; AWA's understanding is that these are in wetter climates.

Because of the saline and sodium content of subsoils (noted above), salts

are expected to be an ongoing presence in low lying or high water table areas such as wetlands. Constructed post-oilsands wetlands are discussed; they are salt-tolerant marsh wetlands with less biomass and species diversity than natural saline marshlands. The report does not make it clear enough that most undisturbed Alberta peat wetlands are in relatively fresh water, not in saline environments, so that constructed wetlands will have quite different plant communities than pre-disturbance peatlands. AWA concludes from this review that peat wetland destruction and the prevalence of salts in constructed marshes represents a major concern for biodiversity that is not sufficiently highlighted in the report.

Another problematic issue for the post-mined landscape is tailings ponds, which now cover over 170 km². The RSC report rightly states that they "raise many questions about [reclamation] feasibility". Toxic naphthenic acid present in tailings remains a challenge to remediate. Proposed end pit lakes that are derived from tailings ponds have not yet been demonstrated to transform into functioning aquatic communities.

The post-In situ landscape and overall species diversity

In situ tar sands operations differ from mines in that they extract deeper bitumen deposits using steam, electricity, combustion and/or solvents. In situ deposits represent 80 percent of Alberta's recoverable bitumen reserves. They cover a land surface area of about 135,000 km², which is 97 percent of the total Alberta oil sands region area and 35 percent of Alberta's boreal forest region. To its credit, the RSC report acknowledges that "the land area influenced by in situ technology is comparable to that disturbed by surface mining when [landscape] fragmentation and upstream natural gas production [for steaming or solvents] are considered."

The report deals too lightly, in my view, with the impact of this in situ land disturbance; there is a technological rather than a precautionary approach to this issue. "Little reclamation research has focused on in situ operations, thus data are not available for this report... the nature of reclamation for disturbances caused by in situ bitumen recovery poses

no particular technological challenge.” One biodiversity issue that could have been identified, at least as a data gap, is the extent of wetland loss from legacy and current practices. Another concern is the impact of densely spaced seismic lines created to delineate bitumen deposits.

The RSC report’s review of animal and bird (faunal) species diversity is brief and mostly seems to apply to combined mining and in situ disturbances. It acknowledges studies predicting that woodland caribou populations will not last more than forty years in the Athabasca oil sands region and that millions of birds will be lost due to habitat fragmentation. The report suggests moose habitat issues are largely resolved by pipeline crossing structures which does not seem to take into account impacts on wetlands.

Given the many factors noted above that would seem to inhibit long-term habitat and vegetation diversity, it is unclear why the report summarizes the main biodiversity concern as one of time scale. “Even though these areas will be reclaimed, there is a long time between habitat destruction and successful reclamation.” Elsewhere, the report reviews financial security reclamation arrangements, and warns that current practices expose the government to major financial liability risk. A similar risk statement about biodiversity loss would also have been appropriate.

What do Albertans expect the post-mining landscape will look like?

The RSC report emphasizes that Alberta regulations require land to be reclaimed to “equivalent land capability,” which is a “functioning natural landscape” of some productive use, not necessarily a “boreal ecosystem.” It asserts that the goal of restoration, a return to pre-disturbance conditions, is not possible in every exact way, so the concept is of little value. This seems an overly drastic dismissal of a useful concept, since “restoration” expectations could be linked to Alberta’s own Biodiversity Monitoring Institute’s measures of landscape intactness. The RSC report also asserts that there is a mistaken popular perception that boreal ecosystems are the reclamation goal, in part because of different definitions of “reclamation” used in government information and regulatory documents.



Strong cumulative effects management that sets disturbance caps is needed in the boreal region..
PHOTO: C. WEARMOUTH

The RSC panel states that the reclamation industry and regulatory bodies of Alberta favour reclamation over restoration. Yet high profile oil sands industry communications perpetuate the public’s impression that the boreal landscape will be restored. For example, CAPP’s Land & Technology site states “we are using innovation to help us return the land we use to a sustainable landscape that is equal to or better than how we found it.” In the oil sands industry’s public relations campaign of autumn 2010 (<http://www.capp.ca/oilsands/ads/Pages/default.aspx>), a TV ad states: “We want to leave restored land that people are proud to see for generations after that.” The print ad on land impacts is headlined: “I grew up on a farm. I know what it means to have the land restored.”

According to the Panel, the “forward-thinking perspective” on reclamation is to clearly define end goals “unriddled by semantics and opposing perspectives” so that Albertans could “reassess what is needed and what is achievable and separate that from what is idealized and desired.” More bluntly, the report asks: “Could stakeholders step away from their

preconceived past-focused desires and merge their needs for a newly developed landscape?” Aside from displaying a breathtaking insensitivity to aboriginal treaty rights and traditional land uses, this statement seems to suggest Albertans should only aspire to what an overly permissive development policy can deliver, rather than question the policy itself.

The RSC report acknowledges that “many advocate a total disturbance area cap for each project, and for the oil sands in general... To date, neither government nor industry has shown any interest in adopting a disturbance cap. There is further concern with the potential inability for cumulative effects to be understood and addressed.” AWA maintains that Albertans do not want, nor should we settle for, vast tracts of our boreal forest with markedly less habitat and species diversity. Instead, the RSC findings further strengthen our perspective that resource leasing and industrial project approvals should only proceed if cumulative impacts are much better managed to maintain biodiversity. 🌱