Air Dispersion of Methane Seeps – Fugitive Emission Evaluation

Geosyntec consultants

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Evaluation Criteria

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- **EPA Approved Model**

AERSCREEN used with both area and volume source characteristics

- **Terrain assumptions**

Forest and Grassland evaluated due to various terrain considerations

- **Basis of Data**

COGCC Seep Concentration studies from 2001, 2007 and 2015

Seeps measured via vehicle survey. Mass rates back-calculated at arbitrary distances of 25m, 50m, 75m, and 100m from the vehicle. Distance was capped at 100m for mass rate analysis, however a larger distance would result in higher mass rate values. The likelihood of distances greater than 100m is high.

Study Area

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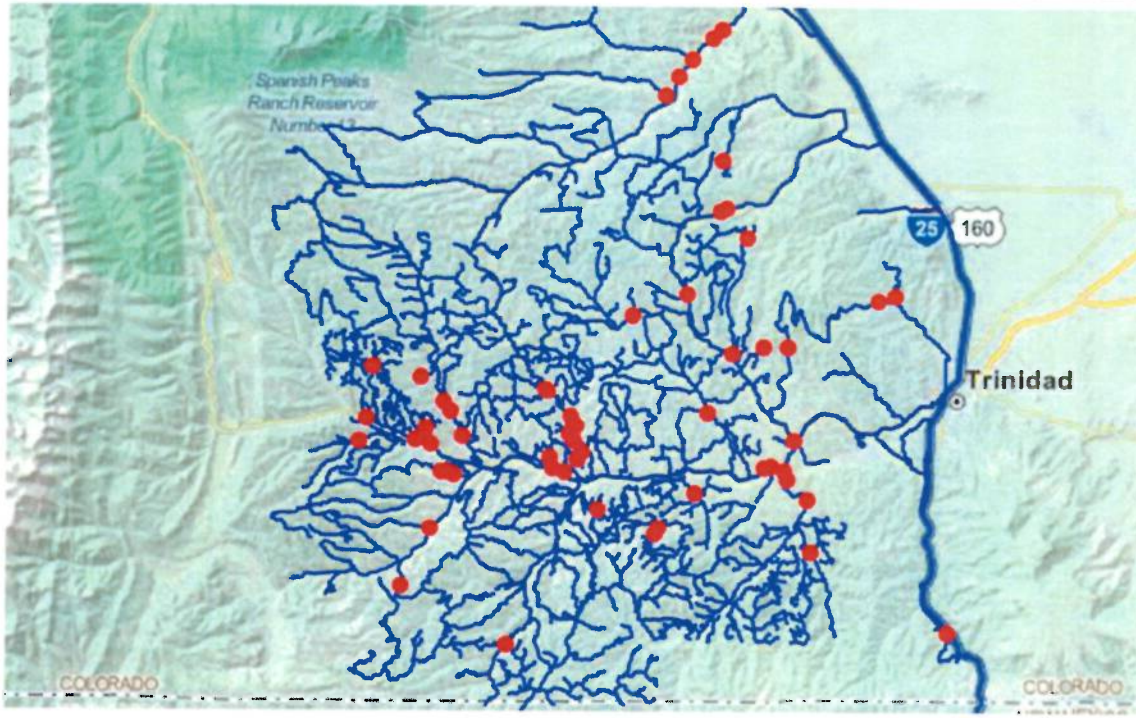

Figure 2. Map showing seeps detected during the 2015 survey (red boxes) and vehicle track (blue line).

2001 – 2015 COGCC Methane Seep Survey Trends

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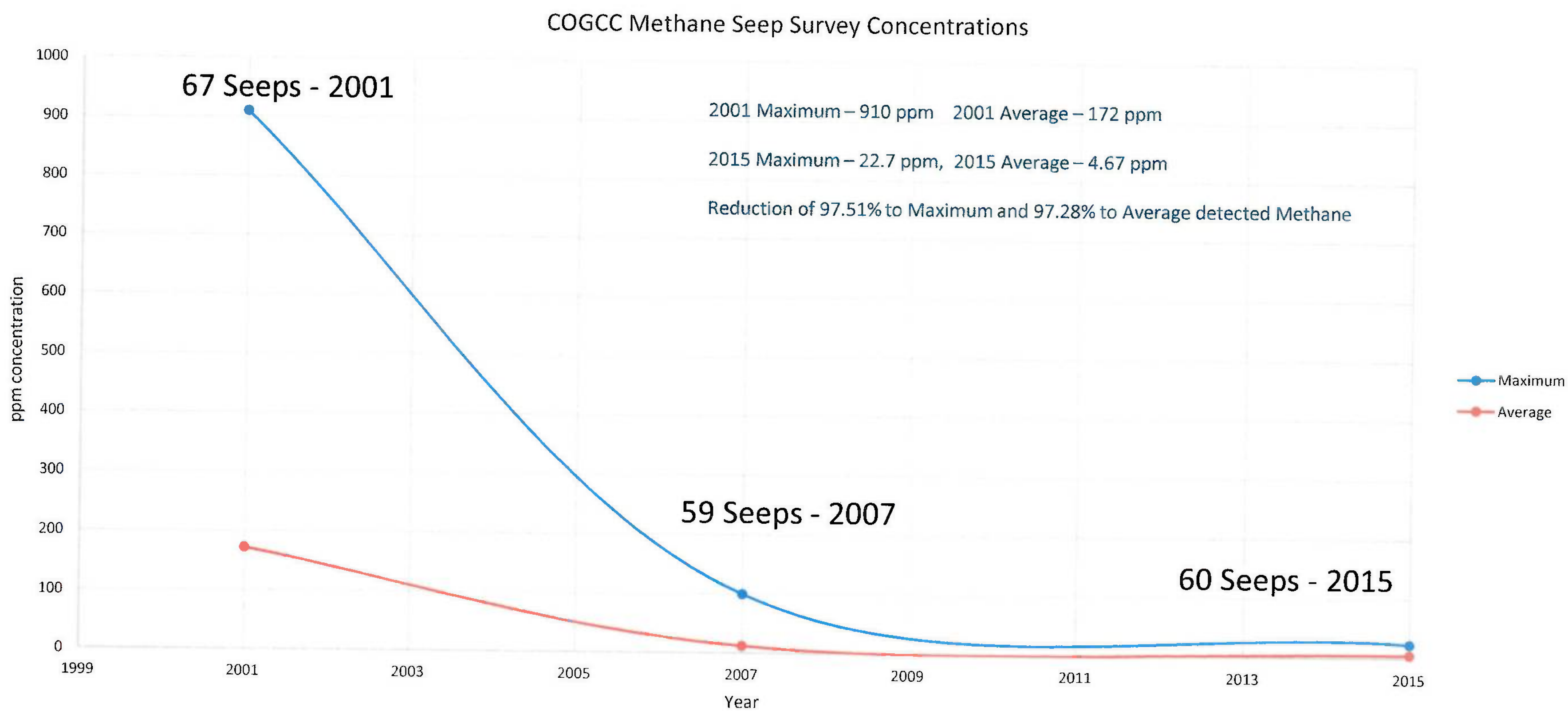

AERSCREEN Modeling Results

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AERSCREEN-Predicted Basin-Wide Methane Seep Emissions By Downwind Distance and Land Use (US tons per year)												
Source Type	25 m 2001	25 m 2007	25 m 2015	50 m 2001	50 m 2007	50 m 2015	75 m 2001	75 m 2007	75 m 2015	100m 2001	100m 2007	100m 2015
Volume Source - Forest	37,275	2,647	906	113,148	8,035	2,751	223,333	15,859	5,430	363,123	25,786	8,829
Area Source - Forest	2,521	179	61	6,637	471	161	11,842	841	288	17,843	1,267	434
Volume Source - Grassland	2,769	197	67	4,645	330	113	6,629	471	161	8,770	623	213
Area Source - Grassland	1,215	86	30	1,850	131	45	2,889	205	70	4,120	293	100
	2001	2007	2015									
Survey Average Seep (ppm)	172	13.87	4.67									
Total Number of Seeps	67	59	60									

Notes:

1) All data in this table represent calculated emission rates based upon monitored concentrations with samples assumed to be monitored at 1m elevation.
2) The volume and area sources are the two source types in AERSCREEN that most accurately represent the physical nature of a methane seep.
3) The AERSCREEN model is a conservative 2-dimensional air dispersion model.
4) For a given source, the surface roughness estimated by the grassland (0.005 m) and the Coniferous Forest (1.3 m) provide a "bounding" of AERSCREEN-predicted downwind concentrations.
5) AERSCREEN Model Version 16216