

2018-19 Work Plan Template

All fields with an * are mandatory

Project Description Summary			Co-Chair Decision (March 8, 2018)
Date *	Project/Work Plan Identifier (if applicable)	Program Type and Strategic Alignment *	*Decision Pool C: Activity paused. * Activity paused pending a meeting to be informed by the Oil Sands Monitoring Program Secretariat on high resolution imagery, remote sensing, LIDAR, geospatial analysis application and directions for the OSM Program overall. This includes improved understanding of leverage sources for the same or similar data. * Funding in 2018/19 and beyond is dependent upon the findings of the meeting.
03/01/2018	WL-MD-6-1718	OSM - Focus Study	
Program Category *	Status *	Dept. ID	
Wetlands	Existing Project		
Project Leadership / Contact information			
Project Title *	Key Words (max 10) *		
Remote Sensing Wetland Ecosystem Change Detection Method Development	Oil sands development; remote sensing; wetland, LIDAR; multi-spectral; stressors; wet area mapping; biomass; hydrology; pollution, vegetation		
Surname *	Given Name *	Title *	
Cobbaert	Danielle	Dr.	
Organization *	Department	Division	
Alberta Provincial	Alberta Environment and Parks	Environmental Monitoring and Science Division	
Branch *	Section/Unit (if applicable)	Phone *	
Science	Biodiversity and Ecosystem Health	15879860653	
Email *	Mailing Address	City	
danielle.cobbaert@gov.ab.ca	9th Floor, 9888 Jasper Avenue	Edmonton	
Postal Code	EMSD Executive Owner (if Applicable)		
T5J5C6	Monique Dubé		
Project Information			
Project Objective(s) (Bullet Form) *	- Detect and report changes in wetland ecosystem in relation to Oil Sands Developments and related Point and Non-point source emissions - Determine utility of remote sensing technologies to quantify wetland vegetation structure and species changes associated with a) hydrological alterations, b) N-deposition associated with oil sands industry development, and c) land disturbance.		
Plain Language Overview (100 words) *	Wetlands within the Oil Sands (OS) region are facing pressures from land use disturbance, climate change, and natural hazards resulting in alteration of some of the underlying processes and feedbacks that have historically maintained these sensitive ecosystems. This project will use remote sensing technology to characterize and quantify the temporal and spatial changes in wetland extent, and vegetation community structure associated with hydrological alteration and nitrogen-deposition across the OS region. Accurate classification of wetland extent and change across the OS region will contribute to sound land-use decisions regarding wetland management including disturbance, mitigation and reclamation.		
Project Duration *	Project Original Start Date *	Estimated Completion Date *	
Multi-Year	01/04/2017	31/03/2020	
Specify Objectives This Project Will Address in 2018/2019. *	-Develop a remote sensing-based wetland classification methodology for sentinel (intensive long-term monitoring sites) and synoptic (one-time monitoring sites with subset of core monitoring variables) monitoring site wetlands outlined in the OSM Long-Term Monitoring Wetland Program using the available Province of Alberta LIDAR dataset with reference to underlying surficial geology, digital elevation models, and vegetation structural characteristics specific to the Oil Sands region.		
Specify Objectives This Project Will Address Beyond 2018/19 (if multi-year). *	- Assess the ability of LIDAR technology to accurately identify the effects of natural disturbance (e.g. inter-annual variation in climate, fires) versus effects of oil sands development due to a) hydrological alteration and b) N-deposition on wetland ecological condition (primarily changes in open water area and depth, and vegetation change over time). - Use LIDAR-based methods as a "lots of plots" methodology to reduce costs associated with in situ field validation, and as a means for scaling to lower resolution historical remote sensing archives and continuous (future) data collection frameworks such as the Landsat Data Continuity Mission based on "hot spot" analysis of ecosystem change. This includes recommendations on how frequently to acquire imagery and monitor for wetland change using LIDAR and optical imagery		
List Key Questions/Hypotheses Related to Each Objective Stated Above. *	- Question: Are wetlands sensitive to natural and anthropogenic disturbance? - Question: If wetlands are changing how rapidly is this occurring? - Question: What are the driving mechanisms associated with wetland change? -Hypothesis: Hydrologic alteration of surface water and groundwater associated with Oil Sands development may be accelerating wetland changes beyond what occurs naturally within this environment.		
Main Assumptions, Constraints, Dependencies. *	- Assumption: Vegetation in Boreal Plain peatlands exist in a near persistent state of moisture stress as precipitation is generally exceeded by potential evapotranspiration. As such atmospheric deposition, hydrologic alteration and landscape disturbance are the key stressors affecting wetland ecosystems in the oil sands region. - Constraints: current research is examining localized impacts to evaluate the local processes causing change, but a regional approach is needed to identify and document the range of locations and magnitudes of impacts to wetlands		

Partner Categories (select all that apply) * A partner is an individual, group, agency, community etc. that is an active participant in the project and in achieving the project deliverables.	Knowledge System *	Location (select all that apply) *
<input type="checkbox"/> Federal Government <input type="checkbox"/> Another AEP Division <input type="checkbox"/> Another GoA Department <input checked="" type="checkbox"/> University/Academic Institution <input type="checkbox"/> Solely delivered by GoA <input type="checkbox"/> Citizen Science <input type="checkbox"/> Indigenous Community or Organization <input type="checkbox"/> ENGO <input type="checkbox"/> Other	Classical Science	<input type="checkbox"/> Office or Laboratory <input type="checkbox"/> Sub-regional <input type="checkbox"/> Transboundary (provincial/territorial) <input checked="" type="checkbox"/> Lower Peace Region <input type="checkbox"/> Upper Peace Region <input type="checkbox"/> North Saskatchewan Region <input type="checkbox"/> Red Deer Region <input checked="" type="checkbox"/> Lower Athabasca Region <input type="checkbox"/> Upper Athabasca Region
AEP ONLY: Strategic Alignment to EMSD Outcomes		
AEP ONLY: Strategic Alignment to EMSD Science Plan, select 1-2 areas that apply (if Applicable)		
Ecosystems and Predicting Change Choose one		
AEP ONLY: Strategic Alignment to AEP Departmental Outcomes		
AEP ONLY: Environmental and Ecosystem Health and Integrity	AEP ONLY: Sustainable Economic Diversity	AEP ONLY: Social Well-Being
Biodiversity	No	Yes
AEP ONLY: Protected Public Health and Safety from Environmental		
No		
AEP ONLY: IMAG/IMSC Information Needs, Please Specify Which Need(s) is Being Addressed. File location M:\EMSD\Common\Portfolio Mgmt System Shared Docs	1) Biodiversity 27.2: A regularly updated inventory on the footprint with information on the status of ecological recovery. What is the condition of vegetation on human footprints (by type) in Alberta? 2) Biodiversity 38: Provincial Vegetation Map: Provincial vegetation map (composition, structure). 38.1. What is the composition and structure of vegetation at the provincial scale, including in protected areas?	
AEP ONLY: How This Project Will Address Each Strategic Theme Selected Above.	1) This project will investigate new approaches and methods for assessing wetland vegetation condition in areas affected by human disturbance associated with oil sands activities. 2) This project will assess vegetation composition and structure at a plot-level scale and modelled to the Athabasca oil sands region, including protected areas. These approaches and methods may be extended to provincial scale or integrated with provincial-scale work.	
Project Methodology		
List the Key Project Phases and Provide Bullets for Each Major Task Under Each Project Phase. *	Phase/Objective 1: - Derive LiDAR-based data products (1m x 1m digital elevation model of ground surface topography; map of vegetation structure; foliage fractional canopy cover; indicators of biodiversity using foliage structural complexity) - Wetland areas classified based on location, extent, and type Phase/Objective 2: - Derive aboveground biomass based on shrub allometry - Map Palmer Drought Severity Index and frequency for site areas from 1970 to present - Compare changes in biomass with proximal depth to water table at key sites - Determine prevailing wind direction to quantify advection of nitrogen from Syncrude and Suncor stacks - Quantify the probability of deposition and impacts on biomass change Phase/Objective 3: - Process historic air photos, optical images from SPOT and Landsat TM satellites collected over the last 10-40 years - Detection of vegetation and land surface changes using remote sensing imagery - Determine optimal time period for re-acquisition of remote sensing data used for change detections	
Describe How Changes in Environmental Condition Will Be Assessed. *	- Vegetation change will be compared over time and related to hydrologic stress and N-deposition with distance from oil sands activities.	
Are There Benchmarks (e.g., objectives, tiers, triggers, limits, reference conditions, thresholds, etc.) Being Used to Assess Changes in Environmental Condition? If So, Please Describe, If Not, State "NONE". *	- Baseline (reference) conditions of wetland land cover classification will be derived from Province of Alberta airborne LiDAR data circa 2008 and used to assess changes in wetland extent and vegetation community structure.	

Provide a Brief Description of the Methods By Project Phase. *	<p>Phase 1: - Wetland areas will be classified following Chasmer et al. 2016; Chasmer et al. in progress</p> <p>Phase 2: - Shrub allometry estimated from in situ geographically located measurement plots (Falster et al. 2015) and used to derive aboveground biomass based on relationship between LiDAR-derived shrub heights from multi-temporal LiDAR data (Hopkinson et al. 2015) - Footprint or dispersion modelling (Chasmer et al. 2008; 2011) will be used to quantify the probability of deposition with distance of wetlands from the source and impacts on biomass change using LiDAR and optical vegetation indices as indicators of vegetation change</p> <p>Phase 3: - Processing of optical images from SPOT and Landsat TM based on Chasmer et al. in review - Detection of vegetation and land surface changes at various pixel resolution will provide quantitative analysis of the range and magnitude of changes that can be observed using optical imagery</p>
List the Key Indicators Measured. *	- open water area; water depth; wetland area, wetland vegetation community type, condition and structure, wetland classes and subclasses, changes over time.
Describe Sample Handling Procedures, If Not Applicable, State N/A. *	N/A
List SOPs that Will Be Used, If Not Applicable, State N/A.*	N/A
Describe the QA/QC Plan, If Not Applicable, State N/A. *	N/A
Describe How Indigenous Communities are Involved in the Project Design, Data Collection, and Analysis (Knowledge Co-creation) and How is their Consent Sought. If Not Applicable, State N/A.*	N/A
Components Delivered by Others	
List by Project or Project Phase Each Component That Will Be Delivered by An External Party (including analytical laboratories) and Name the Party. State None if Not Required. *	<ul style="list-style-type: none"> - Objective 1: Airborne LiDAR data (circa 2008) from which baseline wetland land cover classification will be derived (Province of Alberta/Airborne Imaging Inc.) - Objective 2: Collection and validation of LiDAR data products from Objective 1 (ARTEMIS Lab at University of Lethbridge) - Hydrometric and meteorological data acquired by Petrone and Devito (University of Alberta) - Objective 3: High resolution SPOT optical imagery (2006-2016) (collaboration between University of Lethbridge and Planet Inc.) - Landsat TM multispectral data (1986 - 2016) (freely available via United States Geological Survey)
Will These Components be Delivered Under Grant or Contract or Both? Please Describe and Name the Associate Work Plan/Grant/Contract for These Services if Not Included Within This Work Plan. *	<ul style="list-style-type: none"> - Primarily delivered through an existing grant (18GRAEM25) to the University of Lethbridge to Drs. Laura Chasmer and Chris Hopkinson. - Collaboration with AEP through all project stages (site selection, methods, field work and analysis).
Monitoring Site Locations and Coordinates (for all sites, please add them to the Monitoring Site Location tab - a separate excel sheet)	
Attach Map of Locations. Distinguish Indicators by Station if Necessary. Distinguish Sampling Frequency by Station if Necessary.	
Project Schedule	
FOR OIL SANDS MONITORING PROJECTS ONLY: A coordinated field monitoring schedule for the OSM Program is required. Please complete the attached document named "OSM Program Field Monitoring Schedule" in addition to this work plan. Fill as much as you can recognizing that scheduling changes will occur and the scheduling document will be updated regularly. Please note the scheduling document will be shared with stakeholders.	See OSM Program Field Monitoring Schedule document attached.

FOR OIL SANDS MONITORING PROJECTS ONLY: Have You Coordinated With Other Project Leads On Field Logistics? If So, Please Specify. *		This project is fully integrated with the NEW Wetland Ecosystem Monitoring Project work plan (WL-PD-10-1718), led by Danielle Cobbaert (AEP). The project will be coordinated with the Aerial Remote Sensing for Wetlands in the PAD Work Plan (WL-PD-4-1718), led by Daniel Peters and Donald Baird (ECCC).	
Other			
Additional Details.			
Will Capacity Building and Training be a Component of the Project and If So, Explain How. If Not, State N/A.*		- Development of highly qualified persons (HQPs) is a component of the project through supervision of graduate students at the University of Lethbridge by Dr. Laura Chasmer. - Additionally, AEP staff Danielle Cobbaert and Josh Montgomery (Wetland Scientists) will be collaborating on the project to build skills and expertise within AEP.	
Environmental Impact and Considerations.			
Data Management and Digital Assets			
Will Data be Produced as a Result Of This Project? *	Type of Quantitative Data Variables	Frequency Of Collection	
Yes	Continuous	Other	
Data Collection Period: Start	Timeline For Upload Period: Start Date - End Date		
Date - End Date	Start Date - End Date		
01/05/2018 - 31/10/2018	30/03/2020		
Is There a Data Sharing Agreement? (Yes or No).	In progress in grant to University of Lethbridge (18GRAEM25).		
Will the Data Include Traditional Knowledge as Defined by and Provided by an Indigenous Representative, Community or Organization (Yes / No).	No		
Platform/Location of Data Storage.	- Alberta Geodiscover - Alberta Water Portal (led by Dr. Chris Hopkinson) - OSM data portal (in development)		
Project Deliverables			
Proposed 2018-19 Deliverable Type (for each deliverable outline document, presentation, meeting, etc.)			
<input checked="" type="checkbox"/> Peer-reviewed Journal Publication	<input type="checkbox"/> Peer-reviewed Conference Proceeding	<input type="checkbox"/> Non-peer reviewed Conference Proceeding	
State of science: Use of remote sensing for monitoring the effects of oil sands development on wetland ecosystems	Q1 - Deliverable, Comments	Q1 - Deliverable, Comments	
- Submitted to Canadian Journal of Remote Sensing (or similar journal) - May 2018 - To develop a remote sensing monitoring framework to assess the direct and indirect effects of oil sands (OS) development on wetlands ecosystems in northern Alberta. There is a need to spatially and temporally monitor wetland loss, transformation to other landscape units (e.g. lake or terrestrial) and gain via wetland reclamation projects.			
Q2 - Deliverable, Comments	Q2 - Deliverable, Comments	Q2 - Deliverable, Comments	
Q3 - Deliverable, Comments	Q3 - Deliverable, Comments	Q3 - Deliverable, Comments	

Q4 - Deliverable, Comments	Q4 - Deliverable, Comments	Q4 - Deliverable, Comments
<input checked="" type="checkbox"/> Technical Report	<input type="checkbox"/> Book Chapter	<input type="checkbox"/> Public Dissemination Document
Annual Technical Report	Q1 - Deliverable, Comments	Q1 - Deliverable, Comments
- Scientific and operational reports, containing cumulative results and program development progress, including data and mapping products - March 2019		
Q2 - Deliverable, Comments	Q2 - Deliverable, Comments	Q2 - Deliverable, Comments
Q3 - Deliverable, Comments	Q3 - Deliverable, Comments	Q3 - Deliverable, Comments
Q4 - Deliverable, Comments	Q4 - Deliverable, Comments	Q4 - Deliverable, Comments
<input type="checkbox"/> Conference Presentation(s)	<input type="checkbox"/> Stakeholder Presentation	<input type="checkbox"/> Key Engagement/Participation Meeting *
Q1 - Deliverable, Comments	Q1 - Deliverable, Comments	Q1 - Deliverable, Comments
Choose one	Choose one	Name of Meeting, Year, Location, Dates, Participant Groups and Number of Participants.
Q2 - Deliverable, Comments	Q2 - Deliverable, Comments	Q2 - Deliverable, Comments
Choose one	Choose one	Name of Meeting, Year, Location, Dates, Participant Groups and Number of Participants.
Q3 - Deliverable, Comments	Q3 - Deliverable, Comments	Q3 - Deliverable, Comments
Choose one	Choose one	Name of Meeting, Year, Location, Dates, Participant Groups and Number of Participants.
Q4 - Deliverable, Comments	Q4 - Deliverable, Comments	Q4 - Deliverable, Comments
Choose one	Choose one	Name of Meeting, Year, Location, Dates, Participant Groups and Number of Participants.
<input type="checkbox"/> EMSD Strategic & Operational Publication	<input checked="" type="checkbox"/> Other Documents	
Q1 - Deliverable, Comments	Wetland classification maps and open water maps from ~1982 to present in oil sands mining study area	
	- High resolution (1m) maps including ground surface elevation (DEM), vegetation characteristics, detailed wetland classification map of extent and type - Autumn 2018 (optical imagery) - Winter 2019 (LIDAR)	

Q2 - Deliverable, Comments	Remote sensing (LiDAR and Landsat) datasets	
	- Corrected, normalised vegetation index maps produced using optical imagery; Water mask products; land surface classifications; change trajectory maps; statistical significance of slope; r2 - March 2019	
Q3 - Deliverable, Comments	Wetland classification maps and open water maps from ~1982 to present across Athabasca oil sands region (possible inclusion of Cold Lake and Peace River regions)	
	- Wetland classification and open water maps of wetland extents and type for the Oil Sands area around Fort McMurray using Landsat (coarser resolution across larger region) - Winter 2019	
Q4 - Deliverable, Comments	Q4 - Deliverable, Comments	
Proposed Deliverables After 2018/2019 for the project funds received in 2018/2019		
<input checked="" type="checkbox"/> Peer-reviewed Journal Publication	<input type="checkbox"/> Peer-reviewed Conference Proceeding	<input type="checkbox"/> Non-peer reviewed Conference Proceeding
Status and trends in wetland area and ecological condition over time associated with changes in climate and oil sands mining development	Q1 - Deliverable, Comments	Q1 - Deliverable, Comments
- Submitted October 2019 - spatial distribution of wetland change and intensity of change from ~pre-oil sands development (historic air photos), 1982 (Landsat) and 2006 (SPOT) to present; using in situ LiDAR and optical (multi-spectral) remote sensing methods - map drying trends in region using Palmer Drought Severity (or similar index) and frequency to track drying trends separate from oil sands development water extraction and N deposition - effects of pixel resolution on accuracy of wetland change detection - determine recommended repeat times for remote sensing data acquisition to monitor wetland change over time		
Effects of wetland loss associated with oil sands development on downstream water quality	Q2 - Deliverable, Comments	Q2 - Deliverable, Comments
- Submitted December 2019 - co-authored with Danielle Cobbaert, Laura Chasmer and Rebecca Rooney		
Assessment of the effects of hydrologic alteration by Oil Sands industries with distance from oil sands mines	Q3 - Deliverable, Comments	Q3 - Deliverable, Comments
- Submitted March 2020 - uses vegetation structural changes as proxy indicators for wetland ecosystem condition - includes developing framework for identifying ecosystem sensitivity to changes in depth to water table associated with industry-based resource extraction		
Assessment of the effects of Nitrogen (N) deposition with distance from oil sands mines	Q4 - Deliverable, Comments	Q4 - Deliverable, Comments
- Submitted March 2020 - Uses vegetation structural changes as proxy indicators for wetland ecosystem condition to determine effects of N deposition		
	Q5 - Deliverable, Comments	Q5 - Deliverable, Comments
Status and trends in wetland area and ecological condition over time associated with changes in climate and in situ oil sands development		
Technical Report	Book Chapter	Public Dissemination Document

Annual Technical Report - Scientific and operational reports, containing cumulative results and program development progress, including data and mapping products - March 2020	Q1 - Deliverable, Comments	Q1 - Deliverable, Comments
Q2 - Deliverable, Comments	Q2 - Deliverable, Comments	Q2 - Deliverable, Comments
Q3 - Deliverable, Comments	Q3 - Deliverable, Comments	Q3 - Deliverable, Comments
Q4 - Deliverable, Comments	Q4 - Deliverable, Comments	Q4 - Deliverable, Comments
<input type="checkbox"/> Conference Presentation(s)	<input type="checkbox"/> Stakeholder Presentation	<input type="checkbox"/> Key Engagement/Participation Meeting *
Q1 - Deliverable, Comments Choose one	Q1 - Deliverable, Comments Choose one	Q1 - Deliverable, Comments Name of Meeting, Year, Location, Dates, Participant Groups and Number of Participants.
Q2 - Deliverable, Comments Choose one	Q2 - Deliverable, Comments Choose one	Q2 - Deliverable, Comments Name of Meeting, Year, Location, Dates, Participant Groups and Number of Participants.
Q3 - Deliverable, Comments Choose one	Q3 - Deliverable, Comments Choose one	Q3 - Deliverable, Comments Name of Meeting, Year, Location, Dates, Participant Groups and Number of Participants.
Q4 - Deliverable, Comments Choose one	Q4 - Deliverable, Comments Choose one	Q4 - Deliverable, Comments Name of Meeting, Year, Location, Dates, Participant Groups and Number of Participants.
<input type="checkbox"/> EMSD Strategic & Operational Publication	<input type="checkbox"/> Other Documents	
Q1 - Deliverable, Comments	Q1 - Deliverable, Comments	
Q2 - Deliverable, Comments	Q2 - Deliverable, Comments	
Q3 - Deliverable, Comments	Q3 - Deliverable, Comments	

Q4 - Deliverable, Comments	Q4 - Deliverable, Comments
All Completed Products if a multi- year project, specify all completed products to date (consistent format for the fields below). Add rows as required.	
Journal Paper	
Required Format: Author (follow APA citation format), Year, Title, Journal, Volume, Page Numbers, Open or Closed and Document Location Example: Jacoby, W. G. (1994). Public Attitudes Toward Government Spending. American Journal of Political Science, 38(2), 336-361. Fearon, J. D., & Laitin, D. D. (2003). Ethnicity, Insurgency, and Civil War. American Political Science Review, 97(01), 75. doi: 10.1017/S0003055403000534	
1)	
2)	
3)	
4)	
5)	
Technical Report	
Required Format: Author, Year, Title, Publisher Location, Name of Publisher, Publisher, Document Location Example: Author, F.M. (Publication Year). Title of Report (Report No. XXX). Publisher City, State: Publisher	
1)	
2)	
3)	
4)	
5)	
Book Chapter	
Required Format: Author, Year, Title of Paper, Editors, Title of Book, Page Numbers, Location of Publisher, Name of Publisher, Document Location Example: Hemingway, E. (1999). The Killers. In J. Updike & K. Kenison (Eds.), The Best American Short Stories of the Century (pp.78-80). Boston, MA: Houghton Mifflin	
1)	
2)	
3)	
4)	
5)	
Conference Proceeding	
Required Format: Author, Year, Title of Paper, Editors, Title of Proceedings, Name of Conference Location of Conference, Publisher Location, Name of Example: Author of Paper, A., & Author of Paper, B. (Year, Month date). Title of Paper. In A. Editor, B. Editor, & C. Editor. Title of Published Proceedings. Paper Presented at Title of Conference: Subtitle of Conference, Location (inclusive page numbers). Place of Publication: Publisher.	
1)	
2)	
3)	
4)	
5)	
Public Dissemination Document	
Required Format: Author, Year, Title, Journal / Report, Volume, Publisher, Page Number, Number of Pages, Document Location	
1)	
2)	
3)	
4)	
5)	
AEP ONLY: EMSD Strategic and Operational Publication	
Required Format: Author, Year, Title, Publisher Location, Name of Publisher, Publisher, Document Location	
1)	
2)	
3)	

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Other Documents
Detailed Information of Other Documents
1)
2)
3)
4)
5)
Conference Presentation
Required Format: Presenter, Date, Location, Title, Platform or Poster, Conference Name
1)
2)
3)
4)
5)
Stakeholder Presentation
Required Format: Presenter, Date, Location, Title, Platform or Poster, Name of Meeting
1)
2)
3)
4)
5)
Key Engagement/Participation Meeting
Required Format: Meeting Host, Date, Location
1)
2)
3)
4)
5)

Human Resources / Staffing Plan (roles and responsibilities)			
Name & Role	Organization	Responsibilities	
Danielle Cobbaert, Co-Principal Investigator	AEP	Coordination and integration between various Wetland Monitoring Focus Studies; program lead for JOSM Long-term wetland monitoring program development Focus Study including remote sensing component; Co-PI on vegetation indicator criteria and vegetation methods	
Laura Chasmer, Co-Principal Investigator	University of Lethbridge	Remote sensing data analysis and integration at sites, including LIDAR and optical remote sensing data analysis; collaboration with lead scientists in other projects, such that remote sensing initiatives are comparable across sites; graduate student supervising and HQP development	
Chris Hopkinson, Co-Investigator	University of Lethbridge	LIDAR collections, operations and processing, integration with RADAR imagery, field logistics and graduate student support; access to high power computing resources and measurement instrumentation including survey-grade GPS; access and integration of results within Alberta Water Portal	
Richard Petrone, Collaborator	University of Waterloo	Sentinel sites, hydro-meteorology and validation lead	
Jonathon Price, Collaborator	University of Waterloo	Sentinel sites, hydro-meteorology and validation datasets	
Kevin Devito, Collaborator	University of Alberta	Synoptic site: long-term hydrology and hydrometric measurements	
Josh Montgomery, field support and GIS support	AEP	<ul style="list-style-type: none"> - Conduct critical review of existing Alberta Merged wetland inventory to meet current monitoring needs, including a literature review of existing and emerging remote sensing methods for an updated provincial wetland inventory. - Assist with remote sensing analysis and GIS analysis of wetland monitoring sites . - Conduct field sampling of wetland monitoring sites as required. 	
AEP ONLY: Additional Human Resources Required from EMSD			
Name & Role	Branch - Section	Estimated time (% of annual FTE)	Estimated Salary Range
Danielle Cobbaert, Wetland Scientist	Science - Biodiversity and Ecosystem Health	10	\$110,000 - \$130,000 (including 25% to cover benefits)
Josh Montgomery, Wetland Scientist	Science - Biodiversity and Ecosystem Health	15	\$70,000 - \$90,000 (including 25% to cover benefits)
			Choose one
			Choose one
			Choose one
			Choose one
			Choose one
			Choose one
			Choose one
			Choose one
Financial Details and Budget Request			

Source of Funding Requested Year 1 - 2018/19		
	AEP ONLY: EMSD	OSM
Salaries and Benefits - EMSD Chargeback		\$26,250
Salaries and Benefits -New OSM Staff		\$0
Operations and Maintenance		
Consumable materials and supplies		
Conferences and meetings travel		
Field work travel		
Project-related travel		
Engagement		
Reporting		
External Contracts -		
Organization/Vendor/Suppliers		
Overhead		
Grants to U. Lethbridge (18GRAEM24)		\$198,393
Capital		
Total budget request for the year	\$0	\$224,643
Total budget approved		

Source of Funding Requested Year 2 - 2019/20		
	AEP ONLY: EMSD	OSM
Salaries and Benefits - EMSD Chargeback		\$26,250
Salaries and Benefits -New OSM Staff		
Operations and Maintenance		
Consumable materials and supplies		\$500
Conferences and meetings travel		\$8,000
Field work travel		
Project-related travel		
Engagement		
Reporting		\$3,000
External Contracts -		
Organization/Vendor/Suppliers		
Overhead		\$25,950
Grants		
Capital		
Total budget request for the year	\$0	\$63,700
Total budget approved		

Source of Funding Requested Year 3 - 2020/21		
	AEP ONLY: EMSD	OSM
Salaries and Benefits - EMSD Chargeback		\$26,250
Salaries and Benefits -New OSM Staff		
Operations and Maintenance		
Consumable materials and supplies		
Conferences and meetings travel		
Field work travel		
Project-related travel		
Engagement		
Reporting		
External Contracts -		
Organization/Vendor/Suppliers		
Overhead		
Grants		
Capital		
Total budget request for the year	0	26250
Total budget approved		

Source of Funding Requested Year 4 - 2021/22		
	AEP ONLY: EMSD	OSM
Salaries and Benefits - EMSD Chargeback		\$26,250
Salaries and Benefits -New OSM Staff		
Operations and Maintenance		
Consumable materials and supplies		
Conferences and meetings travel		
Field work travel		
Project-related travel		
Engagement		
Reporting		
External Contracts -		
Organization/Vendor/Suppliers		
Overhead		
Grants		
Capital		
Total budget request for the year	0	26250
Total budget approved		

Budget Request for the Entire Project	0	340,843
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Project Approval(s)		
Proposal Submitted by		
Surname	Given Name	Organization
Cobbaert	Danielle	Alberta Environment and Parks
Signature	Date	
	13-Feb-18	

X



Danielle Cobbaert
Wetland Scientist

Proposal for OSM Reviewed by

EMSD Executive Director	Signature	Date
Bill Donahue, Science Branch		13/02/18

AEP Administrator/Coordinator - Review	Signature	Date
	X Dan Farr, for Bill Donahue Director, Biodiversity and Ecosystem Health ...	

ECCC Administrator/Coordinator - Review	Signature	Date

OSM Project Approved by

AEP Co-Lead for OSM	Signature	Date

ECCC Co-Lead for OSM	Signature	Date

AEP ONLY: Proposal for EMSD Reviewed by

EMSD Director	Signature	Date

AEP ONLY: EMSD Project Approved by

EMSD Executive Director	Signature	Date

EMSD Chief Scientist	Signature	Date

OSM / EMSD Project Has Not Been Approved

Project Status	Date Notified	Date Required
The project is conditionally approved. The following conditions are required before approval is granted.		

List the Condition(s)

Condition(s) Addressed / Approval Granted
Choose one

OSM / EMSD Approval Post Removal of Condition(s)

Name & Title	Signature	Date

Add All Monitoring Site Locations and Coordinates (insert more rows if required)

Location Name *	Lat*	Long*
Firebag Fen	57.22433	-110.898
Poplar Road Fen	56.93852	-111.549
Unnamed 1 Fen	56.57392	-111.276
Pauciflora Fen	56.37542	-111.235
Unnamed 2 Fen	56.32108	-111.65
Mariana Fen	55.899	-112.096
McClelland Fen	57.44	-111.448
Kearl Fen	57.265	-111.262
JPH4 Bog	57.113	-111.423
McKay Bog	57.228	-111.703
McMurray Bog	56.627	-111.196
Anzac Bog	56.469	-111.043
Mariana Bog	57.431	-111.279
McClelland Bog	57.433	-111.256
Kearl Bog	57.275	-111.253
S46 SOWW	58.337	-111.504
Unnamed 1 SOWW	57.507	-111.544
McKay SOWW	57.143	-111.605
Unnamed 2 SOWW	57.027	-111.488
La Saline SOWW	57.076	-111.523
McMurray SOWW	56.818	-111.424
Voyager SOWW	56.934	-111.454
Shipyards SOWW	56.96	-111.436
Mariana SOWW	55.878	-112.113
McClelland SOWW	57.453	-111.294
Kearl SOWW	57.258	-111.252
Maqua SOWW	56.36996	-111.28354
Tower Road North SOWW	56.79252	-111.78166
Horse River SOWW	56.10873	-111.76422
Hangingstone SOWW	56.31507	-111.6237
Pat's Pond West SOWW	57.51162	-111.40179
AOSTRA Road SOWW	56.939	-111.66248

Financial Details and Budget Request

Source of Funding Requested Year 1 - 2018/19

	AEP ONLY: EMSD	OSM - Grant to U. Lethbridge (cost breakdown)
Salaries and Benefits	\$25,000	\$118,950
Operations and Maintenance		\$5,000
Consumable materials and supplies		\$3,000
Conferences and meetings travel		\$6,000
Field work travel		\$7,500
Project-related travel		
Engagement		
Reporting		\$2,000
External Contracts -		\$30,000
Overhead		\$25,943
Grants to U. Lethbridge (18GRAEM24)		
Capital		
Total budget request for the year	\$25,000	\$198,393
Total budget approved		

Source of Funding Requested Year 2 - 2019/20

	AEP ONLY: EMSD	OSM
Salaries and Benefits	\$25,000	\$161,500
Operations and Maintenance		
Consumable materials and supplies		\$500
Conferences and meetings travel		\$8,000
Field work travel		
Project-related travel		
Engagement		
Reporting		\$3,000
External Contracts -		
Overhead		\$25,950
Grants		
Capital		
Total budget request for the year	\$25,000	\$198,950
Total budget approved		