Eye Gnat Population Reduction in San Diego County and Future Research

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Presentation Outline

- Population dynamics of eye gnats
  - Background levels
- What constitutes a drop in population levels? Basic Ecology
- Grid sampling
- On Farm vs. Community Sampling
- Active vs. Passive Trapping

Must Identify the Source

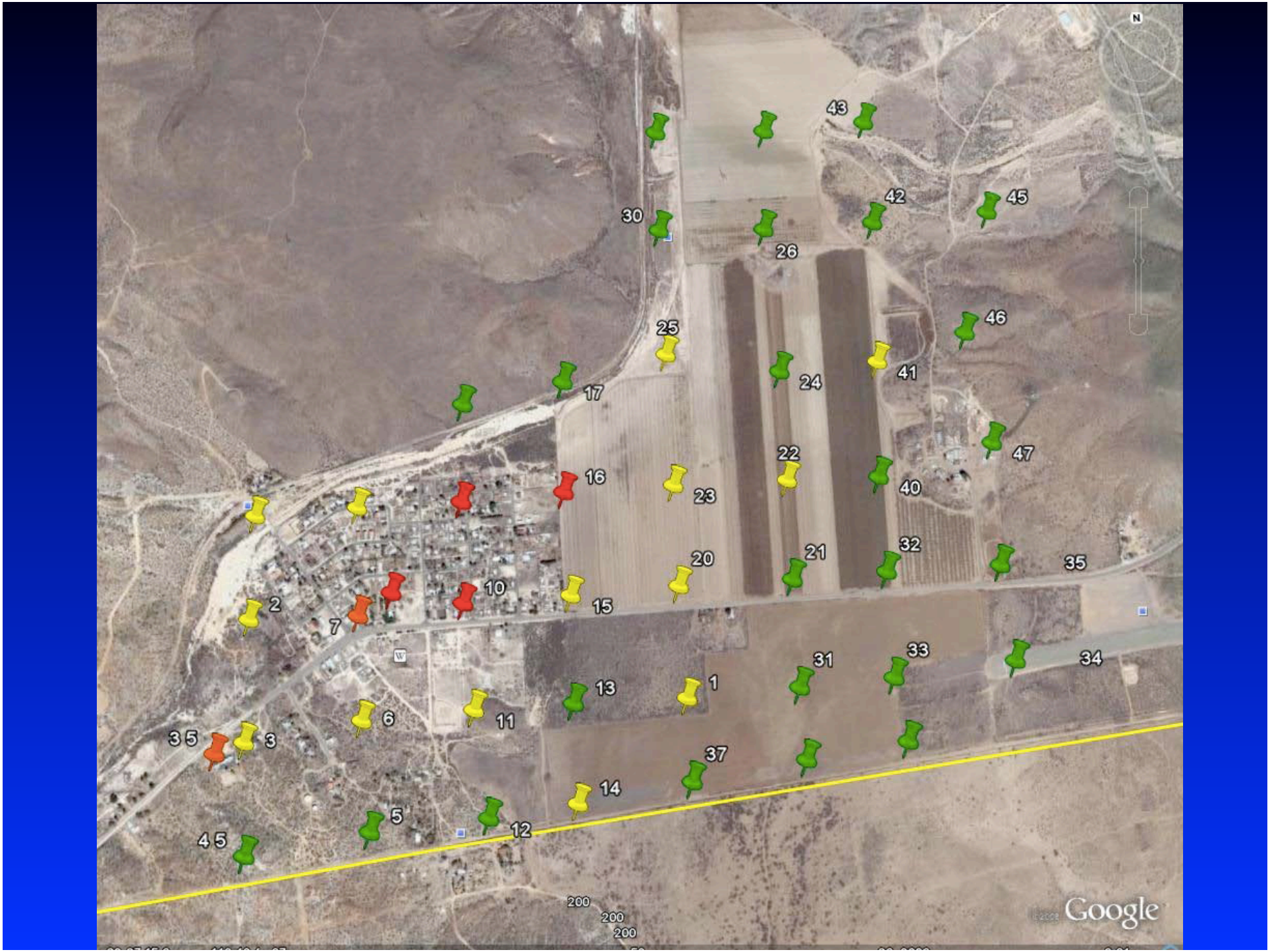
- Key to solving the problem
- Mass trapping has rarely impacted economically damaging pests
- Population reduction at the source will impact overall populations to best effect
- Overall or integrated approach is needed

Is the population higher than normal?

- Sampling in surrounding environment
- UCCE collar traps
- What measurement should be used?
  - Eye gnats/trap/day
  - Best standardization for environmental effects (temp., humidity, light, wind, etc.) over time

Background Levels of Eye Gnats Around Jacumba

OBJECTIVE: Determine how prevalent eye gnats are in the natural environment away from the influence of agriculture.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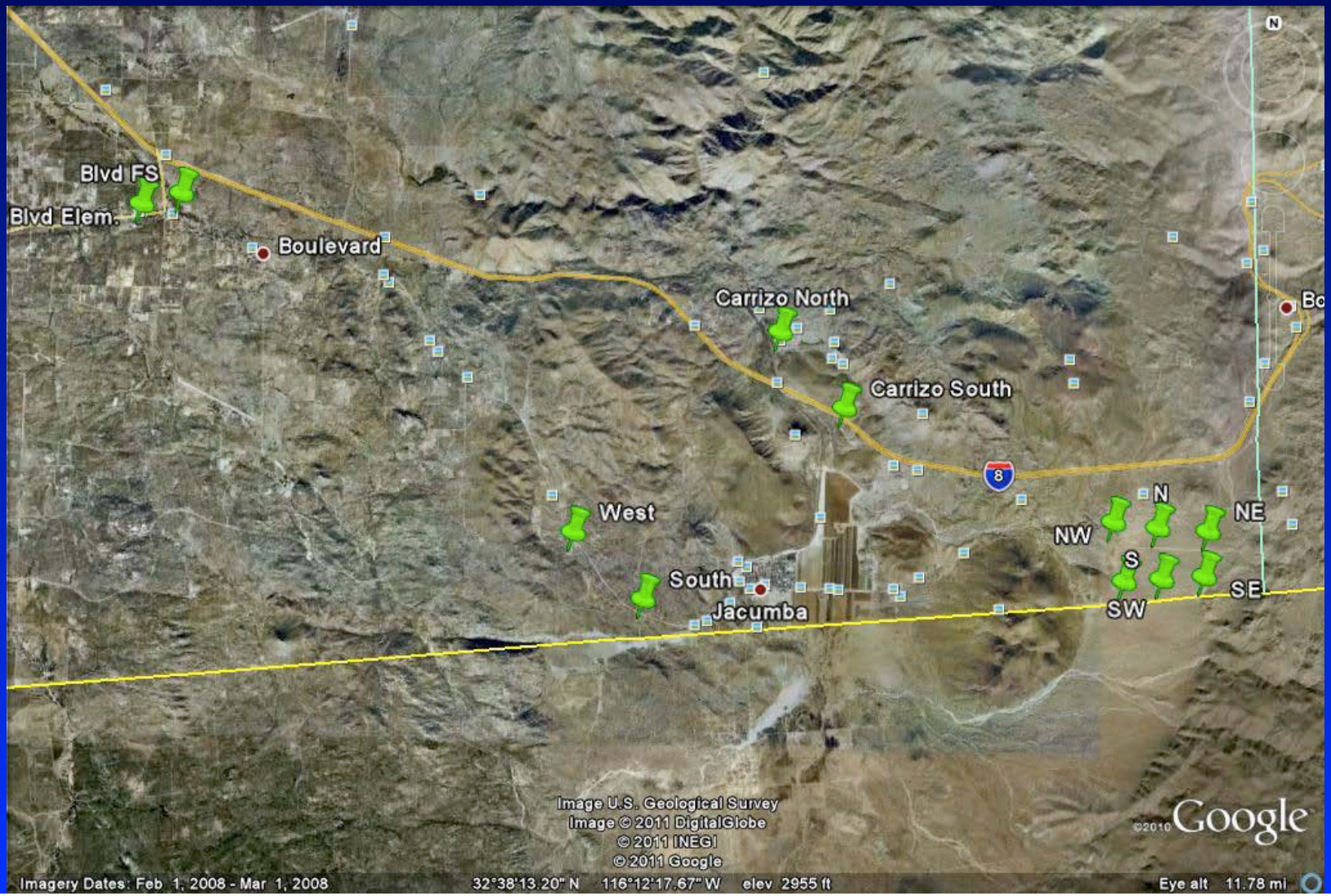
Background Levels of Eye Gnats Around Jacumba

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Background Levels of Eye Gnats Around Jacumba

Table 1. Number of eye gnats captured in collar traps placed select distances from Bornt Family Farms between April and Sept 2010.

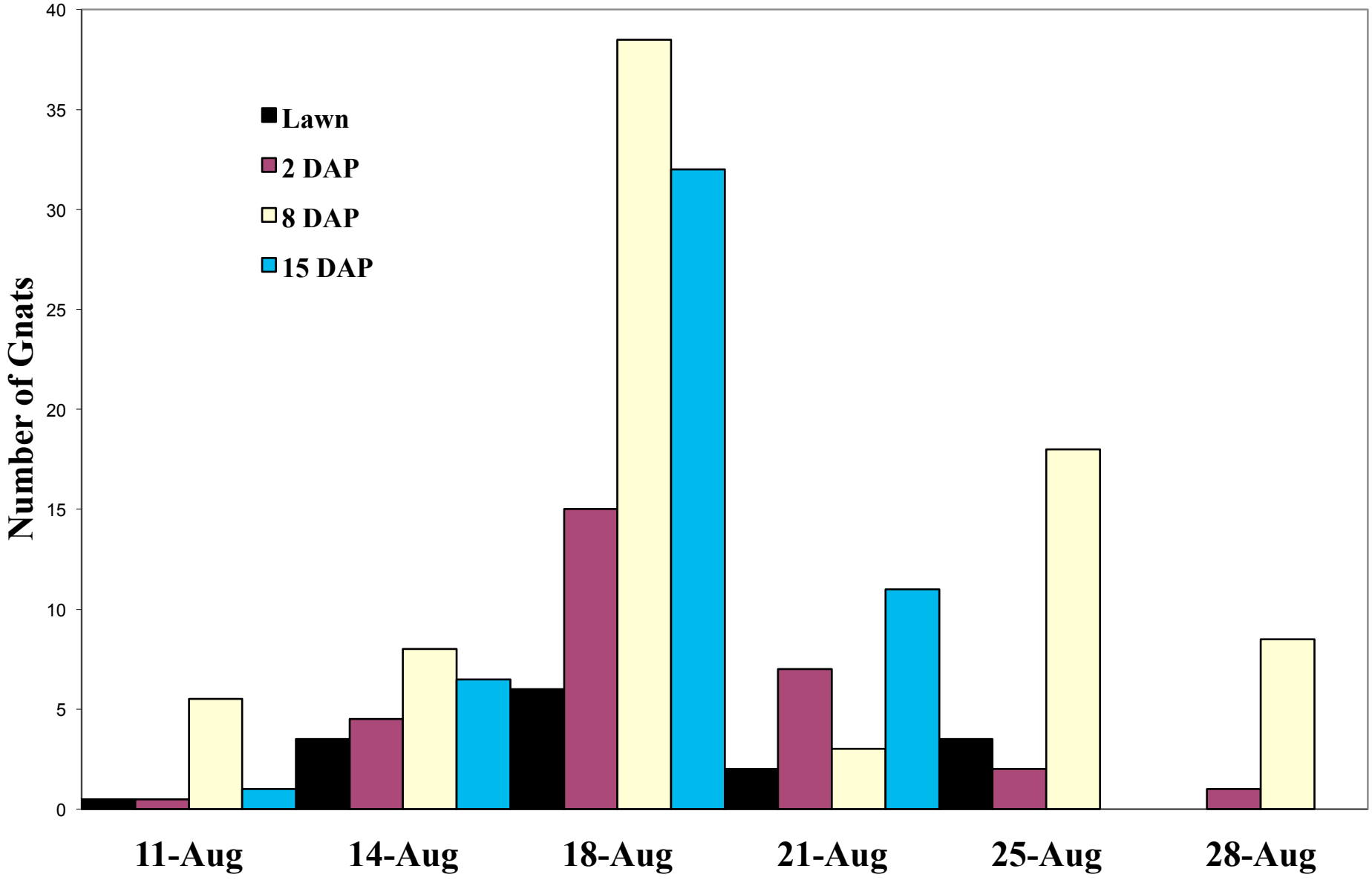
Site	No. of traps	No. of Gnats
Boulevard Elementary	1	11
Boulevard Firehouse	1	5
2 Miles West, horse Stable	2	68
2.5 miles East	6	6
1.25 Miles North	1	272
2.5 Miles North	1	92
Totals	12	454
	Mean No.	37.8
	Mean/Day	0.2

Emergence Trapping in Jacumba

2008

- Emergence Traps Approx 1m^2
- Where are the eye gnats emerging from?
- Traps placed on and off the farm
  - Residents irrigated lawns
  - Within farm production
    - Differing crop cycles

Emergence Assessment August 7-28, 2008



Eye Gnat Levels in Jacumba

2008

Emergence Traps Approx 1m^2

- **Eye gnats/trap/day = 0.9**
- **Eye gnats/trap/day = 4.3**
- **Lawn Acreage <5 acres**
- **Farm Acreage >400 acres**

1 acre = 4047m^2

Baseline

- Need a starting point. What is the population like at present?
- Mitigate the problem
- Monitor the population using the same methods every year
- Analyze for changes

Standardized Methods

- Adult trapping on a grid
- GPS coordinates
- UCCE Collar Trap
- 2008 Oct baseline – In-town trapping
- 2009 July, Aug, Sept, Oct
- 2011 Weekly

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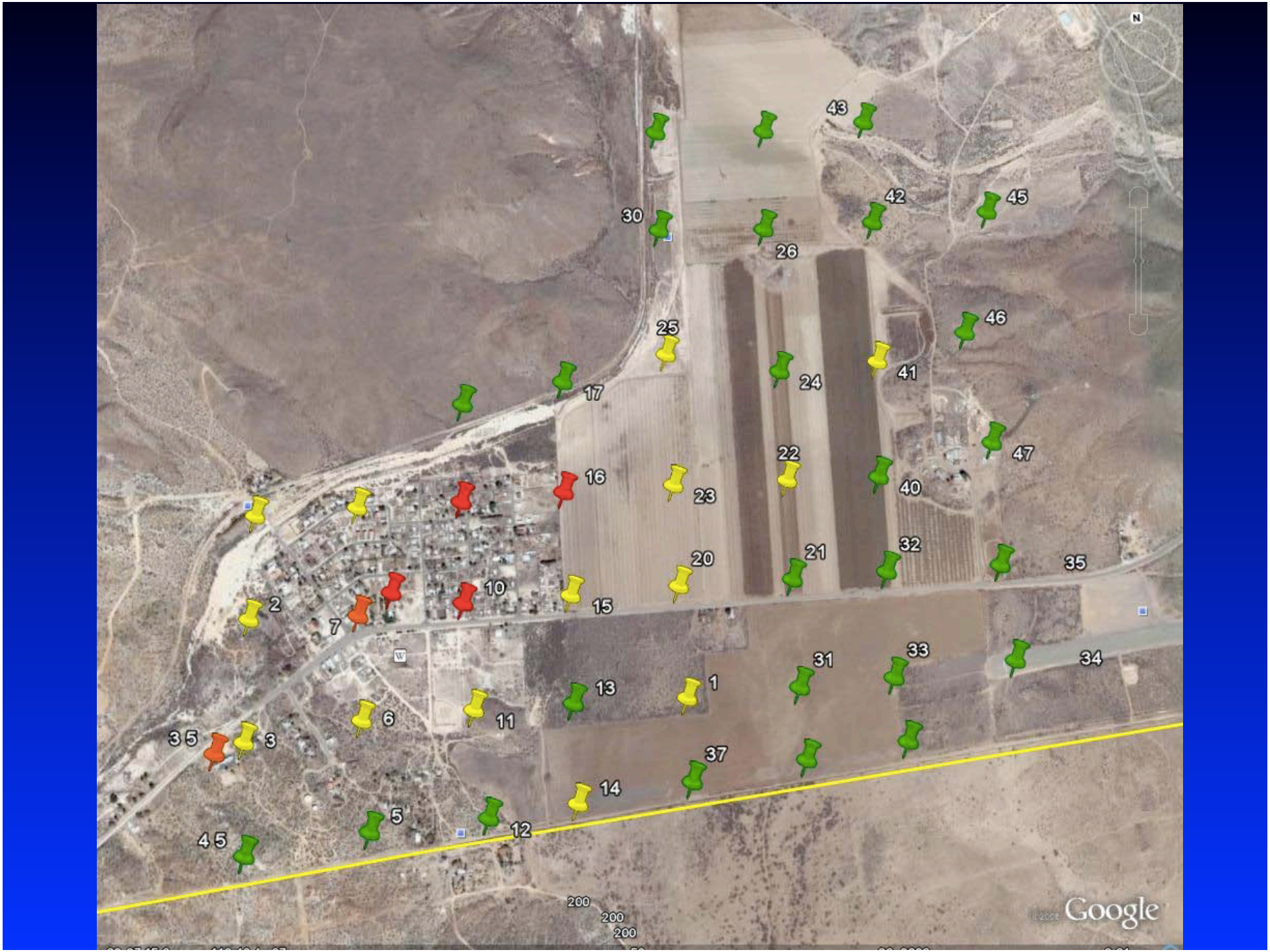
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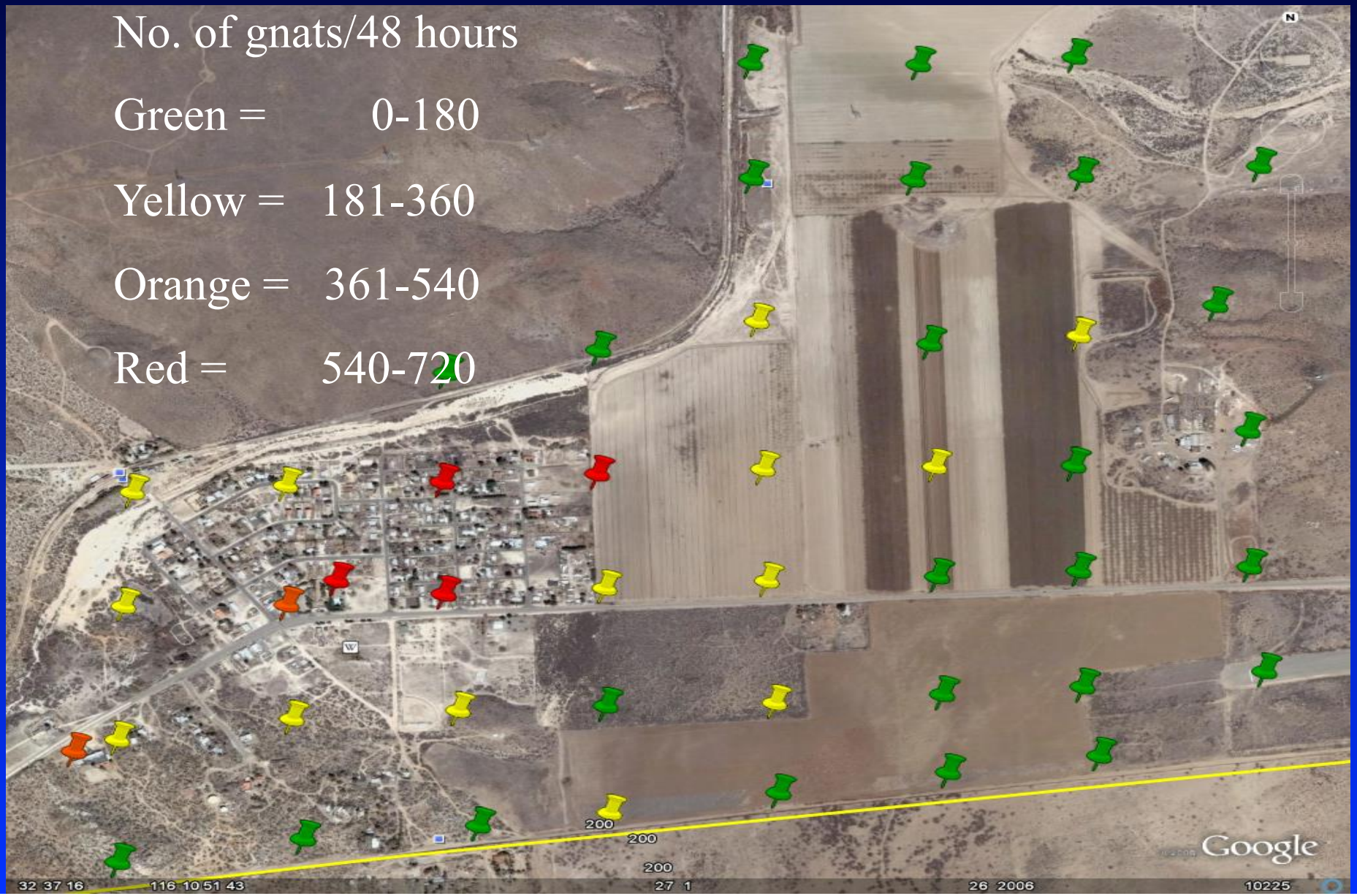
October 28-30, 2008



2009

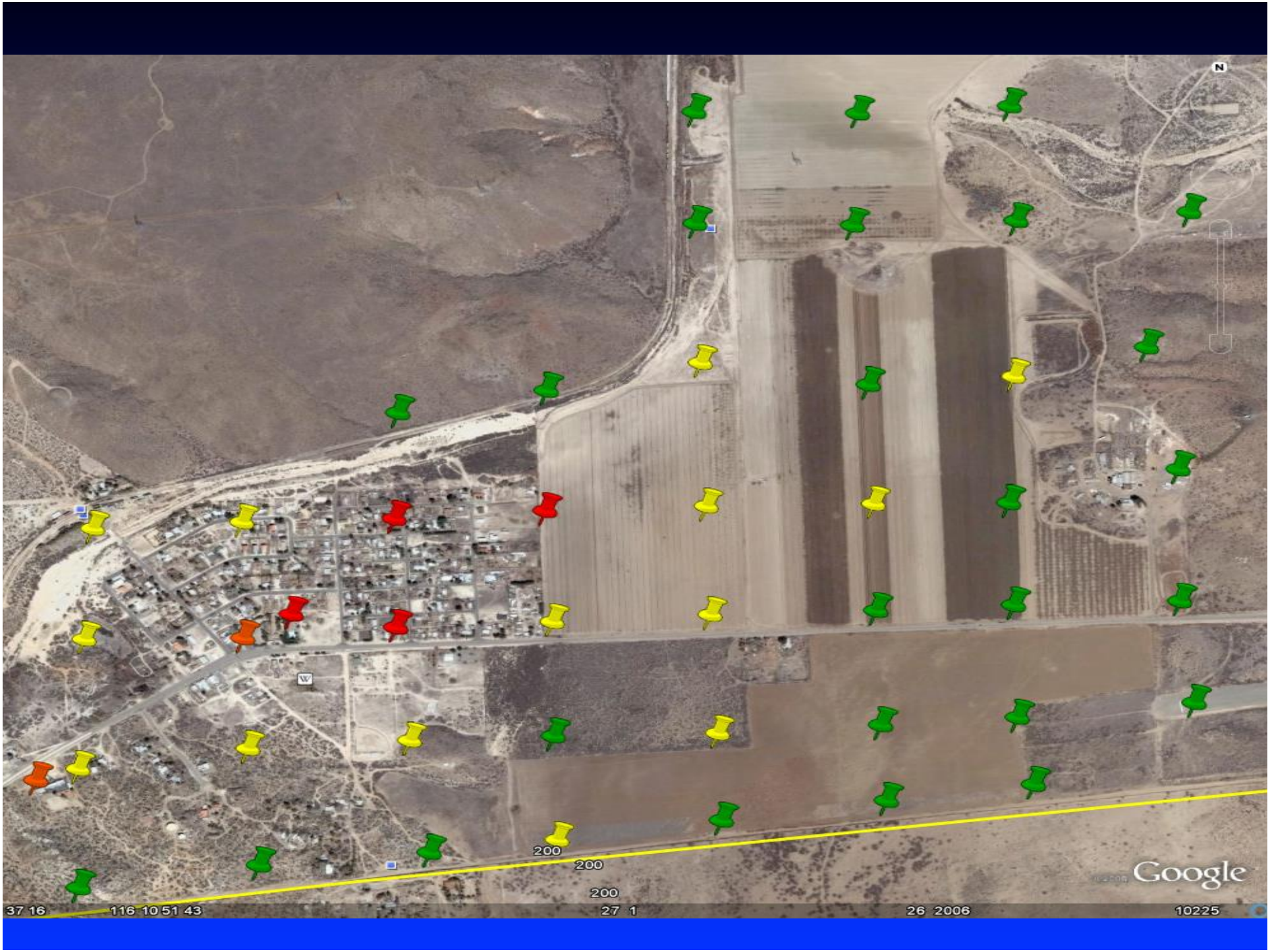
Trap #	Oct-08	Jul-09	Aug-09	Sep-09	Oct-09	2009 Pooled Average
1	*167.5*	11	4.4	11.5	245.5	*68.1*
2	*103.5*	19.5	0	15	9	*10.9*
3	*176.5*	31	7.7	30	231.5	*75.1*
4	*32*	7	0	10.5	12	*7.4*
5	*94.5*	15.5	2.3	2.5	16	*9.1*
6	*221*	4	0.1	1.5	24	*7.4*
7	*50*	13	0.3	101	173.5	*71.9*
8	*169*	59.5	3.3	65.5	82.5	*52.7*
9	*346*	11	0.6	1.5	37.5	*12.6*
10	*339.5*	30	2	19	29.5	*20.1*
11	*145.5*	218	3.3	166	47.5	*108.7*
12	*56*	0	2.3	23	37	*15.6*
Means	***158.4*a**	**38.1c**	**2.6d**	**37.2c**	**78.8b**	*38.3*

2009

Table 12. Average number of adult eye gnats captured in traps in specific areas around Jacumba in 2009.

Description of Area Observed	Trap Numbers	Number of Traps	Average No. of Gnats/Trap
South perimeter of farm	37,38,39	3	29.7
North perimeter of farm	42,26,30,29	4	47.0
1000 feet from community edge in farm	37,1,20,23,25	5	106.8
West edge of farm on the community border	15,16,17	3	16
Center of town	7,8,9,10	4	161.5
Town's west perimeter	2,3,4.5	3	171.7
Town's south perimeter/Mexican border	4.5,5,12	3	43.3
All Mexican border	4.5,5,12,37,38,39	6	36.7

Adult eye gnats are concentrated in a relatively small area, a 2000-foot diameter area that is based on a line that separates the farm from the community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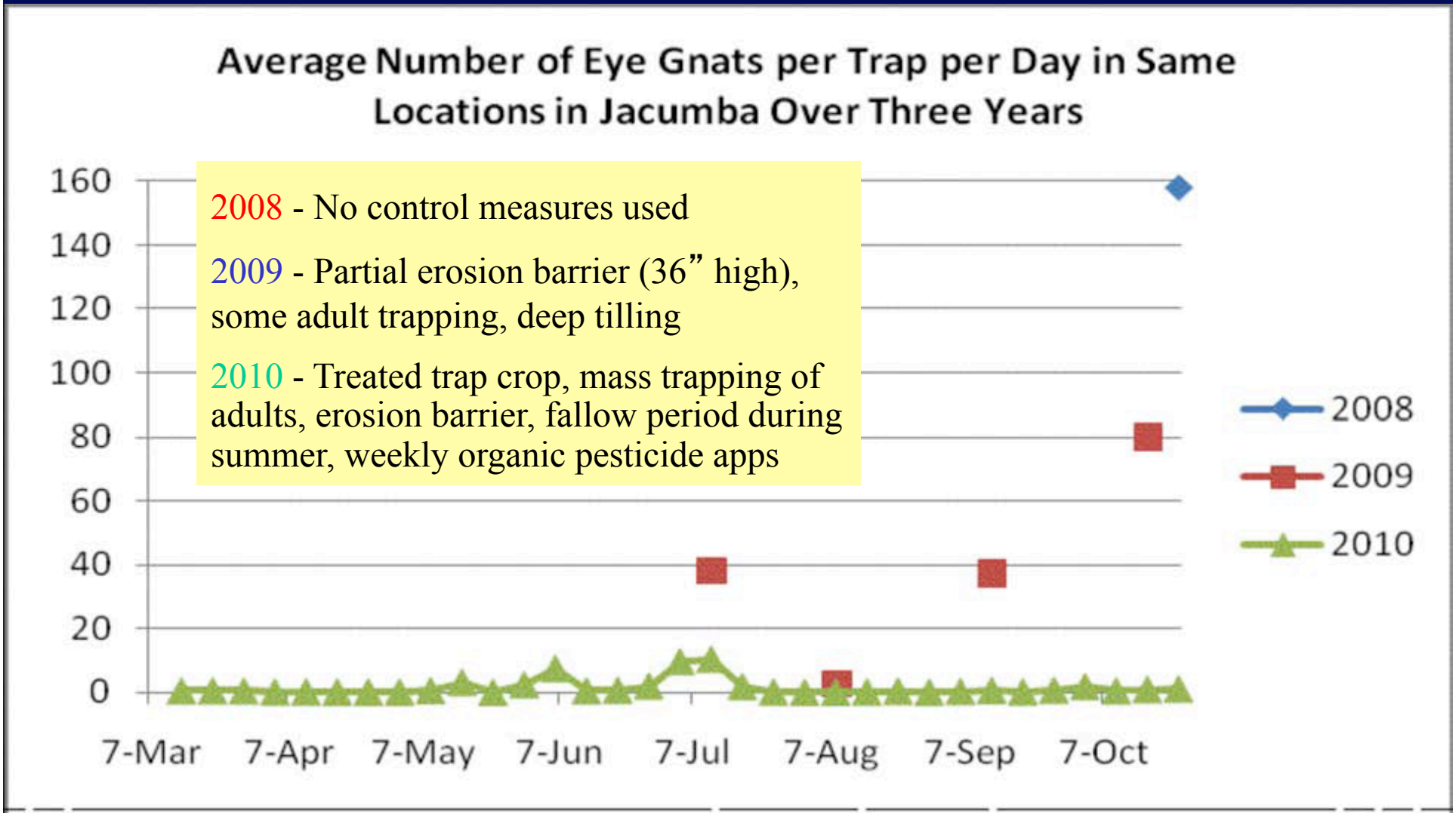
Grid Trapping in Town)



Reduction Insufficient

- 2010 – Good News Reports
- 2011 – Backed off weekly organic pesticide treatments, Summer thunderstorms during fallow period, mitakes made south or HWY 80 – More complaints
- 2012 – Significant improvemnts and changes with good potential

Future Research

- Will fallow ground still produce eye gnats for any length of time? How long?
- Does altitude affect eye gnat populations?
- Will row covers affect populations?
- Will soil incorporated organic amendments affect soil borne stages?
- Will eye gnats migrate to harbourage within fields for capture?

Future Research

- What organic pesticides will affect any eye gnat stage?
- Will mass trapping in hot spots help reduce populations?
- Capture mark and release studies – Where are they migrating to and how far?
- Can we develop a lure-and–kill device using a synthetically derived lure?

Future Research

- What affect does composting have on soil-borne stages of eye gnats?
- Develop an effective sampling method for eye gnat soil-borne larvae
- Test various organic products that may be repellent to adults and reduce ovipostion
- Determine most effective trap height and within field trap density?

Questions?