Zoonotic Disease Workshop 2016
ZD Highlights

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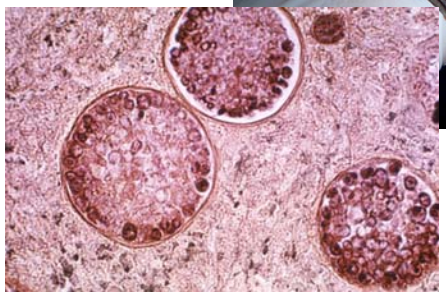
PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER COMMUNITY

Let's talk about…

- Mycotics Surveillance
  - *Coccidioides immitis, Cryptococcus gattii*
- Mosquito Surveillance
  - West Nile virus
- Tick Surveillance
  - Field surveillance, partner surveillance
- Rabies
- Canine Leptosirosis
- Plague



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Coccidioides immitis - Valley Fever

Coccidioides is a fungus that lives in the soil. When mammals breathe in fungal spores they can become infected. 8,232 cases of Valley fever were reported in 2014 (CDC). To date, Washington has 9 confirmed locally acquired cases.

Soil sampling Project Summary

Counties- **4**
Sites- **13**
Positive Sites – **5**
Soil Samples Taken- **891**

County	# Sites	# soil samples taken	# positive samples	# samples pending results
Benton	6	604	24*	374
Yakima	5	149	7	72
Walla Walla	1	104	unknown	104
Kittitas	1	34	unknown	34

**11 repeat sample locations*

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How do we find it?

- Use human case and animal serology information to sample in places of likely exposure
- Public lands are preferred locations
- Systematic sampling – transect/plot
  - Composite soil sample
  - Composite rodent hole soil sample
- High Volume Air Sampler
  - Staplex Type TF1A
- Passive Atmospheric Deposition Sampler (PADS)
  - Uses the same filter as the TF1A

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Air Sampling

Staplex High Volume Air Sampler
TF1A

Impinger

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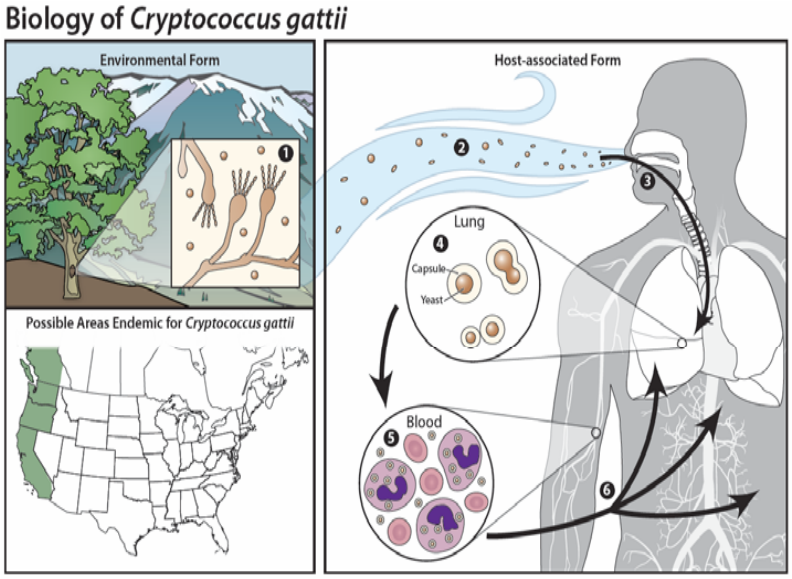
Cryptococcus gattii

What are the signs and symptoms?

- Cough that lasts weeks or months
- Sharp chest pain
- Unexplained shortness of breath
- Severe headache
- Confusion
- Fever
- Night sweats
- Unintended weight loss



Cryptococcus gattii lives in the environment (1), usually in association with certain trees or soil around trees. Humans and animals can become infected with *C. gattii* after inhaling airborne, dehydrated yeast cells or spores (2), which travel through the respiratory tract and enter the lungs of the host (3). The small size of the yeast and/or spores allows them to become lodged deep in the lung tissue. The environment inside the host body signals *C. gattii* to transform into its yeast form, and the cells grow thick capsules to protect themselves (4). The yeasts then divide and multiply by budding. After infecting the lungs, *C. gattii* cells can travel through the bloodstream (5)—either on their own or within macrophage cells— to infect other areas of the body, typically the central nervous system (6).

Correct diagnosis and antifungal treatment are key to recovery

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Cryptococcus gattii

Environmental Sampling

Year	Samples collected	Results
2014	41	All Negative
2015	0	NA
2016	40	All Pending

Animal Case Surveillance

Year	Samples Submitted	Results
2014	9	5 (+) gattii / 3 (+) Crypto sp.
2015	6	4 (+) gattii / 1 (+) neoformans
2016	2	1 (+) neoformans / 1 pending

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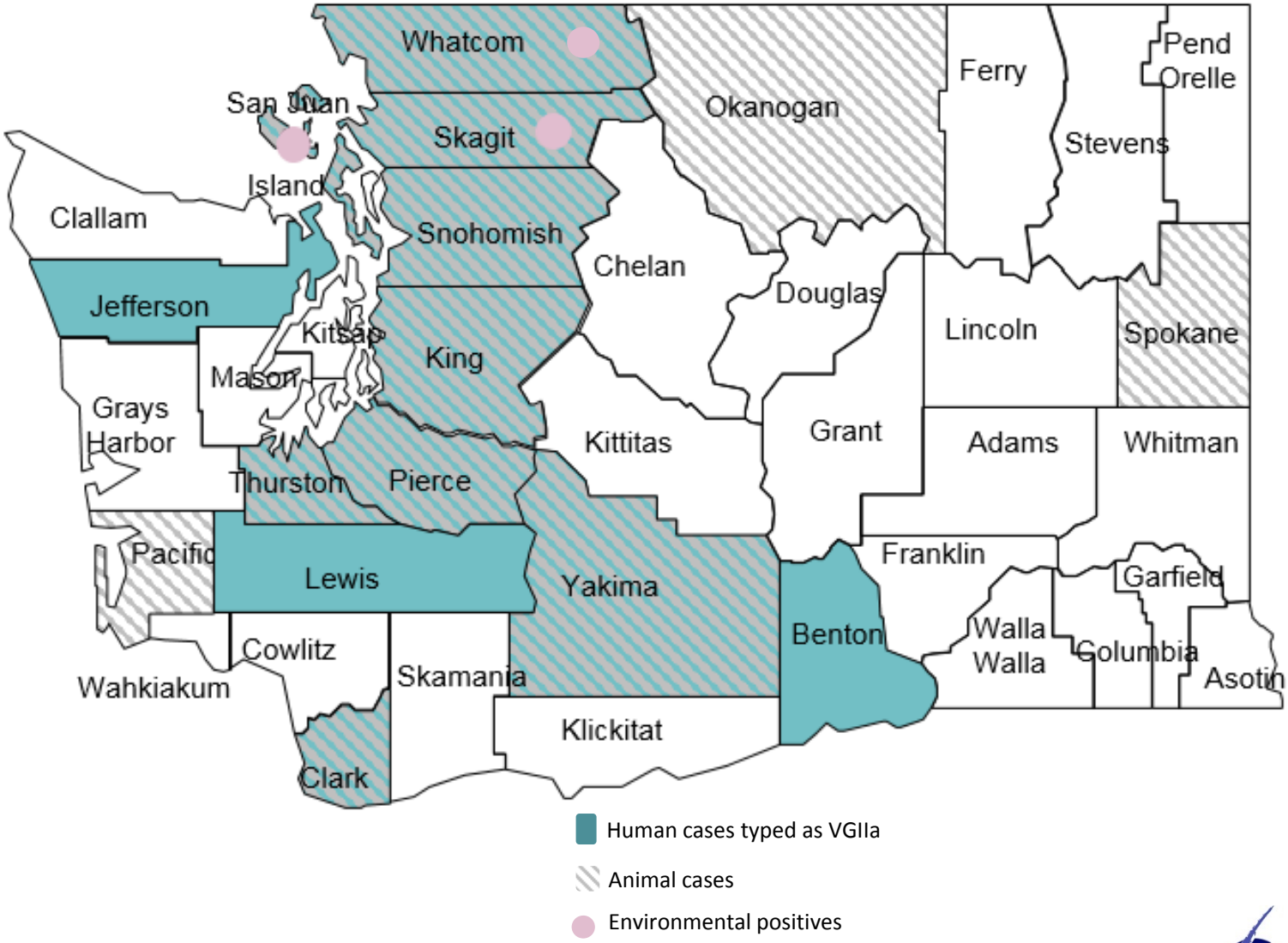
WA Epidemiology

Cryptococcus gattii, 2004-2015



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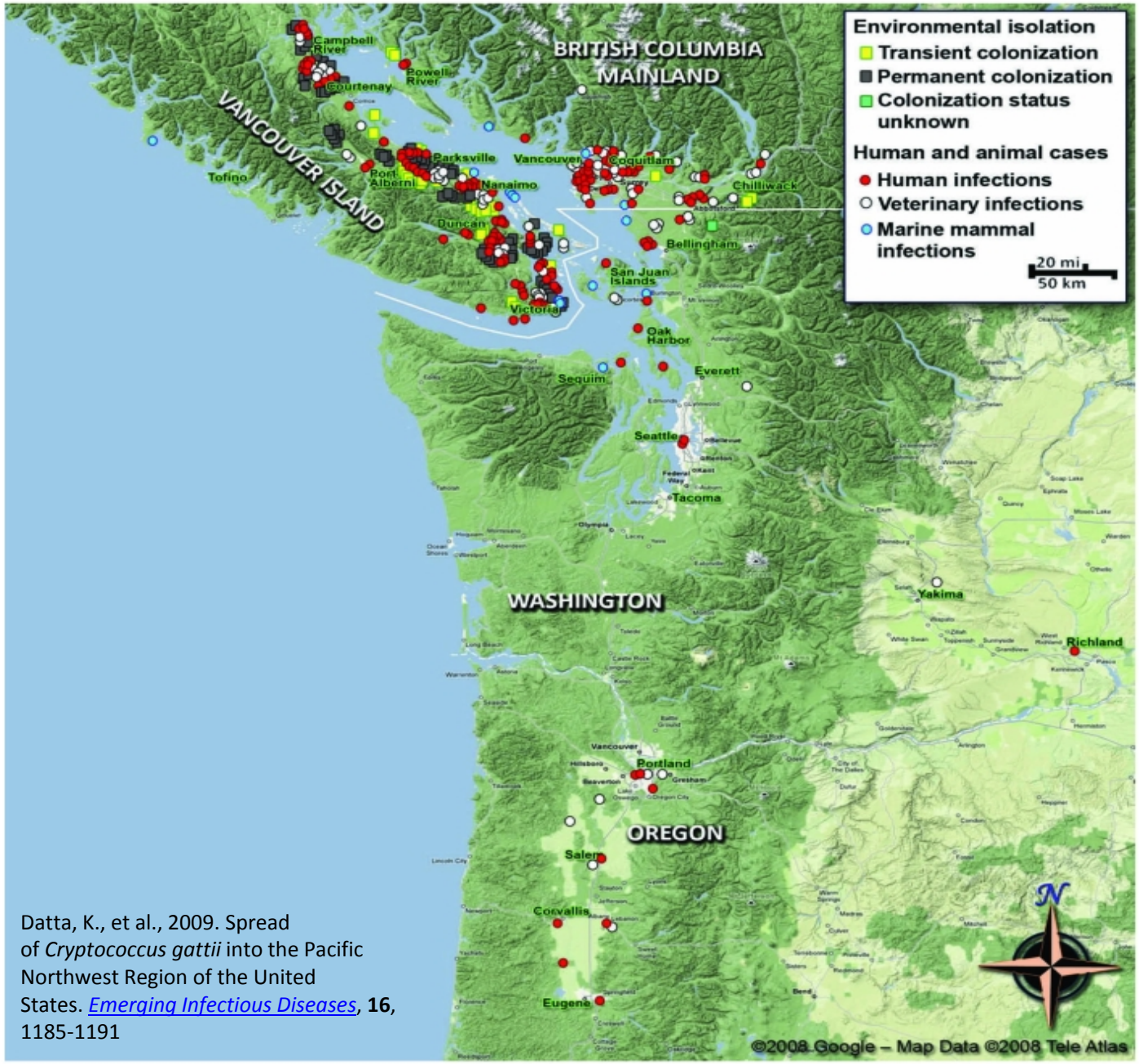

Datta, K., et al., 2009. Spread of *Cryptococcus gattii* into the Pacific Northwest Region of the United States. *Emerging Infectious Diseases*, **16**, 1185-1191

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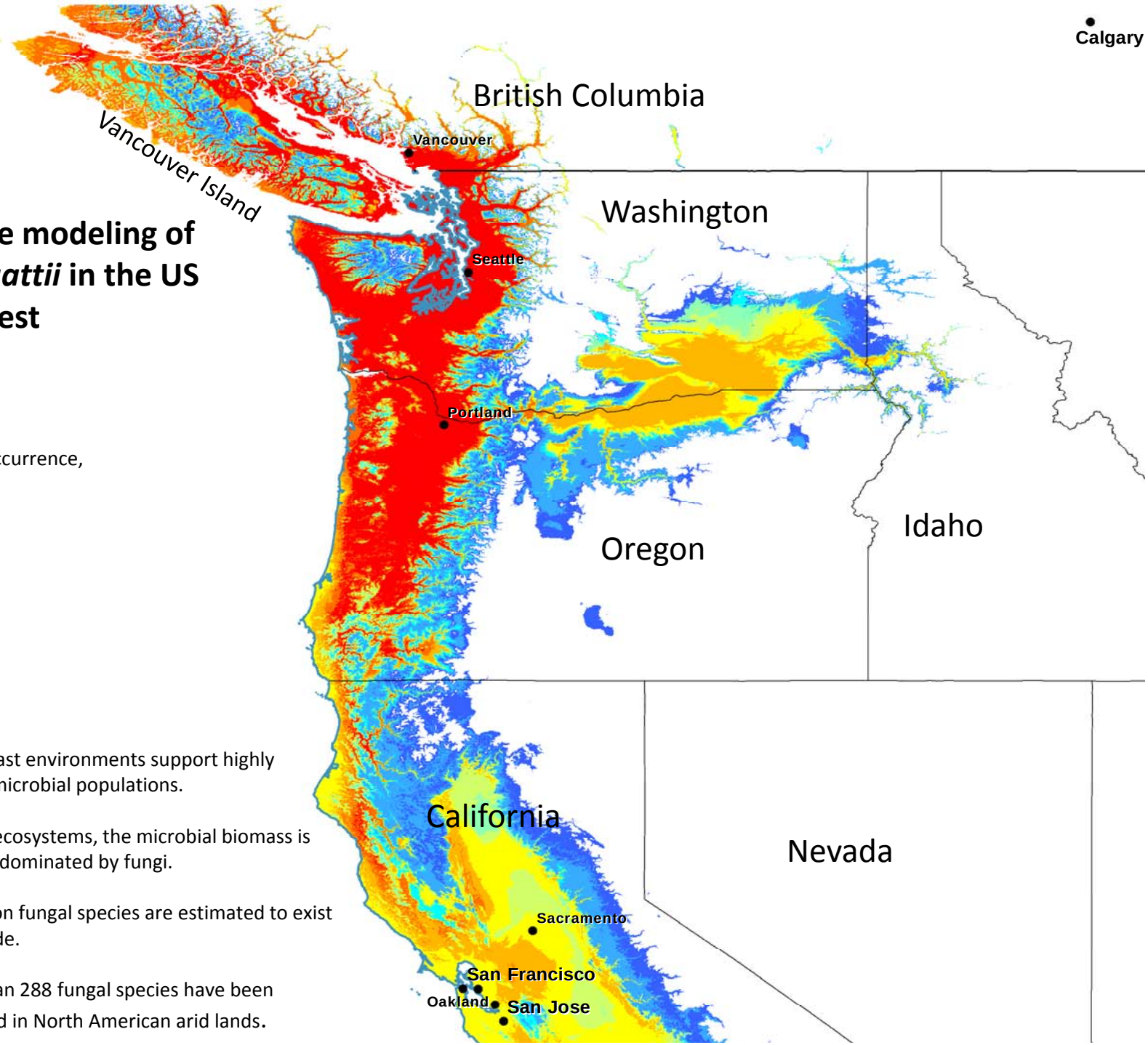
Ecological niche modeling of *Cryptococcus gattii* in the US Pacific Northwest



Likelihood of species occurrence, as per the ENM:

- 91-100%
- 81-90%
- 71-80%
- 61-70%
- 51-60%
- 41-50%
- 31-40%
- 21-30%
- 11-20%
- 1-10%
- 0%

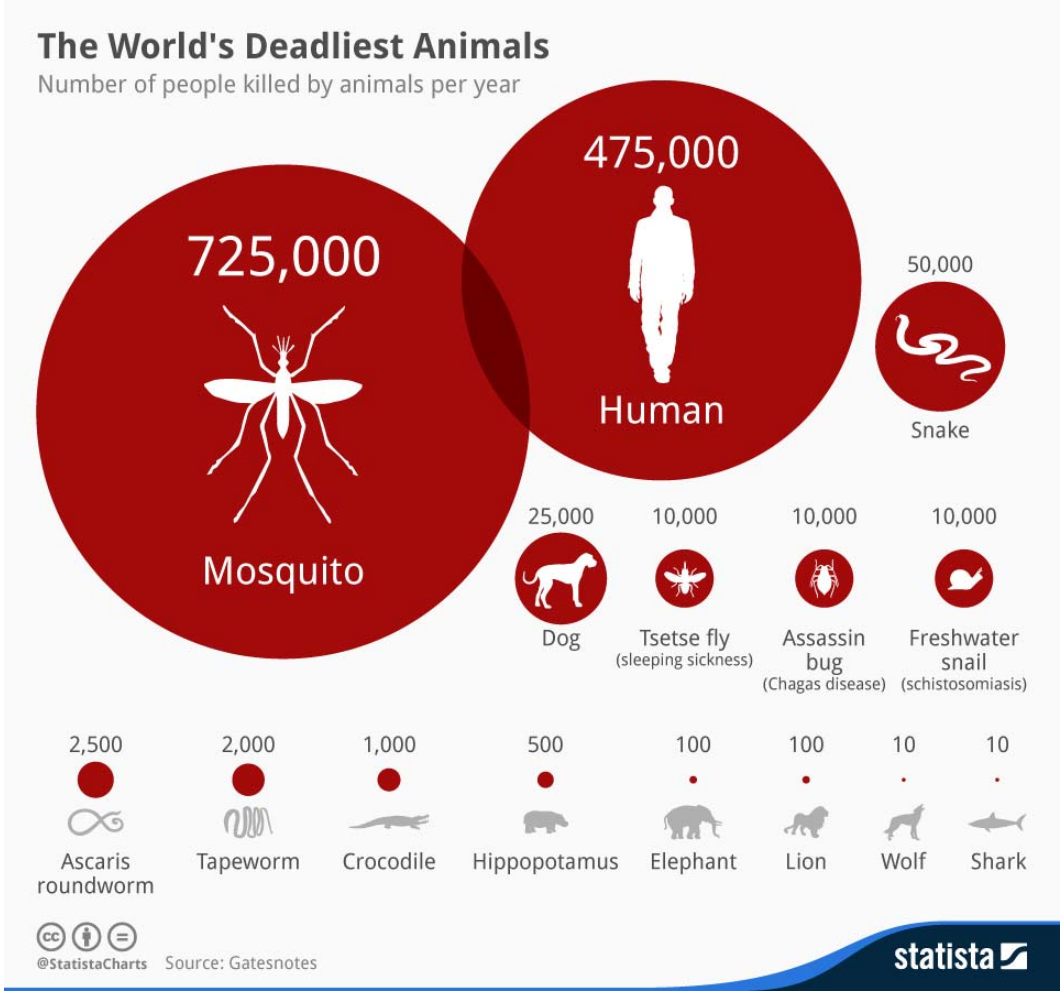
West Coast environments support highly diverse microbial populations.

In most ecosystems, the microbial biomass is typically dominated by fungi.

1.5 million fungal species are estimated to exist worldwide.

More than 288 fungal species have been described in North American arid lands.

What is the deadliest animal in the world?



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West Nile Virus

DOH processes specimens and data for about 500,000 mosquitoes annually

Dead bird surveillance is coming to an end. Mosquito populations are a better indicator of WNV activity

Continued WNV activity in the South Central region of Washington State

~ 9,000 mosquitoes from Stevens County

2016 - Higher than usual activity in the North Eastern portion of the state

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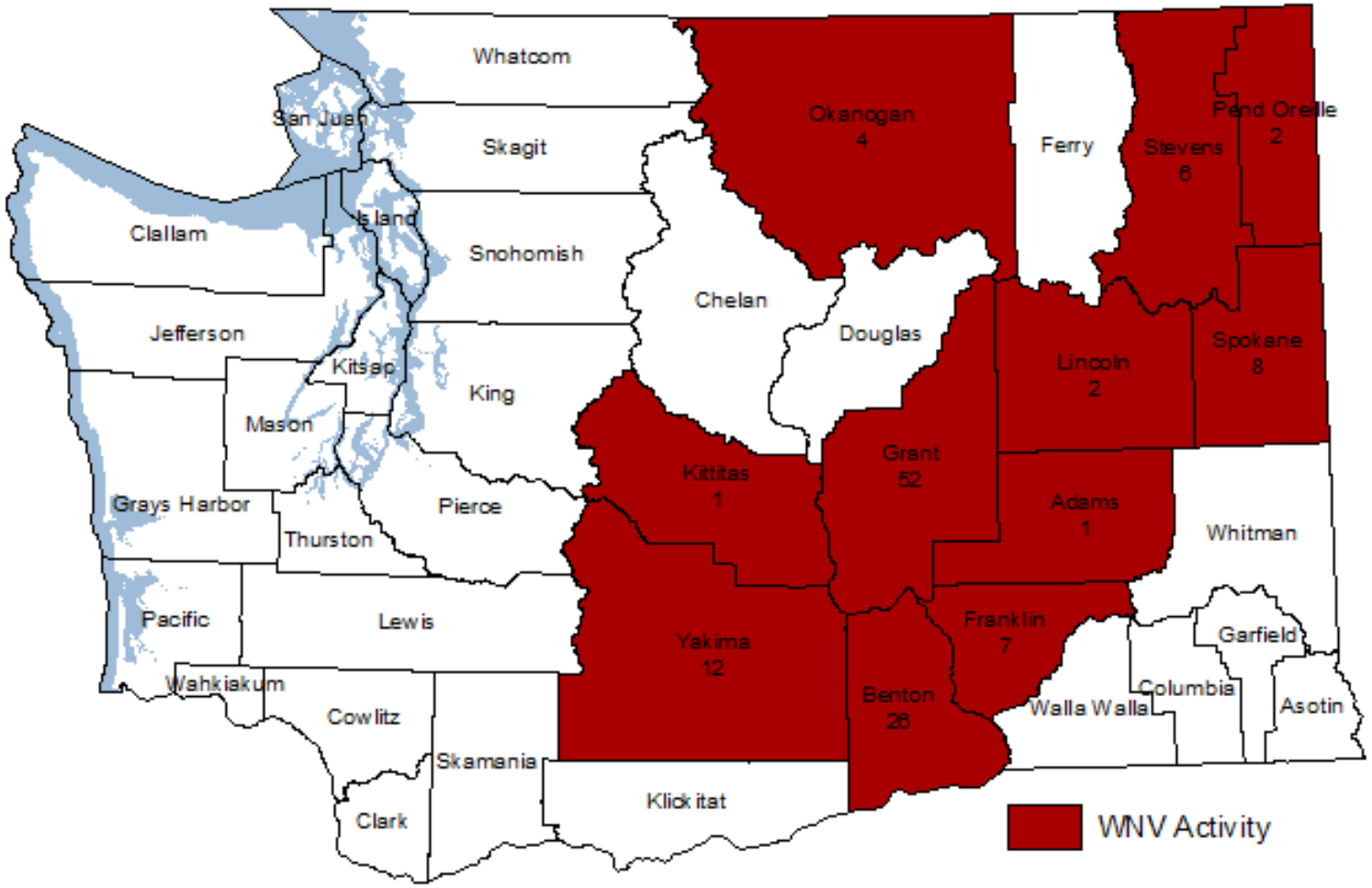
2016 WNV Activity

Horses/mammals, birds mosquitoes



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2016 WNV Activity

West Nile Virus-Positive Cases in Washington, 2016					
County	Human		Horse/Other Mammal	Bird	Mosquito Sample
	By County of Likely Exposure	By County of Residence			
Adams	0	0	0	0	1
Benton	2	2	1	0	25
Franklin	0	0	1	0	6
Grant	0	0	1	0	51
Kittitas	0	0	1	0	0
Lincoln	0	0	2	0	0
Okanogan	0	0	4	0	0
Pend Oreille	0	0	2	0	0
Spokane	3	3	7	1	0
Stevens	0	0	5	0	1
Walla Walla	1	1	0	0	0
Whitman	1	1	0	0	0
Yakima	1	1	1	0	11
Multi-county Exposure*					
In-state Acquired					
Out-of-state Acquired					
Totals	8		25	1	95

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TICK WARNING

Please send this warning to everyone on your e-mail list.
If someone comes to your front door saying they are checking for ticks due to the warm weather and asks you to take your clothes off and dance around with your arms up,
DO NOT DO IT!! THIS IS A SCAM!!
They only want to see you dance naked.
I wish I'd gotten this yesterday... I feel so stupid.

www.theredneckplayground.com

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Tick Surveillance

- Veterinary partnerships are coming to an end
  - Funding reduction for fed ticks
- Focus moves to field surveillance ticks
  - Unfed tick collections
- Routine tick drag / flag
- 30 minute timed habitat plot

If you know of a tick "hot spot" please let us know so we can collect ticks for pathogen testing

Better yet- SHOW US! Join us for a day of field work!

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Tick Surveillance Project – 2016 Update

- 129 Partners
- Over 10,700 ticks collected since beginning of project in 2010
- Over 2,500 ticks tested

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2016 Tick-borne Disease - *Ixodes*

Genus	Year	Total Ticks Tested	Positive Results			
			Ap	*Bb*	*Bm*	*Babesia*
All Ixodes	2016	300	2/200 (1.0%)	2 (0.7%)	0	0
Ixodes pacificus	2011 - 2016	1,147	11/964 (1.1%)	19 (1.7%)	2/855 (0.2%)	0
Total All Ixodes	2011 - 2016	1,875	14/1,675 (0.8%)	26 (1.4%)	2/838 (0.2%)	0

Washington State Department of Health

2016 Tick-borne Disease - *Dermacentor*

Genus	Year	Total Ticks Tested	Positive Results		
			Rr	Ft	NP Rick*
Dermacentor	**2016**	**200**	**0**	**1 (0.5%)**	**10/35 (28.6%)**
Dermacentor	**2013 - 2016**	**632**	**0**	**1/492 (0.2%)**	**48/175 (27.4%)**

***Non-Pathogenic *Rickettsia* include:**

- *R. bellii*
- *R. montanensis*
- *R. peacocki*
- *R. rhipicephali*
- *Rickettsia – Ixodes pacificus* endosymbiont

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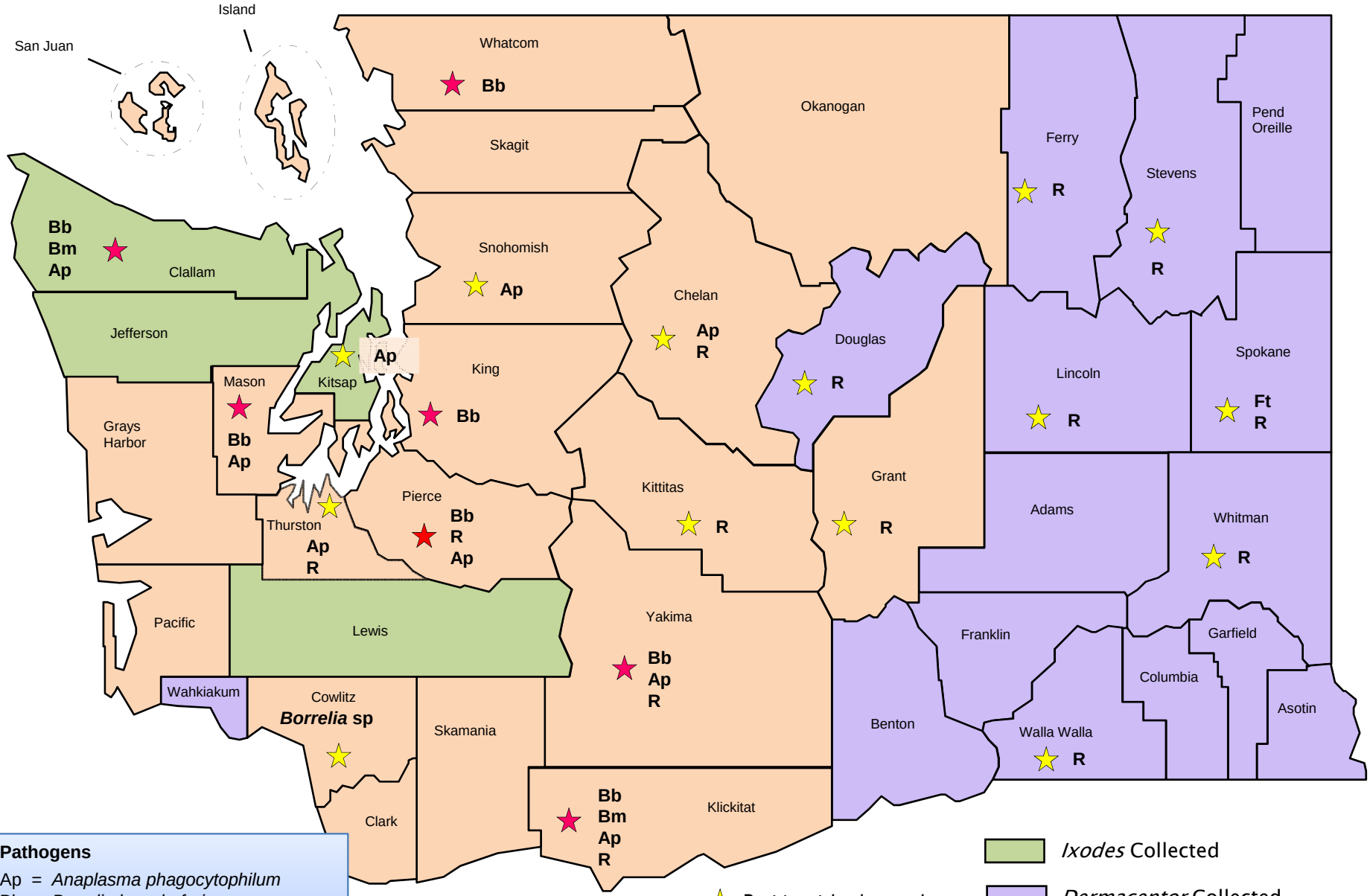
San Juan
Island
Whatcom
Bb
Skagit
Okanogan
Ferry
R
Stevens
R
Pend Oreille
Bb
Bm
Ap
Clallam
Snohomish
Ap
Chelan
Ap
R
Douglas
R
Lincoln
R
Spokane
Ft
R
Jefferson
Ap
King
Bb
Mason
Bb
Ap
Kitsap
Grays Harbor
Pierce
Bb
R
Ap
Thurston
Ap
R
Kittitas
R
Grant
R
Adams
Whitman
R
Pacific
Lewis
Yakima
Bb
Ap
R
Franklin
Garfield
Columbia
Asotin
Wahkiakum
Cowlitz
Borrelia sp
Skamania
Benton
Walla Walla
R
Clark
Bb
Bm
Ap
R
Klickitat
Pathogens
Ap = Anaplasma phagocytophilum
Bb = Borrelia burgdorferi
Bm = Borrelia miyamotoi
Ft = Francisella tularensis
R = non-pathogenic Rickettsia species
Positive ticks detected
Bb+ ticks detected
Ixodes Collected
Dermacentor Collected
Both Genera Collected
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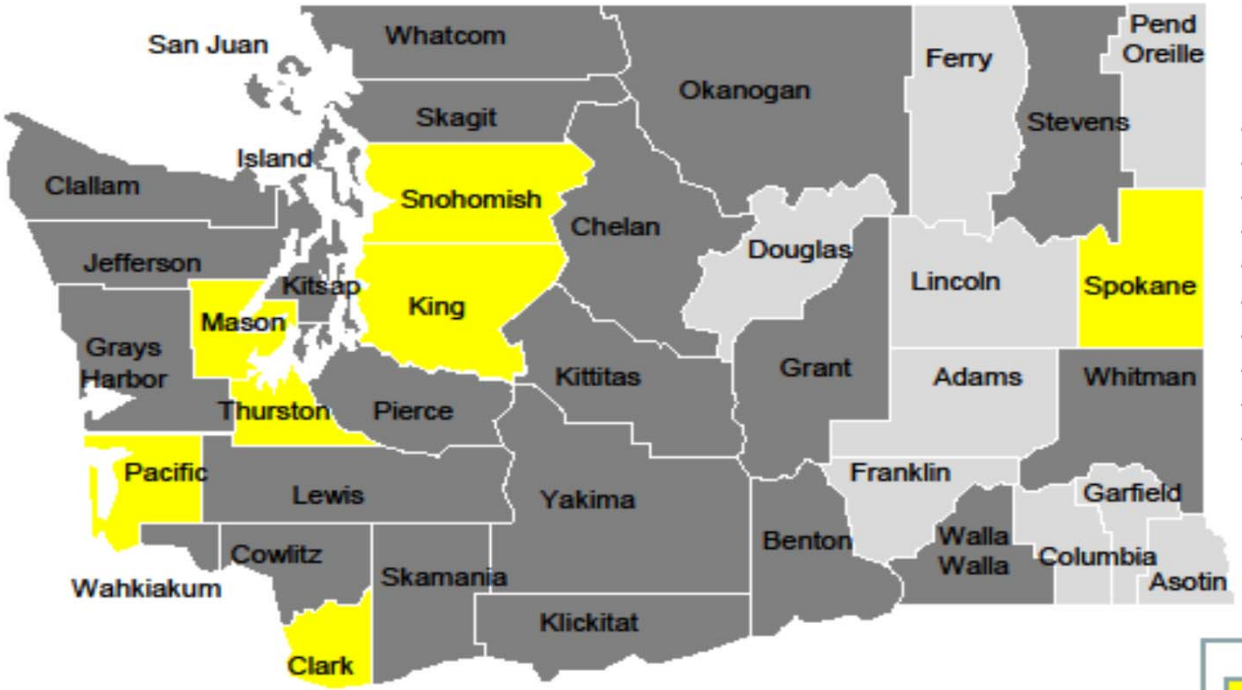
Rabies

Bats Tested for Rabies, Washington State, January 1 – December 31, 2015 (N = 305 Tested Bats)



Month	County	# Positive Bats
June	Thurston	1 bat
July	Spokane	1 bat
July	King	1 bat
August	Mason	1 bat
August	Clark	1 bat
September	Pacific	1 bat
September	King	1 bat
September	Mason	1 bat
September	Snohomish	1 bat

Nine rabid bats were identified during 2015.

*Additionally, a rabid cat was identified in Jefferson County in November 2015

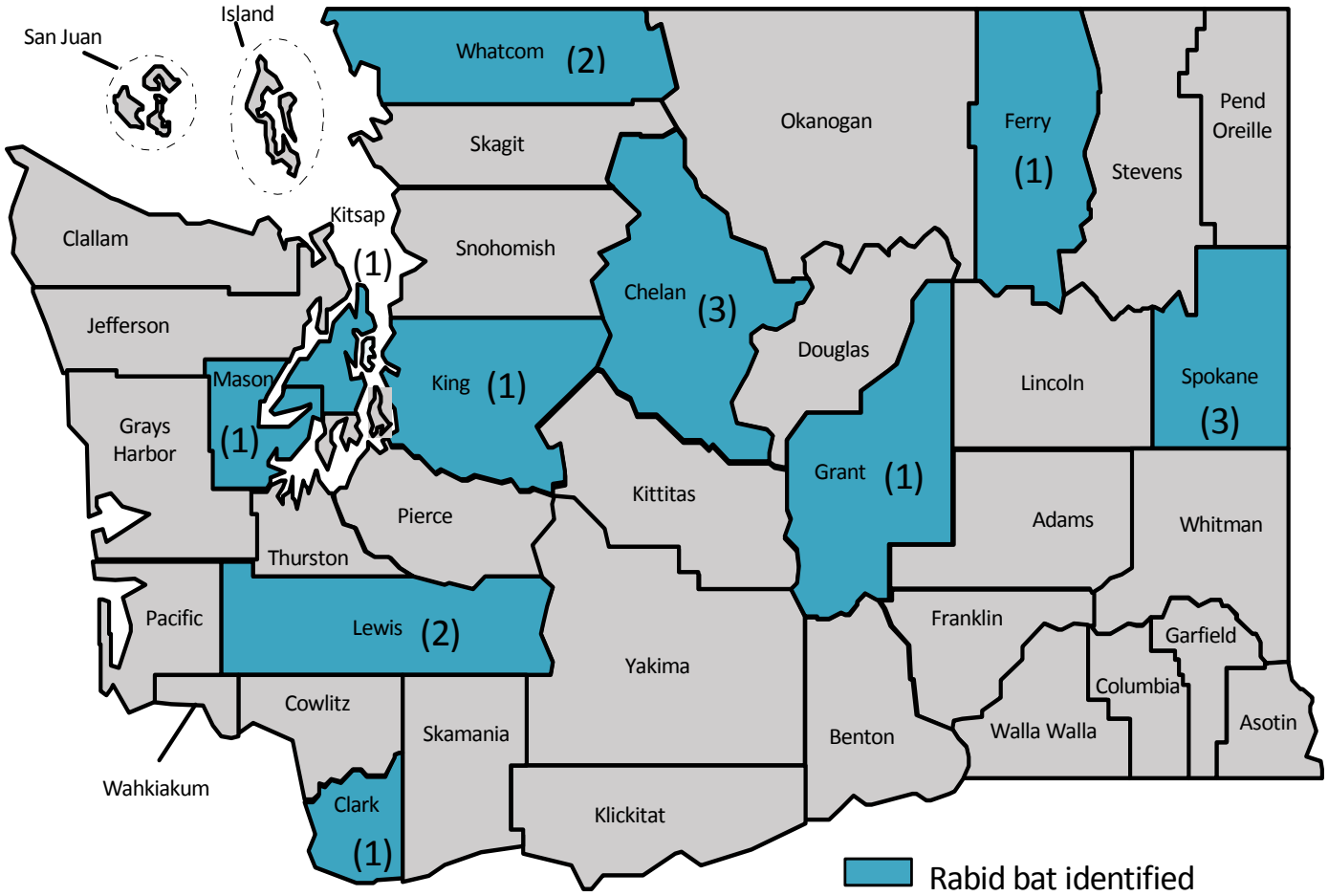
- Rabid bat identified
- Bats submitted for testing, no positives identified
- No bats submitted for testing

Office of Communicable Disease Epidemiology

Last updated 5/16/2016

Rabies

Preliminary 2016 Data



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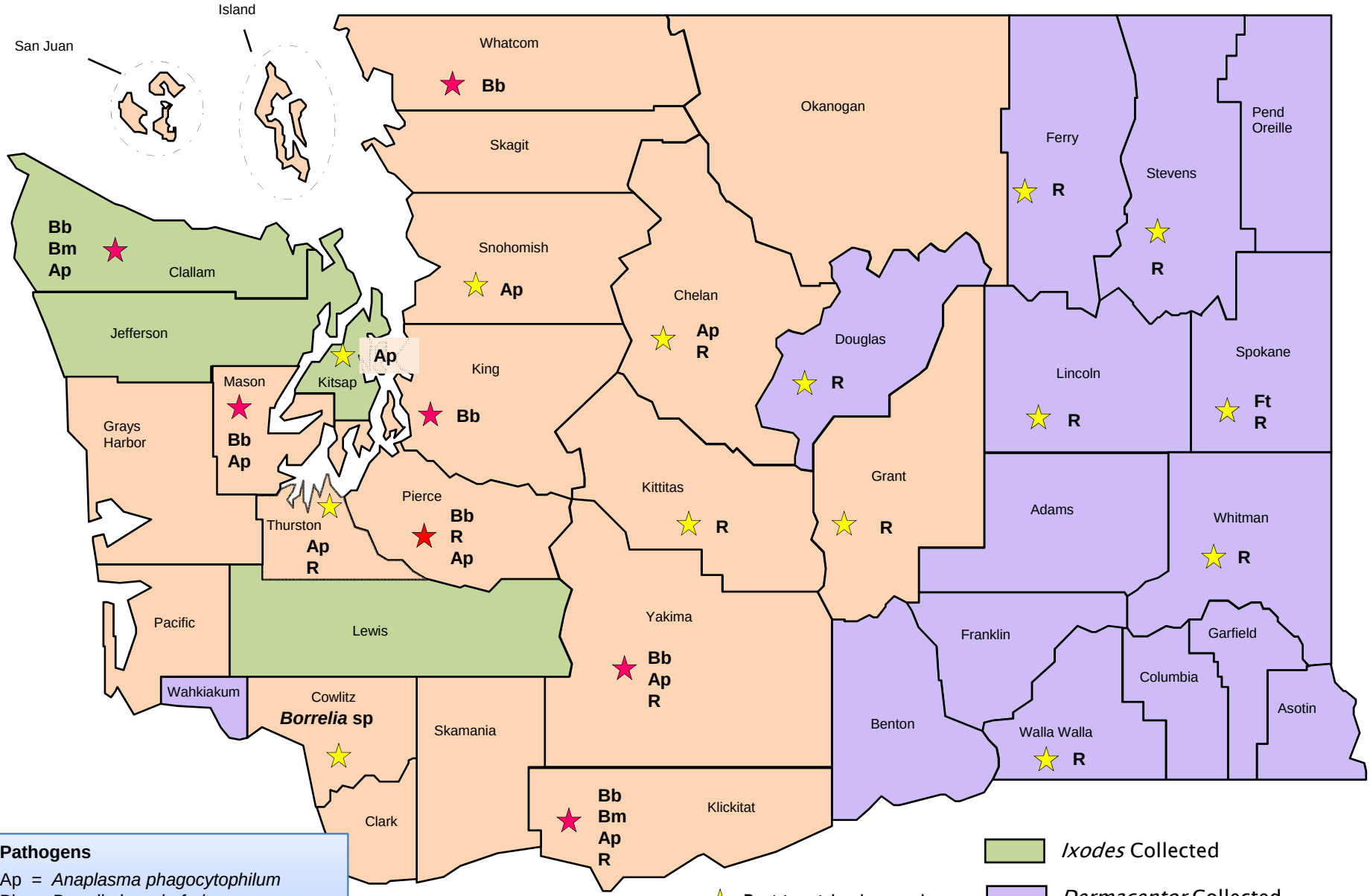

Pathogens

Ap = *Anaplasma phagocytophilum*
Bb = *Borrelia burgdorferi*
Bm = *Borrelia miyamotoi*
Ft = *Francisella tularensis*
R = non-pathogenic *Rickettsia* species

Positive ticks detected

Bb+ ticks detected

Ixodes Collected

Dermacentor Collected

Both Genera Collected

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Canine Leptospirosis

- Bacteria that is spread through urine of infected animals
- Can persist in the soil and water for weeks or months
- Exposure can occur through the skin (especially if broken) or mucous membranes
- Common symptoms:
  - Fever
  - Stiffness
  - Abdominal pain/discomfort

Surf Dogs USA

- **Canine vaccine is available**

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2015 Canine Leptospirosis

- 18 reported canine leptospirosis cases
  - 15 confirmed
  - 3 suspected

jacksonville.com

Entershikarism

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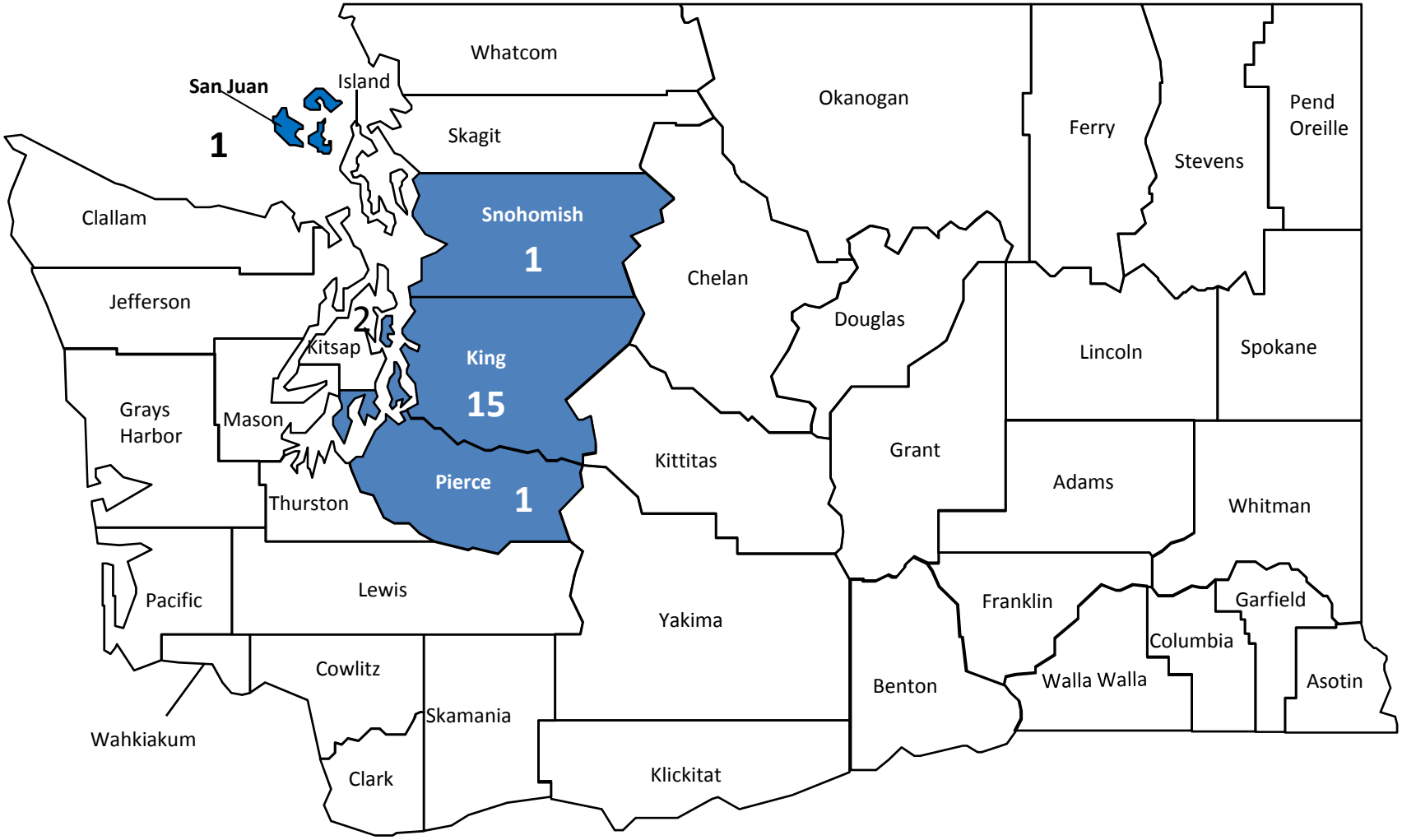
2015 Canine Leptospirosis



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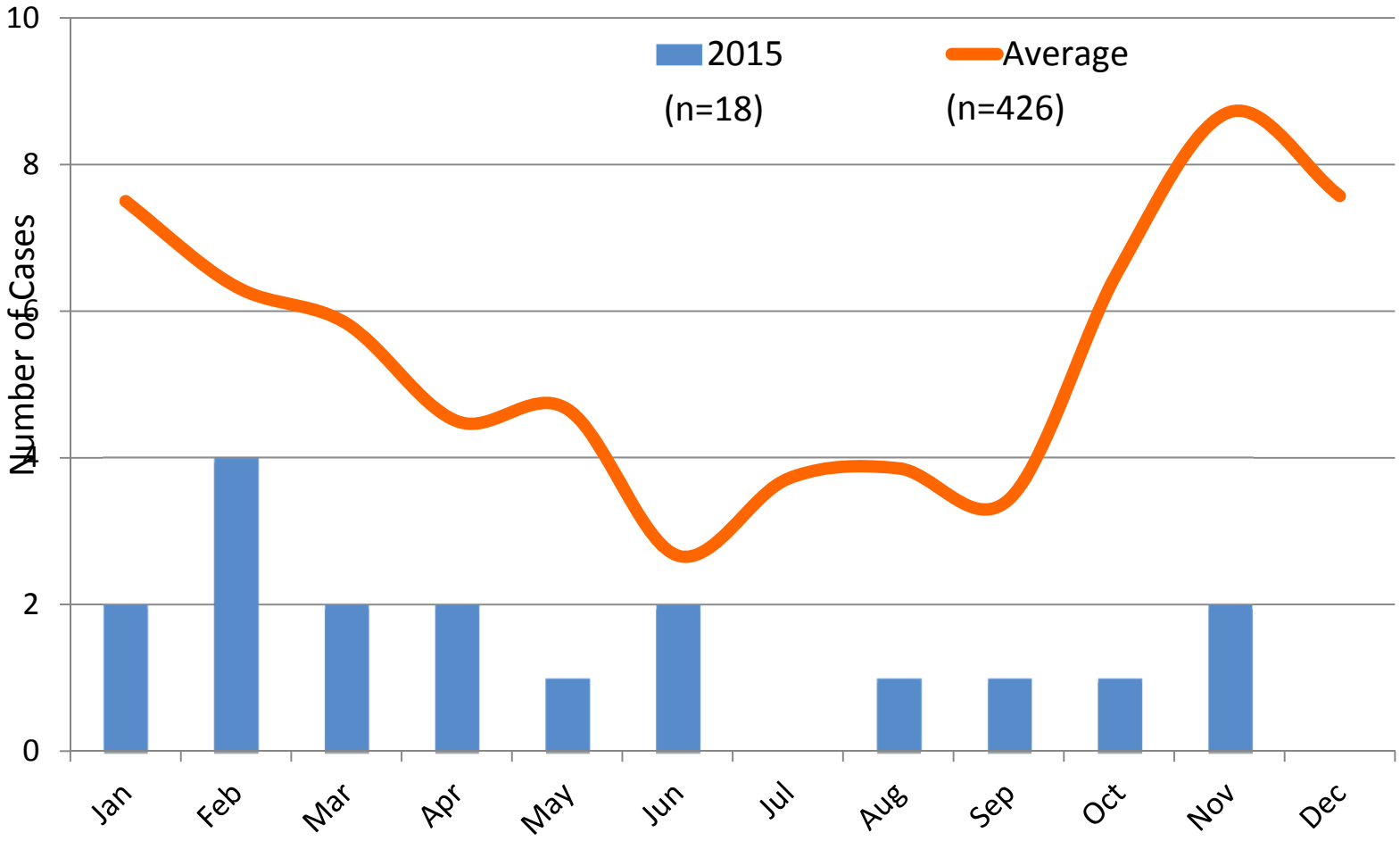
2015 Canine Leptospirosis



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2016 Canine Leptospirosis

As of September 20, 2016:

- 9 reported canine leptospirosis cases
  - 7 Confirmed
  - 2 Suspected

Photo: Seth Casteel

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Plague in Washington State

- 1975 thru 2014 - Serologic sampling of **8,787** samples collected statewide showed **2.58%** (227 samples) reactivity.

- July 2014 thru June 2015 – **134** samples collected: **All negative**

CURRENT SITUATION:

We are actively recruiting volunteers to help collect blood samples from coyotes preferably or other rodent eating wildlife

If you or someone you know traps coyotes and is interested in participating in plague surveillance , please contact me:

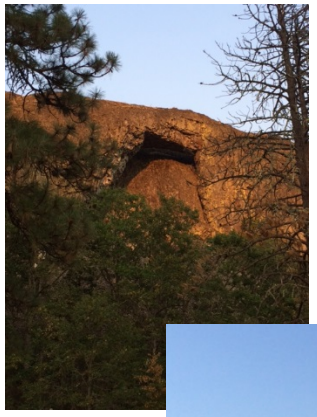
Flea – Red Hot Chili Peppers

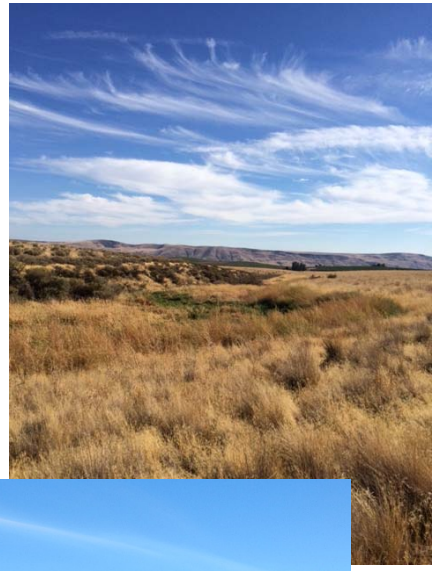
david.kangiser@doh.wa.gov

360.236.3064

Washington State Department of Health

If you or someone from your agency/organization would like to learn more about how to help with any of our field surveillance projects, please contact me:





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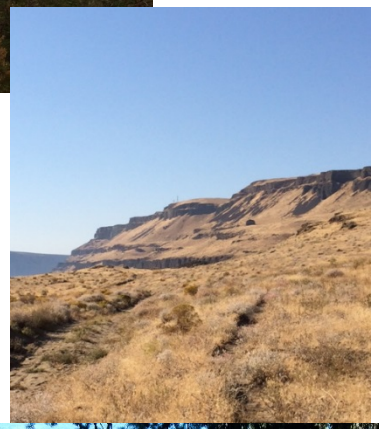
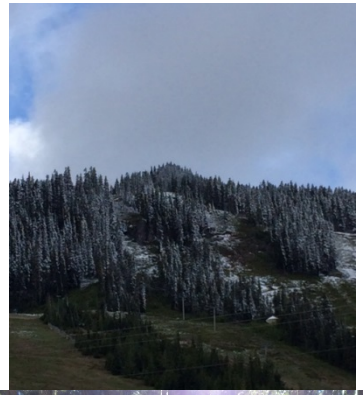
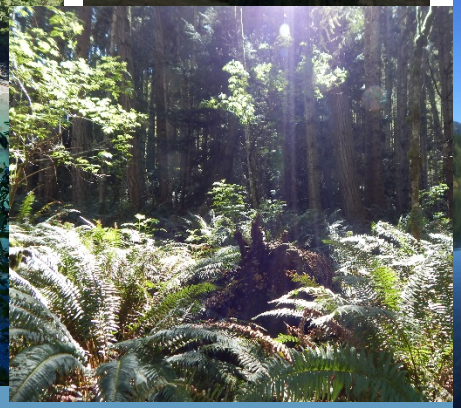
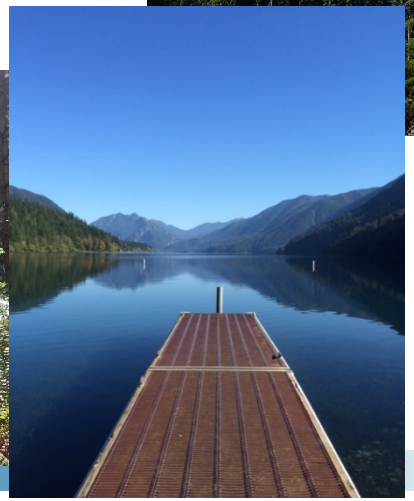
THANK YOU!









Next Up!

Hanna Oltean

Epidemiologist with the Office of Communicable Disease Epidemiology with Washington State Department of Health

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