Québec 2010
AIPCR · PIARC

XIII INTERNATIONAL WINTER ROAD CONGRESS

QUÉBEC, FEBRUARY 8 TO 11, 2010

SUSTAINABLE WINTER SERVICE FOR ROAD USERS

Winter service management and service vehicle activity reports

Einar Palsson

Icelandic Road Administration (ICERA)

Chief of Technical development

einar.palsson@vegagerdin.is

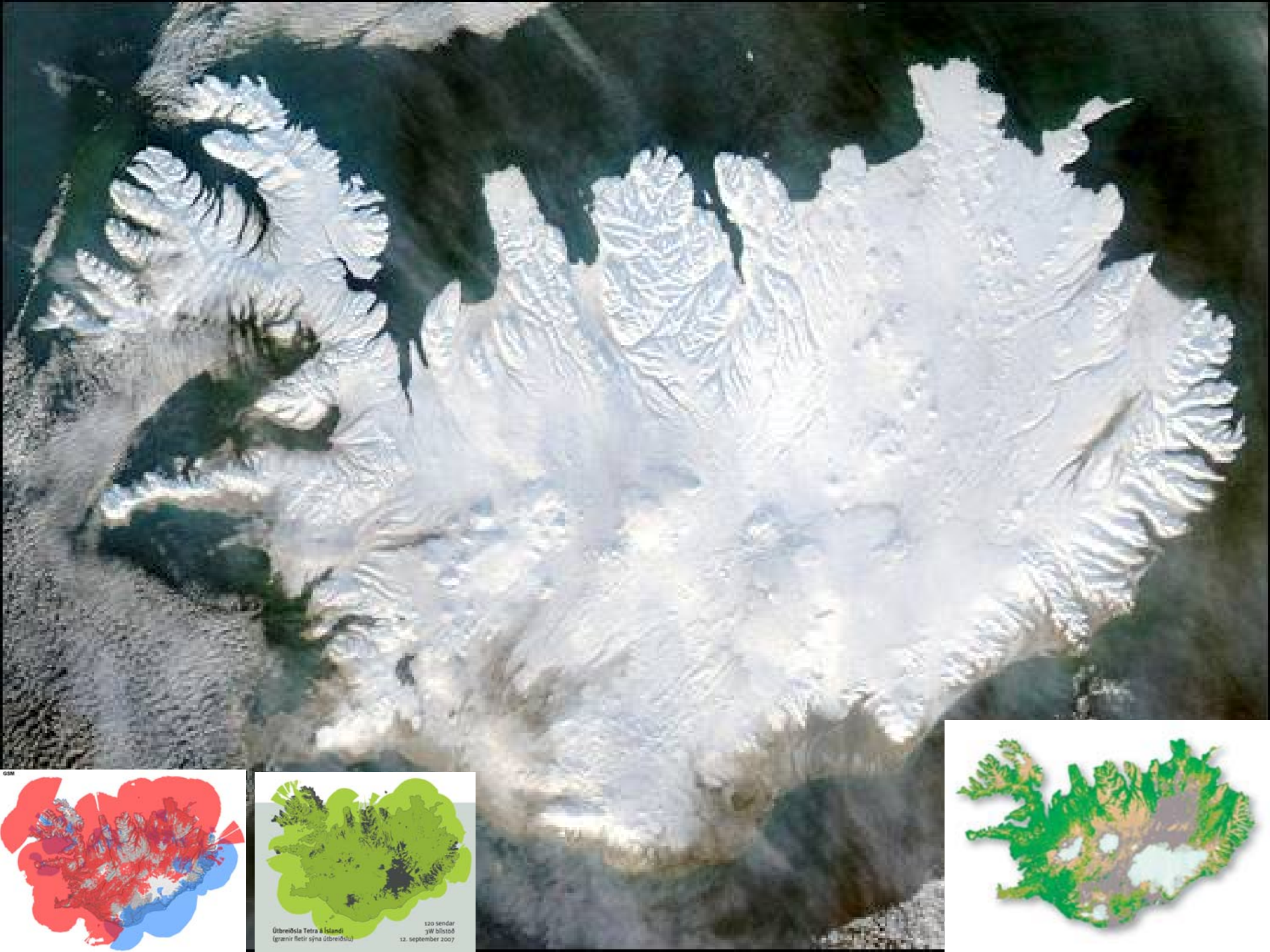
WORLD ROAD ASSOCIATION MONDIALE DE LA ROUTE
AIPCR · PIARC

Québec

VEGAGERÐIN

CONTENT

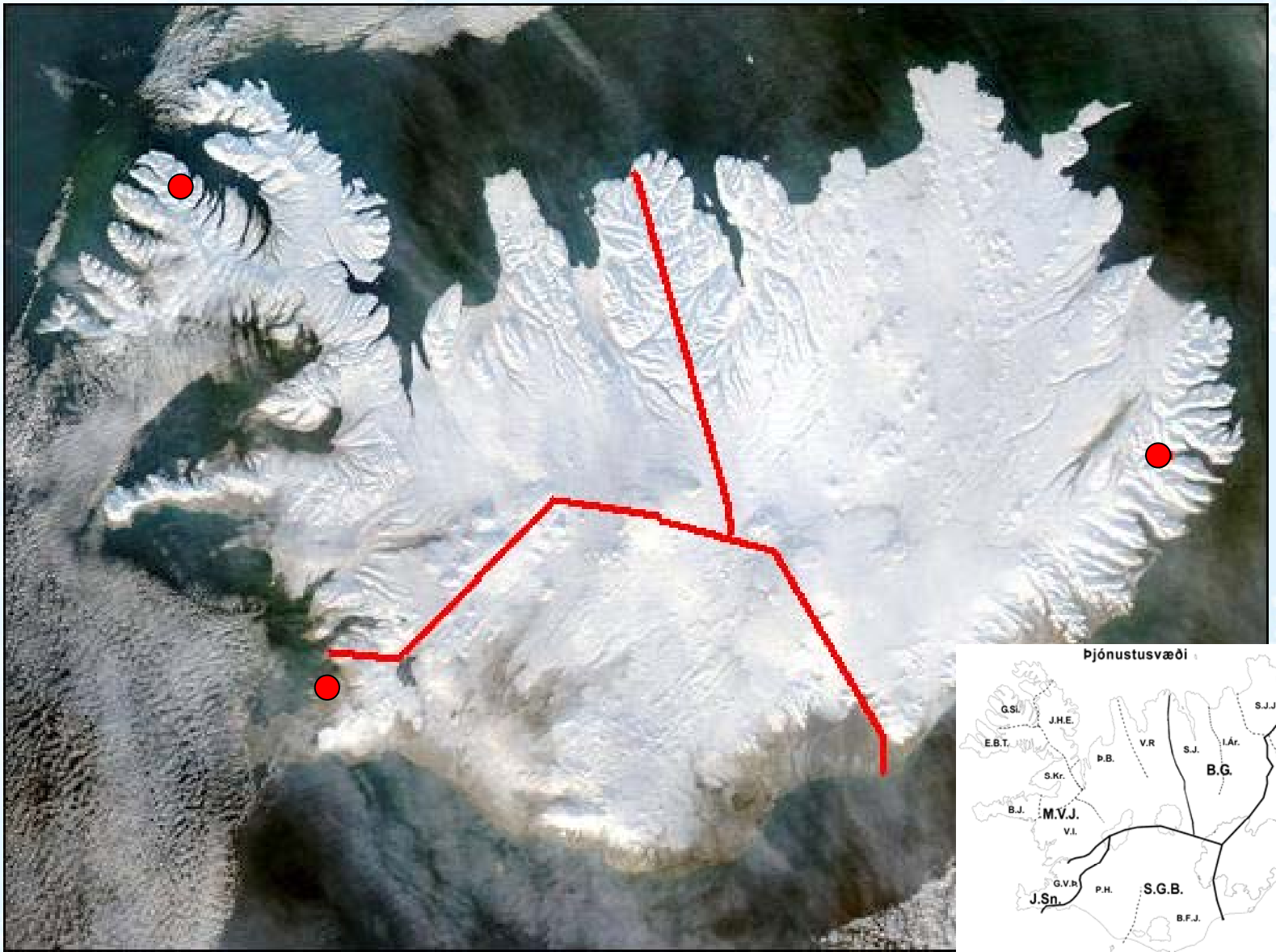
- Background information
  - Climate, geography and population
  - Roads and communication network
- **Winter maintenance management - activity recording**
  - Data analyses and data examples
  - Winter service costs
  - Fleet management and activity recording
- Summary



GSM

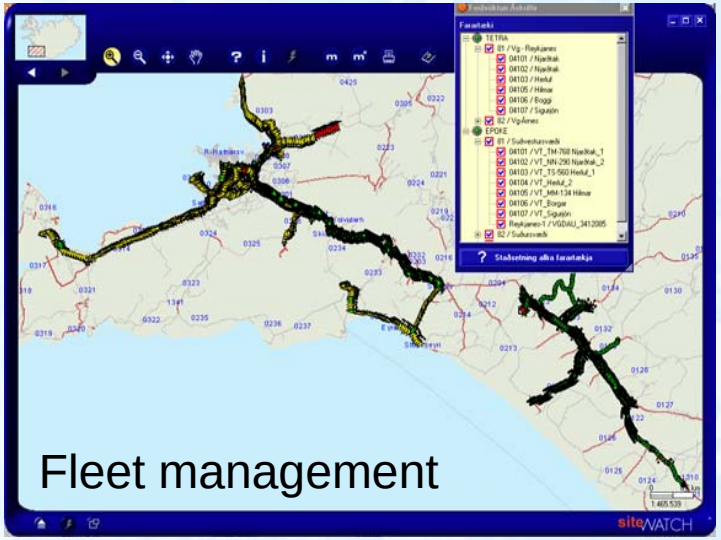
Útbreiðsla Tetra á Íslandi
(grænir fletir sýna útbreiðslu)
120 sendar
3W bílstöð
12. september 2007

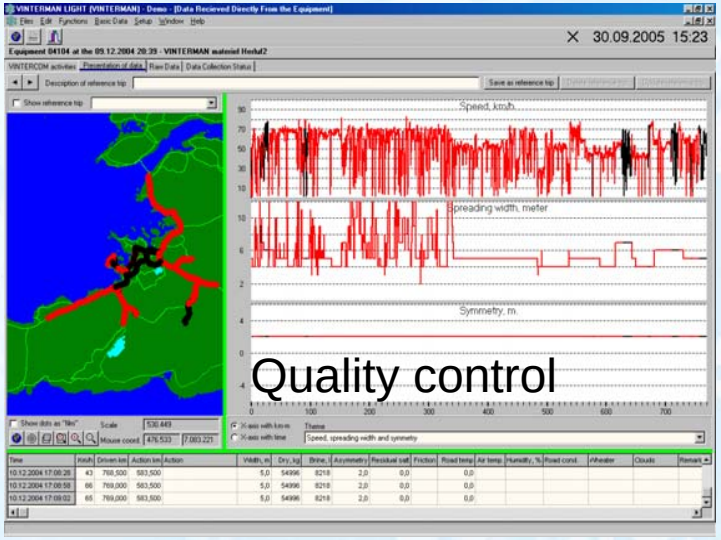
WINTER SERVICE CONTROL CENTERS



Québec 2010
AIPCR · PIARC

WINTER MAINTENANCE MANAGEMENT: ACTIVITY RECORDING





Invoicing

VEGAGERÐIN

Snow removal and de-icing

Date from 01.03.2006 to 15.03.2006

Vehicle / Date	Chore no.	Chore element	Treatment route	Salt/sand (tons)	Treatment length (km)	Treatment Cost (kr)
04101	**VT_TM-768 Njarðtak_1**					
07.03.2006						
341-4060	0041.20	Krýsuvíkurv-flugstöð		0,9	26,2	11.806 kr.
341-4060	0043	Grindavíkurvegur		1,0	28,9	13.011 kr.
341-4060	0044	Hafnavegur		0,9	17,4	7.812 kr.
341-4060	0045	Garðskagavegur		0,8	16,0	7.202 kr.
341-4060	0425.10	Hafnir-Reykjanesvita		2,2	25,2	11.358 kr.
341-4060	0425.20	Reykjanesvv.-Grindav		0,0	0,4	160 kr.
341-4060	0429	Sandgerðisvegur		0,4	6,9	3.086 kr.
Date total:				**6,3**	**121,0**	**48.386 kr.**
08.03.2006						
341-4060	0041.10	Nesbraut-Krýsuvíkurv		0,5	11,5	5.179 kr.
341-4060	0041.20	Krýsuvíkurv-flugstöð		3,5	83,9	37.770 kr.
Date total:				**4,0**	**95,4**	**38.177 kr.**
Vehicle total: 04101				**10,4**	**216,4**	**86.564 kr.**
04102	**VT_NN-290 Njarðtak_2**					
06.03.2006						
341-4060	0041.10	Nesbraut-Krýsuvíkurv		0,6	9,5	4.273 kr.
341-4060	0041.20	Krýsuvíkurv-flugstöð		10,2	121,6	54.726 kr.
341-4060	0043	Grindavíkurvegur		2,3	29,9	13.452 kr.
341-4060	0421	Vogavegur		0,2	2,7	1.236 kr.
341-4060	0427	Ísólfsskálavegur		0,0	0,5	242 kr.
Date total:				**13,3**	**164,3**	**65.715 kr.**
07.03.2006						
341-4060	0041.20	Krýsuvíkurv-flugstöð		2,0	81,6	36.699 kr.
Date total:				**2,0**	**81,6**	**32.621 kr.**
Vehicle total: 04102				**15,3**	**245,8**	**98.336 kr.**
04103	**VT_TS-560 Herluf_1**					
06.03.2006						
341-4060	0001.10	Bláfjallav.-Nesbr		0,1	2,7	1.199 kr.
341-4060	0001.20	Nesbraut-Þingvallav.		0,0	0,1	61 kr.
341-4060	0040	Hafnarfjarðarvegur		0,6	8,8	3.978 kr.
341-4060	0041.10	Nesbraut-Krýsuvíkurv		0,1	1,7	771 kr.
341-4060	0049	Nesbraut		0,4	5,7	2.547 kr.
341-4060	0413	Breiðholtsbraut		0,0	0,9	389 kr.
Date total:				**1,3**	**19,9**	**7.951 kr.**
07.03.2006						
341-063	001	Álftanes		1,0	17,6	7.899 kr.
341-4060	0001.10	Bláfjallav.-Nesbr		1,1	13,2	5.927 kr.
341-4060	0040	Hafnarfjarðarvegur		4,3	98,9	44.507 kr.
341-4060	0041.10	Nesbraut-Krýsuvíkurv		1,9	16,7	7.530 kr.

AIPCR · PIARC Québec 2010

WINTER SERVICE – SOUTHWEST ICELAND

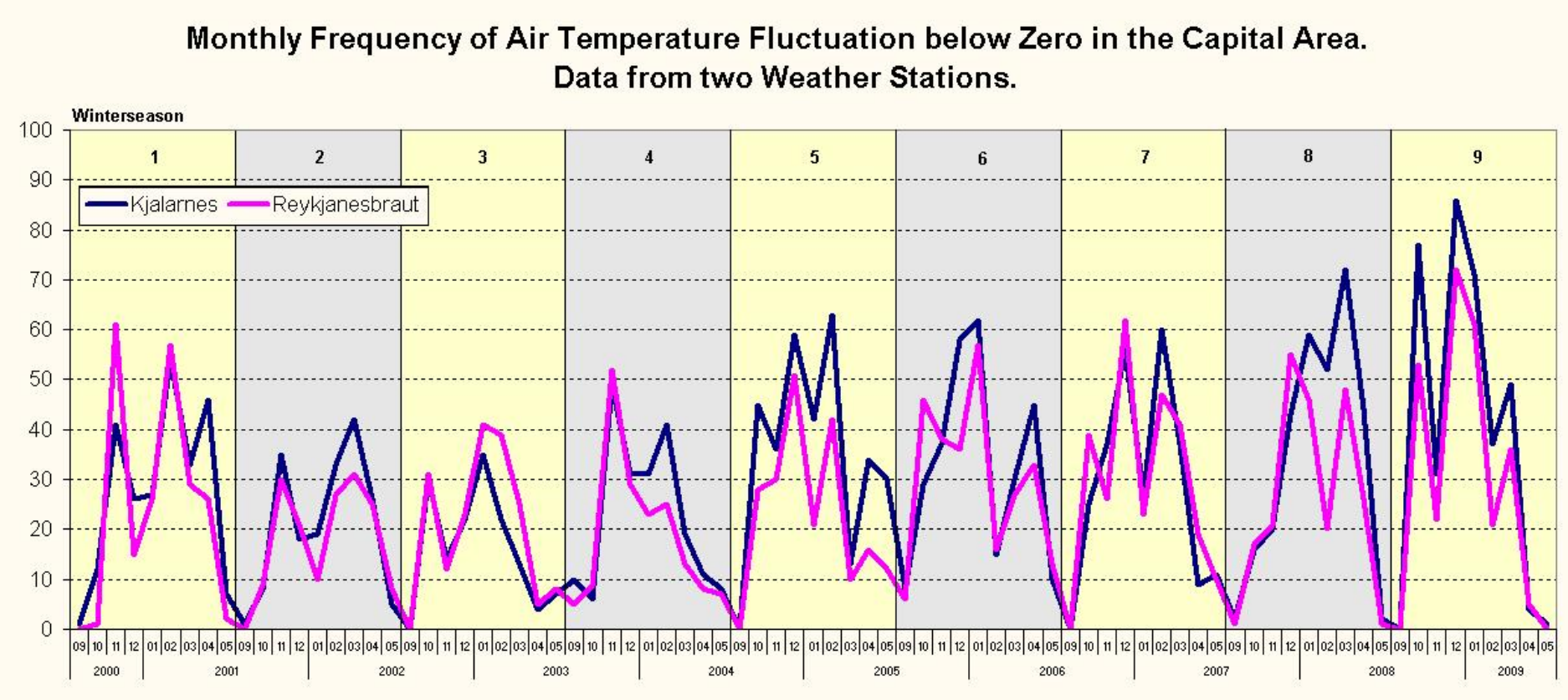
(capital area) 1.october – 30.april ´08/´09

Actual serviced road network = 230 km

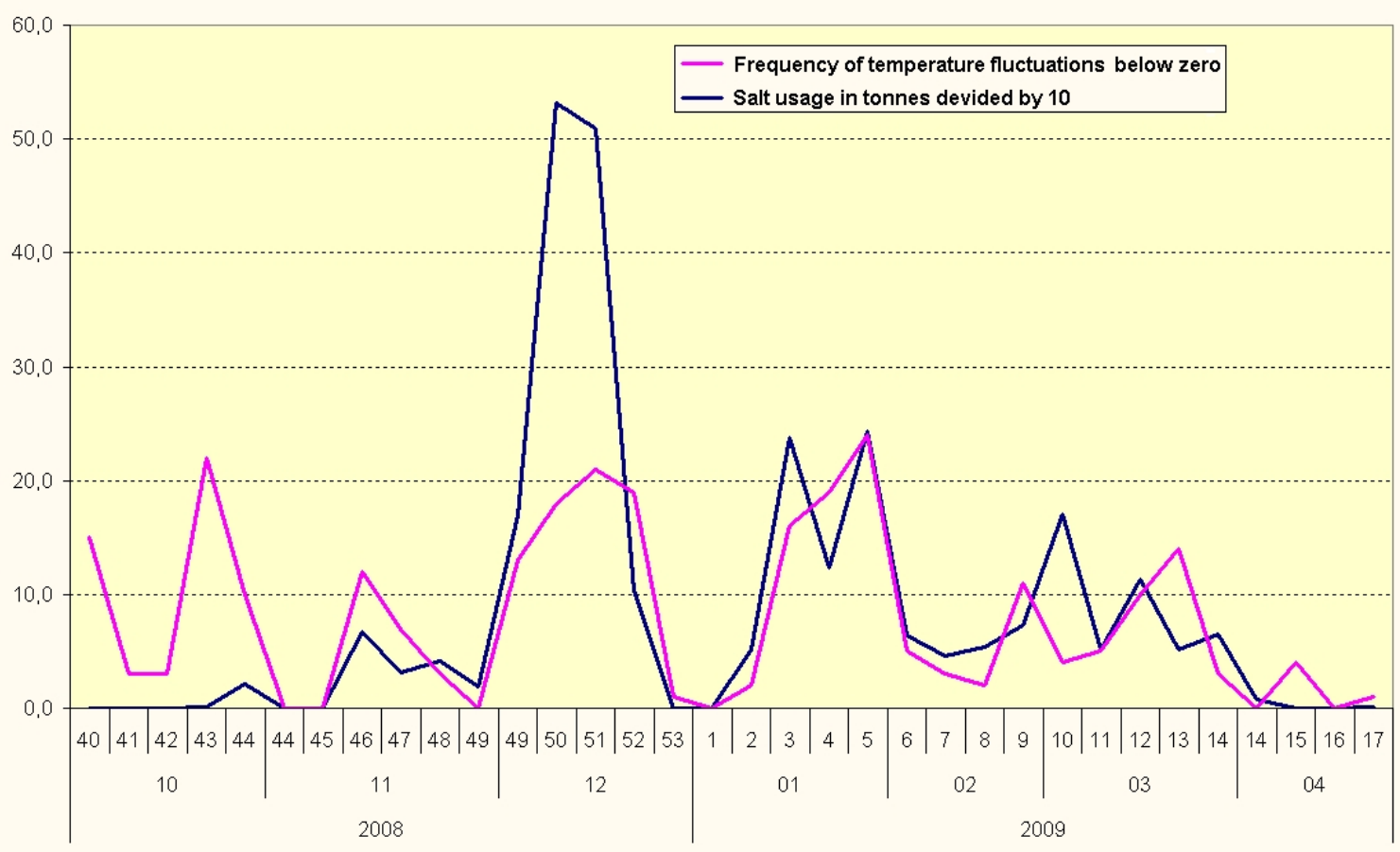
Vehicle	Winter-service (hours)	Distance (thousand-km)	Salt (thousand-tonnes)	Winter-service (days)	Hours/day	Distance/day
1	446	18,3	1	67	**7**	**272**
2	421	18,1	1	73	6	248
3	408	17,1	0,7	88	5	195
4	611	26,0	1,5	**124**	5	209
5	385	16,4	0,7	79	5	208
6	**620**	**28,8**	1,2	114	5	253
7	551	23,4	1,1	105	5	223
8	481	18,9	1	83	6	228
9	487	16,4	**1,6**	70	**7**	235
10	116	5,2		32	4	163
11	366	14,2	0,8	75	5	190
Total	4.892	203.0	10,7	910		

Two Control/Inspection vehicles drove: 64 and 69 = 133 thousand km during 179 days (745 km/day)

AIR TEMPERATURE FLUCTUATION BELOW ZERO YEAR 2000-2009



WINTER SERVICE AND AIR TEMPERATURE FLUCTUATION



Frequency of air temperature fluctuation below zero and amount of deicing agent used on road adjacent the weather station

WINTER SERVICE COSTS / BUDGET

Service station Hafnarfjörður

Area Suðvestursvæði

Vehicles | Winter service status

Work number		Road section	Accrued cost 2009	Budget 2009	Ratio
341-4060	0001.10	Bláfjallav.-Nesbr	17,524	25,003	70,1%
341-4060	0001.20	Nesbraut-Þingvallav.	9,646	42,792	22,5%
341-4060	0001.30	Þingvallav.-Göng	5,720	21,856	26,2%
341-4060	0036.10	Hringv.-Skálafellsv.	3,971	4,017	98,8%
341-4060	0036.20	Skálafellsv.-þjónust	3,951	5,759	68,6%
341-4060	0040	Hafnarfjarðarvegur	9,031	34,702	26,0%
341-4060	0041.10	Nesbraut-Krýsuvíkurvegur	15,715	35,239	44,6%
341-4060	0041.20	Krýsuvíkurv-flugstöð	43,999	87,318	50,4%
341-4060	0042.10	Reykjanesbr.-Vigdísarvv	1,916	2,564	74,7%
341-4060	0042.20	Vigdísarvv.-Krýsuvík	0,019	0,399	4,7%
341-4060	0043	Grindavíkurvegur	7,732	12,220	63,3%
341-4060	0044	Hafnavegur (sameinað við 0425.10)	2,402	2,398	100,2%
341-4060	0049	Nesbraut	6,843	17,667	38,7%
		Total	154,007	334,715	46,0%

Record: 18 of 50

ACTIVITY RECORDING: MANAGEMENT CHALLENGES

- Heterogeneous equipment vendors
- Control vehicles and old equipment
- Bi-directional / two-way communication
- Costs
- Design flaws

VEHICLE RECORDING IN WINTER SERVICE – DESIGN PRIORITIES

1. Data acquisition (recording)
   - Coordinates
   - Time and distance
   - Activities (sensors)
2. Communication (data delivering)

- No matter what – data should always be collected and stored. Data acquisition and transmission are to be isolated and processed seperately

SUMMARY AND FURTHER DEVELOPMENT

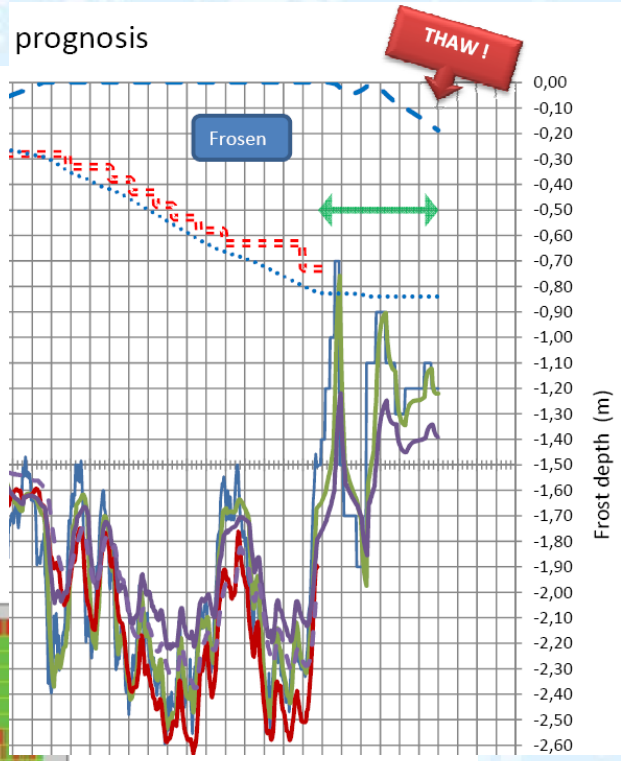
- Location, geography and weather
- Winter Maintenance Manangement
- Data acquisition
- Future vehicle tracking developments

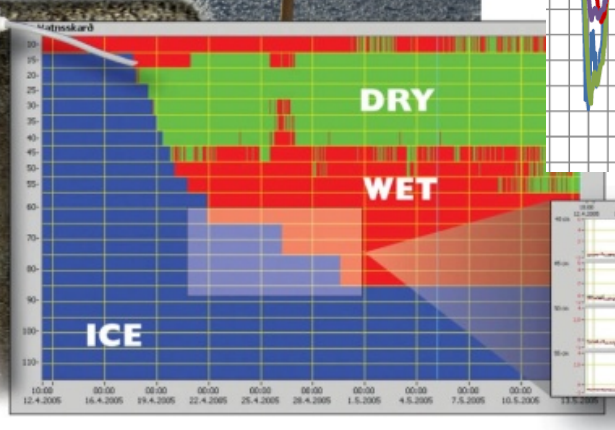
- Frost depth monitoring and prognosis model

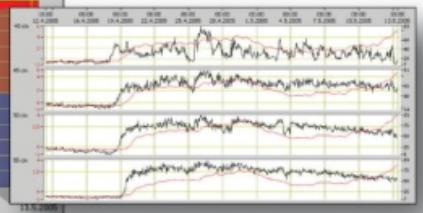
FROST-DEPTH MONITORING AND PROGNOSIS MODEL

Frequent mid-winter axle-load restrictions, December -April

- **Axle-load restriction management**
- **Real time monitoring**
- **5 day frost-depth prognosis based on weather forecast**








Thank you!