**JMM 2010**                        **San Francisco, CA**

**MAA CPS --** *Quantitative Reasoning & the Environment*

**Organizers -- Karen Bolinger, Maura Mast, Cinnamon Hillyard**

*Environmental Mathematics & Our Community Role*

Ben Fusaro

Florida State University

**fusaro@math.fsu.edu**

**Who, or what, is the community; how do we make contact?**

    National organizations such as Audubon.

    *Save Our Trees, Friends of the Nanticoke River,* etc.

    Authors of pro-environ. articles or letters in newspapers.

**What mathematics & science are most useful?**

    HS math, intro. college math (including statistics).

    Analytical → Metaphorical, Qualitative, Visual.

    Local plants, animals, habitat; some chemistry, physics.

**What kind of resistance is to be expected?**

    Developers, their lawyers and other "hired guns"

    Members or heads of city/county commissioners.

Cypress Trees  (Metaphor, visual)

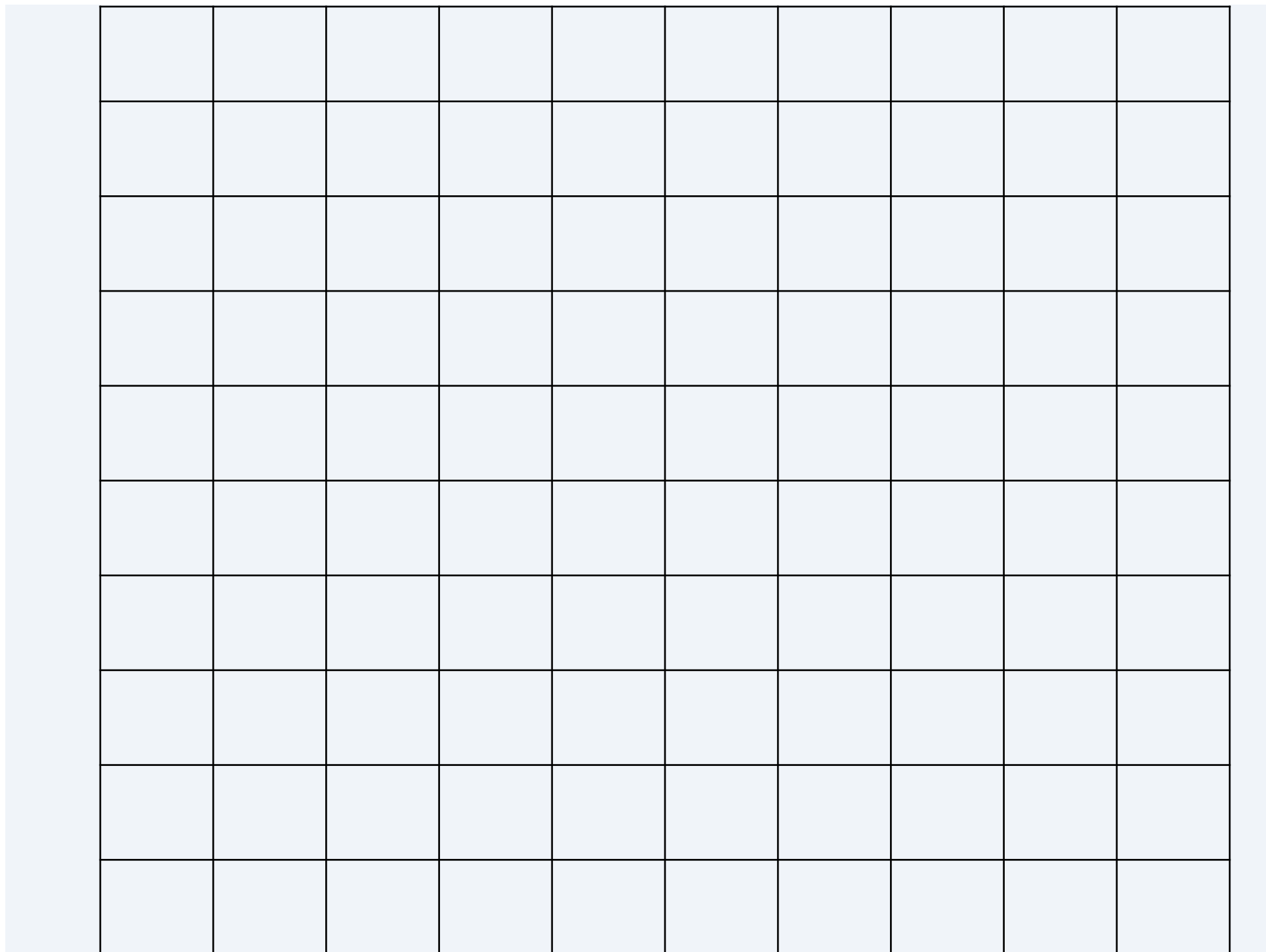*Who:*  Legislature regulating cypress cutting & shredding .

*Challenge:*  Slow the destruction of cypress trees & domes.

*Proposed solution:*  Provide Sierra lobbyist Susie C. with
   information to prevent cutting trees =< 30" in diameter
   and "only" 100 acres.

Environ. Math. to the rescue …

A 30" DBH cypress tree has  C = 30xΠ  = 94 inches.

"Tell Sen. Paula Dockery (R) that *she can't get her arms
around*  a 30" DBH tree, a stretch of almost *eight feet.*"

Keeping Track of Scrub Jays via Colored Leg Bands

*Who:*  The Nature Conservancy Monitoring Project.

*Challenge:*  ID bird by color & position of 14 bands.

*Proposed solution:*   Use up to seven bands, with no more
than four bands per leg.

The Florida Scrub Jay
*(Aphelocoma coerulescens)*

## COLOR BANDS USED ON FLORIDA SCRUB-JAYS

| | | |
|---|---|---|
| W | = | WHITE |
| R | = | RED |
| G | = | DARK GREEN |
| Y | = | YELLOW |
| B | = | DARK BLUE |
| O | = | ORANGE |
| P | = | PURPLE |
| L | = | LIGHT GREEN |
| A | = | LIGHT BLUE |
| F | = | PINK |
| H | = | HOT PINK |
| K | = | BLACK |
| U | = | MAUVE |
| I | = | LIGHT GREY (IRON) |
| S | = | ALUMINUM |

# Scrub Jays and Colored Leg Bands  (Physics, arithmetic)

*Who:*  The Nature Conservancy Monitoring Project.

*Challenge:*  ID bird by color & position of 14 bands.

*Proposed solution:*   Use up to seven bands, with no more than four bands per leg.

**Right**

1
2
3
4

**Left**

1
2
3

R = 14x13x12x11      L = 14x13x12
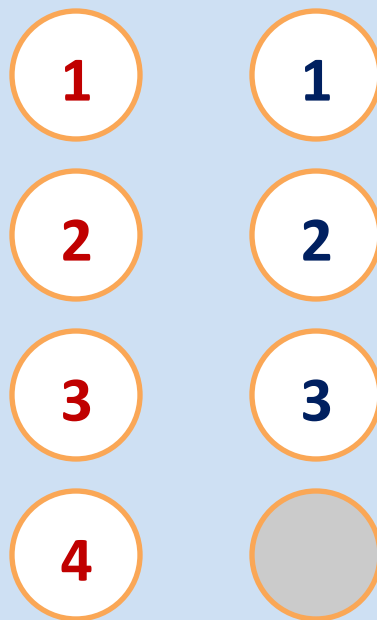
RxL = 24024x2184 = 52,468,416  combo's

The Florida Scrub Jay
*(Aphelocoma coerulescens)*

# COLOR BANDS USED ON FLORIDA SCRUB-JAYS

| | | | |
|---|---|---|---|
| | W | = | WHITE |
| | R | = | RED |
| | G | = | DARK GREEN |
| | Y | = | YELLOW |
| | B | = | DARK BLUE |
| | O | = | ORANGE |
| | P | = | PURPLE |
| | L | = | LIGHT GREEN |
| | A | = | LIGHT BLUE |
| | F | = | PINK |
| | H | = | HOT PINK |
| | K | = | BLACK |
| | U | = | MAUVE |
| | I | = | LIGHT GREY (IRON) |
| | S | = | ALUMINUM |

Spraying for Mosquitoes  (Visuals)

*Who:*  Leon County (FL) Board of Commissioners.

*Challenge:*  Restrict spraying for mosquitoes.

*Proposed solution:*  Have citizens, health specialists, school children, etc., point out the threats to human health from toxic sprays.  One environmentalist joined them.

Environ.  Math. As part of the rescue …

>     Master of Wildlife Conservation  (LC-UF), 1998

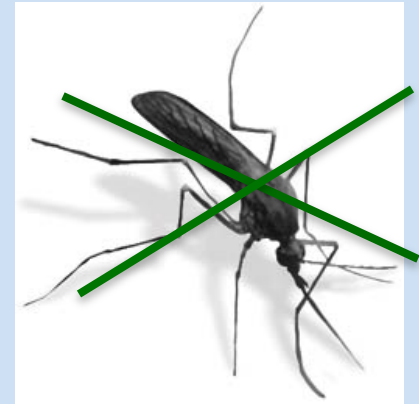>     Master Wildlifer  (Clemson-UF), 2003

>     Master Naturalist  (UF-IFAS), 2009

# The *Mosquito Hawk*

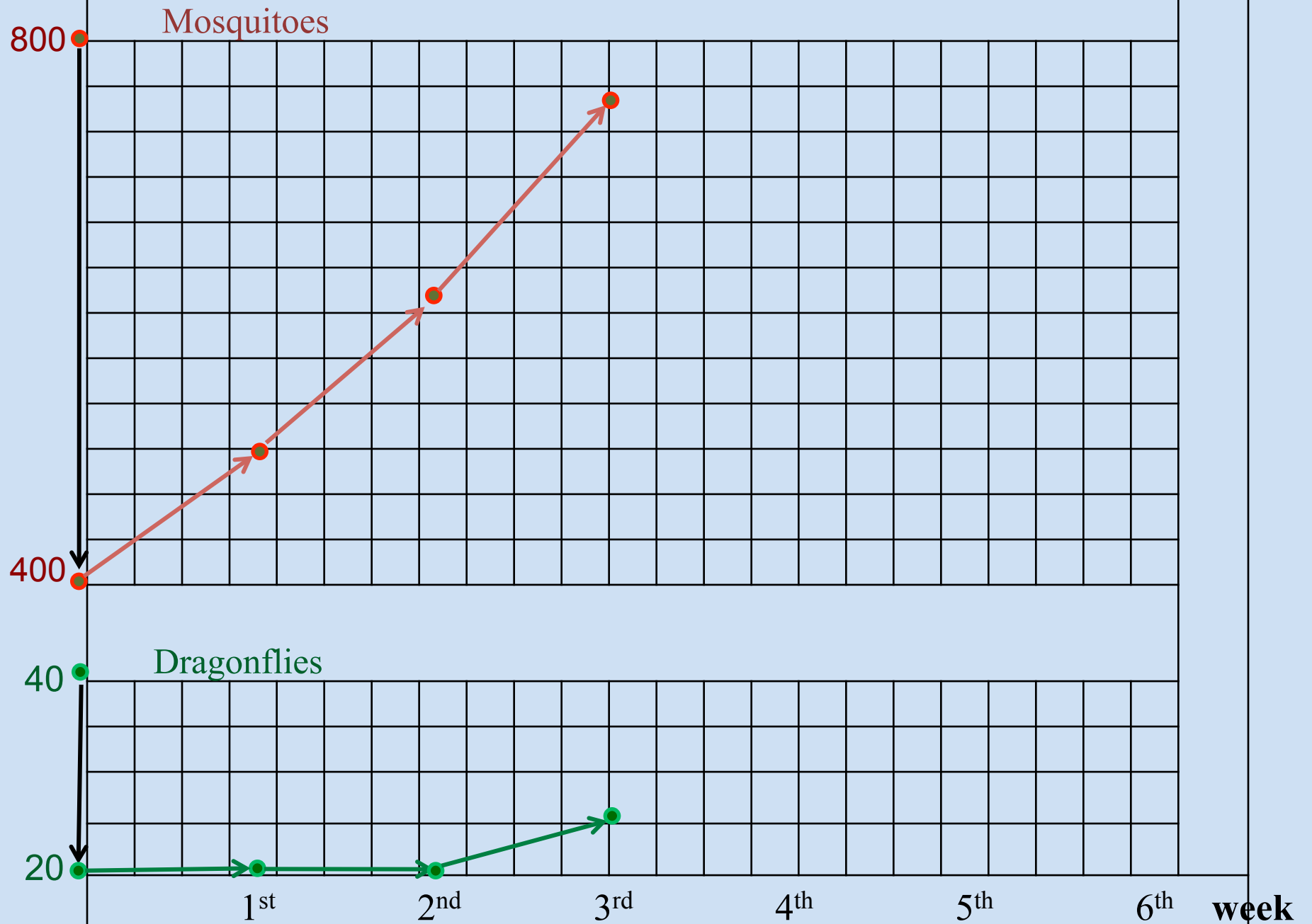$$+ \quad \text{pyrethrin} \quad =$$

$$+ \quad \text{pyrethrin} \quad =$$

$$+ \quad \text{pyrethrin} \quad =$$

Photos: *Google, Google, Flicker*

**Spray to LD50**

Mosquitoes

800
400

Dragonflies

40
20

1st   2nd   3rd   4th   5th   6th   **week**

The
Florida
Panther

Panther Deaths  (Metaphor; arithmetic)

*Who:*  Audubon members; the general public.

*Challenge:*  Take panther-deaths seriously.

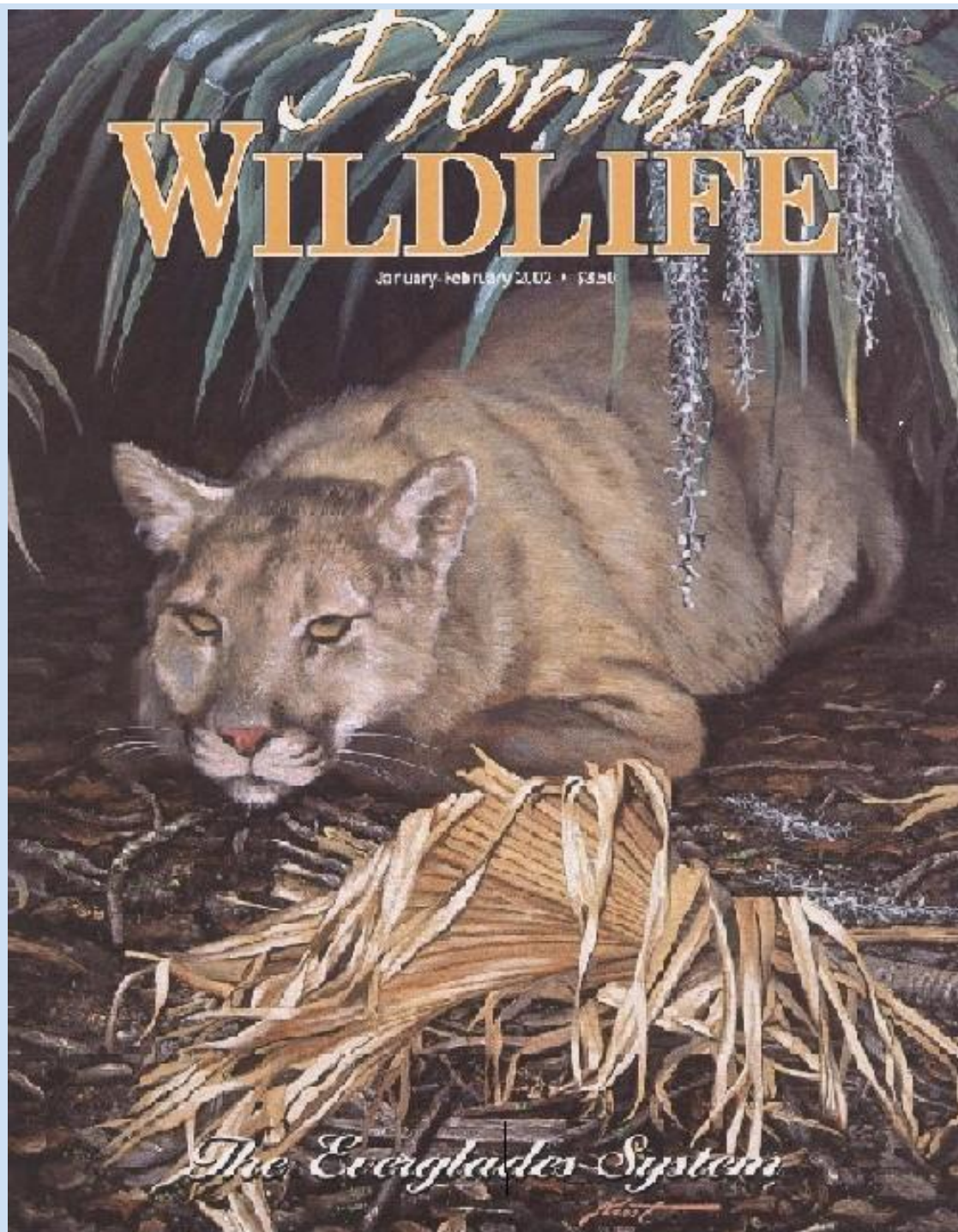*Proposed solution:*  Build underpasses so that panthers can safely cross highways.

Background:  Seven Florida panthers were killed by cars in 2008, out of an estimated population of 100-120.  How to put this in perspective…?

"Would you takes steps to correct such a situation if 1.2 *million* Floridians were killed by cars in a year…?"
"This is a *smaller* proportion than the number of panther deaths"

*Florida*
WILDLIFE

January–February 2002 • $3.50

*The Everglades System*