

A Real-time and Forecast Puff Dispersion Modelling System that Models Accidental Atmospheric Release Events from Rail Cars

17th Railroad Environment Conference: Environmental Management Systems

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What is EAMAS?



CONSULTING ENGINEERS
& SCIENTISTS



- Real-time system (forecast + now cast)
- Advanced modelling (non steady state, curved trajectories)
- Short range and long range transport
- Seamless interface between release model and puff dispersion model
- Handle a variety of modelling scenarios
- Scalable to handle other domains



Sources:
Industry high risk sources -
tanks, vessels, piping.
Industry Inputs Data

Meteorology:
WBEA Stations &
NCEP Forecast



Processing
(Forecast and Dispersion
Modelling H/W at
Oxbridge)

WBEA Station
Analyzer Data



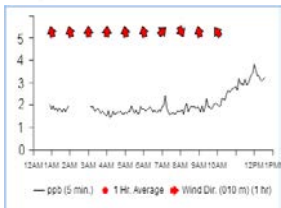
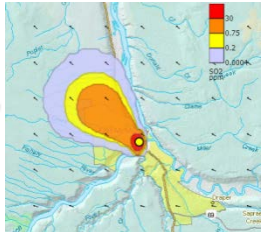
GIS Web Services
For Mapping and Layers
at Service Alberta



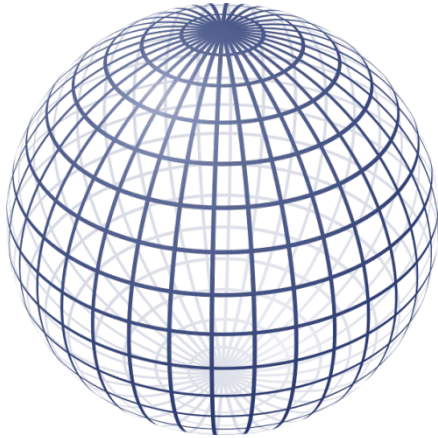
Secure EAMAS Website
at Oxbridge



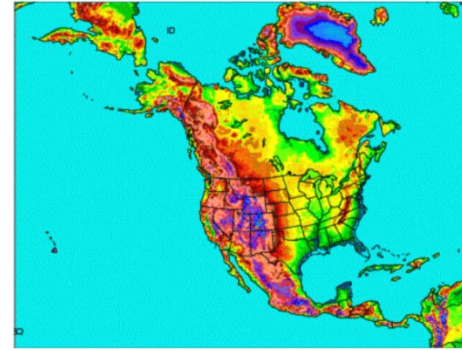
Assessment Team
(Industry, Municipality,
AER, ESRD , etc)



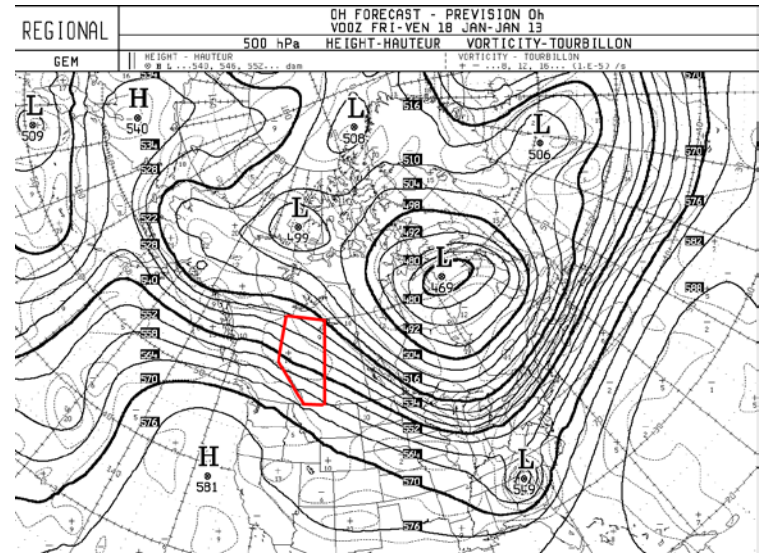
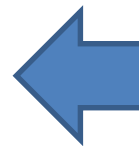
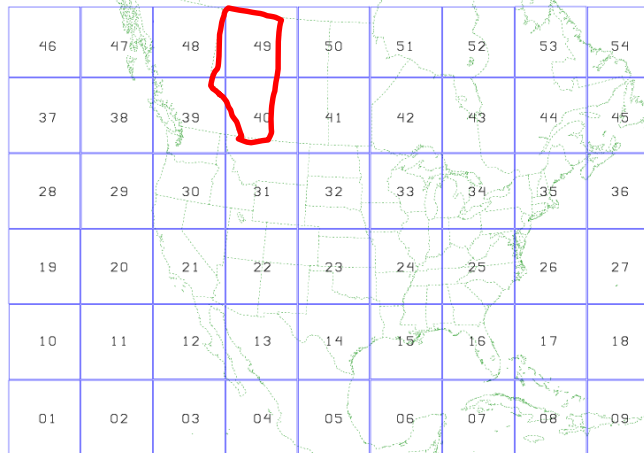




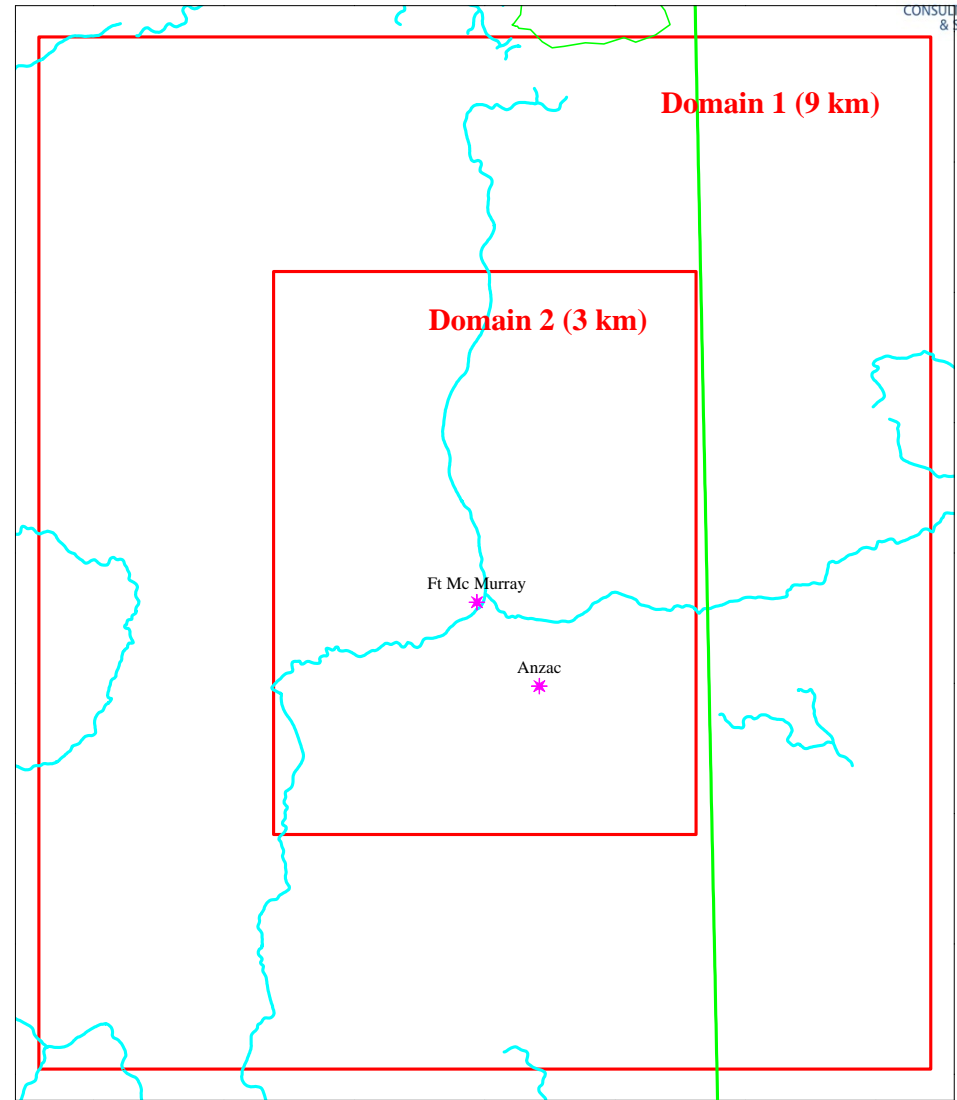
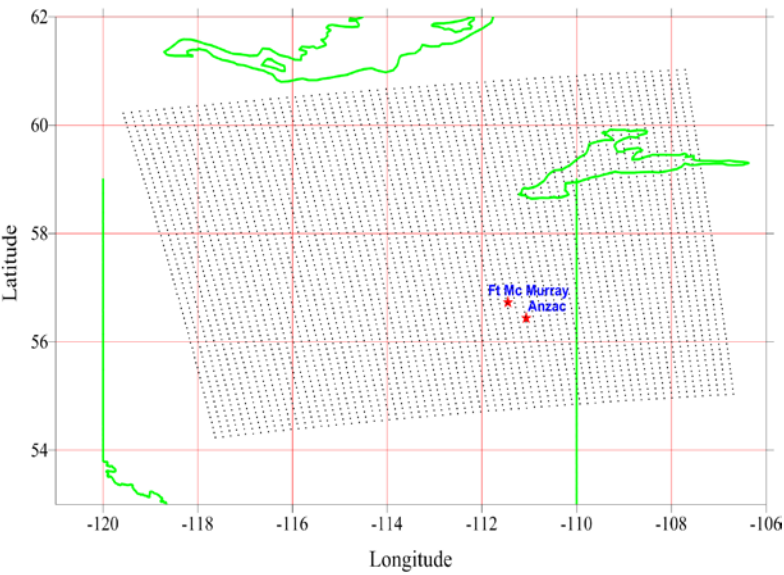
Global
Forecast



NAM 12km



NAM (ETA) 12-km Grid Locations
Tile-49



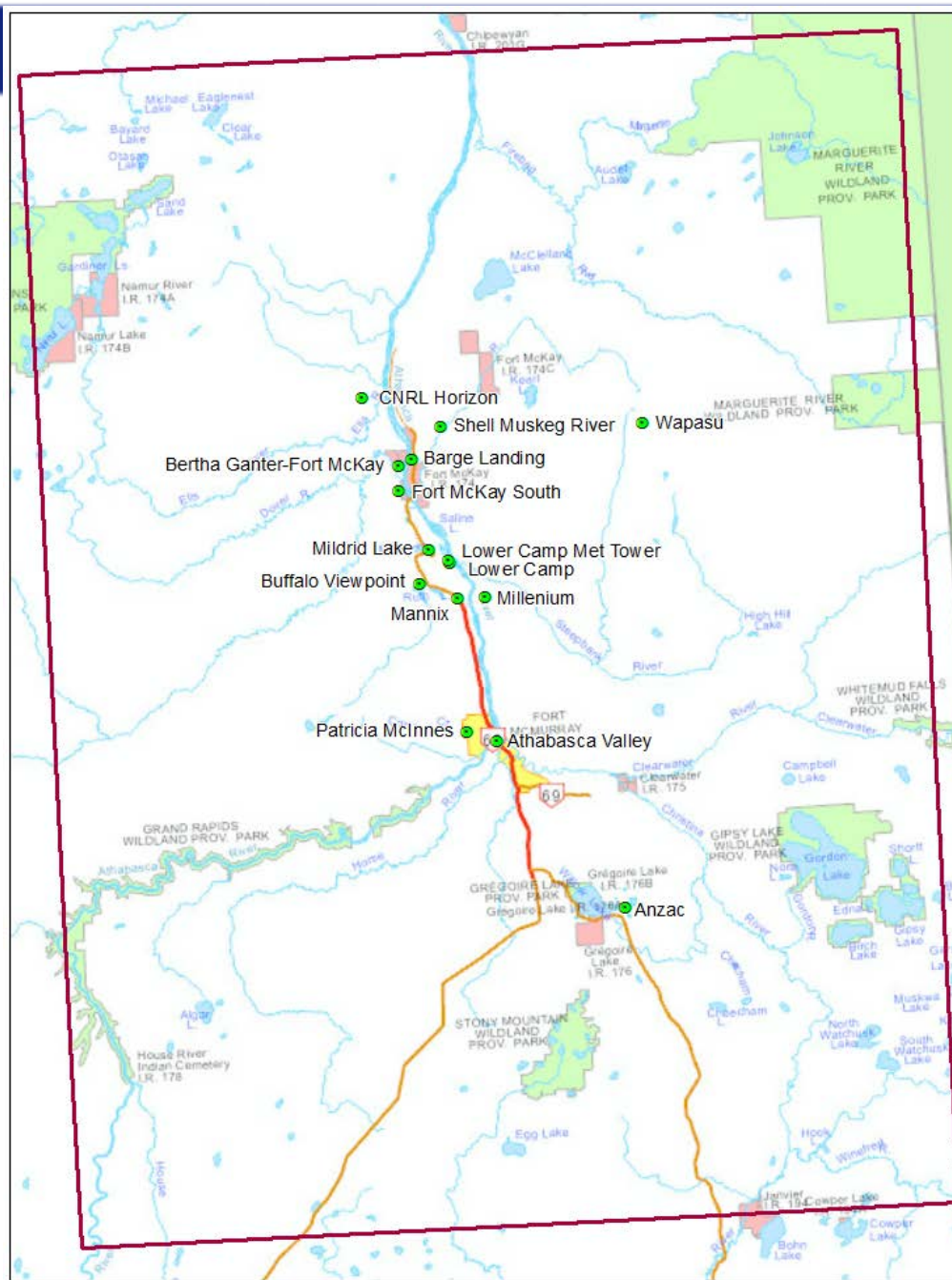
Monitoring Stations

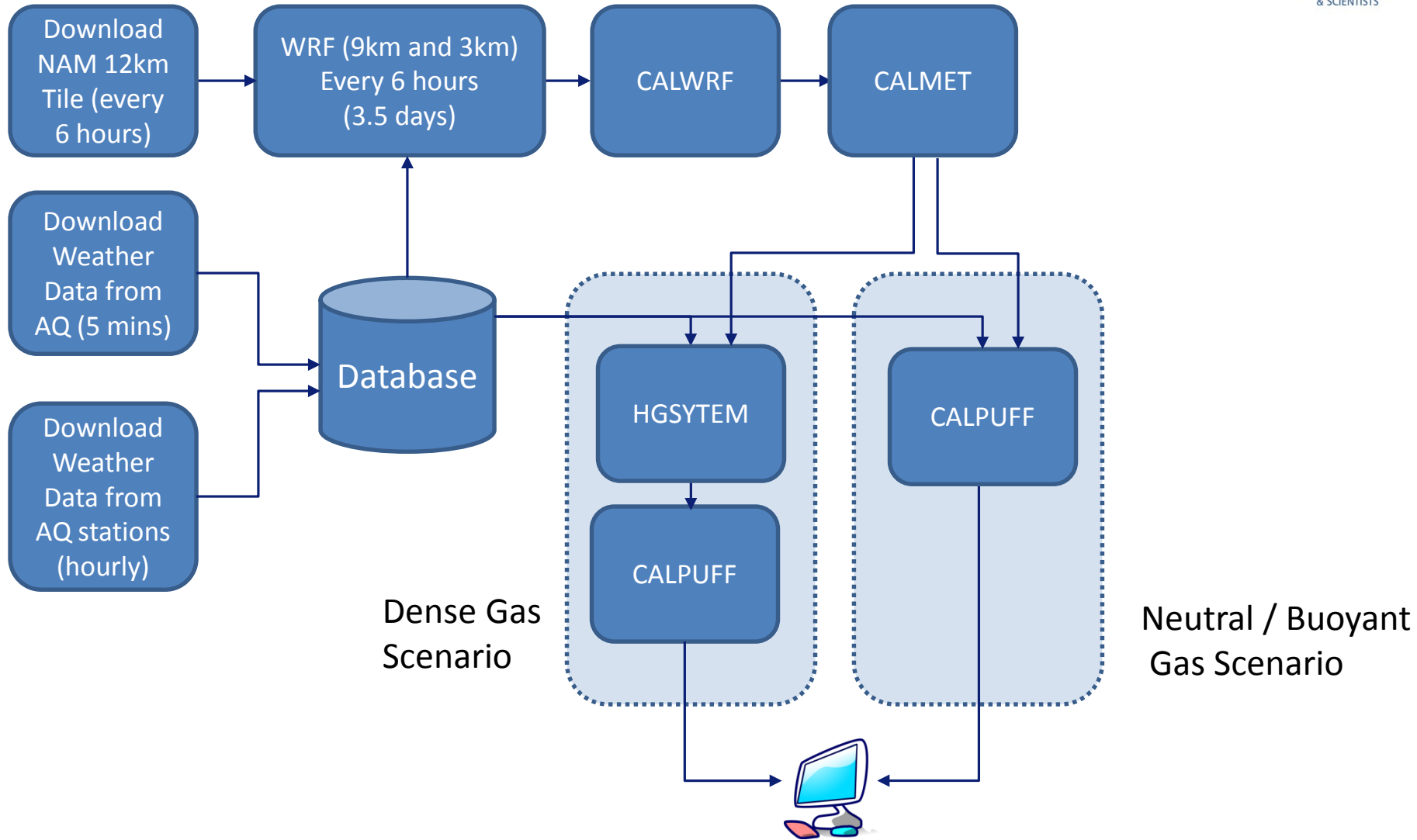


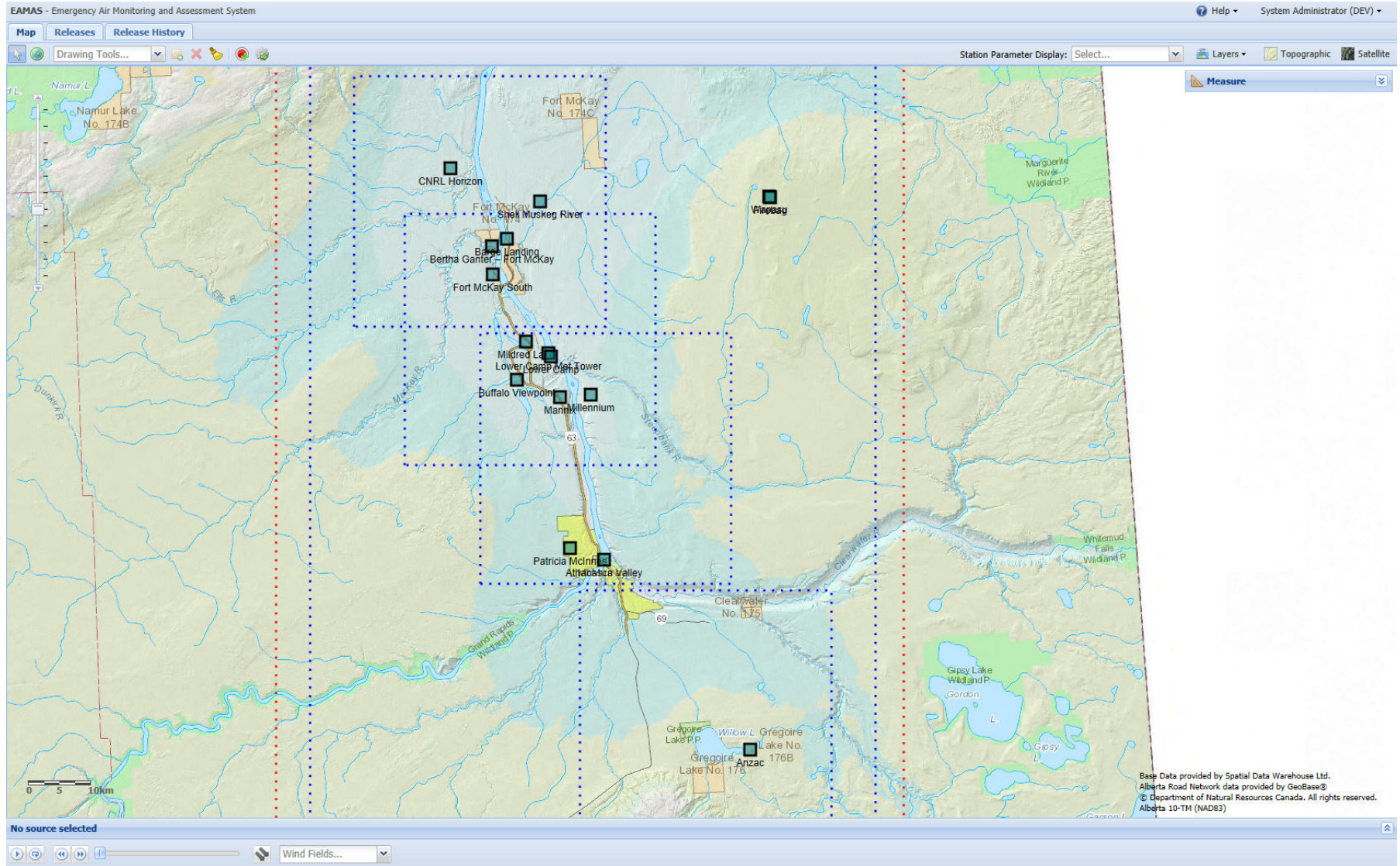
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ENVIRONMENTAL ASSOCIATION



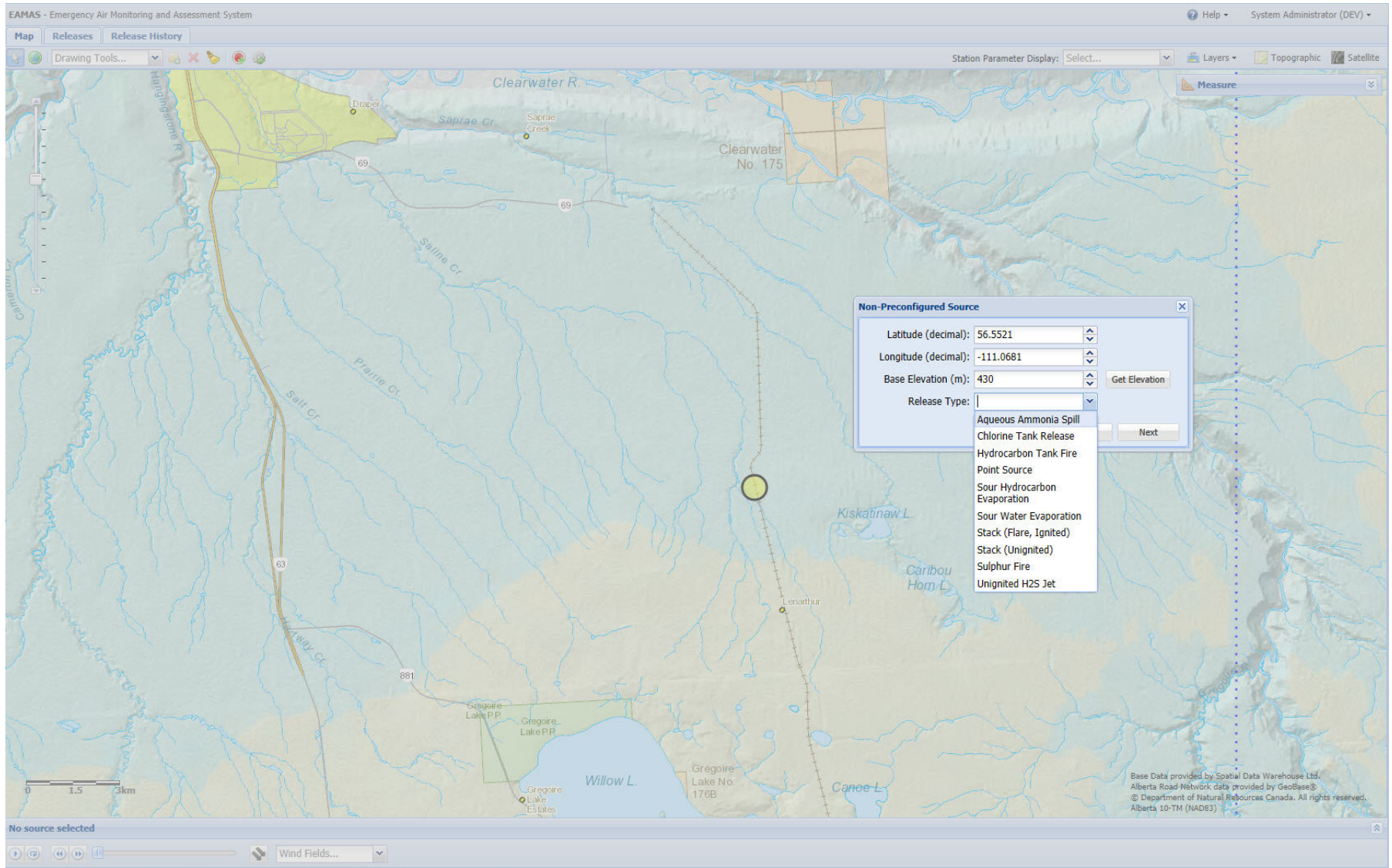




EAMAS - Emergency Air Monitoring and Assessment System

Map Releases Release History

Drawing Tools... Station Parameter Display: Select... Layers Topographic Satellite Measure



Latitude (decimal): 56.5521

Longitude (decimal): -111.0681

Base Elevation (m): 430

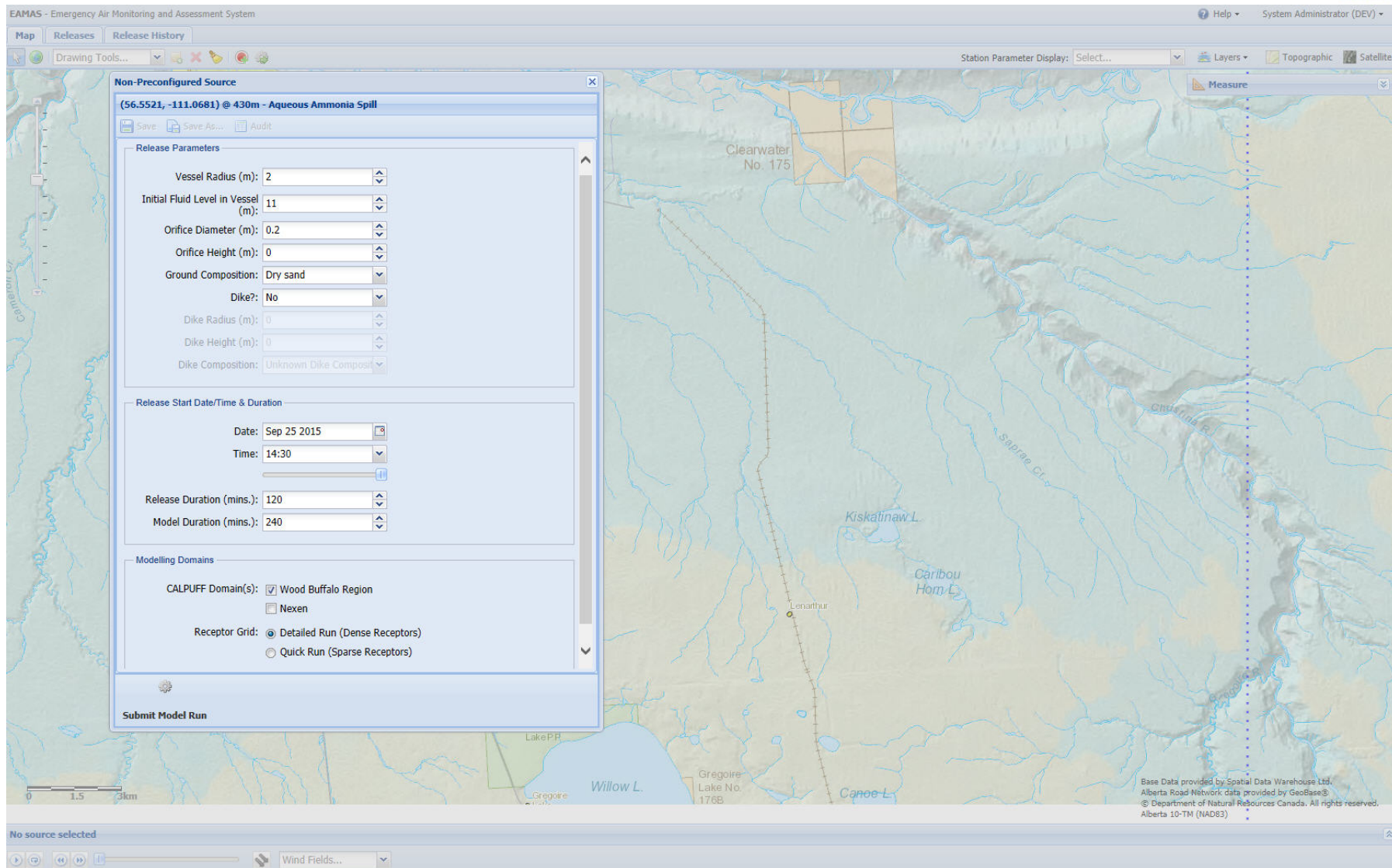
Release Type:

- Aqueous Ammonia Spill
- Chlorine Tank Release
- Hydrocarbon Tank Fire
- Point Source
- Sour Hydrocarbon Evaporation
- Sour Water Evaporation
- Stack (Flare, Ignited)
- Stack (Unignited)
- Sulphur Fire
- Unignited H2S Jet

No source selected

Wind Fields...

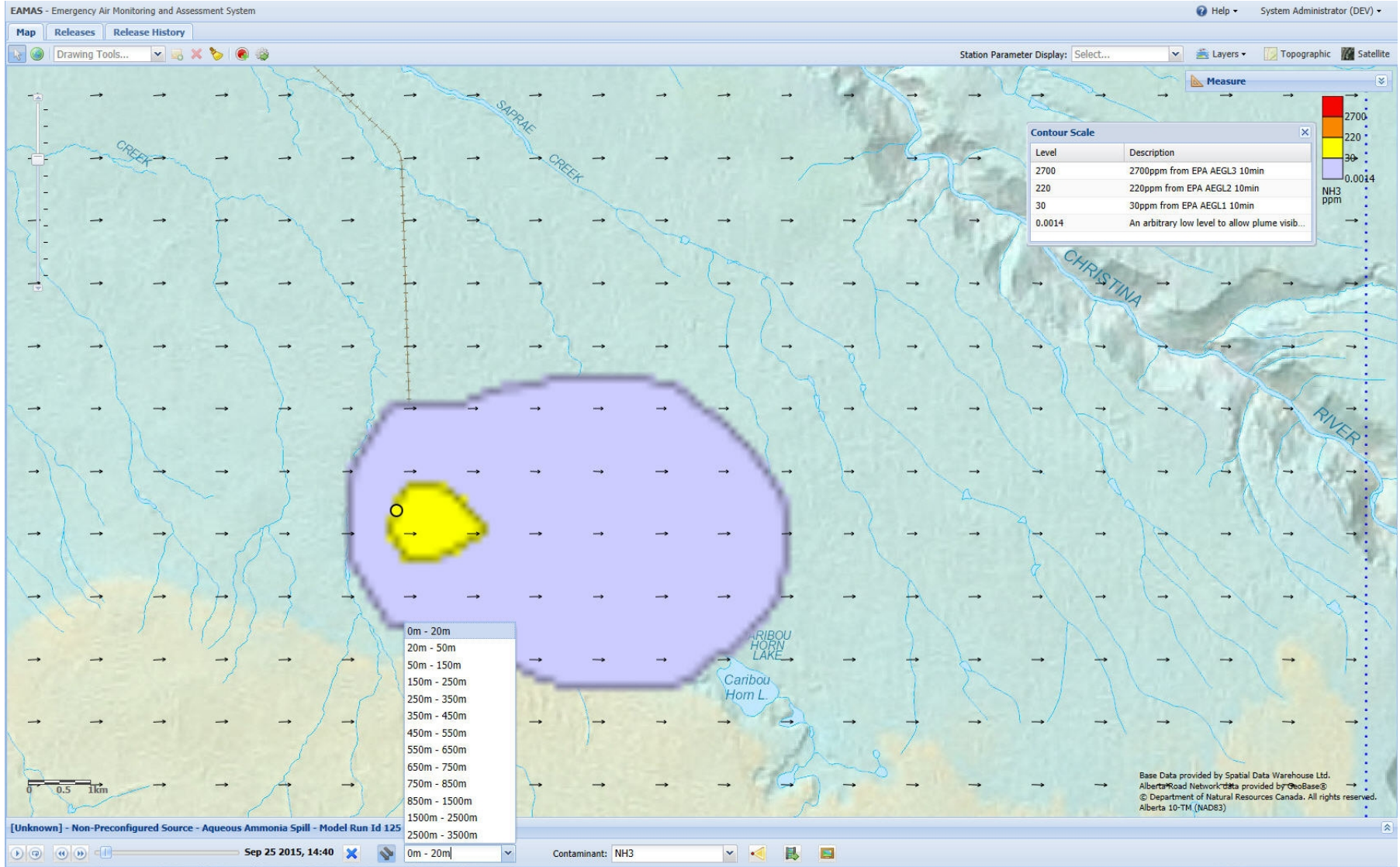
Base Data provided by Spatial Data Warehouse Ltd, Alberta Road Network data provided by GeoBase® © Department of Natural Resources Canada. All rights reserved. Alberta 10-TM (NAD83)



The screenshot displays the EAMAS (Emergency Air Monitoring and Assessment System) interface. The main window shows a topographic map of a region with several lakes and rivers. A spill source is defined at coordinates (56.5521, -111.0681) with a radius of 430m. The configuration window is titled "Non-Preconfigured Source" and contains the following settings:

- Release Parameters:**
 - Vessel Radius (m): 2
 - Initial Fluid Level in Vessel (m): 11
 - Orifice Diameter (m): 0.2
 - Orifice Height (m): 0
 - Ground Composition: Dry sand
 - Dike?: No
 - Dike Radius (m): 0
 - Dike Height (m): 0
 - Dike Composition: Unknown Dike Compos...
- Release Start Date/Time & Duration:**
 - Date: Sep 25 2015
 - Time: 14:30
 - Release Duration (mins.): 120
 - Model Duration (mins.): 240
- Modelling Domains:**
 - CALPUFF Domain(s): Wood Buffalo Region, Nexen
 - Receptor Grid: Detailed Run (Dense Receptors), Quick Run (Sparse Receptors)

At the bottom of the configuration window is a "Submit Model Run" button. The map background shows geographical features such as Clearwater No. 175, Kiskatinaw L., Caribou Horn L., Willow L., and Gregoire Lake No. 176B. A scale bar at the bottom left indicates 0, 1.5, and 3 km. The status bar at the bottom left shows "No source selected".



EAMAS - Emergency Air Monitoring and Assessment System

Map Releases Release History

Drawing Tools...

Station Parameter Display: Select...

Layers Topographic Satellite

Measure

Contour Scale

Level	Description
2700	2700ppm from EPA AEGL3 10min
220	220ppm from EPA AEGL2 10min
30	30ppm from EPA AEGL1 10min
0.0014	An arbitrary low level to allow plume visib...

NH3 ppm

Event Notification Wizard (Step 5 of 5)

Please confirm the event details:

Release	Aqueous Ammonia Spill
Event Type	Real Event
Description	There was a train derailment at mile marker 100 at 07:00am. A tanker car full of aqueous ammonia spilled. Emergency response personnel have been dispatched. There will be a conf call at 09:00 to discuss - call in number (xxx) xxx-xxxx.
Notify	ASERT

Cancel Previous Finish

0m - 20m
20m - 50m
50m - 150m
150m - 250m
250m - 350m
350m - 450m
450m - 550m
550m - 650m
650m - 750m
750m - 850m
850m - 1500m
1500m - 2500m
2500m - 3500m

[Unknown] - Non-Preconfigured Source - Aqueous Ammonia Spill - Model Run Id 125

Sep 25 2015, 14:40

Contaminant: NH3

Base Data provided by Spatial Data Warehouse Ltd.
Alberta Road Network Data provided by GeoBase®
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Alberta 10-TM (NAD83)

- A real-time puff dispersion modelling system has been developed
- Incorporates high resolution numerical weather models, air quality monitoring network
- Uses release models (HGSYSTEM) and CALPUFF dispersion model
- Intuitive web-based map interface
- Handles multiple release types and scenarios



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