5- YEAR LONG-TERM DATA MANAGEMENT ACTIVITY WORK PLAN

Changes to this Work Plan are only accepted via an Approved Addendum.

General Information		
Monitoring Category: *(From OSM long-term plan; choose from drop-down menu)*	Standards, QA/QC, Data Mgt.	
Strategic Monitoring Objective: *(From OSM long-term plan; choose from drop-down menu)*	Objective: Establish and Maintain an Integrated Data Management System for Archiving and Retrieval of Oil Sands Monitoring Program data.	
Work Plan Unique Identifier:	*D-7-1718*	
Monitoring Activity Title:	Import Regional Aquatic Monitoring Program (RAMP) Data to Alberta Environment & Parks (AEP) Data System	
Geographic Location (*choose from drop-down menu, if Project Location is in more than one area choose from second drop-down***)**	Location Not Applicable	
Monitoring Site(s) Coordinates *(latitude and longitude)*	N/A	
Monitoring Organization and Responsible Manager:	Alberta Environment and Parks	Anil Gupta
Date Activity initiated:	**2012**	
Specific Project Objective: *(State the activity objective)*	The project objectives are: Repatriate the Regional Aquatics Monitoring Program (RAMP) website and database from Hatfield Consultants to AEP	
Deliverables (2017-18):	1. All RAMP monitoring data are repatriated to AEP's data system. 2. AEP maintain the RAMP public web site till an alternate public web site (e.g. Oil Sands Data and Information Portal) is built and operationalized. 3. Develop recommendations on how the migrated data could be fully discoverable and searchable by utilizing appropriate metadata.	

Project Plan Summary: *Please summarize the monitoring including relevant information such as background, objectives, monitoring area, methods/monitoring design, assumptions, outcomes, and references. These should align with the information provided in Appendix 1: Annual Monitoring Schedule.*

Context:

Role of Hatfield Consultants:

1. Since its inception in 1997, the RAMP program has always been delivered by contractors/consultants, with support from AEP and industry through a technical committee.
2. Since 2004, Hatfield Consultants have been involved in the field monitoring activities as well as management of collected monitoring data and providing public access of data through a public web portal.
3. Hatfield Consultants were retained during the transition period (marked by the implementation of Joint Oil Sands Monitoring (JOSM), merger of RAMP into JOSM and then transitioning of JOSM program from AEP to Alberta Environmental Monitoring and Reporting Agency (AEMERA) and rolling back of AEMERA to AEP) in response to uncertainty with regard to the future of the RAMP program and desire of integrating RAMP into JOSM.
4. Over the last three years of transitioning period, RAMP is now fully integrated into JOSM and ceased to have its own identity.

This Project: The Need

1. Starting next fiscal year (2017-18), it is anticipated that AEP will have capacity built to perform all the activities related to field monitoring and data management currently being performed by Hatfield Consultants.
2. Repatriation of all the RAMP data systems and public website from Hatfield to AEP is required in anticipation that starting next fiscal year (2017-18), Alberta lead water monitoring data (under Oil Sands Monitoring (OSM)) will be managed internally at AEP.

Repatriation Plan (i.e. scope of this project):

1. Given the proprietary nature and licensing of several of the commercial available and Hatfield-developed components used for the RAMP website and data systems, it will not be possible to transfer these specific systems directly to AEP.
2. Figures 1 to 4 presented below shows the work flow and the several sub-components (commercial and Hatfield-developed) currently being used by Hatfield for data acquisition, quality assurance, public access (web portal) and data storage and hosting.
3. AEP has already identified a suitable commercially available (top of the shelf) data management system called WISKI data system, provided by KISTERS North America, Inc. (vendor) The system was selected based on the business need assessment conducted across all the media (air, land, water etc.). It seems that the selected system is able to meet most of AEP OSM data needs with respect to data management (including data validation), public access and visualization, across all media.
4. Currently, AEP is working with vendor (KISTERS North America, Inc) for piloting the WISKI data system to ensure that system is capable of managing OS discrete data types (e.g. water quality data from lotic systems) and meet all the business needs. The pilot is expected to complete by the end of FY 2016-17.
5. A separate work plan has been developed to implement and operationalized the Kisters data system in AEP (please refer: D-ON-5-1718 Oil Sands (OS) Data management System & infrastructure for AEP).
6. It is anticipated that Kisters data management system (currently being piloted) will be used for repatriation of Hatfield's RAMP data systems and public web site.
7. In addition to the scope of work identified in work plan D-ON-5-1718 OS Data management System &

infrastructure for AEP, following additional tasks are required for repatriation of RAMP monitoring data and systems to AEP:

a. Repatriation of Hydrometric and Climate monitoring Network and Data:

- The RAMP hydrometric and climate monitoring networks relays the monitoring data in near real time (NRT) through either cell based or Geostationary Orbital Environmental Satellite (GOES) telemetry.
- Configuration of hydrometric (flow and water levels – ~79 stations), Climate (~5 stations) and Data Sondes (~16 stations) stations in Kisters Data Management System (DMS). Configuration will include setting up of stations and building all the required time-series in new DMS (i.e Kisters Wiski).
- Explore the possibility of replacing cellular based telemetry to GOES.
- Switching the near real time data feed from AQUARIUS (current data system being used by Hatfield) to Kisters DMS (WISKI), i.e. setting up NRT data acquisition in Kisters Wiski. This might require installing data logger Admin software or through Kisters's Soda product.
- Migration of stage-discharge curves/tables from existing Aquarius to Kisters Wiski.
- Migration of historical manual measurements (i.e. water levels and discharge) and applied shift/drift and any other correction factors from existing Aquarius to Kisters Wiski.
- ETL of historical raw and processed data (i.e. corrected water levels and computed discharges) from existing Aquarius to Kisters Wiski.
- Data verification – once all the raw data, correction factors and stage-discharge curves/tables are migrated to new system, attempts will be made to verify that the previously processed data in existing AQUARIUS (i.e. corrections to recorded water levels and discharge computations) are re-created in Kisters Wiski. This is very important step to ensure data quality and data integrity.

b. Repatriation of In Situ Water Quality (data sonde) Monitoring Network and Data:

- The RAMP water quality data sondes monitoring network relays the monitoring data in near real time through either cell based or GOES telemetry. Water Quality data sondes are co-located with existing hydrometric/climate station network.
- Configuration of water quality Data Sondes stations (~16 stations) in Kisters Wiski DMS. Configuration will include setting up of stations and building all the required time-series in new DMS (i.e Kisters Wiski).
- As Water Quality data sondes are co-located with existing hydrometric/climate stations, some of additional tasks required is already covered above (i.e. cellular telemetry to GOES).
- Switching the near real time data feed from AQUARIUS (current data system being used by Hatfield) to Kisters DMS (WISKI), i.e. setting up NRT data acquisition in Kisters Wiski.
- ETL of historical raw and/or processed data (i.e. corrected water quality data) from existing Aquarius to Kisters Wiski.
- Data verification – once all the raw data and correction factors (if any) are migrated to new system, it will be verified that the previously processed data in existing AQUARIUS are re-created in Kisters Wiski. This is very important step to ensure data quality and data integrity.

c. Repatriation of Analytical Water Quality monitoring data:

- Configuration of water quality stations in Kisters's kiWQM DMS. As a part of pilot and scope of the work identified in work plan "D-5-1718: AEP Data Management Program", stations being monitored during 2016-17 are being already configured in new DMS. However, historically monitoring locations has changed which will require configuring additional historical monitoring locations to repatriate all the historical water quality data collected under the RAMP.
- ETL of historical raw and finalized water quality data.

d. Repatriation of Fish Monitoring Data:
- It will be explored if fish data could be migrated in Kisters's kiECO data management system, otherwise these data will be archived in a relational database.

e. Repatriation of Benthic invertebrate and sediment Monitoring Data:
- It will be explored if benthic invertebrate and sediment data could be migrated in Kisters's kiECO data management system, otherwise these data will be archived in a relational database.

f. Repatriation of Land use Change Analysis and other geospatial Data:
- All the land use change analysis and other spatial data created by Hatfield will be migrated to AEP (possibly in Genesis ArcGIS server).

8. RAMP Public Website: The RAMP Data Query, Export, Display, and Report web application is a custom-built web application that connects to the RAMP MySQL database and allows all datasets to be queried, displayed, exported, and reported. Following additional tasks are required for repatriation of RAMP public website to AEP:
   - Procurement of Hosting services
   - Repatriation of MySQL data system to AEP
   - Recreation of map services through AEP's GENESIS ArcGIS Server.
   - Maintenance of public web site for the period till all the RAMP historical data are either available through Kisters's Web Portal or "Oil Sands Data and Information Portal".
   - It is anticipated that by FY2018-19, RAMP public website be disbanded as by that time, RAMP historical data will either be available through Kisters's Web Portal or "Oil Sands Data and Information Portal".
   - Figure 5 below shows the schematic diagram of repatriated RAMP public website.

Figure 1 The process for acquiring data from climate and hydrology stations with GEOS-based telemetry.

Figure 2 The process for acquiring data from climate, hydrology, and datasonde stations with cell-modem based telemetry.

Figure 3 The process for acquiring data describing water quality, benthic invertebrate communities, snow depth, sediment quality and fish populations from field sample collections and laboratories.

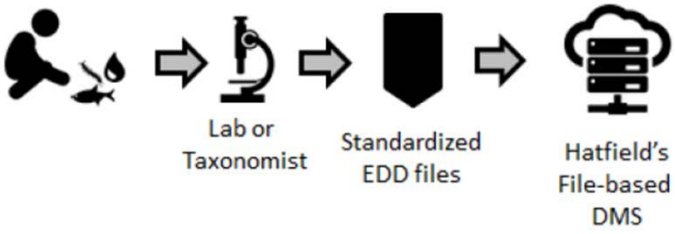


Figure 4 Hatfield's process for extracting, validating, transforming, and loading data to the RAMP database.

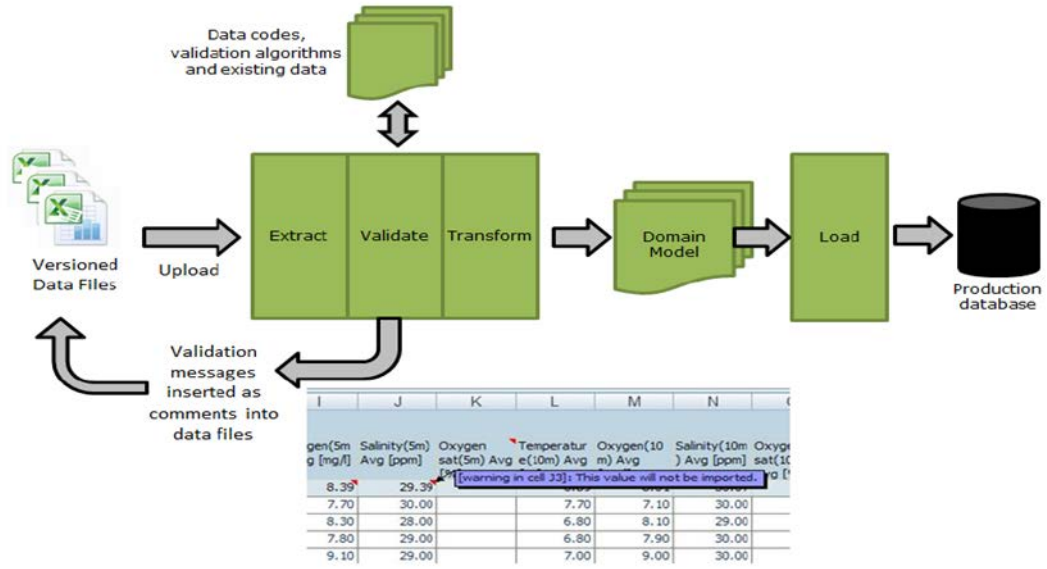
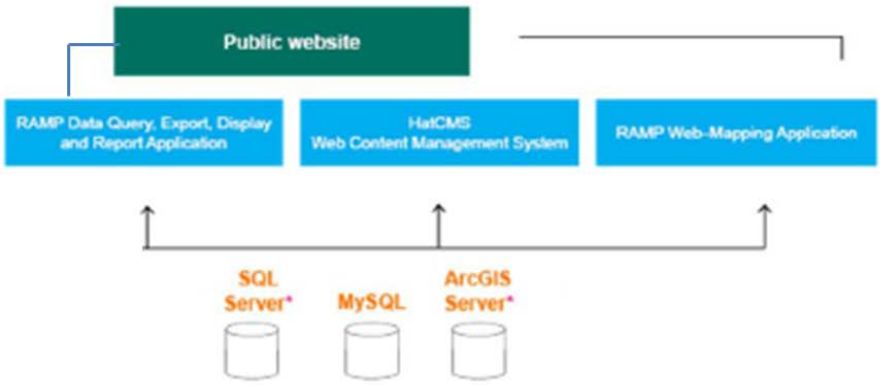


Figure 5 Repatriate RAMP Public website



Appendix 1** – Detailed Multi-Year Financial Breakdown: if changes are to be made then an Addendum must be Complete and Approved.

(Complete the following detailed financial breakdown; add or delete categories as required)

Budget requirements	Year 1 (2017- 2018)		Year 2 (2018- 2019)		Year 3 (201X- 201Y)		Year 4 (201X- 201Y)		Year 5 (201X- 201Y)	
	OSM Funding	External Funding	OSM Funding	External Funding	OSM Funding	External Funding	OSM Funding	External Funding	OSM Funding	External Funding
1) Salaries and benefits										
a) Appendix 2 - Totals	**$20,000**	$0	**$10,000**	$0						
2) Operations and Maintenance										
a) OS Secretariat Operational Costs (including Travel/Translation etc.)										
b) Helicopter										
c) Lab analysis										
d) Data management: License for data management system: WISKI (and other modules e.g. kiWQM and kiECO)	$10,000*	$0	$0	$0						
e) Hosting Services (for web portal and MySQL data System) and computer hardware/software – through AEP contract or university grant	$25,000	$0	$25,000	$0						
3) Consumable Materials and supplies										
a) (*Describe Consumable Supply*)										

4) Travel										
a) Conferences and meetings (*identify conference/meeting*)	$5,000	$0	$0	$0						
b) Field work - travel	$0	$0	$0	$0						
c) Project-related travel	$10,000	$0								
5) External Contracts										
a) Support for configuration of monitoring stations in data management system (Wiski, kiWQM and kiECO) (Contractor or university grant or staff hiring- TBD)	$100,000	$0	$0	$0						
b) ETL of RAMP Data to Kisters data management System - Hydrometric and Climate - In Situ Water Quality (data sonde) - Analytical Water Quality - Fish - Benthic invertebrate - Land use Change Analysis and other geospatial Data (Contractor or university grant or staff hiring- TBD)	 $150,000 $10,000 $50,000 $30,000 $30,000 $25,000	 $0 $0 $0 $0 $0 $0	 $0 $0 $0 $0 $0 $0	 $0 $0 $0 $0 $0 $0						
Grand Total	$465,000	$0	$35,000	$0						

Notes:

* there will not be any cost if licenses for the required Kisters data systems are made available for this project by EMSD/AEP, otherwise, the required system licenses could be acquired using the funding provided in this work plan (may be through University of Calgary).

** Provided cost estimates are based on reasonable assumptions and it might be required to move the budget from one category to another category. However, the total project cost will not be exceeded.

Appendix 2** – Staffing Plan

(Complete the following detailed staffing plan; add or delete categories as required)

	Year 1 – Budget Allocation		Year 2 – Budget Allocation		Year 3 – Budget Allocation		Year 4 – Budget Allocation		Year 5 – Budget Allocation	
Responsible Role	OSM Funding	External Funding	OSM Funding	External Funding	OSM Funding	External Funding	OSM Funding	External Funding	OSM Funding	External Funding
PI – Anil Gupta (0.10 FTE)	$10,000	$0	$0	$0						
Web portal support analyst (0.10 FTE) (lead by Rita L Tippe): Maintenance of public web site for the period till all the RAMP historical data are either available through Kisters's Web Portal or "Oil Sands Data and Information Portal"	$10,000	$0	$10,000	$0						
Grand Total (*inserted into Appendix 1*)	**$20,000**	**$0**	**$10,000**	**$0**						

Appendix 3 - Approvals

Project Submitted by:		
Name: Anil Gupta		
Organization: EMSD/AEP	Signature:	Date: May 25, 2017

Project Approved by:		
Dr. Monique Dubé (AEP)		**Dr. Kevin Cash (ECCC)**
Signature 		Signature 
Date		Date