



Frog Wars! Metapopulation Response of the Chiricahua Leopard Frog to Bullfrog Removal

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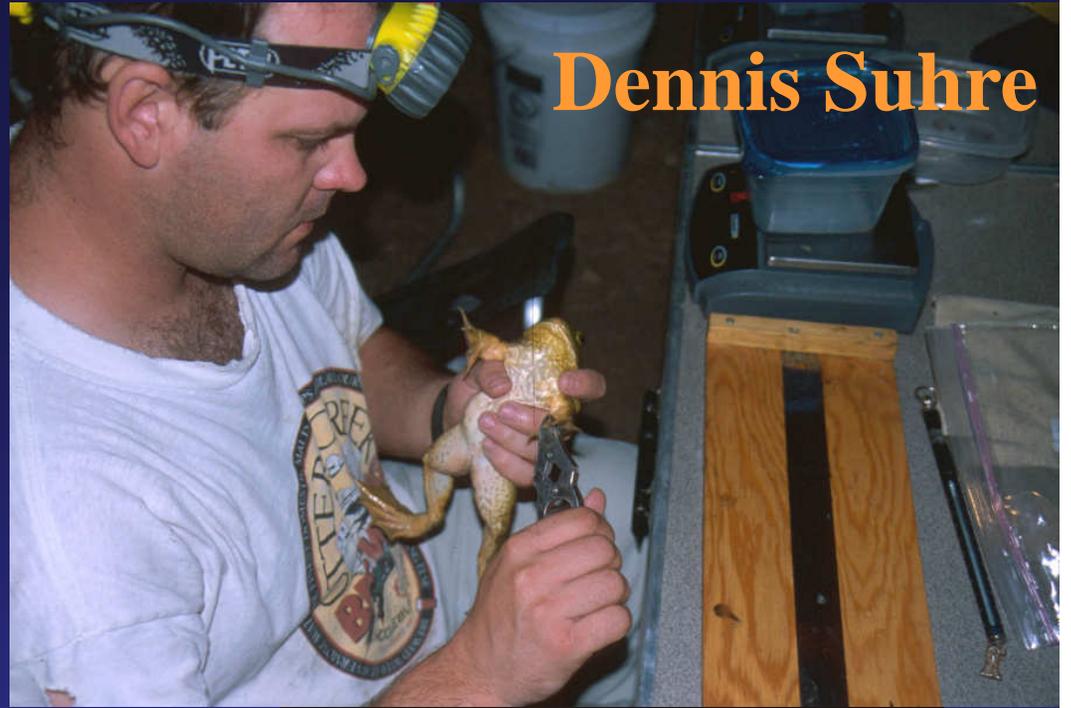
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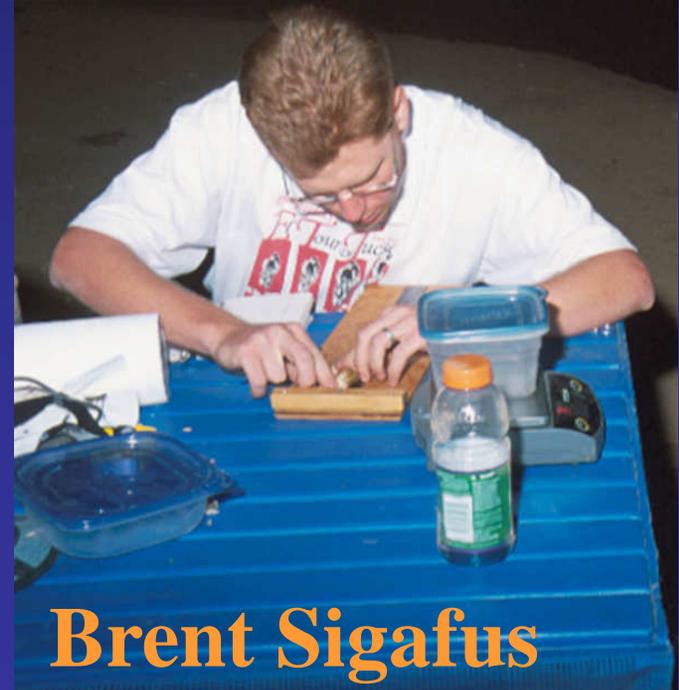
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ARMI - Amphibian Research & Monitoring Init.

AWPF - Arizona Water Protection Fund

UA SNR

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USFS

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Photo Credit: Erik Enderson, Phil Fernandez, Dale Turner

Global Amphibian Declines

Chiricahua Leopard Frog



Lowland
Leopard
Frog



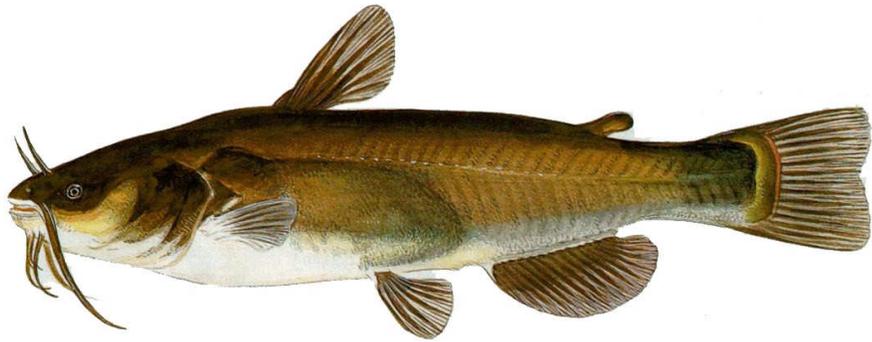
Tarahumara Frog

“True Frogs”
or
Ranid frogs
(genus *Rana* now
Lithobates)

Habitat Loss

Invasive Predators

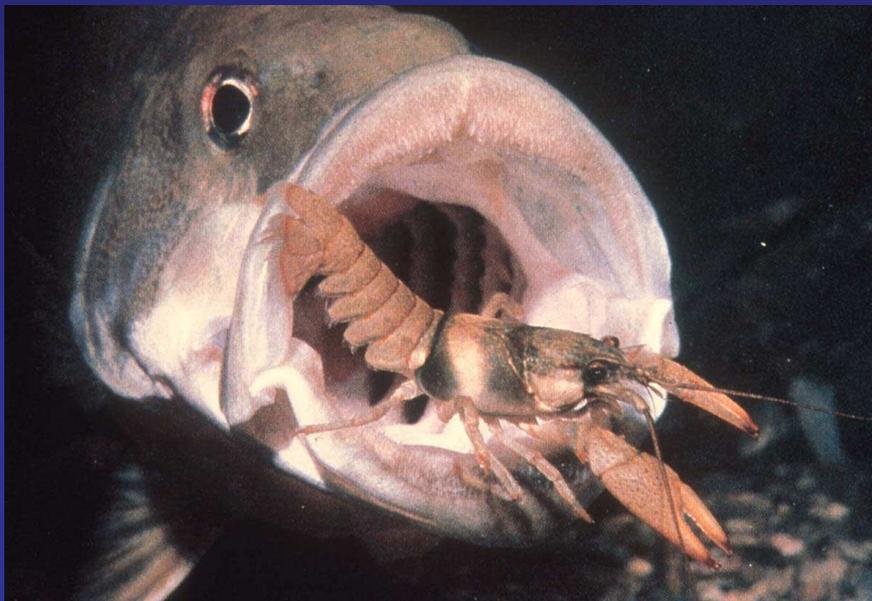
Disease



Black Bullhead



Green Sunfish



Black Bass

Crayfish



American Bullfrog



American Bullfrog



20,000 eggs/clutch





Tadpoles:

800 lbs! (~40,000)





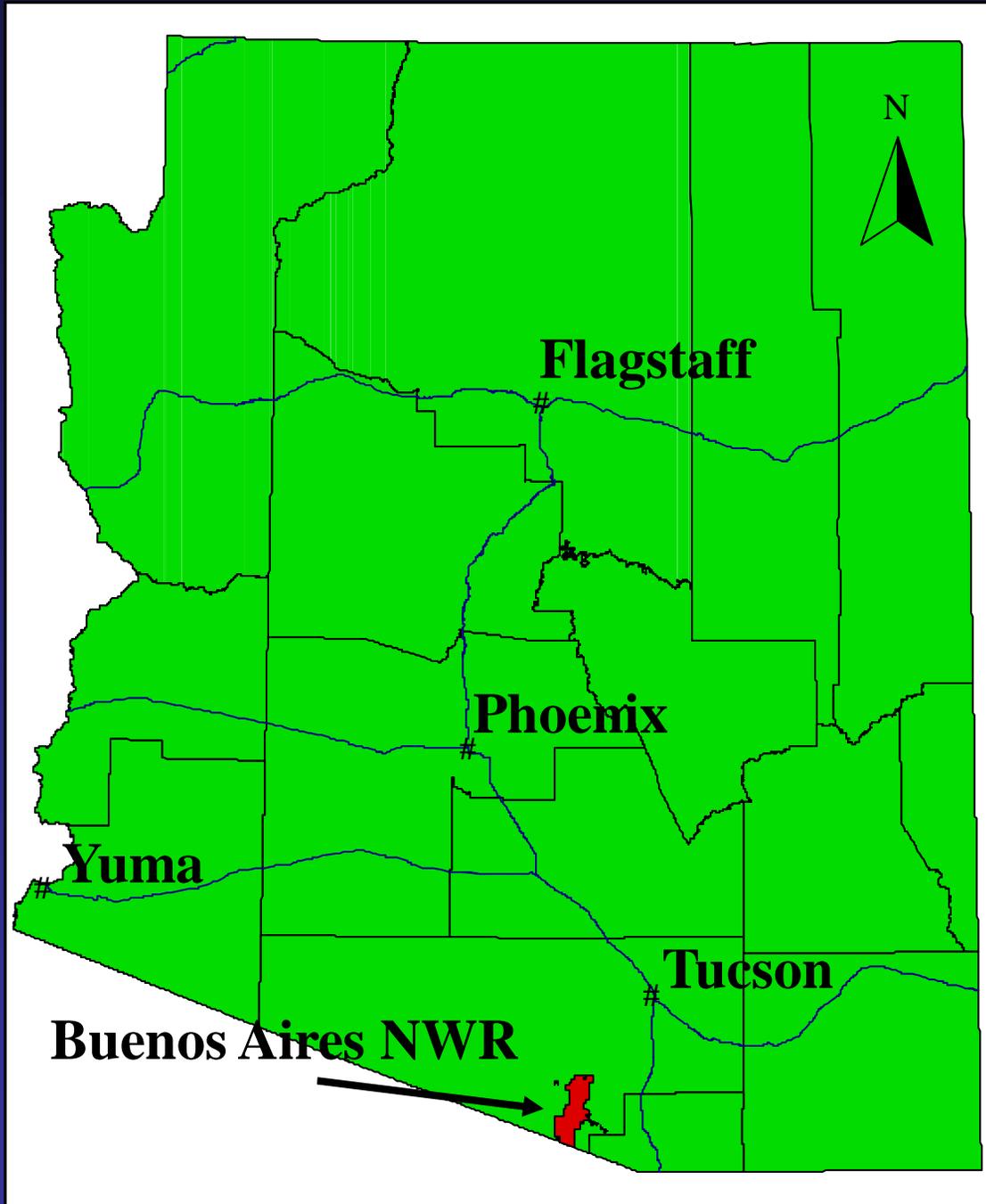
~1000 adult bullfrogs / ha !!

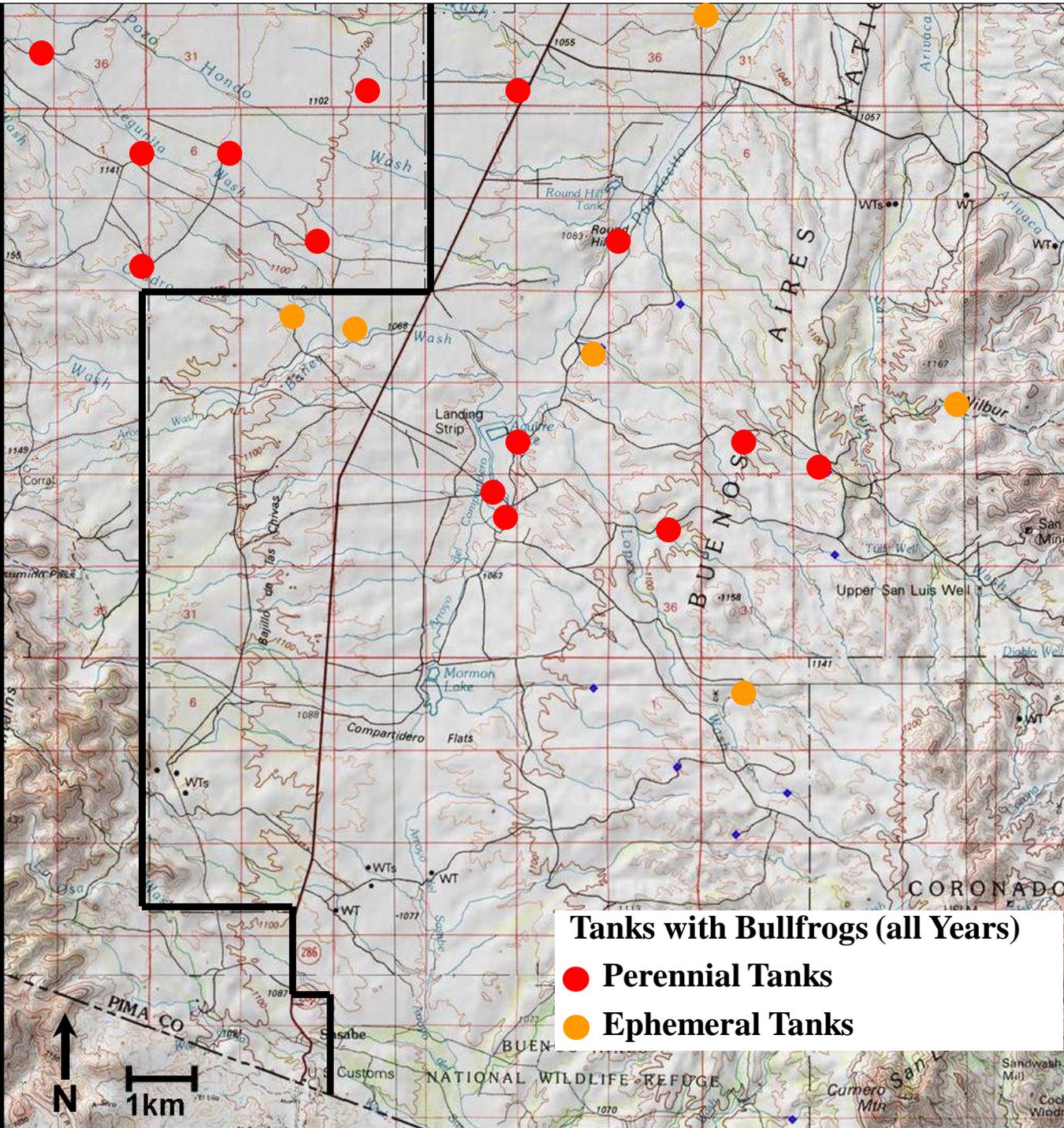
Bullfrog Population Removal

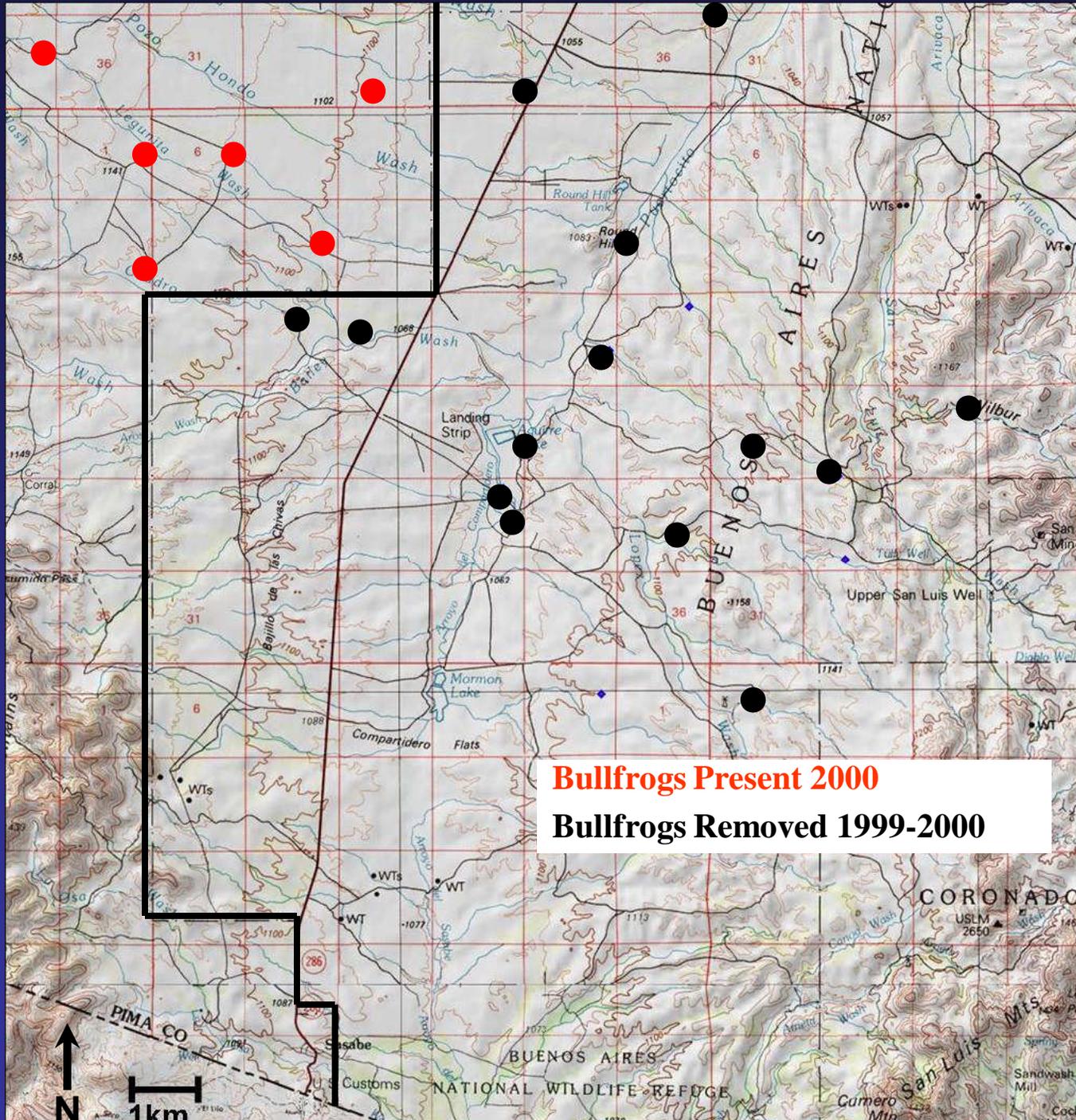


Drying, fencing, hand capture, shooting









Maintenance removal

Manual capture



Shooting



2-person canoe

Chiricahua Leopard Frog

Photo: Erik Enderson



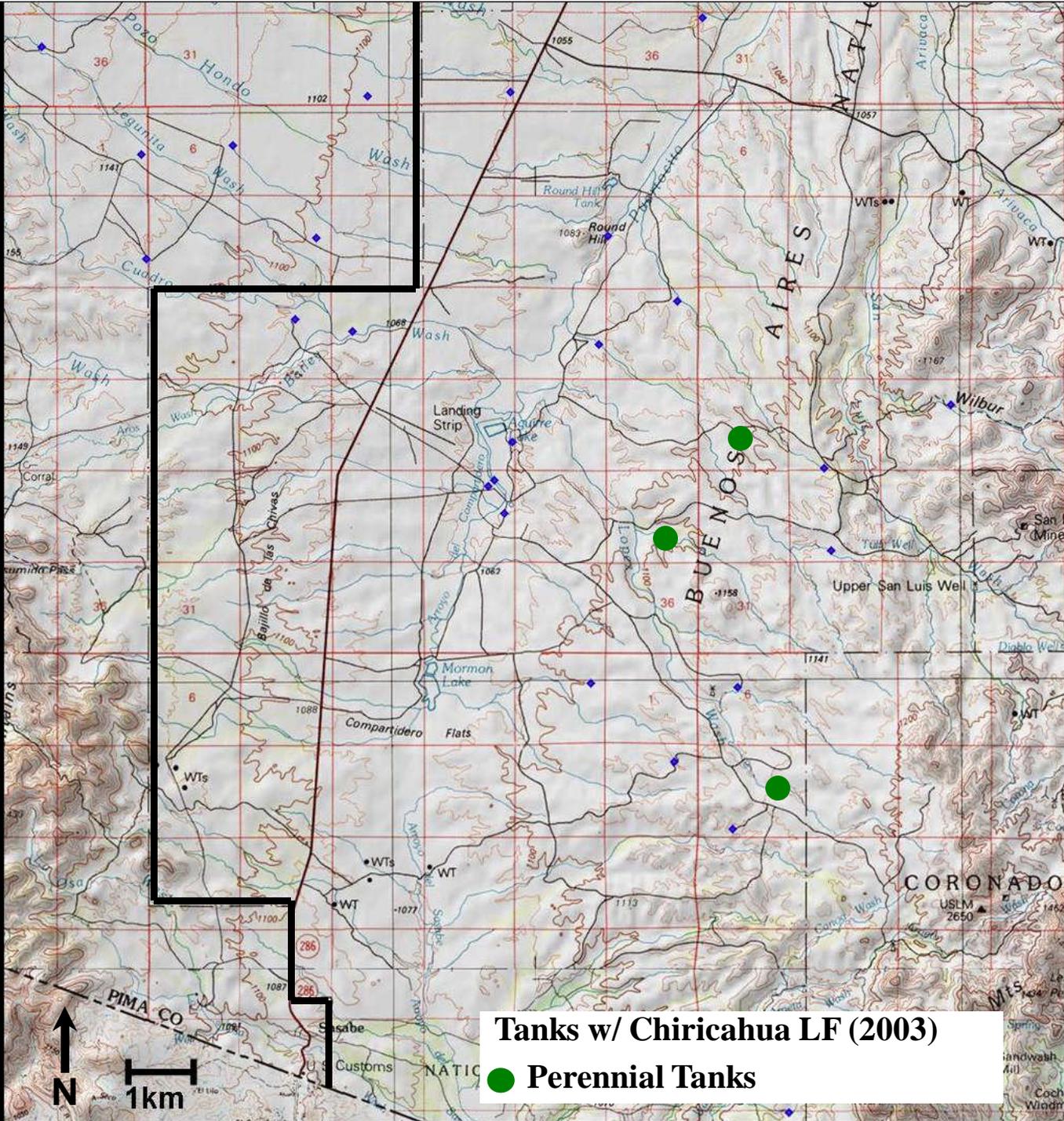
Chiricahua Leopard Frog

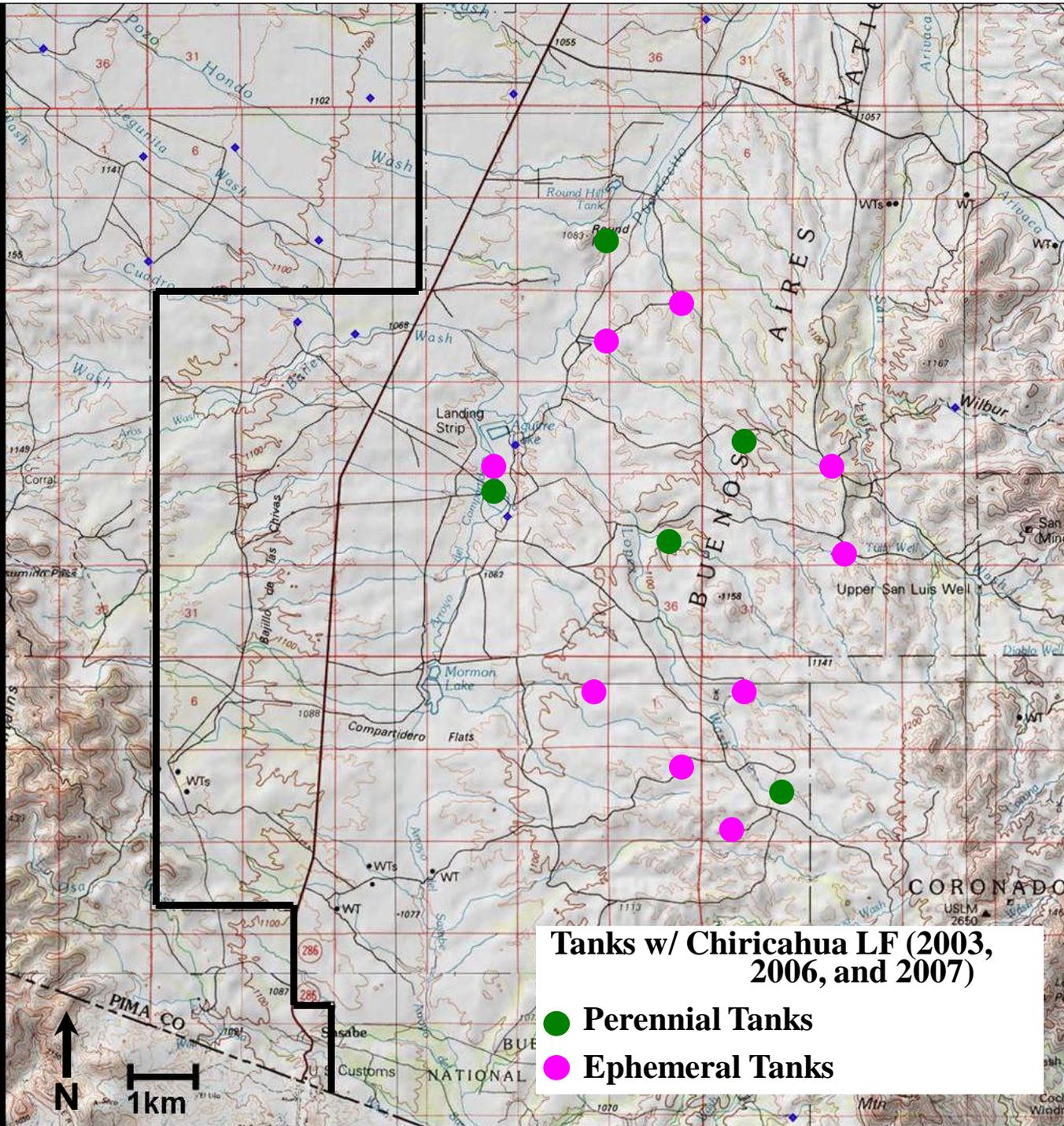
Listed as Threatened, June 13, 2002

Last Altar Valley population pond drying
9 frogs, 13 tadpoles moved into captivity

Photo: Erik Enderson







Occupancy 2006

Rana chiricahuensis BANWR

Psi

P

Model

0.11

0.77

Psi(group)

Psi = PAO = Proportion of Area Occupied

P = Detection Probability

Occupancy 2006

Rana chiricahuensis BANWR + CNF

Psi	P	Model
0.11	0.77	Psi(group) x p(survey)
0.24	0.82	Psi(water) x p(time, water)

Psi = occupancy

P = detection probability



June 2007



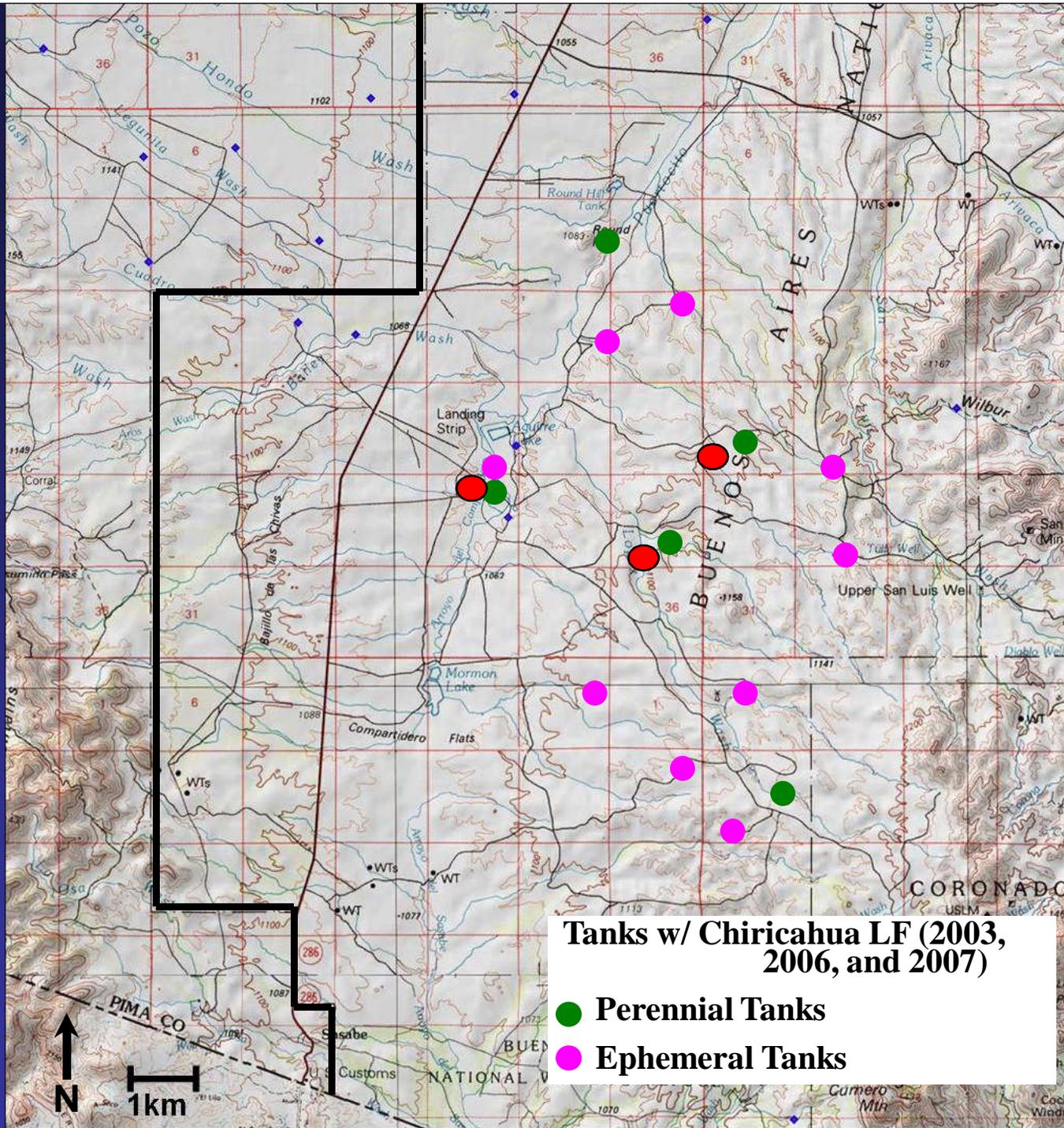
**After 26,000 gallons
of water added**

September 2007



September 2007





Pena Blanca Lake

Currently being drained

1000s of bullfrogs

Leopard frogs nearby – 2 spp.



Plans

Remove bullfrogs as lake dries

Occupancy surveys w/i 5 miles of lake

Remove bullfrogs from ponds ≤ 3 mi of lake

Repeat occupancy surveys

Work out bugs, repeat for other lakes

