
ATTENTION
IF YOU HAVE A
FEVER ALONG WITH
MUSCLE ACHES AND
PAINS, PLEASE STAY
IN YOUR CAR AND
WE WILL EXAMINE
YOU THERE.

“sin nombre”

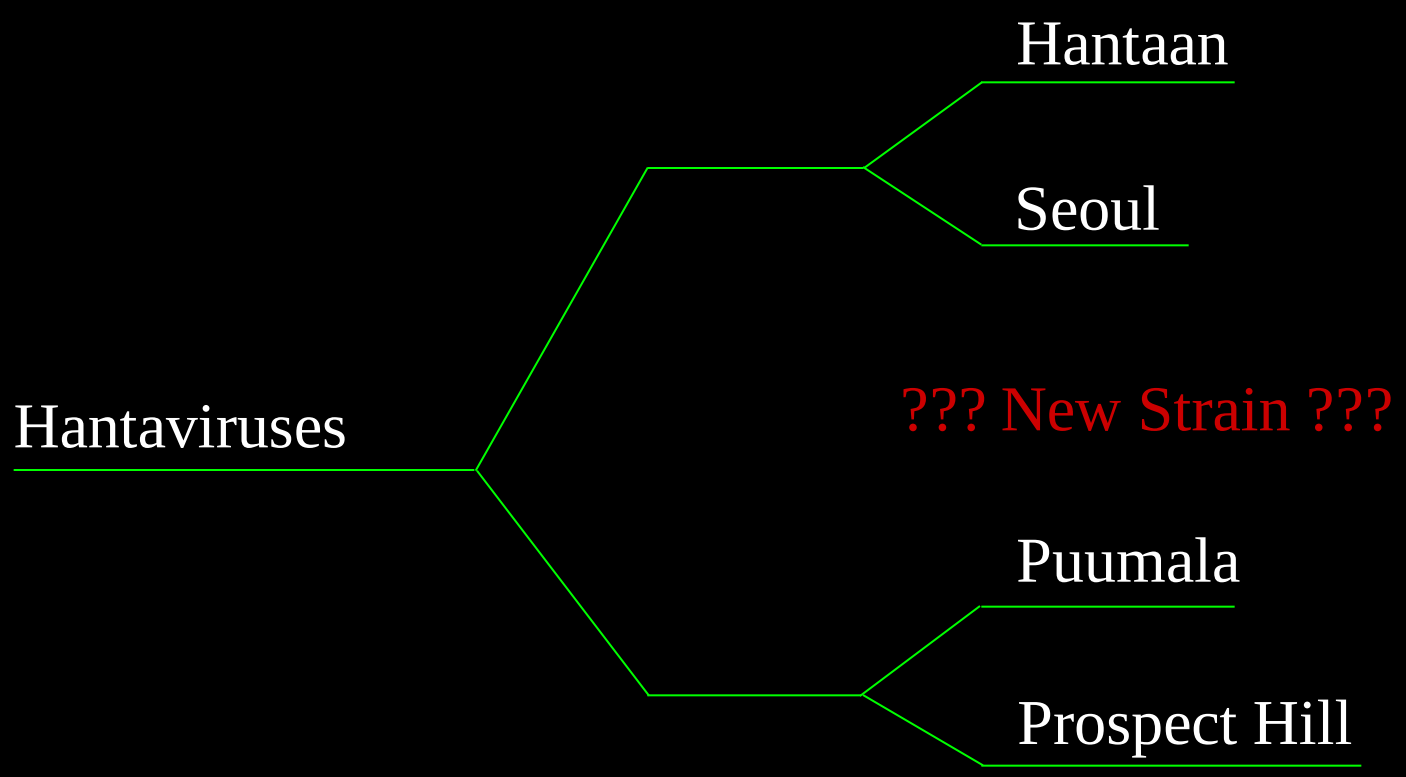
Previously undescribed hantavirus of the family Bunyaviridae

Etiologic agent of “hantavirus pulmonary syndrome” HPS

Mortality rate in excess of 50%

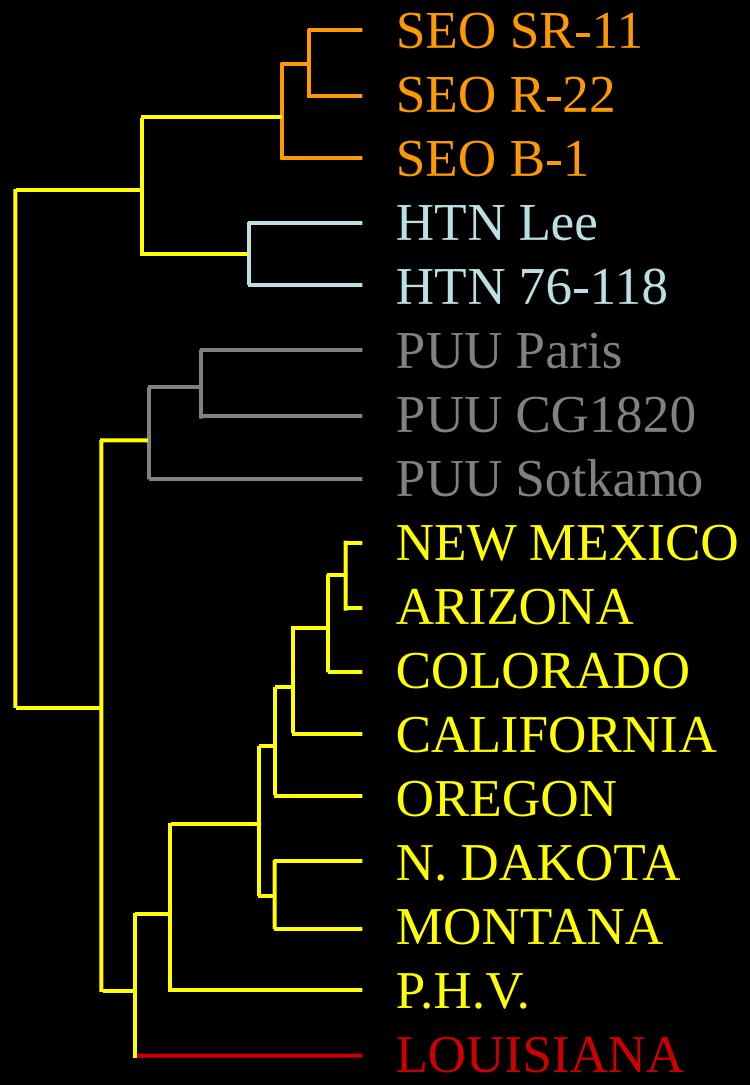
Primary reservoir in the Deer Mouse *Peromyscus maniculatus*

The Hantaviruses

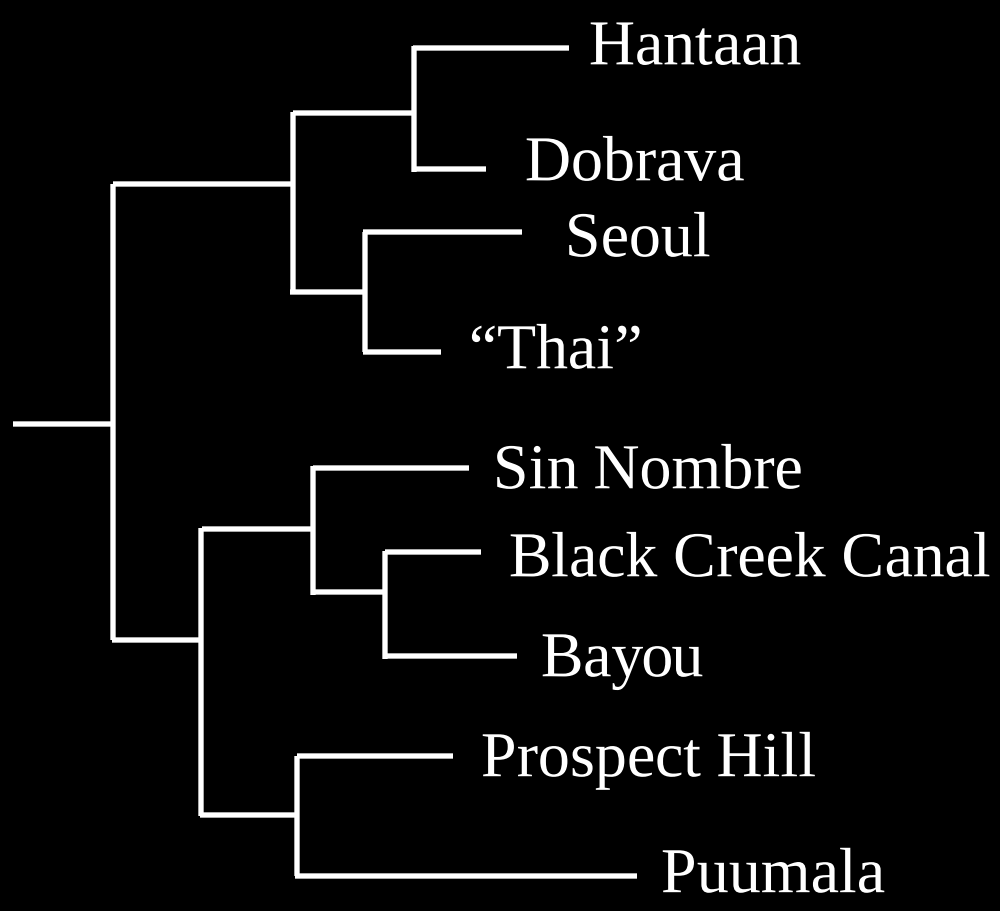



846
86,356

Relationship with Prototype Viruses



Phylogeny of Hantaviruses

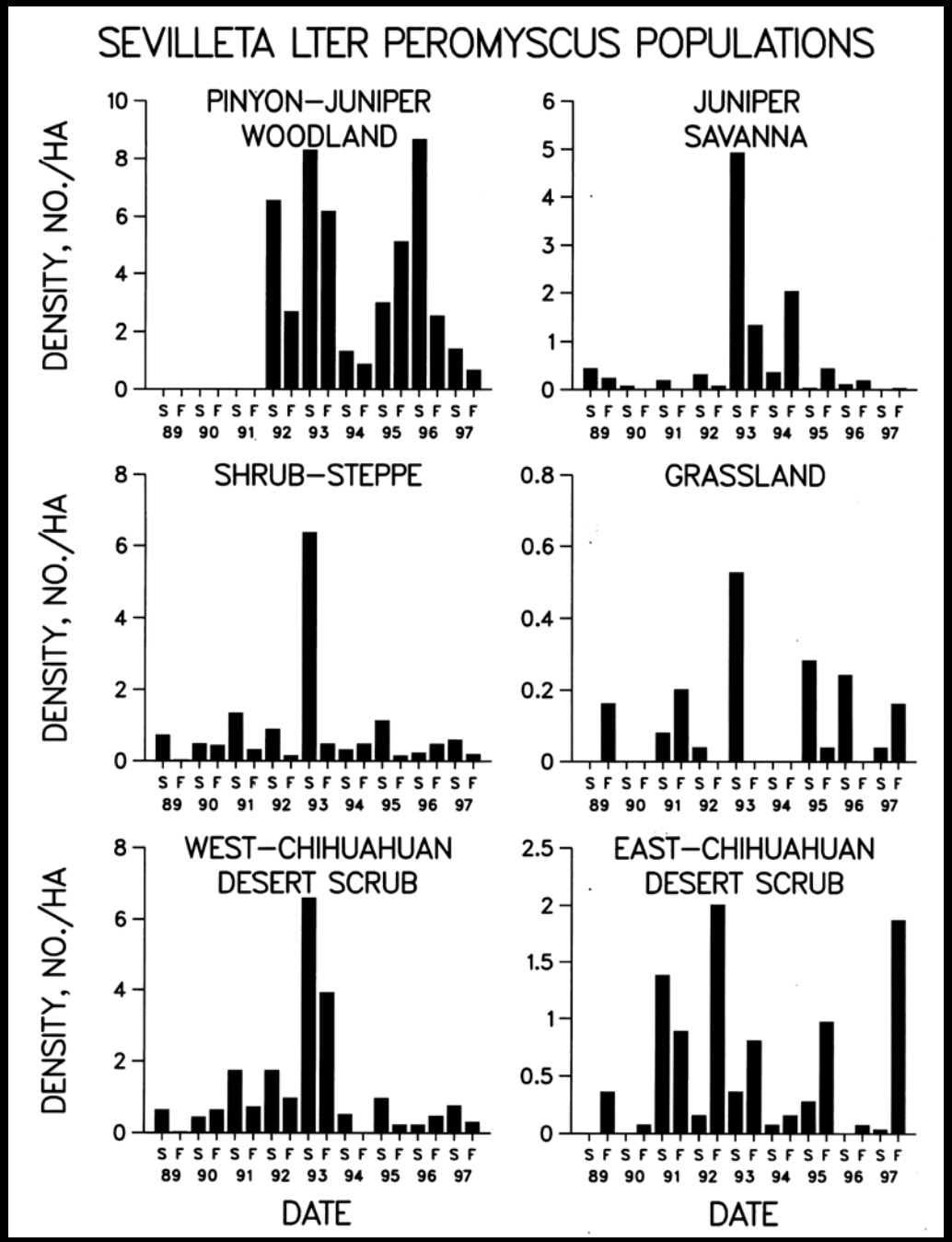


Virus Strain	Rodent Host
Hantaan	*Apodemus agrarius*
Dobrava	*Apodemus flavicollis*
Seoul	*Rattus norvegicus*
“Thai”	*Bandicota indicus*
Sin Nombre	*Peromyscus maniculatus*
Black Creek Canal	*Sigmodon hispidus*
Bayou	Unknown
Prospect Hill	*Microtus pennsylvanicus*
Puumala	*Clethrionomys glareolus*


20 Mya
† *Copemys* (16 Mya)
† *Abelmoschomys* (9 Mya)
Oryzomys?, *Sigmodon?*
7-9 Mya ?
Auliscomys (4.5 Mya)

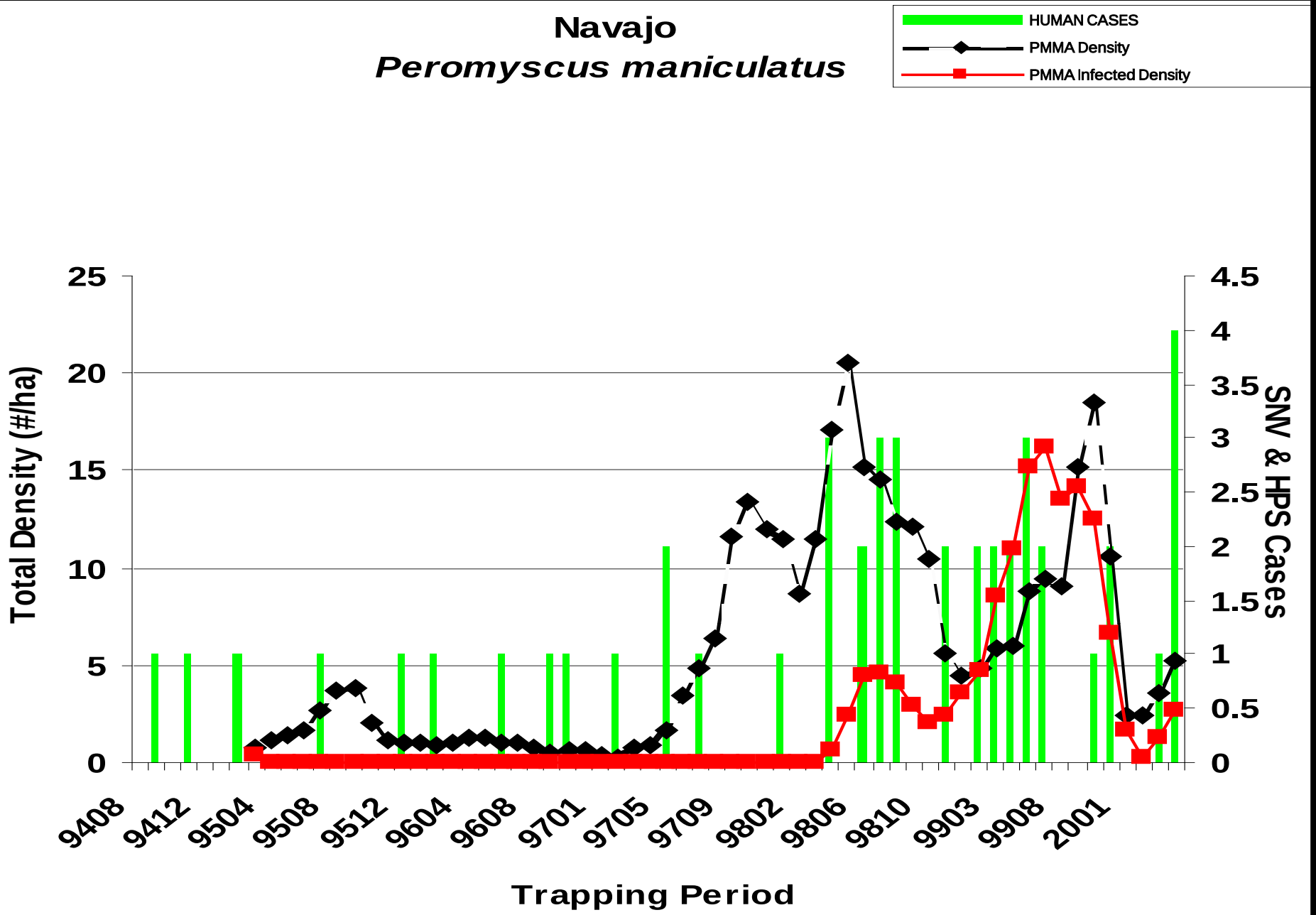

Sin Nombre
Blue River
Muleshoe
Isla Vista
El Moro Canyon
Río Segundo
Caño Delgadito
Río Mamoré
Orán
Bermejo
Andes
New York
Prospect Hill
Monongahela
Bloodland Lake
Bayou
Black Creek Canal
Choclo
Calabaso
Laguna Negra
Juquitiba
Maciel
HU39694
Lechiguanas
Pergamino


U.S.
FISH & WILDLIFE
SERVICE
Sevilleta
National
Wildlife Refuge

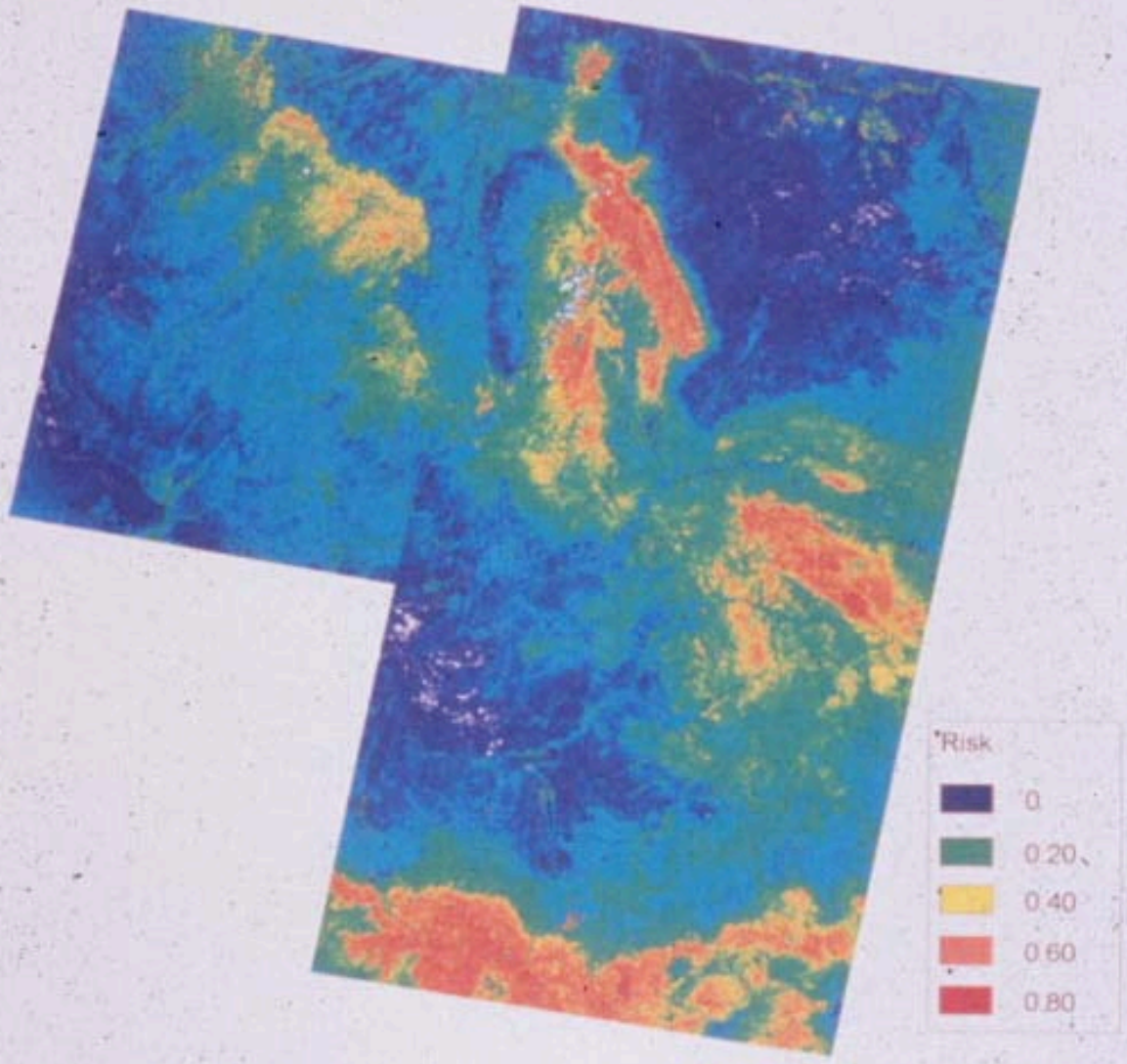

SEVILLETA LTER PEROMYSCUS POPULATIONS
PINYON–JUNIPER WOODLAND
JUNIPER SAVANNA
SHRUB–STEPPE
GRASSLAND
WEST–CHIHUAHUAN DESERT SCRUB
EAST–CHIHUAHUAN DESERT SCRUB
DENSITY, NO./HA
DATE
S F S F S F S F S F S F S F S F S F S F S F
89 90 91 92 93 94 95 96 97

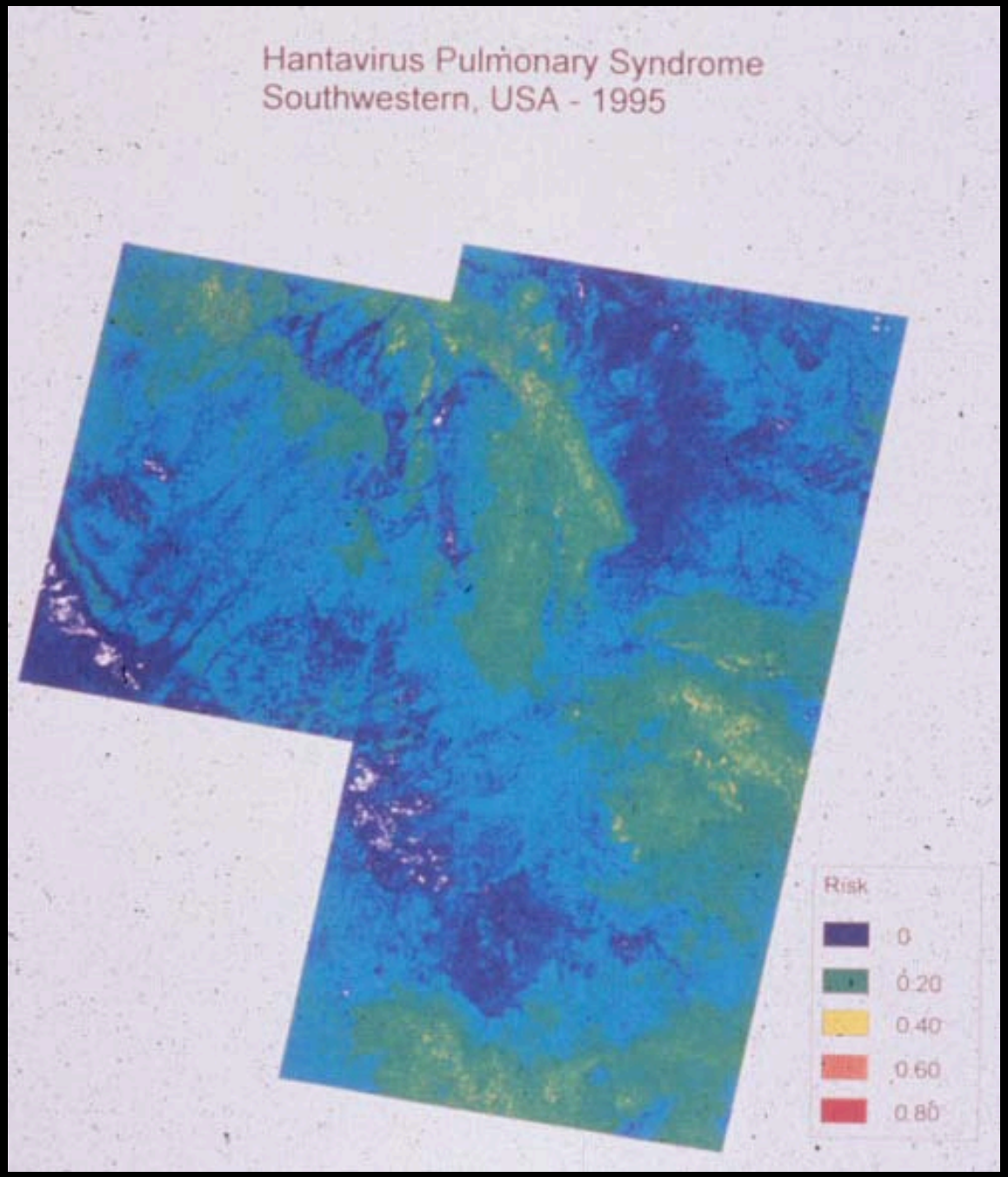
Trophic Cascade Hypothesis (TCH)

- Changes associated with El Niño alter weather patterns in U.S. Southwest
- Increased winter-spring precipitation leads to increases in vegetation and insect populations
- Increases in food and shelter increases size/density of rodent populations
- Increases in density alters the quantity/quality of SNV infection in *Peromyscus* populations
- Return of “normal weather patterns” leads to increased contact with humans

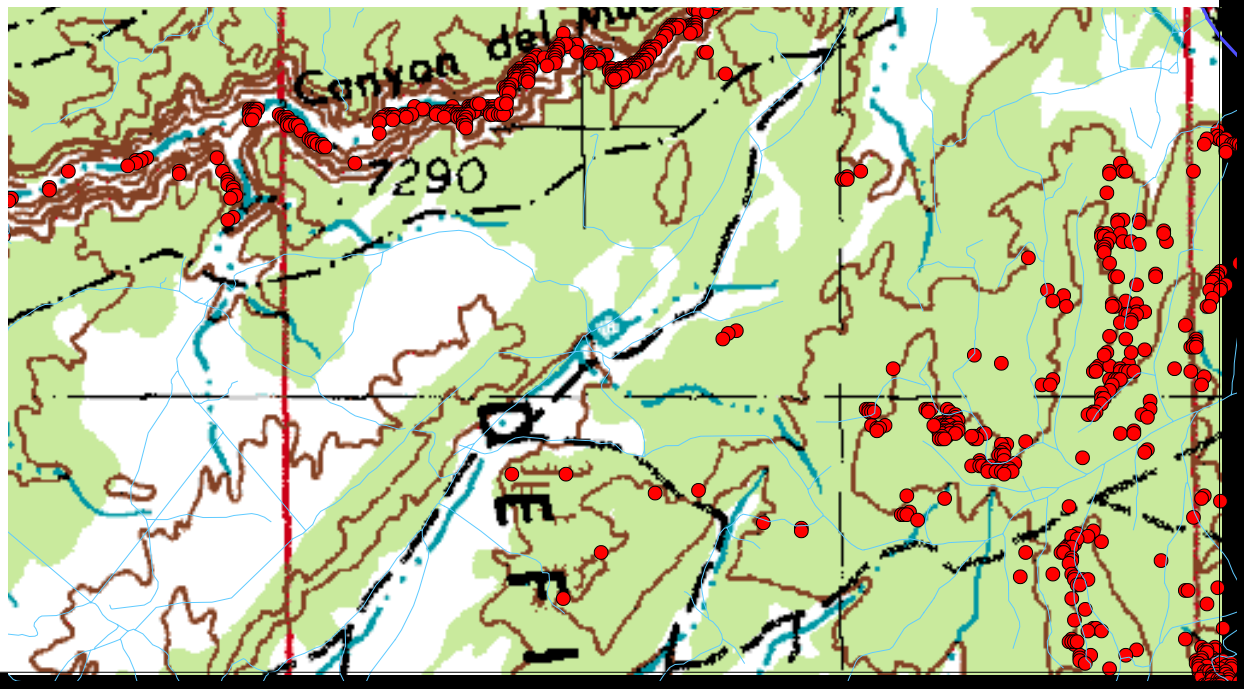

Navajo
Peromyscus maniculatus
HUMAN CASES
PMMA Density
PMMA Infected Density
Total Density (#/ha)
SNV & HPS Cases
Trapping Period
25
20
15
10
5
0
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
9408
9412
9504
9508
9512
9604
9608
9701
9705
9709
9802
9806
9810
9903
9908
2001

Hantavirus Pulmonary Syndrome
Southwestern, USA - 1993

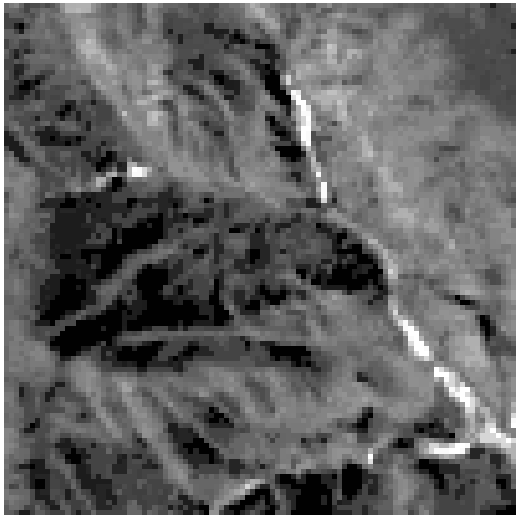



Hantavirus Pulmonary Syndrome
Southwestern, USA - 1995
Risk
0
0.20
0.40
0.60
0.80

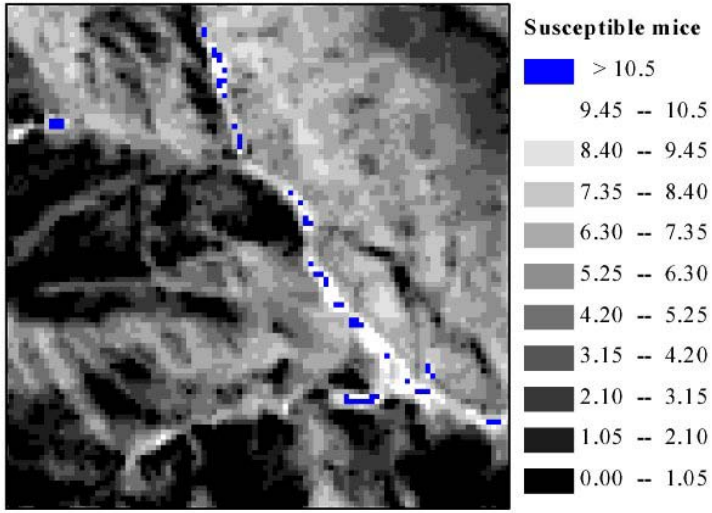
Canyon del Muerto

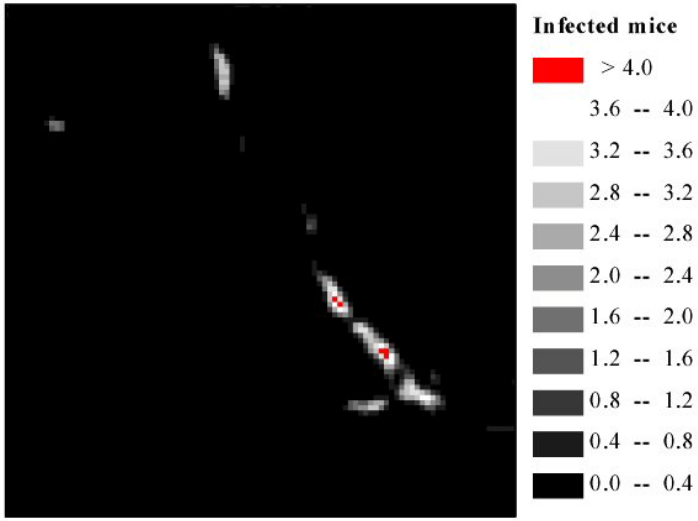


Typical desert landscape



Carrying capacity (derived from landscape)





Mice populations (result of model, given the carrying capacity)

from Abramson & Kenkre (2002)