



Visualising Livestock Movement in 'near' real time

Ben Madin



Murdoch
UNIVERSITY

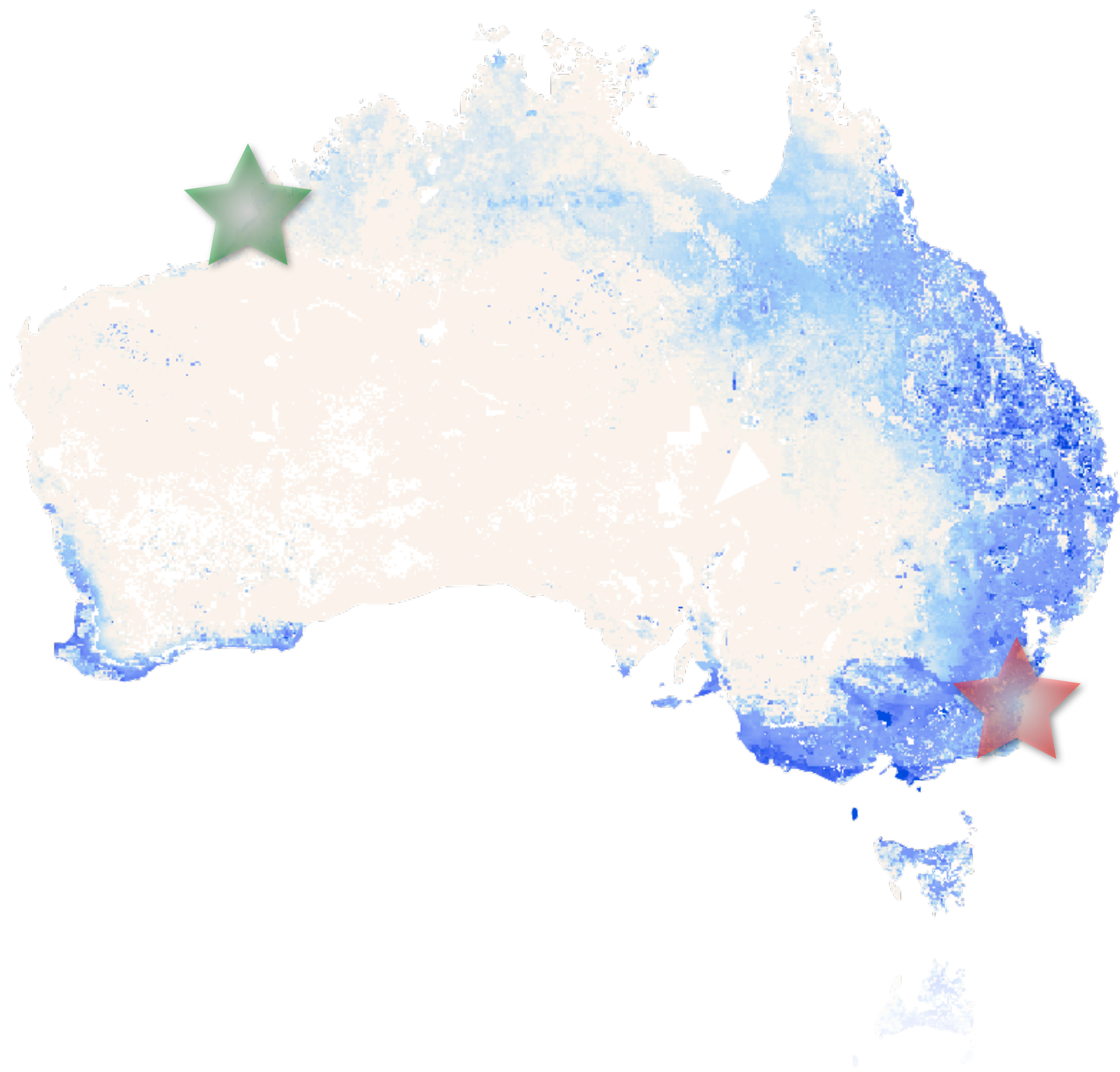


Better health through applied epidemiology

Veterinarian?

What's a vet doing at a GIS conference?









Epidemiology & Maps







Animal movement is bad!!

- Spreads disease effectively
- Responsible for outbreaks in naïve populations.
- Imposes substantial costs on the economy in terms of control and regulation costs.

Animal movement is good!

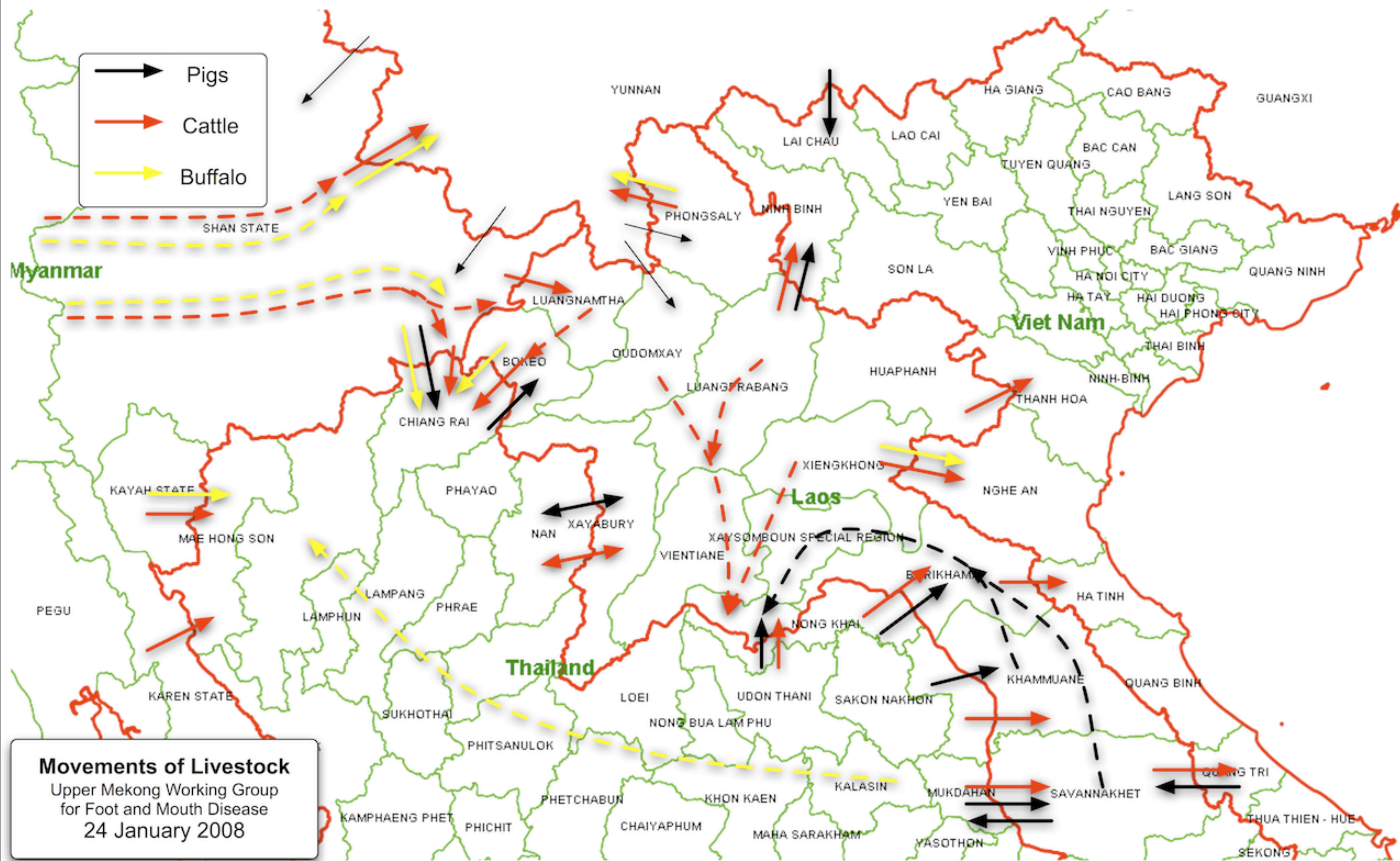
- Vital component of market economy
- Offer economic opportunity to low cost production countries to sell to wealthier neighbours.
- Allows livestock industry in areas which can't support other aspects of the production chain.





Transboundary Diseases

- Specifically interested in the movement of disease over larger areas.
- Contrast this with “Local Spread”
- Difficult to stop without severe quarantine (is it too late anyway?) in a naïve population.
- Really requires a reduction of the susceptible population (vaccination or culling)



What are we trying to do?

- We want to know when animals are moving under certain patterns.
- So we need to be able to 'see' those patterns - of movement.
- We want it to be readily available to be used by those who want it - for the right reasons - **and at the right cost!**

Constraints as opportunities



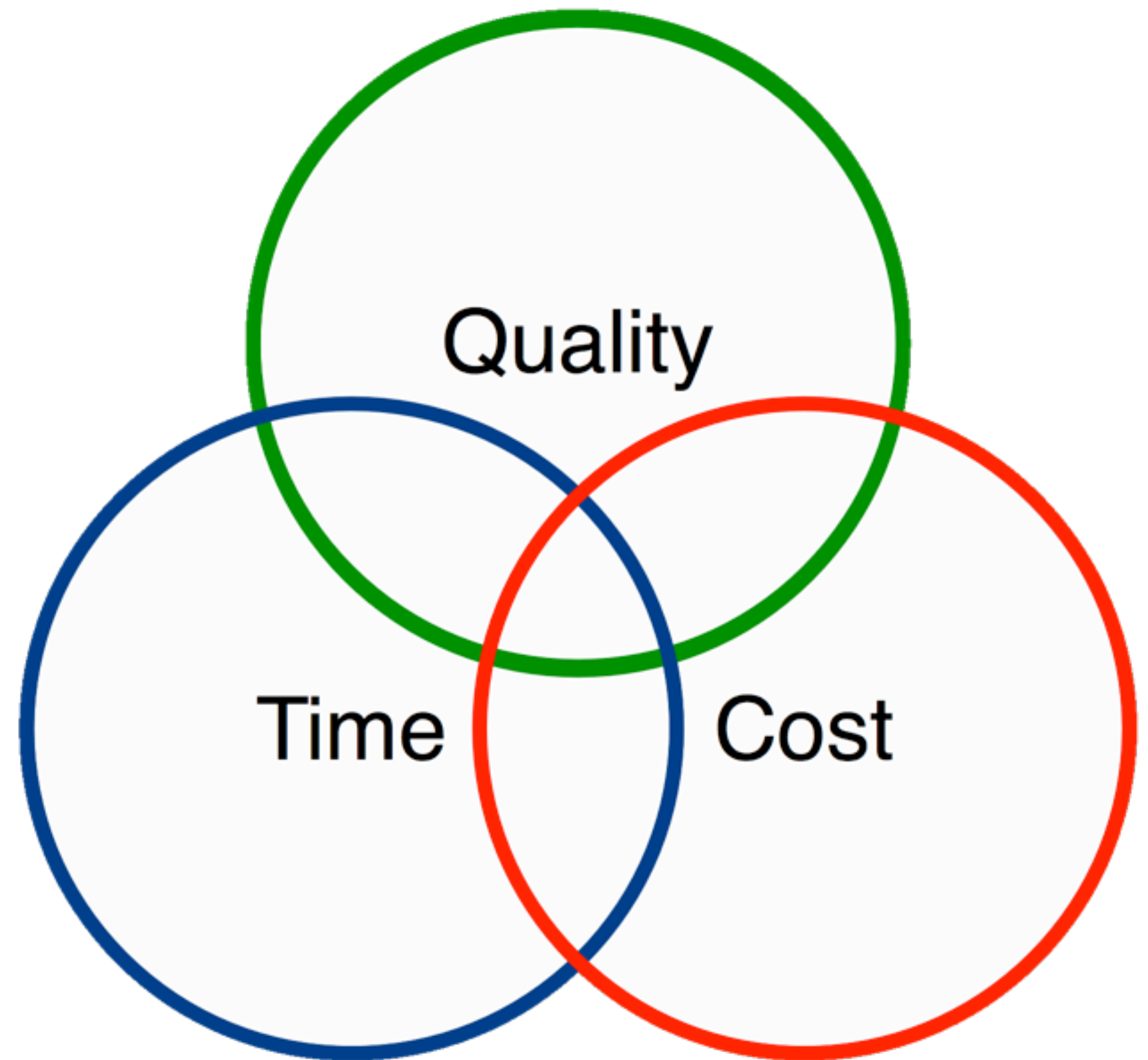
PostGIS



php



OpenLayers



Movement Information

- Who needs it?
 - Minister, response planning team, industry, media, public... everyone wants their bit
- How do they want it?
 - Easily digestible - K.I.S.S!
- When do they need it?
 - Yesterday...

Real time...

- This would be lovely, but there are some issues...
- These are not free-roaming animals at the scale we are interested in.
- Movements are often illegal...



Hidden trackers

- So we're looking into embedded devices:



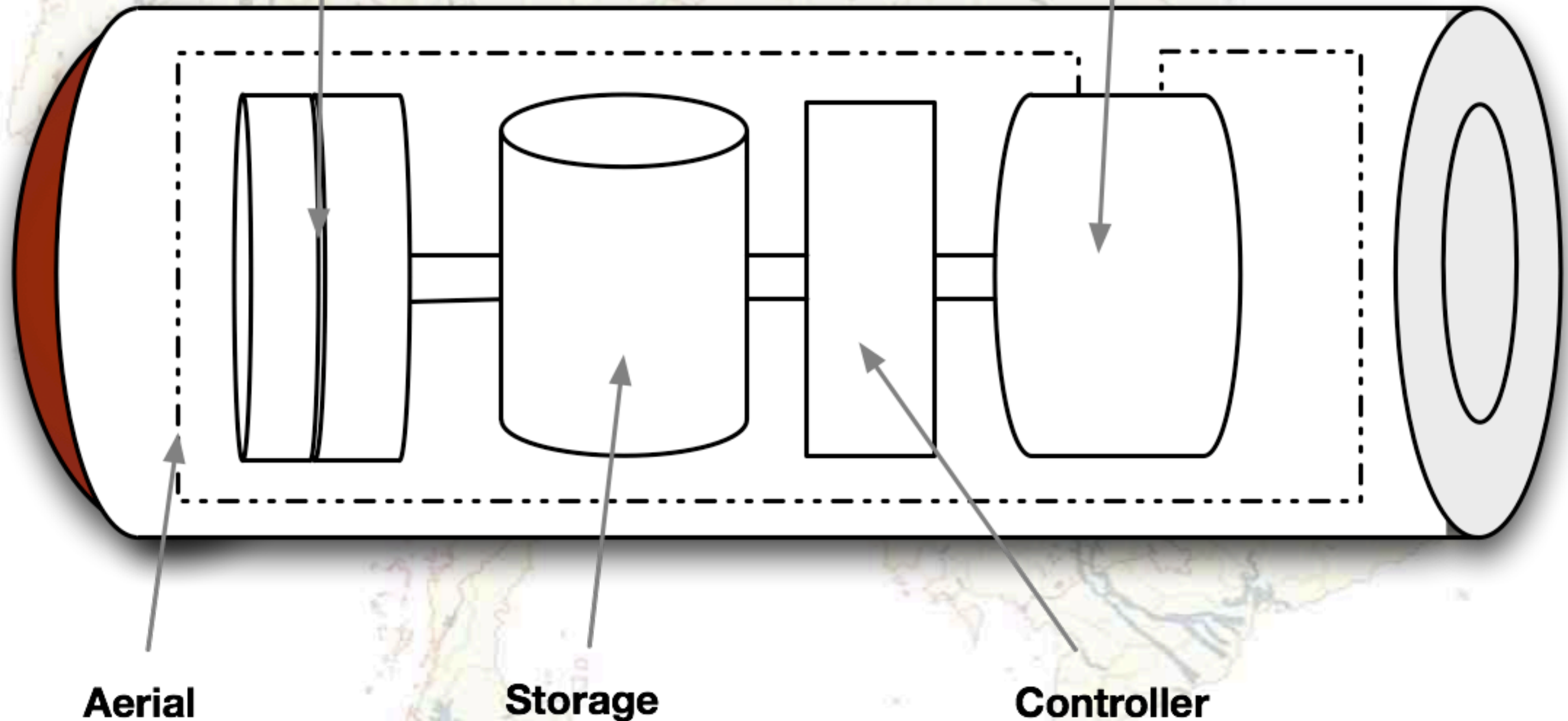
Hidden trackers

Cut away Bolus

Generator

GSM Transmitter

- So we're looking into embedded devices:

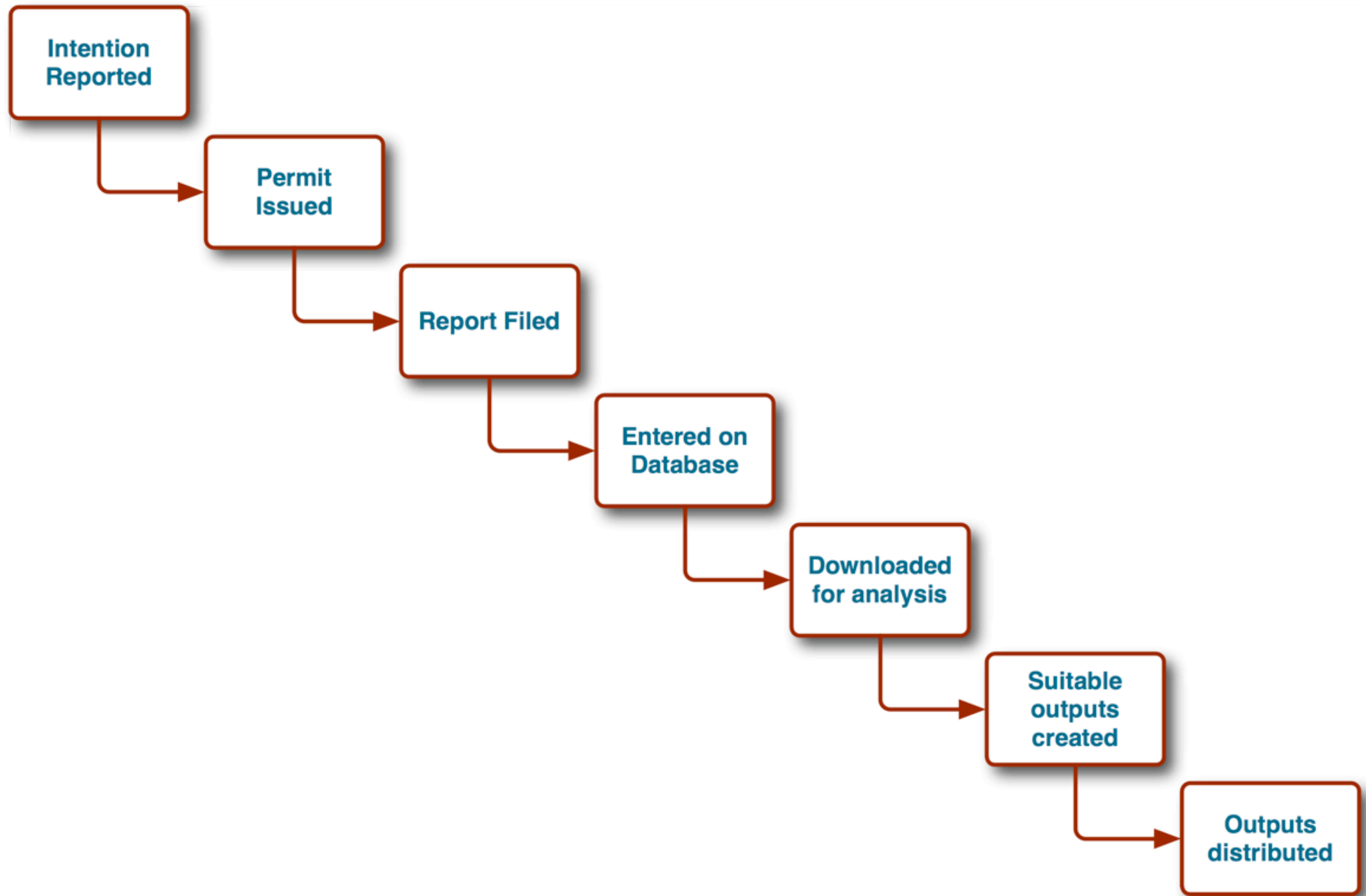


Rumen Boluses

- Problems:
- Research Ethics Committees
- Food Safety Committees
- RF Propagation through ionic substrates
- Power generation
- etc...

'Near' real time

- Is about getting the data as quickly as possible
 - Australia - National Livestock Identification System (NLIS)
 - South-East Asia - still paper based
 - Digital Pen
 - Smartphones
 - SMS



កម្មវិធី ការពារ
សុខភាព និងបណ្តុះបណ្តាល
១០ ឆ.ប.ព.ក

ក្រសួងកសិកម្ម រុក្ខាប្រមាញ់
និងនេសាទ

លេខប័ណ្ណ : ០៣១៦៤.២០០៧

**លិខិតអនុញ្ញាតដឹកជញ្ជូន
សត្វ និងផលិតផលមានដើមកំណើតពីសត្វ**

យោងអនុក្រឹត្យលេខ ១៦ អនក្រ.បក ស្តីពីការត្រួតពិនិត្យអនាម័យសត្វ និងផលិតផលមានដើមកំណើតពីសត្វ ចុះថ្ងៃទី ១៣ ខែ មីនា ឆ្នាំ ២០០៧ ។
យោងលិខិតអនុញ្ញាតឱ្យប្រមូលចិញ្ចឹមលេខ : ចុះថ្ងៃទី ខែ ឆ្នាំ ២០០៧ ចេញដោយនាយកដ្ឋាន ជំងឺសត្វ និងបណ្តុះបណ្តាល ។
អនុញ្ញាតឱ្យឈ្មោះ : ភេទ : មុខរបរបច្ចុប្បន្ន :
កាន់អត្តសញ្ញាណប័ណ្ណលេខ : ចេញដោយ :
ទីលំនៅបច្ចុប្បន្ន : ភូមិ ឃុំ/សង្កាត់ ស្រុក/ខណ្ឌ ខេត្ត/ក្រុង
ដឹកជញ្ជូនសត្វ/ផលិតផលមានដើមកំណើតពីសត្វ : ចំនួន/បរិមាណ :
ដើម្បី :
ចេញដំណើរពី : ភូមិ ឃុំ/សង្កាត់ ស្រុក/ខណ្ឌ ខេត្ត/ក្រុង
នៅថ្ងៃទី ខែ ឆ្នាំ ២០០៧ ។
ឆ្ពោះទៅកាន់ : ភូមិ ឃុំ/សង្កាត់ ស្រុក/ខណ្ឌ ខេត្ត/ក្រុង
តាមផ្លូវជាតិ :
មធ្យោបាយដឹកជញ្ជូនដោយ : ផ្ទាំងលេខ :
ដុតស្តុកសភាពថ្ងៃទី ខែ ឆ្នាំ ២០០៧ ។
វិញ្ញាបនបត្រអនាម័យសត្វ / ផលិតផលមានដើមកំណើតពីសត្វលេខ : ចុះថ្ងៃទី ខែ ឆ្នាំ ២០០៧
បង្កាន់ដៃបង់សោហ៊ុយសេវាកម្មត្រួតពិនិត្យអនាម័យសត្វនិងផលិតផលមានដើមកំណើតពីសត្វ លេខ : ០៣១៦៤.២០០៧
ចុះថ្ងៃទី ខែ ឆ្នាំ ២០០៧ ។
ចំនួនទឹកប្រាក់ : ចេញដោយ :

បានឃើញ និង ឯកភាព
ថ្ងៃ ២៥ ខែ ០៤ ឆ្នាំ ២០០៧
**ប្រធានមន្ទីរកសិកម្មរុក្ខាប្រមាញ់
និងនេសាទ**
សុខុម

ចេញថ្ងៃទី ២៥ ខែ ០៤ ឆ្នាំ ២០០៧
ប្រធានការិយាល័យ
ជំងឺសត្វ និងបណ្តុះបណ្តាល
សុខុម

ប្រធាន
នាយកដ្ឋាន ជំងឺសត្វ និងបណ្តុះបណ្តាល

ATTUS OUT OF NOONAMAH

WALGAIT. Labelle.

15 July '03 start racing

DATE	No	To	COND	TRNG	T OFF
1/7	160	✓ A DELAND, RIVER FARM	R	H	W 9/7
1/7	840	EXPORT/MUDSON CK, 'NIPAH'	R	L	T 10/7
1/7	1008	-----	R	L	FR 11/7
1/7	40	✓ FLY CB FARM (D)	R	F	S 12/7
1/7	1340	EXPORT/DEY / 'STRAIGHT TROOST'	R	L	S 13/7
1/7	1850	EXPORT/DRAWHN WHARE / 'PUNTA ROSA'	R	L	M 14/7
1/7	700	-----	R	L	T 15/7
1/7	9200	EXPORT/HUDSON CK / 'SHOSUN MARU'	R	L	W 16/7
1/7	640	✓ WOOLNER(S)	R	H	T 17/7
1/7	77	✓ TENARRA BATTON (D)	R	H	F 18/7
1/7	2	{ LOCAL OWNER (-W)	R	VH	S 19/7
1/7	3	{ " " }	R	VH	S 20/7
1/8	580	WOOLNER(S)	R	VH	M 21/7
1/8	1350	EXPORT/DRAWHN WHARE / 'TANCOO'	R	L	T 22/7
1/8	260	✓ CARMOOR PLAINS (on boundary of R.A)	R	VH	W 23/7
1/8	260	EXPORT/SANTAVAN / 'EASTERN STAR'	R	L	T 24/7
1/8	400 goats	Rum Jungle EY 'Carnforth'	R	L	F 25/7

same block

high risk entry

what's being done

what's been done

what needs to be done

issues

- boats - SDCHB responsibility
- lack of currency & date in ANEMIS
- SF outside RA/CA

exercise issue - more completion

OIE inc. period 14 days.

min Rocky Bull at Piny Creek 74 days??

Rocky bulls in NEY 20/7

Rocky bulls out NEY 27/7

11:30

14:30



Ben Madin

ຂໍ້ມູນການຍ່າງ GMS

ເລີ່ມໃຫມ່ ສົ່ງ SMS ສົ່ງລາຍລາຍງານ ດຳລິນການ Manage: ອອກຈາກໄປແກມ

ລາຍງານການເຄື່ອນຍ້າຍ - Lao PDR : ສົ່ງ

ພື້ນທີ່: LAO / ຕຳນ່ວນ : ນ. ລຳເງິນ ເພີ່ມພື້ນທີ່ຕົວໃຫມ່

Data source: Unspecified Document Reference: Purchasing Reference: Sanitary Reference:

ລາຍການສິນຄ້າ

ລາຍການສິນຄ້າ	ຈຳນວນທັງຫມົດ	ຈຸດປະສົງ
ຄວາຍ / Buffalo	16	ເອົາໄປຂາຍ
Select one...		
Select one...		

Comments

Please put any other details you feel may be significant in here

ດື່ນທາງ (ທີ່ ມາ)

ປະເທດ: Lao PDR
 ແຂວງ: ຕຳນ່ວນ
 ເມືອງ: ເຊບັ້ງໄທ
 ຊື່ບ້ານ:
 ວັນທີ່ຂົນສົ່ງ: 29/01/2009

ປາຍທາງ (ບ່ອນທີ່ ຈະສົ່ງໄປ)

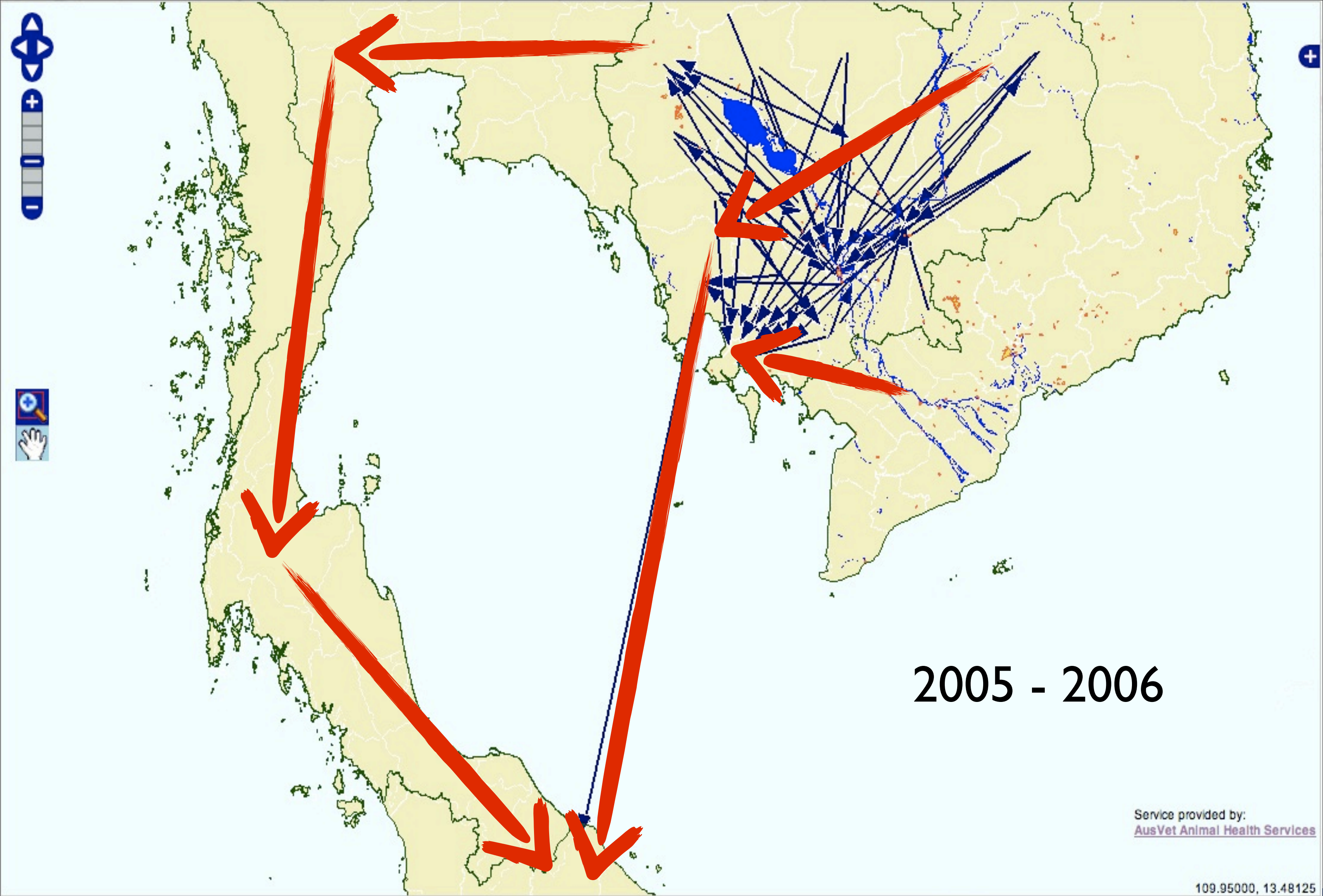
ປະເທດ: Lao PDR
 ແຂວງ: ນະຄອນຫຼວງວຽງຈັນ
 ເມືອງ: ຫາດຊາຍຟອງ
 ຊື່ບ້ານ:
 ວັນທີ.ມາເຖິງ: 01/02/2009

How do we make use of it?

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]
[1,]	128	0	0	0	0	0	0	0	0	0	0	12
[2,]	0	0	0	1	0	0	8	0	0	0	0	31
[3,]	0	0	0	0	0	0	0	0	0	0	0	0
[4,]	0	0	2	0	0	0	1	0	0	0	0	14
[5,]	0	0	0	0	0	0	0	0	0	0	0	0
[6,]	0	0	0	0	0	0	0	0	0	0	0	16
[7,]	0	0	0	0	0	0	0	0	0	0	0	0
[8,]	0	0	0	0	0	0	0	17	0	0	0	0
[9,]	0	0	0	0	0	0	0	0	0	0	0	0
[10,]	0	0	1	0	0	0	0	0	0	0	0	15
[11,]	0	0	1	0	0	0	0	0	0	0	0	0
[12,]	0	0	0	0	0	0	0	0	0	0	0	0
[13,]	0	0	0	0	0	0	0	0	0	0	0	0
[14,]	0	0	0	0	0	0	0	0	0	0	0	0
[15,]	0	0	0	0	0	0	0	0	0	0	0	0
[16,]	0	0	0	0	0	0	0	0	0	0	0	0
[17,]	0	0	0	0	0	0	0	0	0	0	0	16
[18,]	0	0	0	0	0	0	0	0	0	0	0	0
[19,]	0	0	0	0	0	0	0	0	0	0	0	7
[20,]	0	0	0	0	0	0	0	0	0	0	0	0
[21,]	0	0	0	0	0	0	0	1	0	0	0	0
[22,]	0	0	0	0	0	0	0	0	0	0	0	0
[23,]	0	0	0	0	0	0	0	0	0	0	0	0
[24,]	0	0	0	0	0	0	0	0	0	0	0	0

What are we trying to avoid?

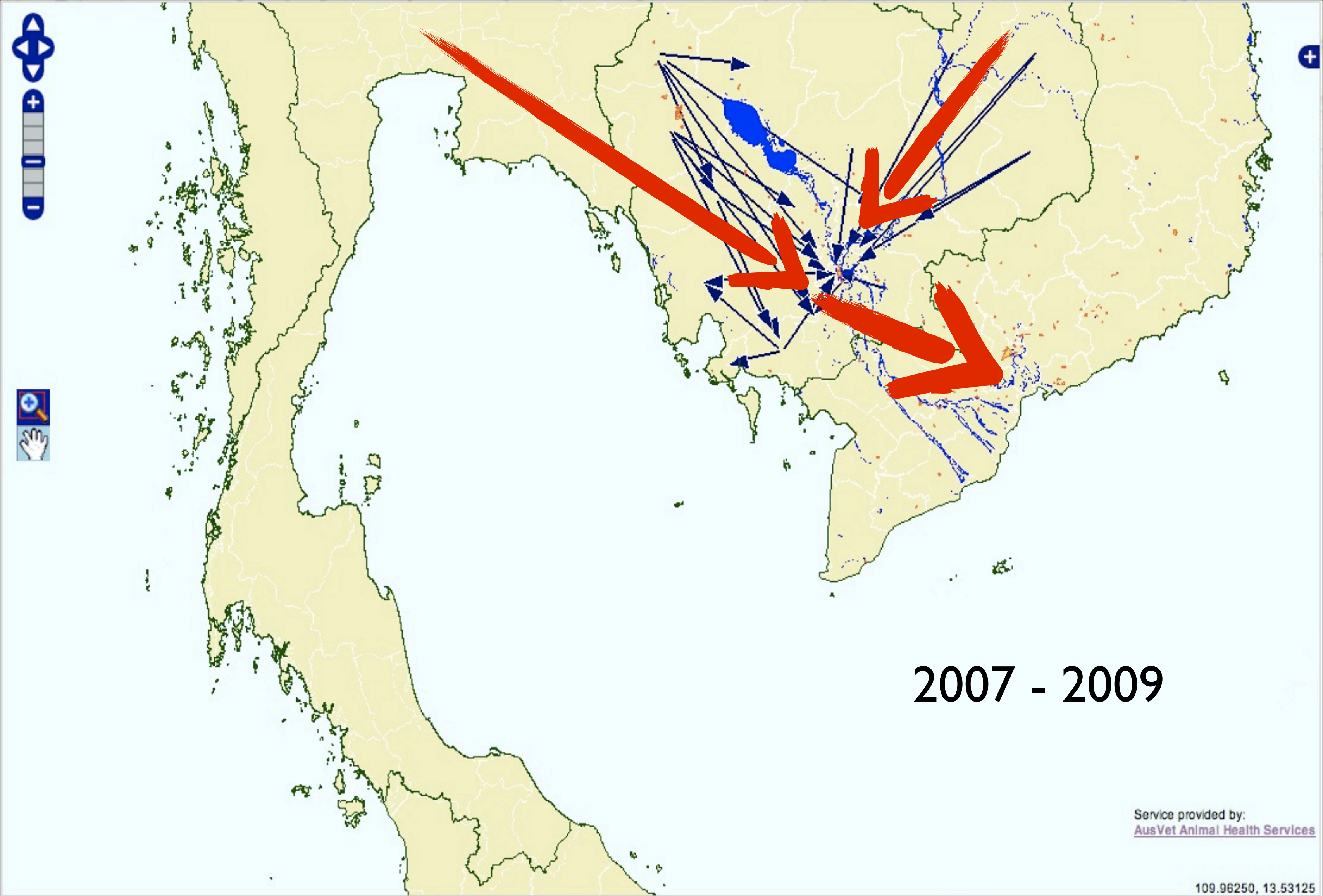
- Relying on static data.
- Working with traders is telling us a great deal about the current trade picture.
- But we don't want to be caught out if the trade changes.



2005 - 2006

Service provided by:
[AusVet Animal Health Services](#)

109.95000, 13.48125

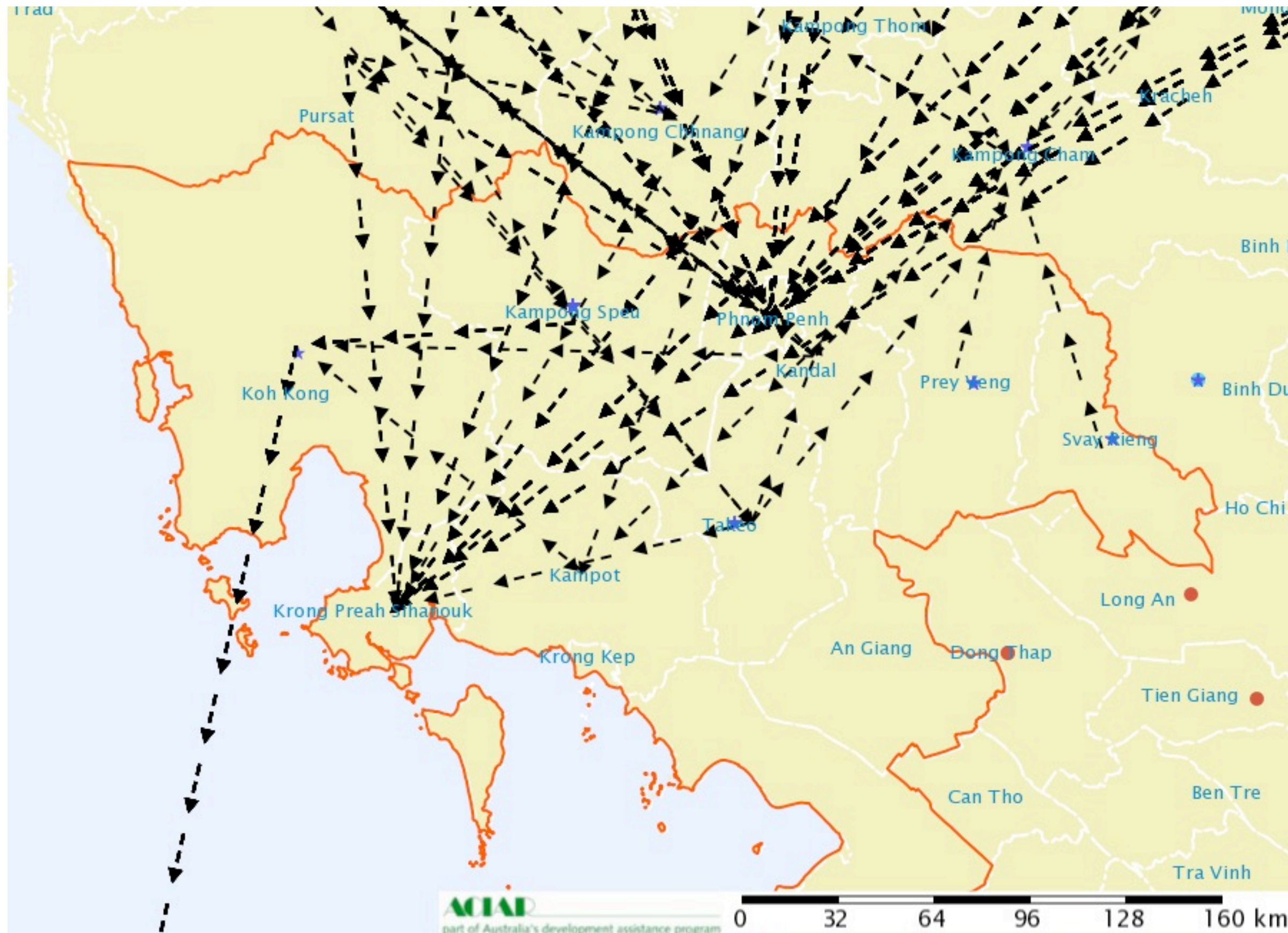


2007 - 2009

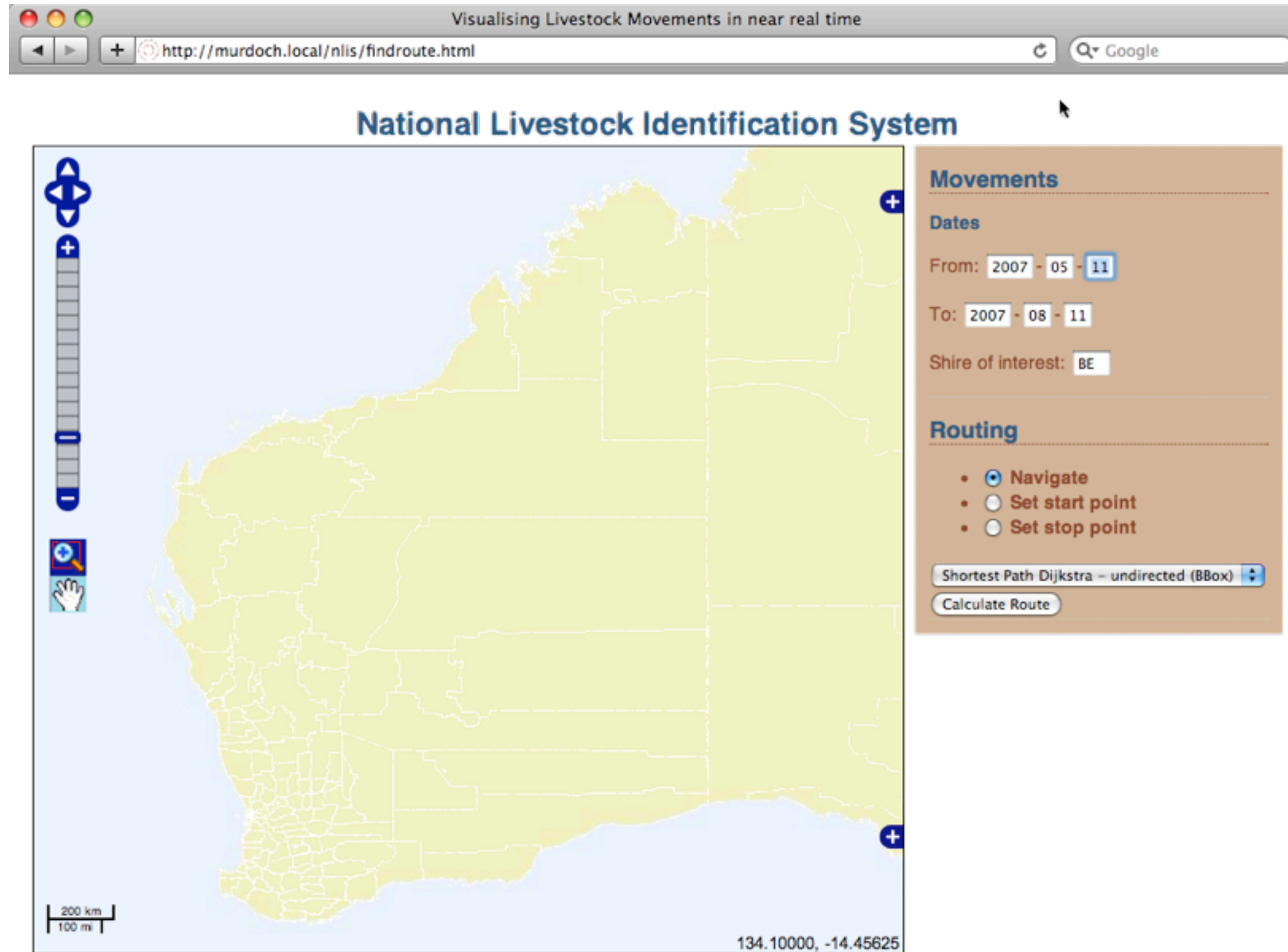
Service provided by:
[AusVet Animal Health Services](#)

109.96250, 13.53125

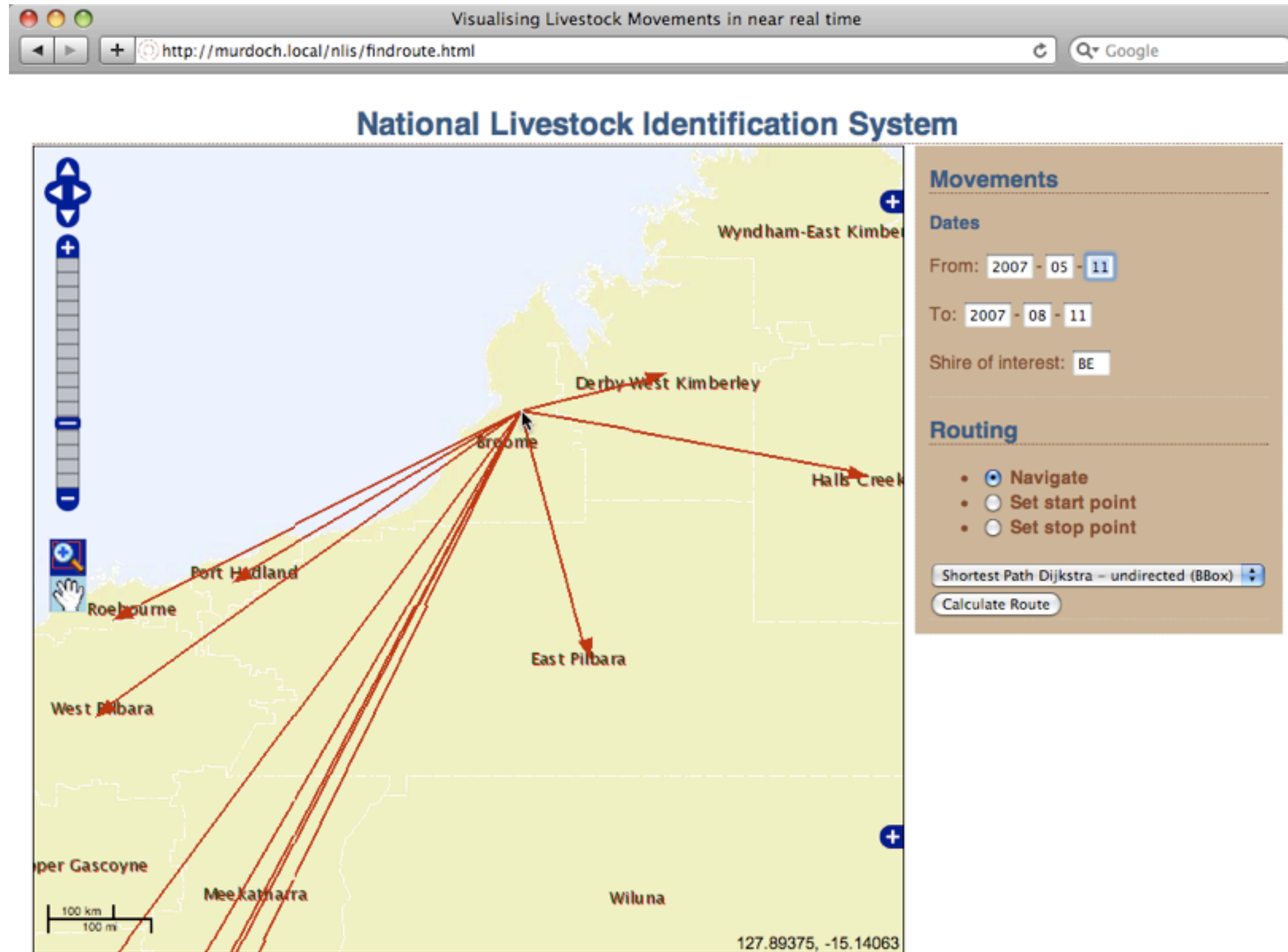
Disease and boundaries



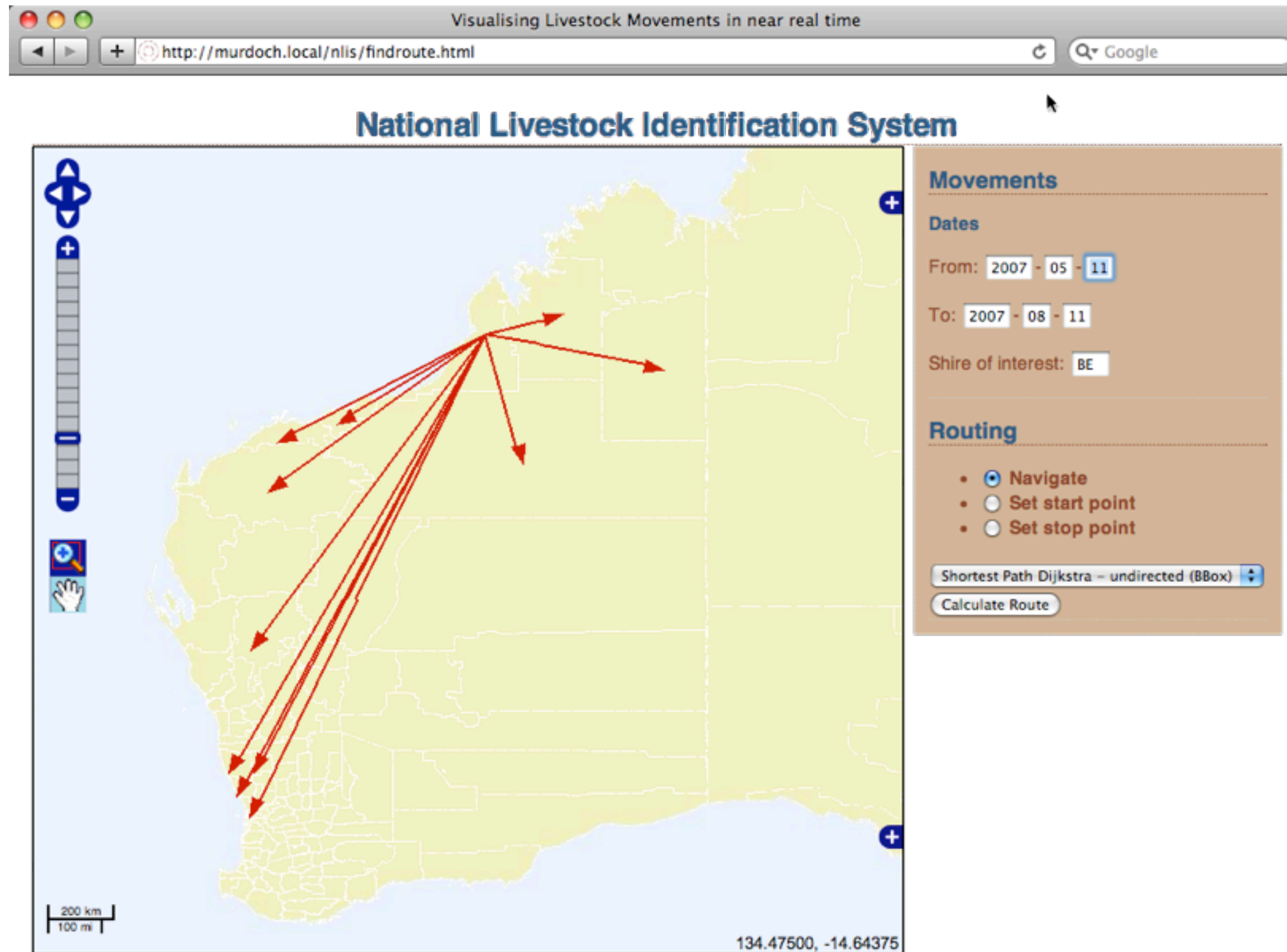
NLIS – Spread maps



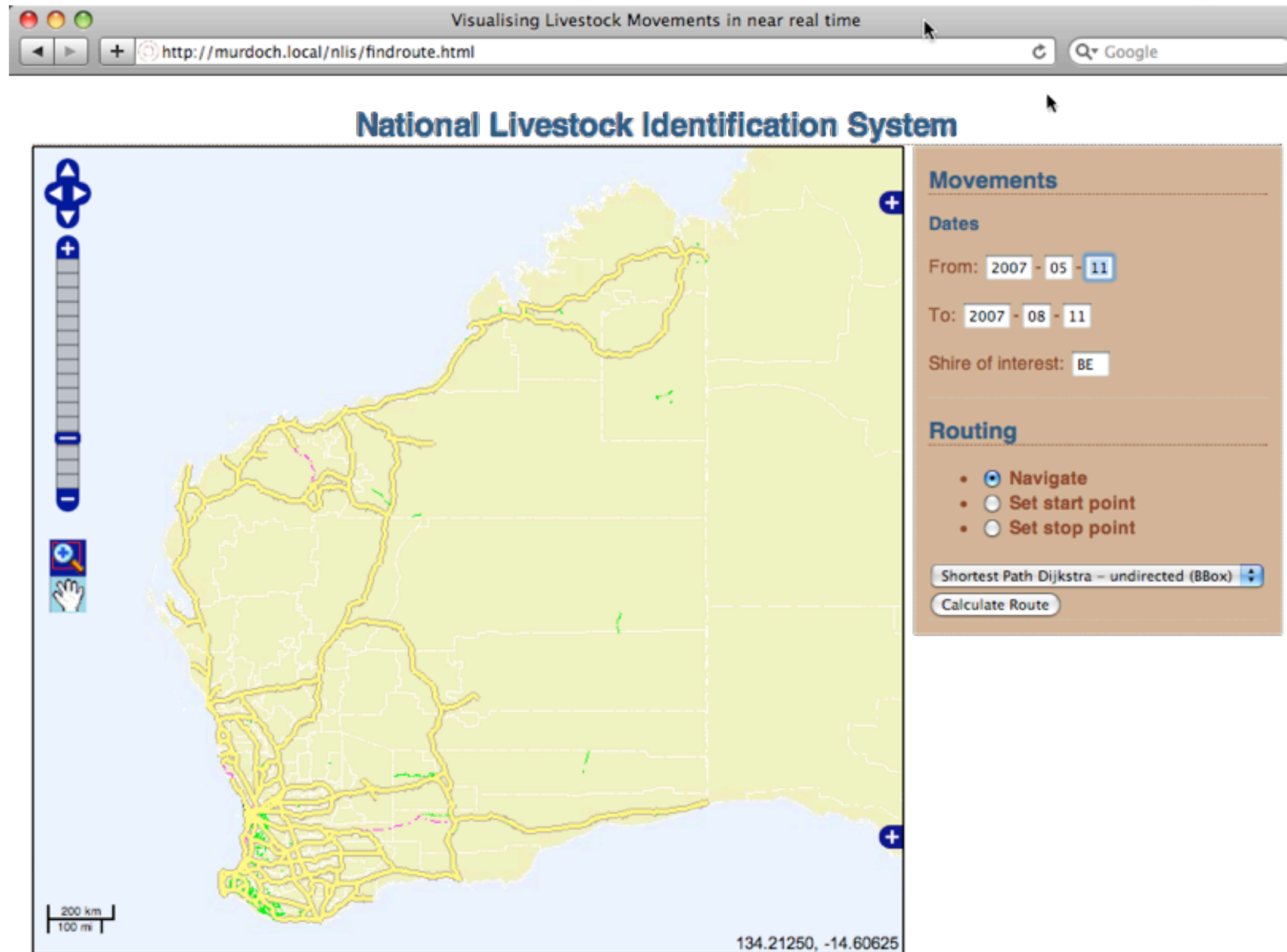
NLIS – Spread maps



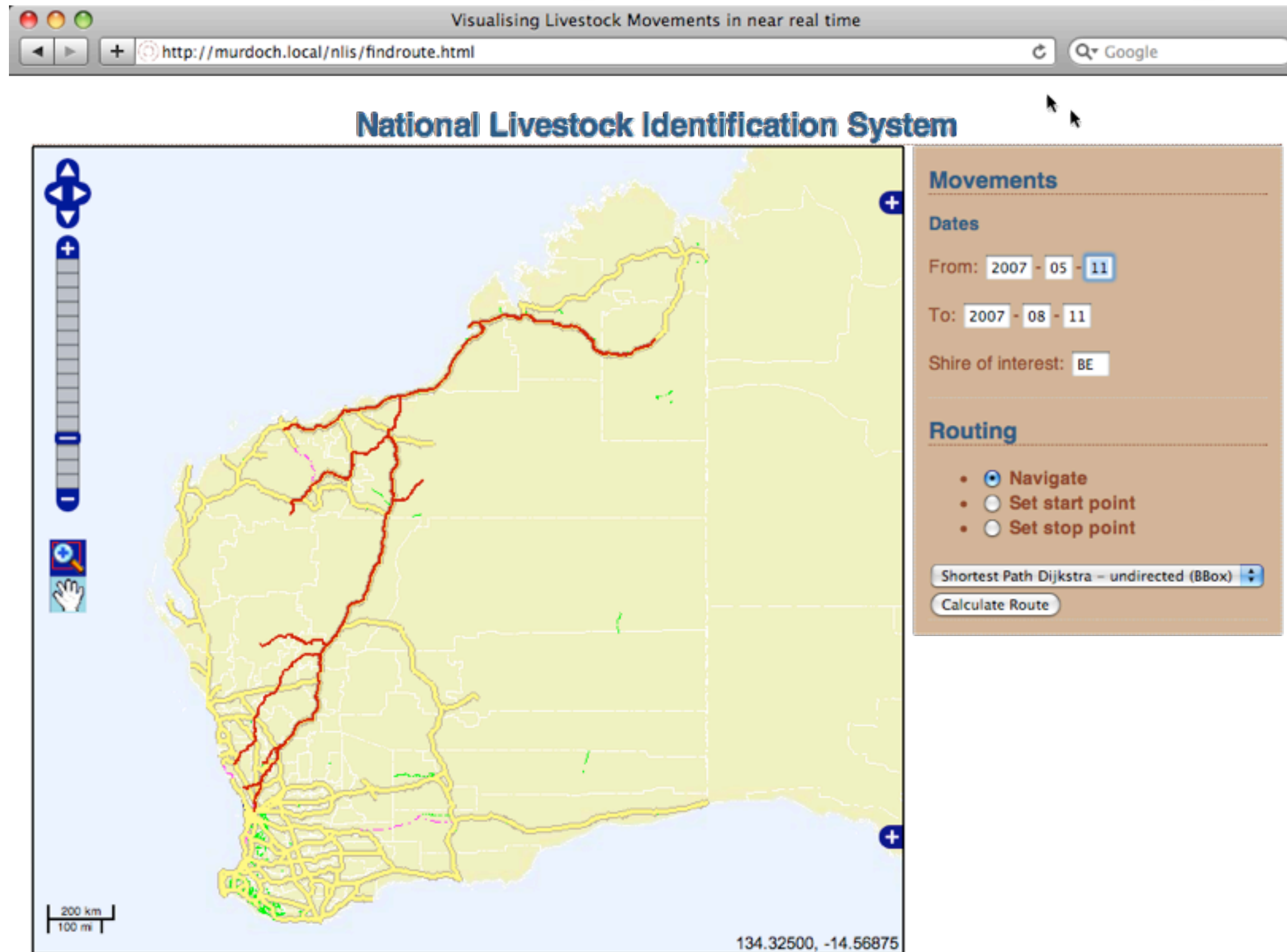
NLIS – Spread maps



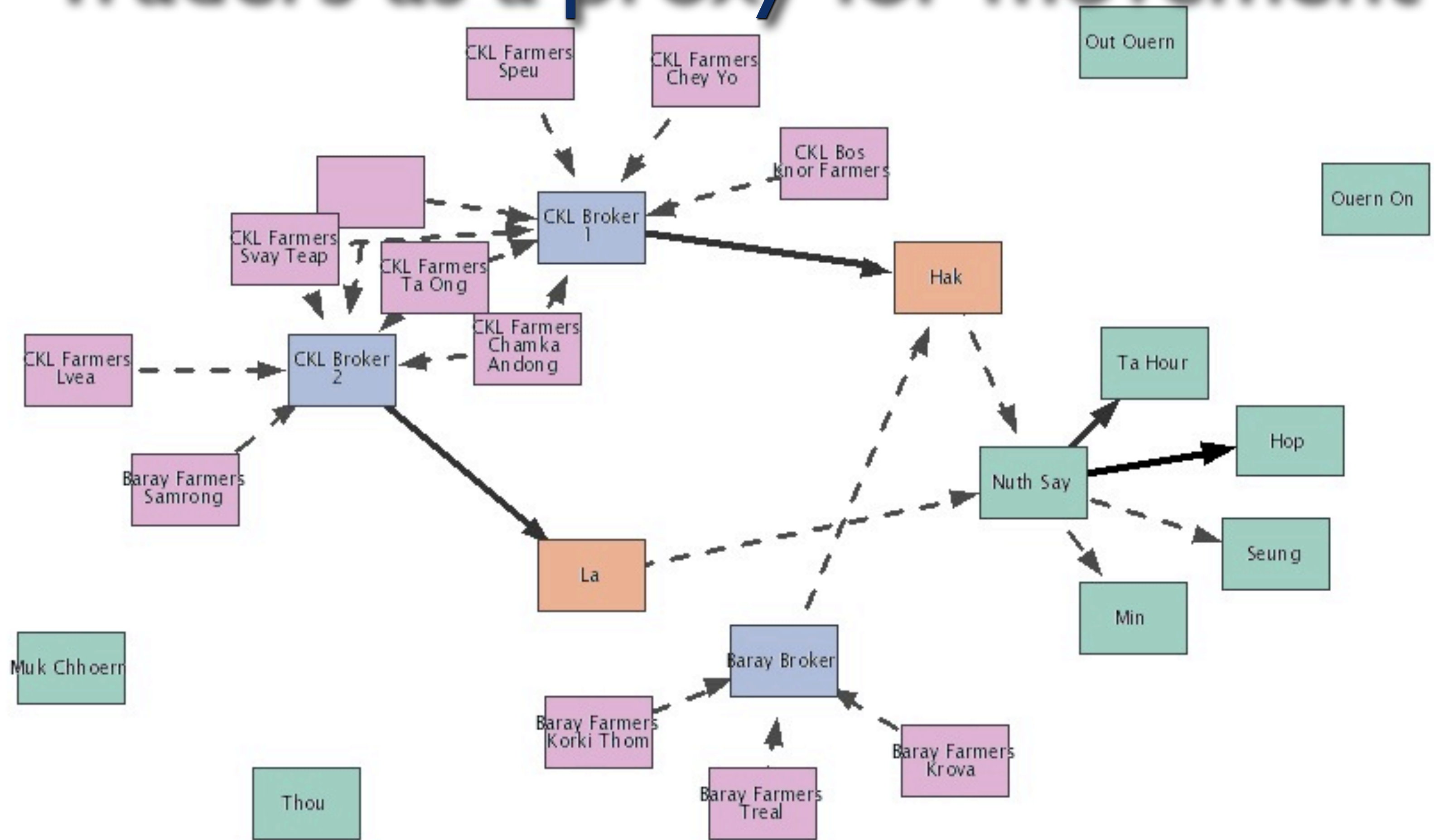
NLIS – Spread maps



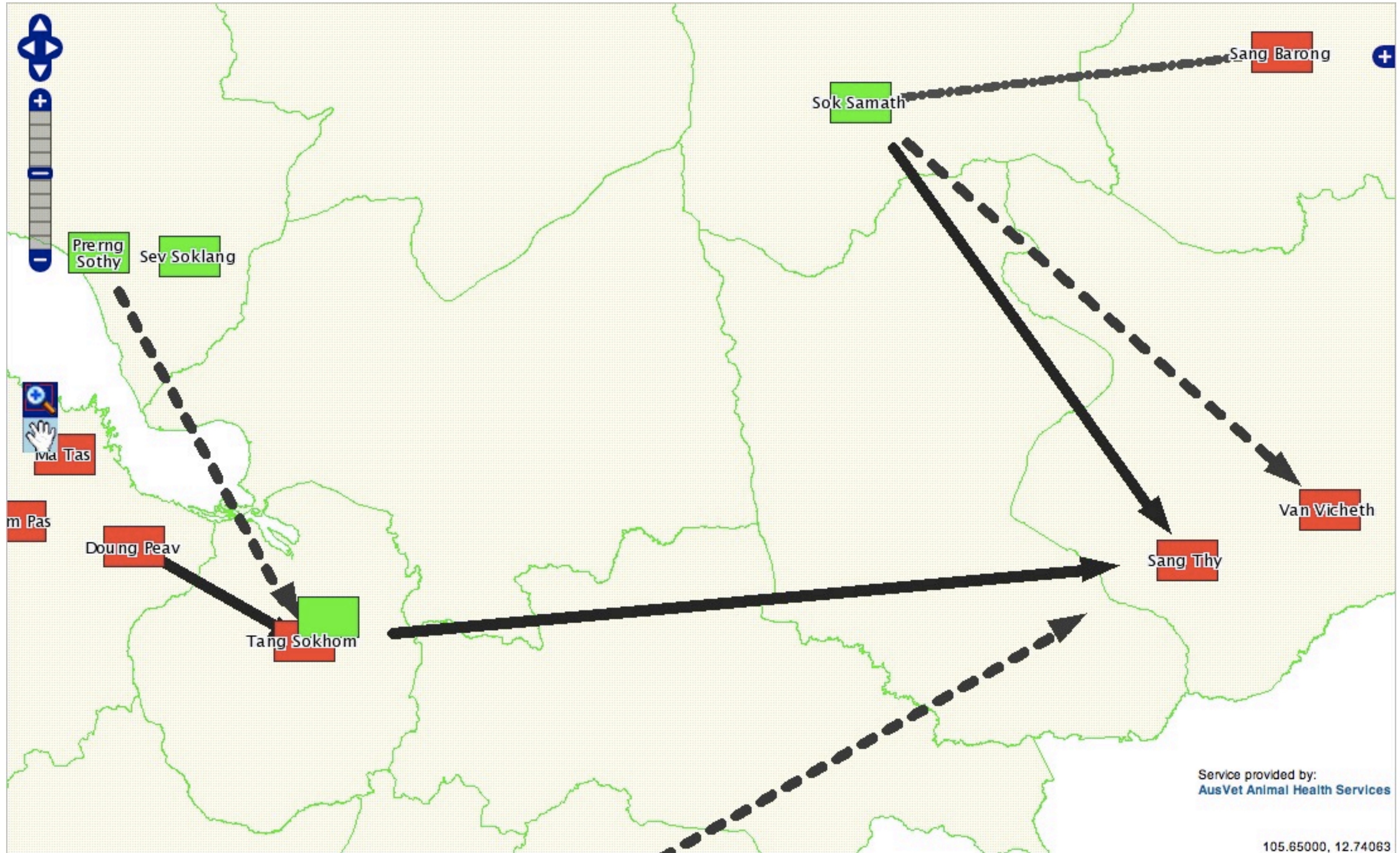
NLIS – Spread maps



Traders as a proxy for movement



'Geo-locate' traders



Conclusions

- Obviously not finished:
 - Need more query capacity / routing
 - Need to incorporate risk factors (known disease, livestock densities, vectors etc)
 - Some input / feedback from users
 - National / Regional acceptability
- Ongoing ownership options

License details



- This work is licensed under the Creative Commons Attribution–No Derivative Works 2.5 Australia License.
- To view a copy of this license, visit <http://creativecommons.org/licenses/by-nd/2.5/au/> or send a letter to Creative Commons, 171 Second Street, Suite 300, San Francisco, California, 94105, USA.