County of San Diego Vector Control Program

Mosquitoes, Rats, Ticks and More!

What is a Vector?

- Any organism capable of carrying and transferring a disease
- Common vectors:
  - Mosquitoes
  - Ticks
  - Rats
  - Flies

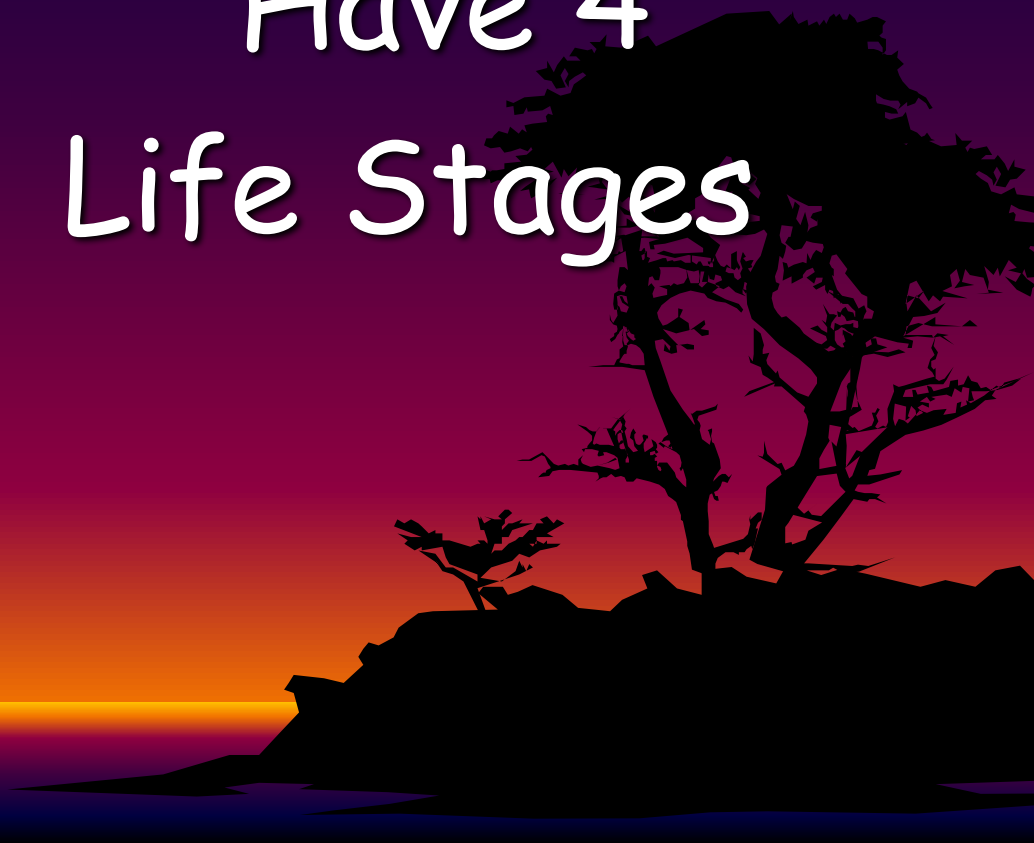
What is the Vector Control Program?

- The Vector Control Program protects and promotes environmental and public health, safety, and welfare
- Vector Control is responsible for educating the public about and controlling:
  - Mosquitoes
  - Rats
  - Flies
  - Other vectors

Mosquito Facts

- San Diego County has 24 different types of mosquitoes
- Only female mosquitoes bite humans
  - Females require the nutrients and protein from blood for their eggs
  - Each blood meal allows the female to lay hundreds of eggs
- Mosquitoes need only half an inch of water to lay eggs

Mosquitoes Have 4 Life Stages



Stage 1:
Female Laying Egg Raft

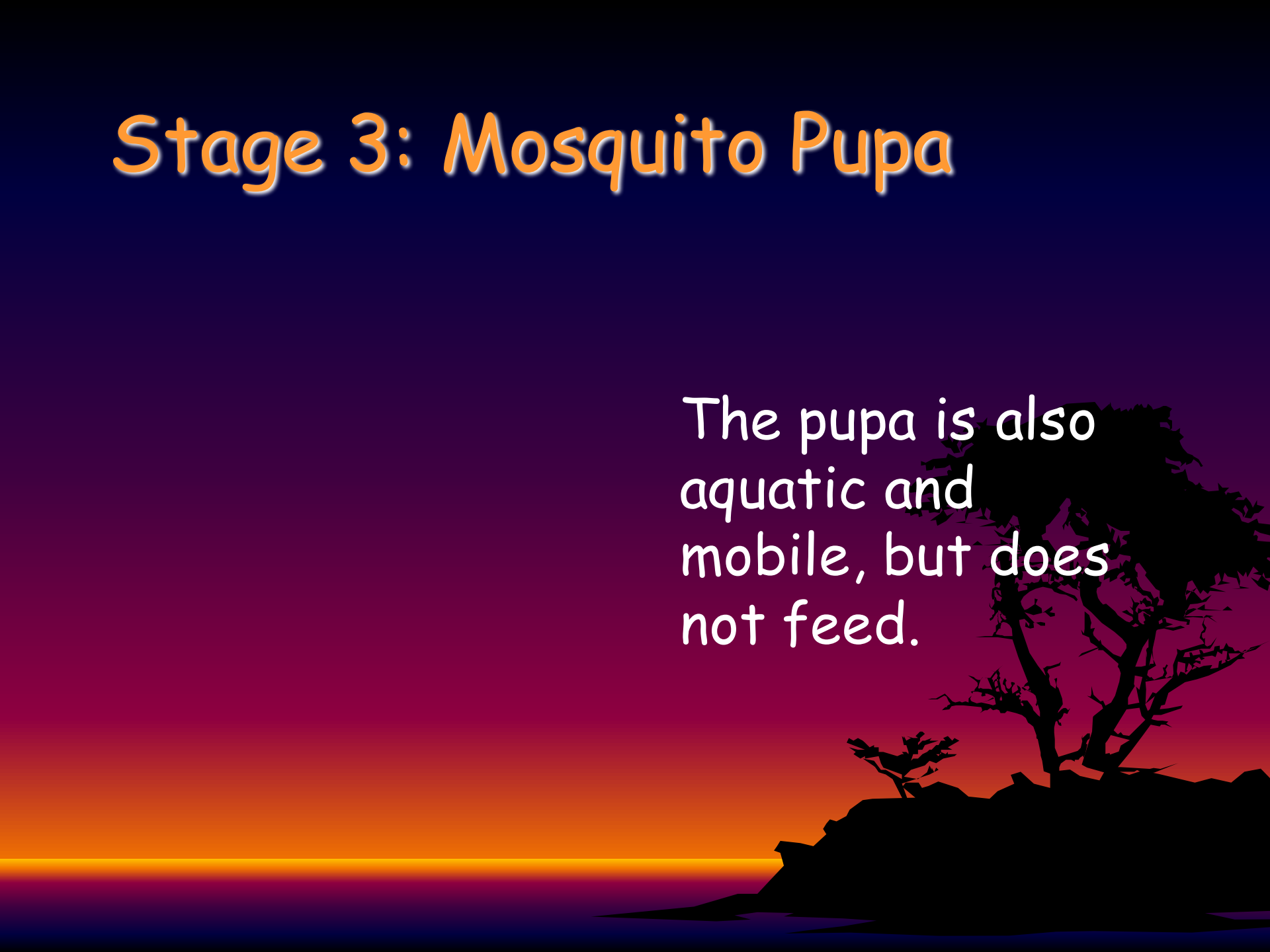
Eggs are laid on water or damp places

Stage 2: Mosquito Larvae

The larvae live in water and are filter feeders.

Stage 3: Mosquito Pupa

The pupa is also aquatic and mobile, but does not feed.



Stage 4: Hatching Adult

The adult hatches from the pupa and begins the cycle again.

During the warm months the entire egg to adult cycle can take only 3-5 days

Adult Female About To Feed

Female Full Of Blood

Mosquito-related Diseases

- West Nile Virus
- WEE
- SLE
- Chikungunya
- Dengue
- Yellow Fever
- Malaria
- Zika virus

What Is West Nile Virus?

- Mosquito transmitted virus
- Usually infects birds, but sometimes humans, horses and other mammals

Where Did WNV Come From?

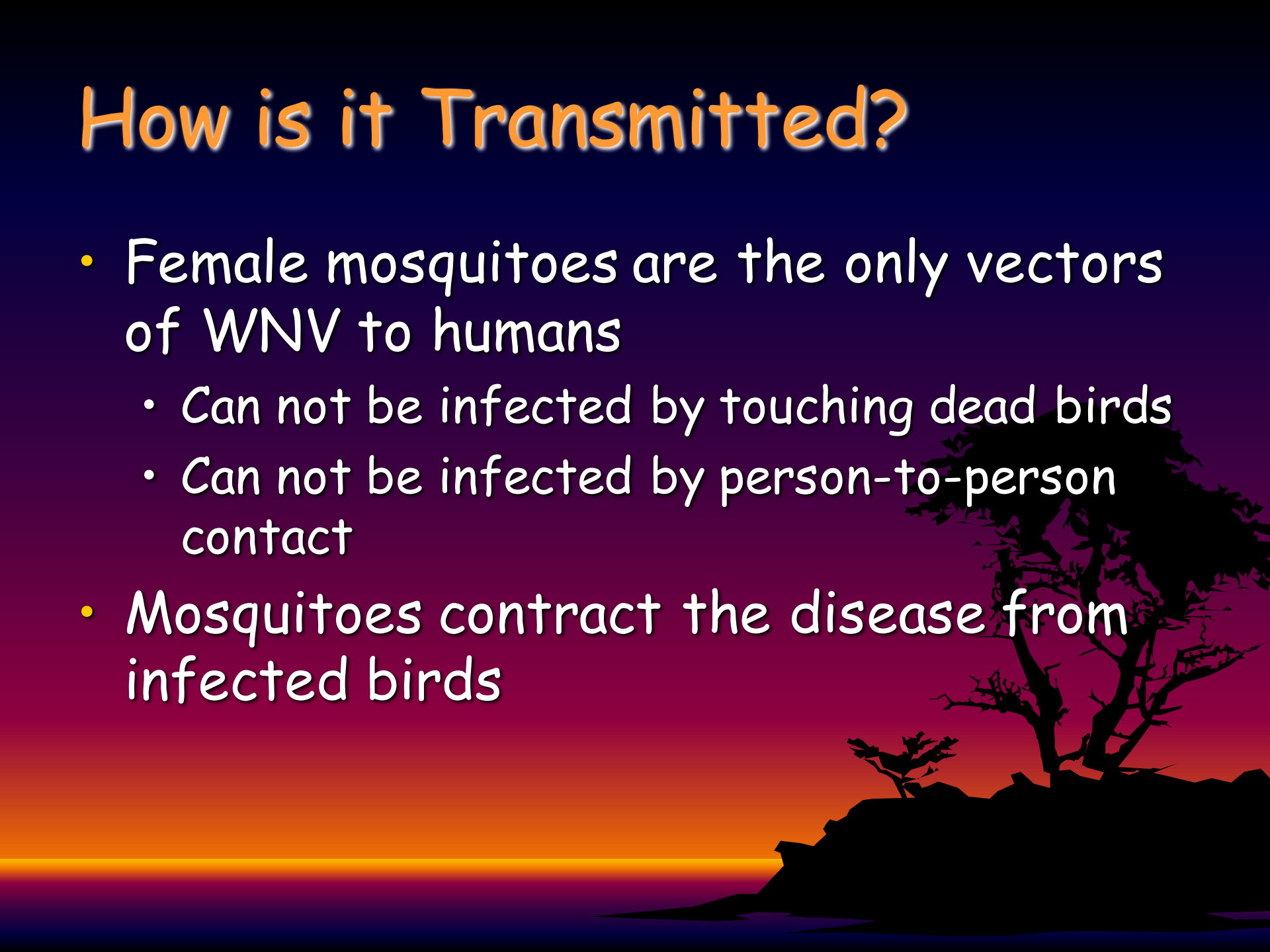
- Originally from Africa, West Asia and the Middle East
- First discovered in Uganda in 1937
- Closely related to St. Louis encephalitis virus which is found in the USA

How Did it Get Here?

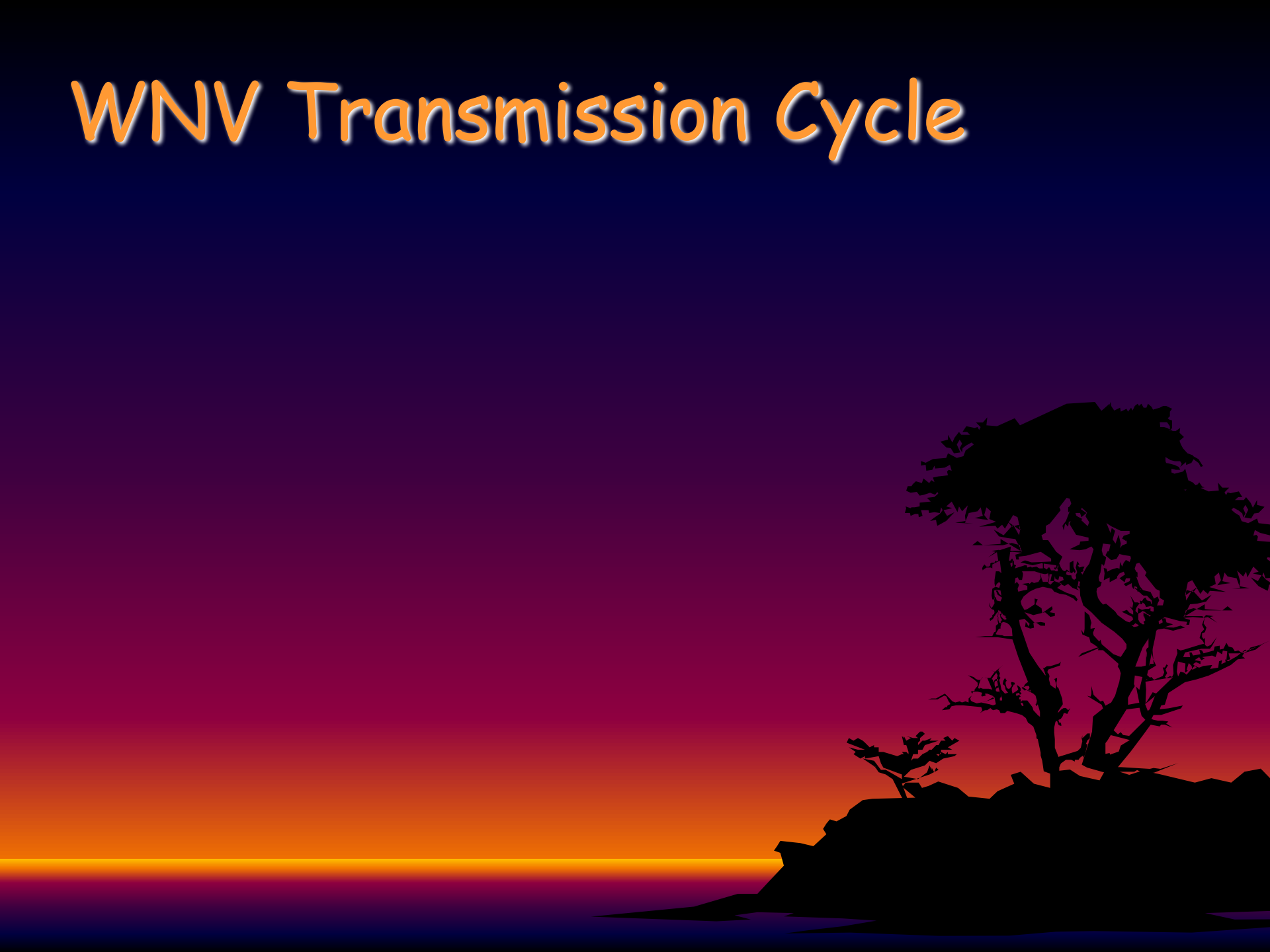
- We don't know?
- First discovered in NY in 1999 at the Bronx Zoo in flamingos
- By 2003, it was found coast to coast

How is it Transmitted?

- Female mosquitoes are the only vectors of WNV to humans
  - Can not be infected by touching dead birds
  - Can not be infected by person-to-person contact
- Mosquitoes contract the disease from infected birds

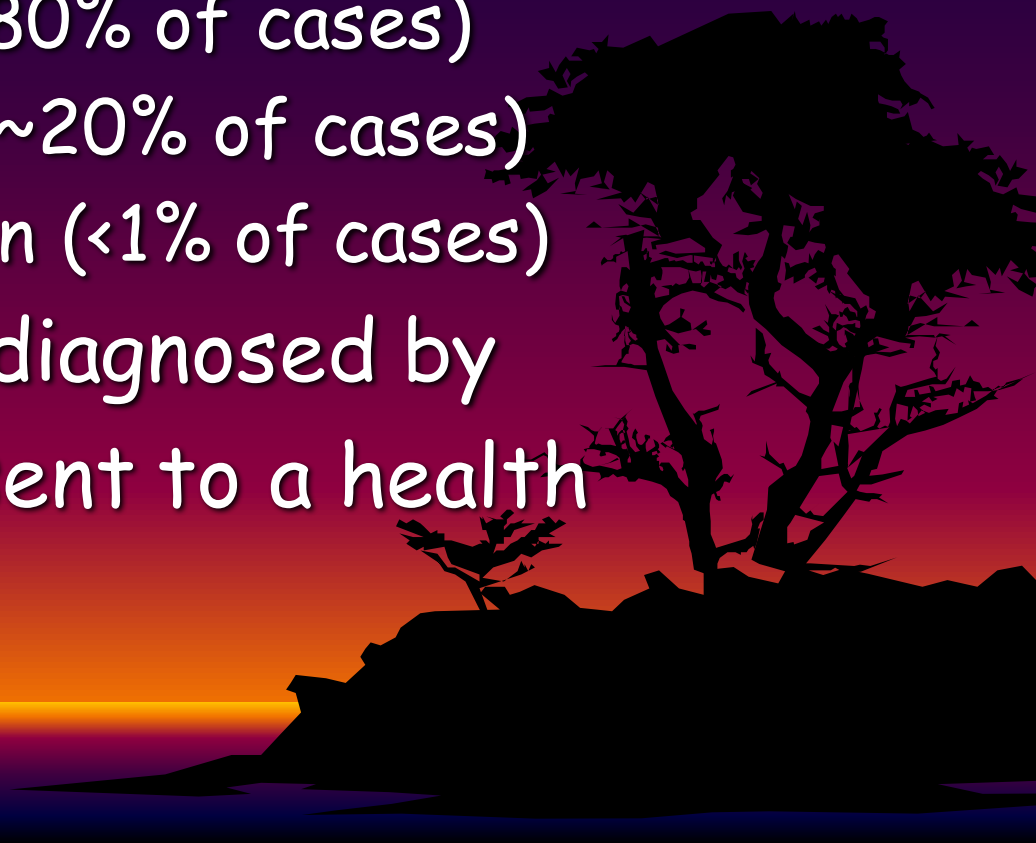


WNV Transmission Cycle



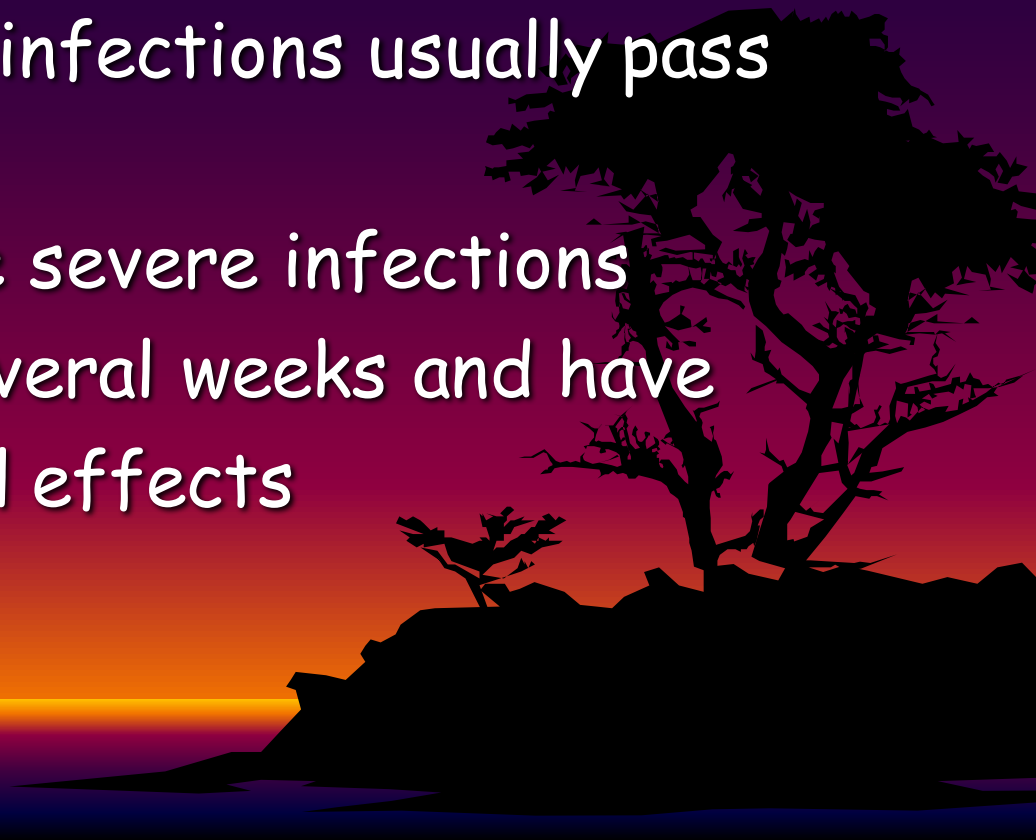
Symptoms

- Incubation Period: 3-14 days
- Three Effects:
  - Asymptomatic (80% of cases)
  - Mild Infection (~20% of cases)
  - Severe Infection (<1% of cases)
- Most commonly diagnosed by a blood sample sent to a health laboratory



How Long Does It Last?

- Symptoms develop 3-14 days after infection
- Symptoms of mild infections usually pass within a few days
- Symptoms of more severe infections may persist for several weeks and have lasting neurological effects



Treatment

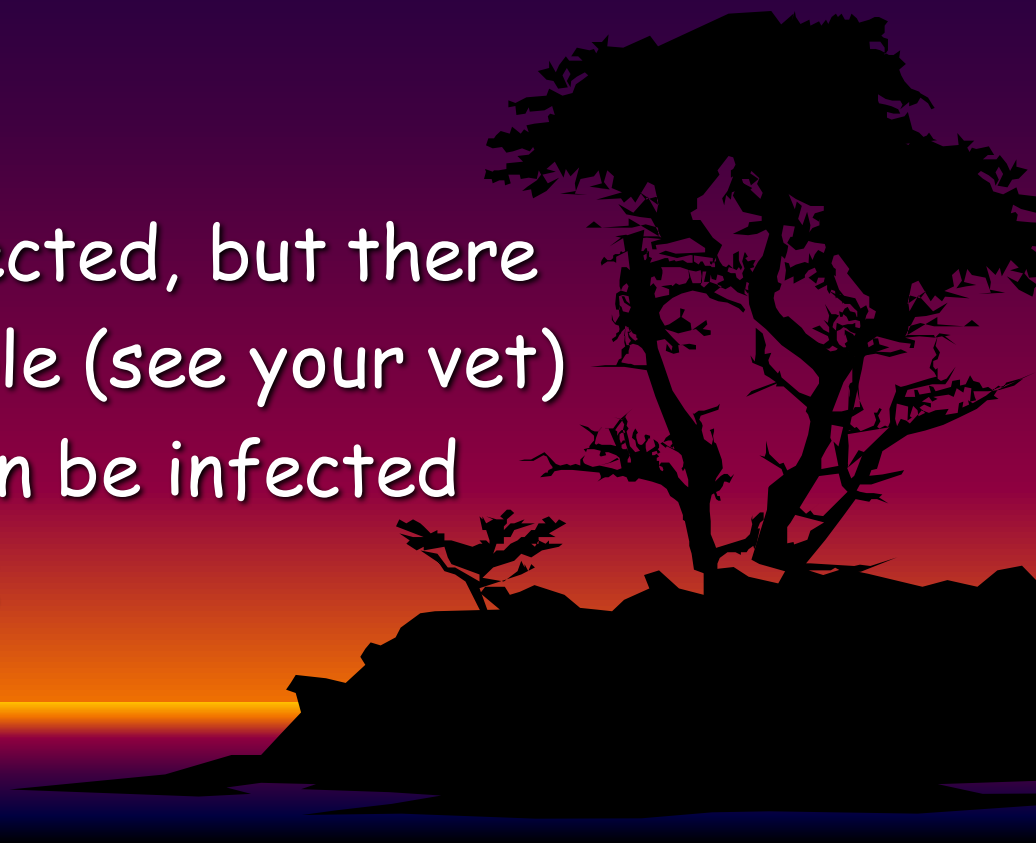
- No specific treatment for WNV
- Hospitalization is recommended for serious infections
  - Supportive care can be provided
    - IV Fluids
    - Respiratory Support
    - Airway Management
    - Preventing Secondary Infections

Who is Most at Risk?

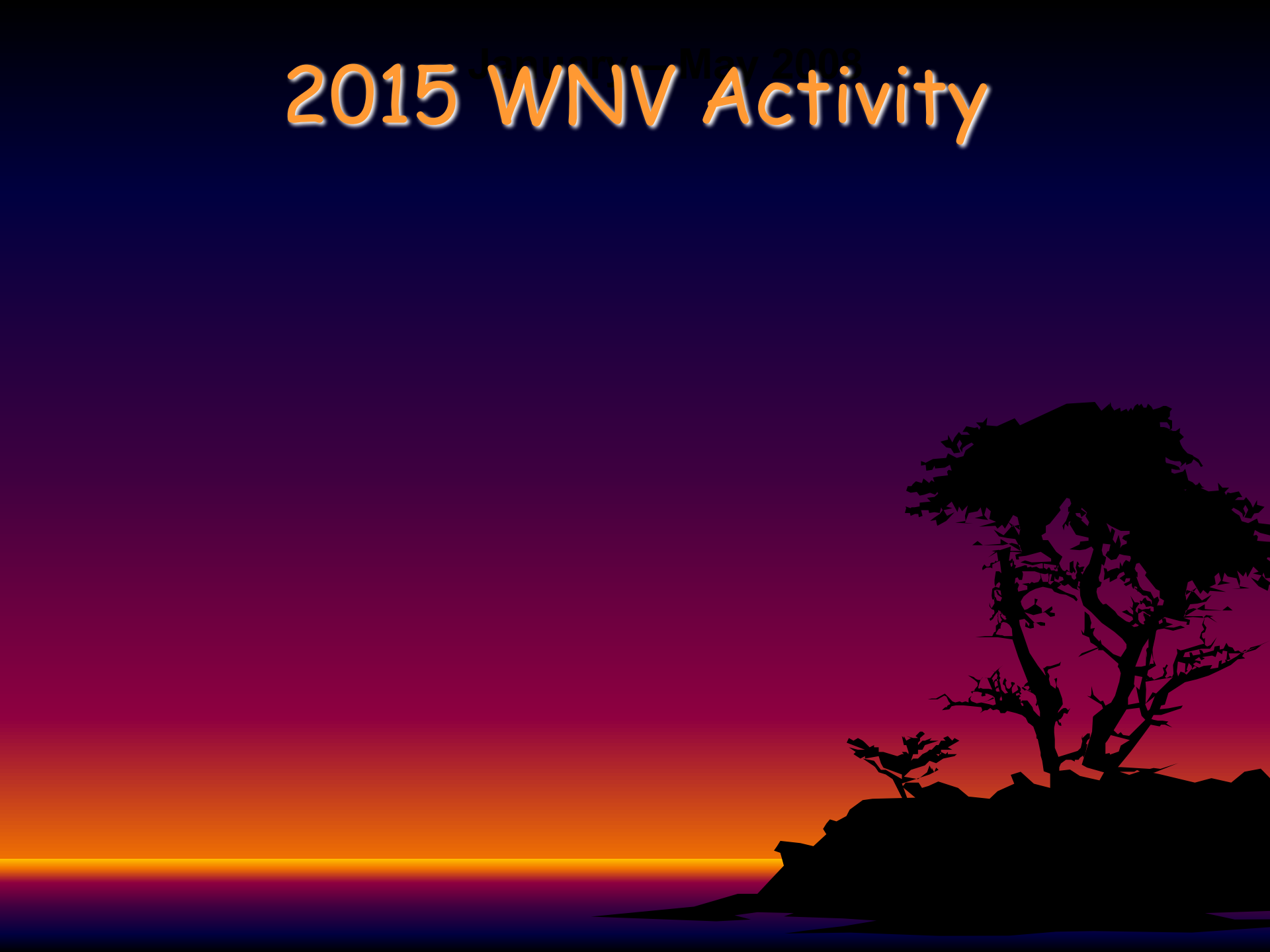
- Those most at risk are:
  - People over the age of 50
  - People with weak immune systems
- No human vaccine is available
  - Best form of protection is to avoid mosquito bites

What About Other Animals?

- Predominantly infects birds
  - Crows
  - Ravens
  - Blue jays
- Tree squirrels
- Horses can be infected, but there is a vaccine available (see your vet)
- Other mammals can be infected but rarely get sick



2015 WNV Activity



2015 Season Totals

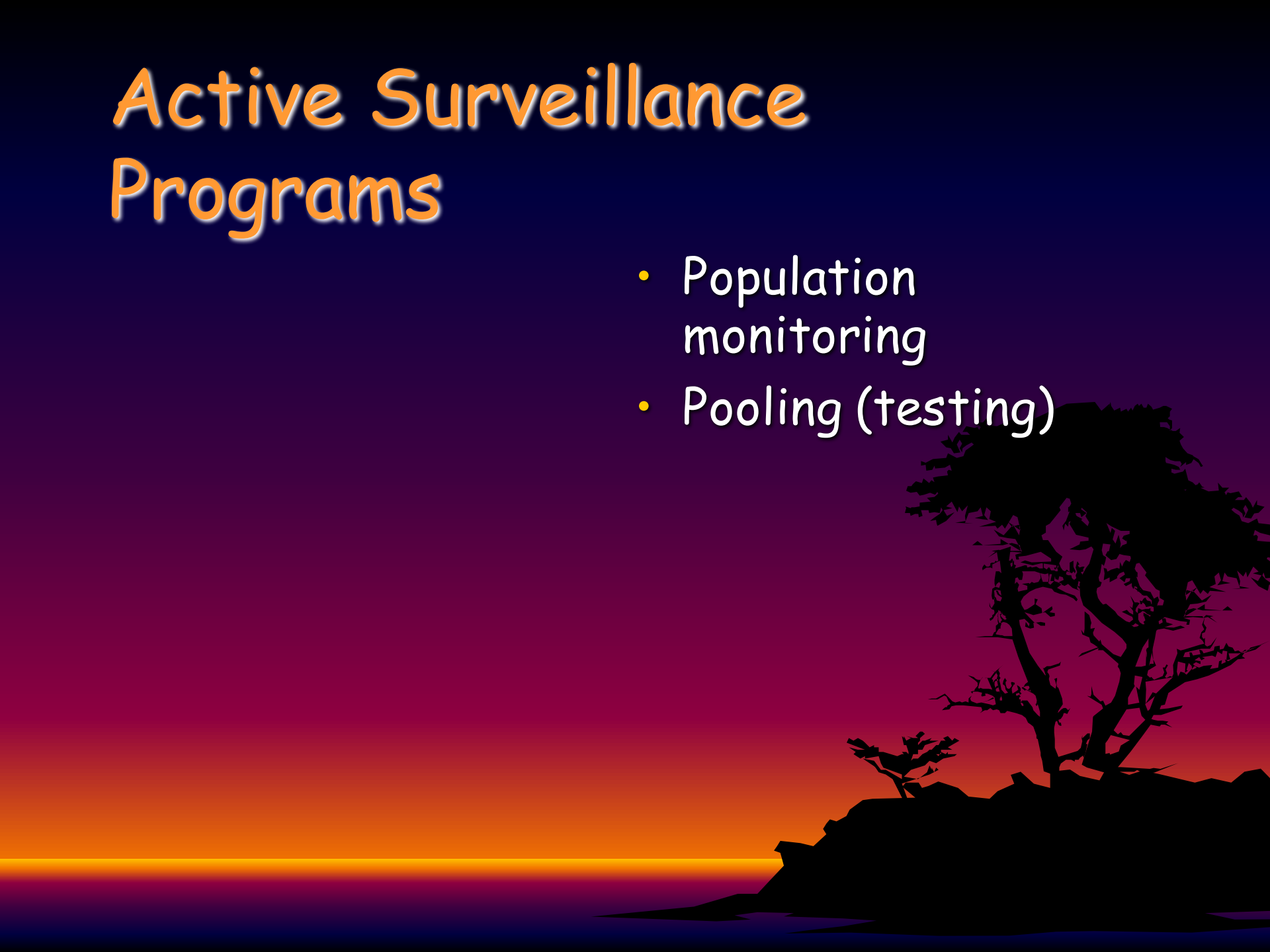
- 44 human cases
- 367 positive birds
- 49 positive mosquito pools
- 12 positive sentinel chickens
- 1 positive horse

What is the County doing?

- Surveillance
- Dead Bird Testing
- Sentinel Chickens
- Mosquito Control
- Mosquito Fish
- Public Outreach

Active Surveillance Programs

- Population monitoring
- Pooling (testing)



Aerial Surveillance

Dead Bird Testing

- Crows are highly susceptible to West Nile virus
- Must be dead for less than 24 hours, with eyes intact
- Call (858) 694-2888 to report dead birds!

Sentinel Chicken Screening

Here are the mosquito larvae!

When we find larvae we can CONTROL!

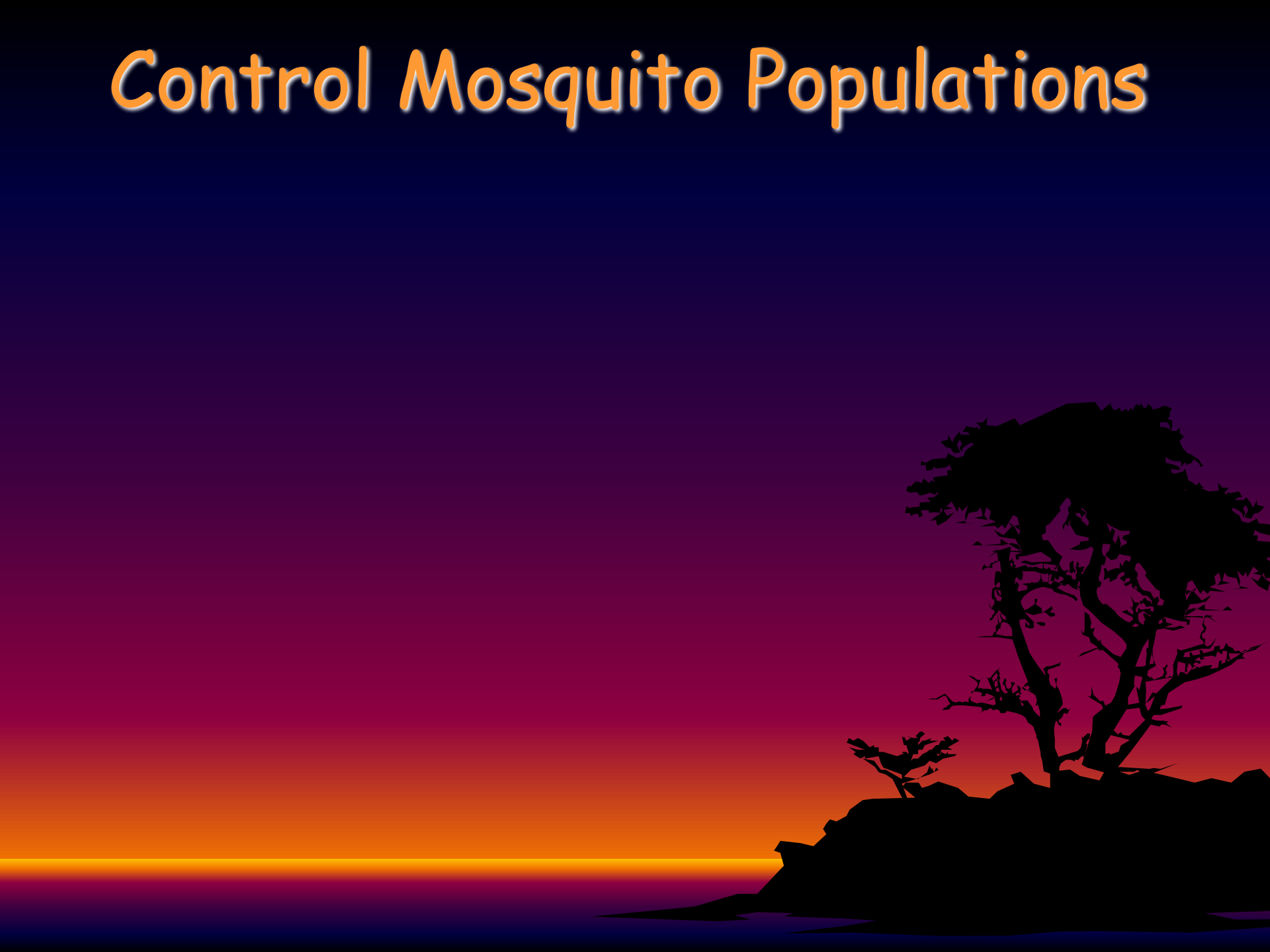
Ground Application

Aerial Larvicide Applications

Public Outreach

- Public education
- Press releases and media events
- Web page
- Ads & articles in various publications
- Routine service calls
- www.SDfightthebite.com

Control Mosquito Populations

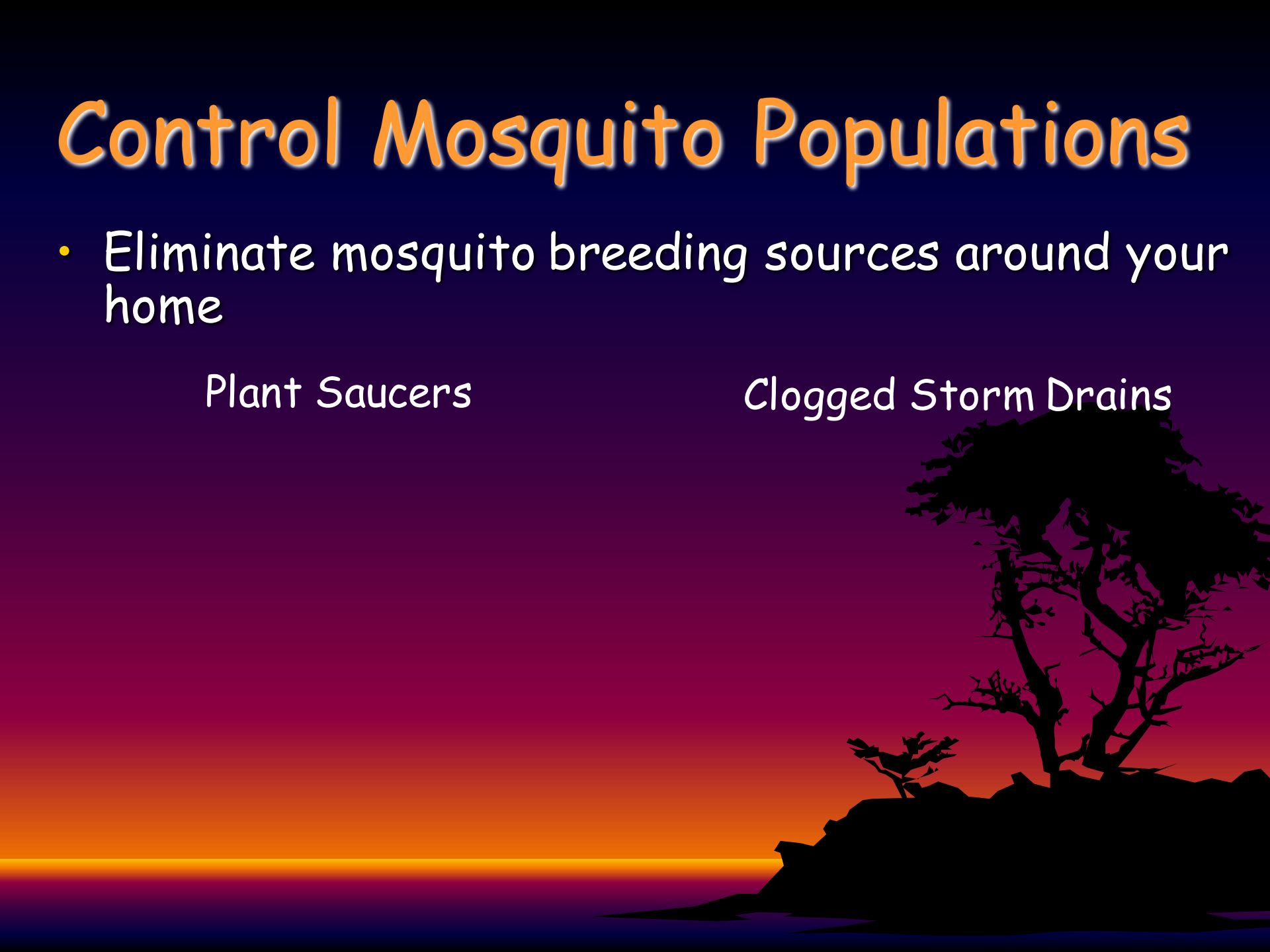


Control Mosquito Populations

- Eliminate mosquito breeding sources around your home

Plant Saucers

Clogged Storm Drains



Stagnant Green Swimming Pool

Control Mosquito Populations

- Place mosquito fish in ornamental fountains, ponds, and unused pools
- Mosquito Fish eat mosquito larva
- FREE Mosquito Fish are available at locations around the county

Prevent Mosquito Bites

- Repair/install window screens

Prevent Mosquito Bites

- Avoid outdoor activity during dusk & dawn
- Wear long sleeved shirts and long pants
- Use insect repellent when outdoors
- Treat clothing with repellents if necessary

Prevent Mosquito Bites

Use repellents containing:

- DEET
- Picaridin
- Oil of
  Lemon
  Eucalyptus
- IR 3535

Special Note!!

- Bug zappers and electronic repelling devices do not control or repel mosquitoes!

How Can The Public Help?

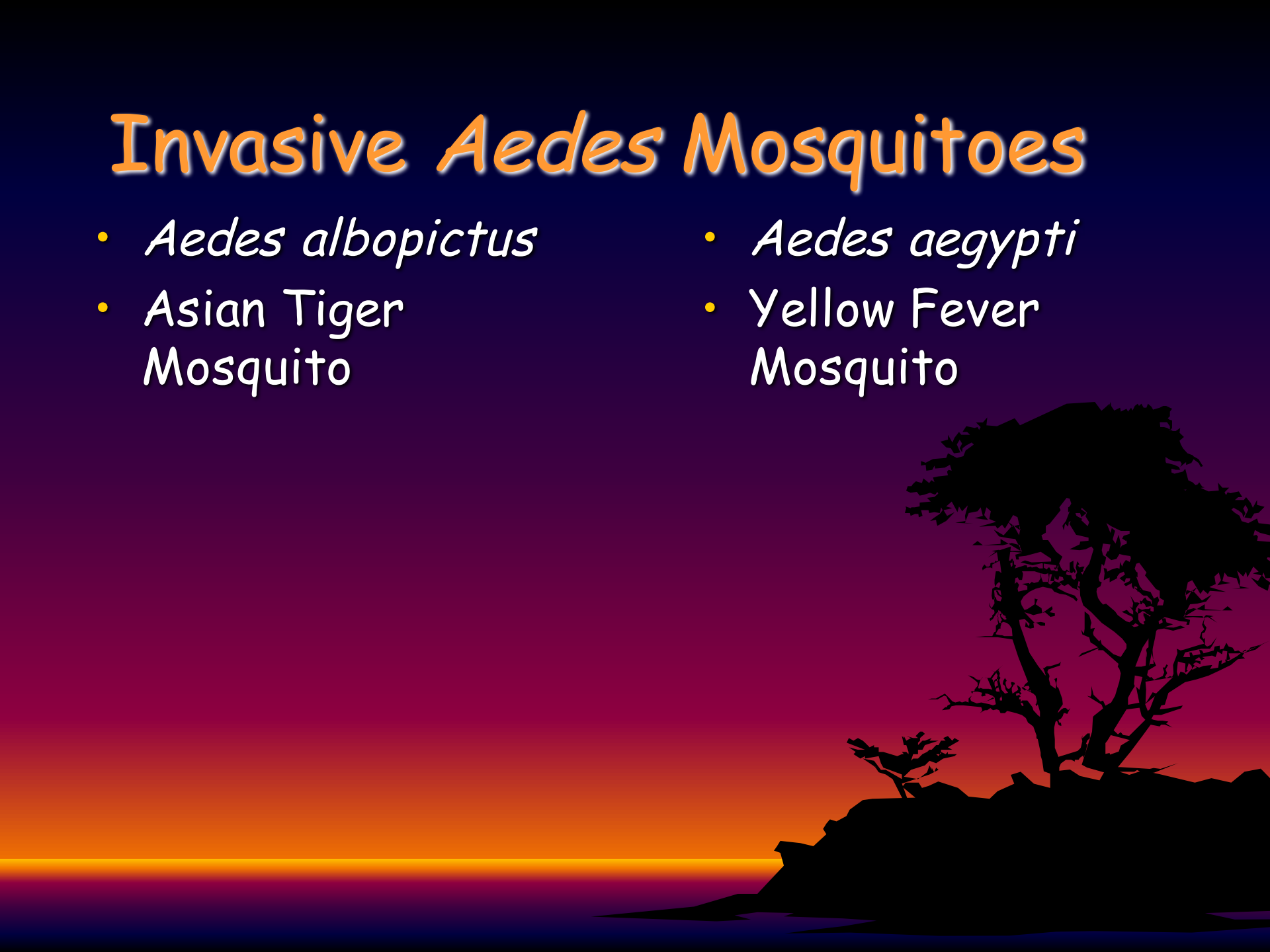
- Eliminate standing water – bird baths, gutters, old tires, pots and buckets etc.
- Use mosquito eating fish in ponds
- Report dead birds
- Report mosquito breeding

Vector Control
Takes the BITE out of
WEST NILE VIRUS
(888) 551-INFO

Invasive *Aedes* Mosquitoes

- *Aedes albopictus*
- Asian Tiger Mosquito

- *Aedes aegypti*
- Yellow Fever Mosquito



Aedes facts

- Vectors for Dengue, Chikungunya, Yellow Fever, and Zika virus
- Daytime biters
- Prefer humans
- Lay eggs in small containers
- Eggs are resistant to drying out

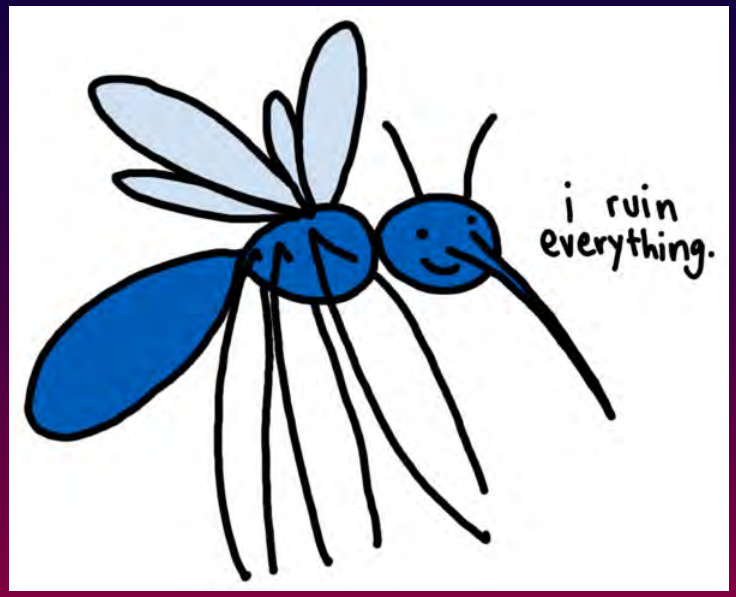
Aedes breeding sources

- Indoor sources

Aedes breeding sources

- Outdoor sources

The End……for the moment



Questions?

Rats

Rat Facts

- Rats can:
  - Spread disease
  - Contaminate food
  - Cause damage by chewing
- Rats are usually most active at night
- Seeing rats during the day means there are more rats lurking nearby or they have eaten bait
- Rats are omnivores

Types of Rats

Roof Rat

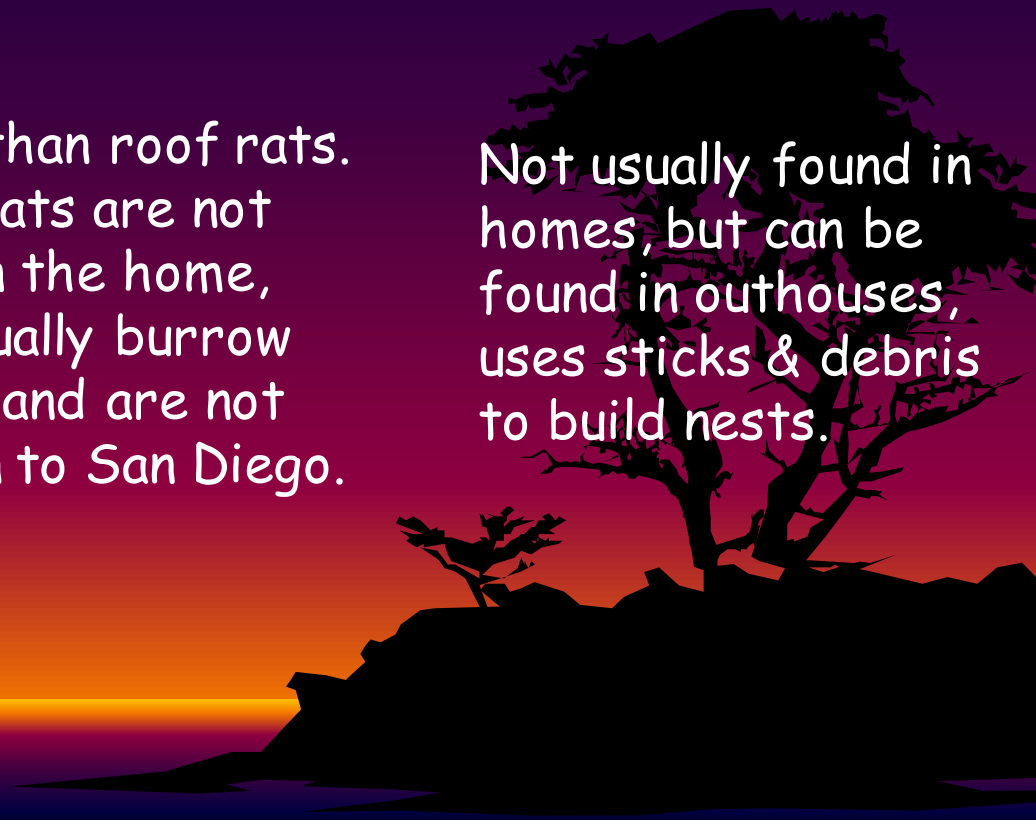
Most common type of rat in San Diego County, likes to climb and live above ground.

Norway Rat

Bigger than roof rats. These rats are not found in the home, they usually burrow outside and are not common to San Diego.

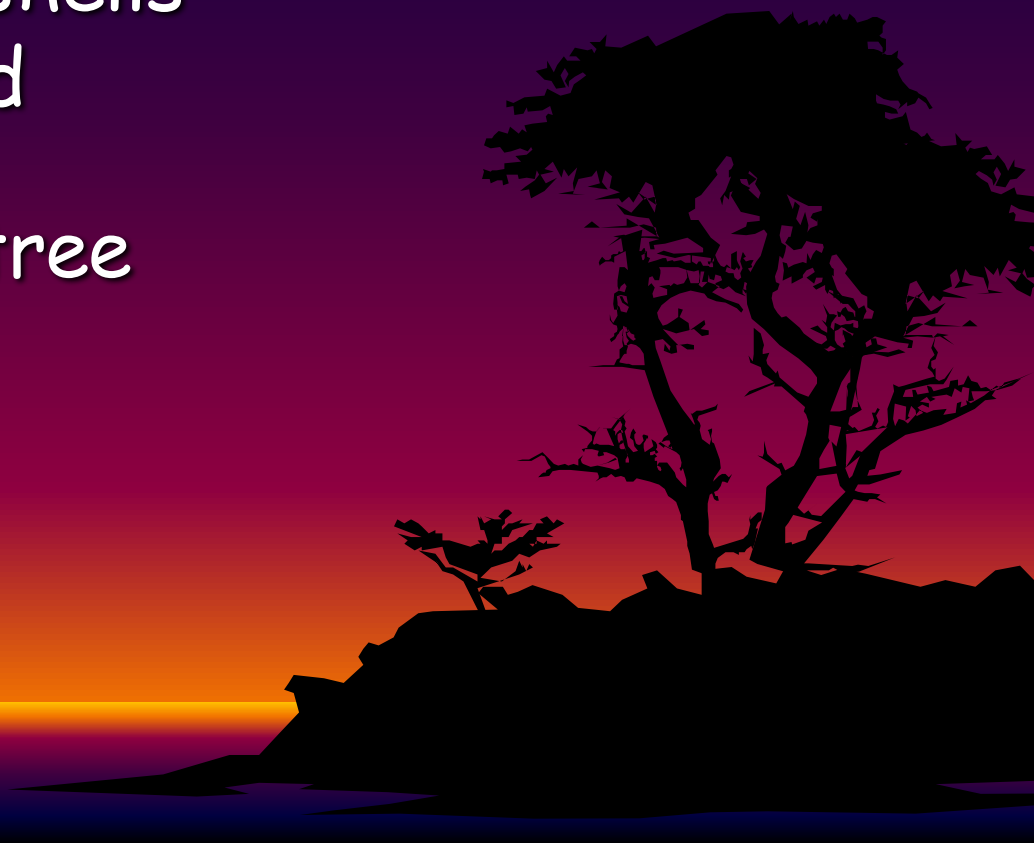
Wood Rat

Not usually found in homes, but can be found in outhouses, uses sticks & debris to build nests.



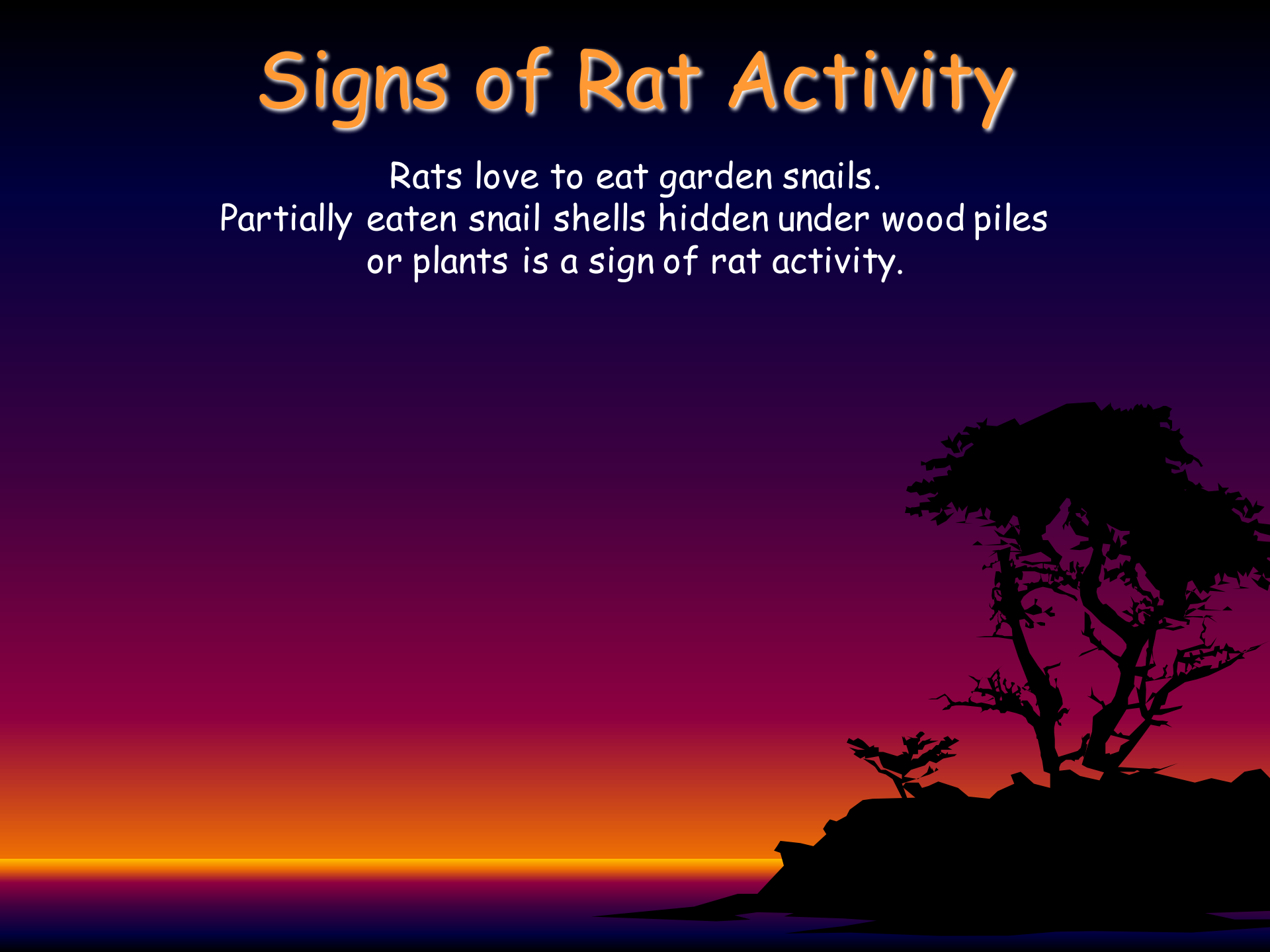
Signs of Rat Activity

- Rat droppings
- Rub or grease marks
- Piles of eaten snail shells
- Signs of gnawing and chewing
- Stripped plant and tree bark
- Damaged food and containers



Signs of Rat Activity

Rats love to eat garden snails.
Partially eaten snail shells hidden under wood piles or plants is a sign of rat activity.



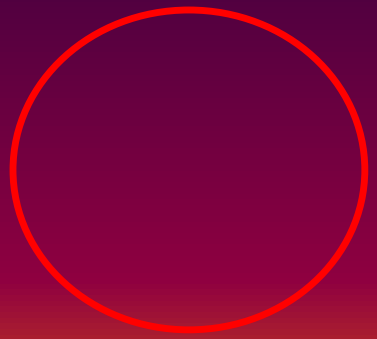
Signs of Rat Activity

Macadamia Nuts

Rats love these nuts, they will sometimes save them in piles for later.

Signs of Rat Activity

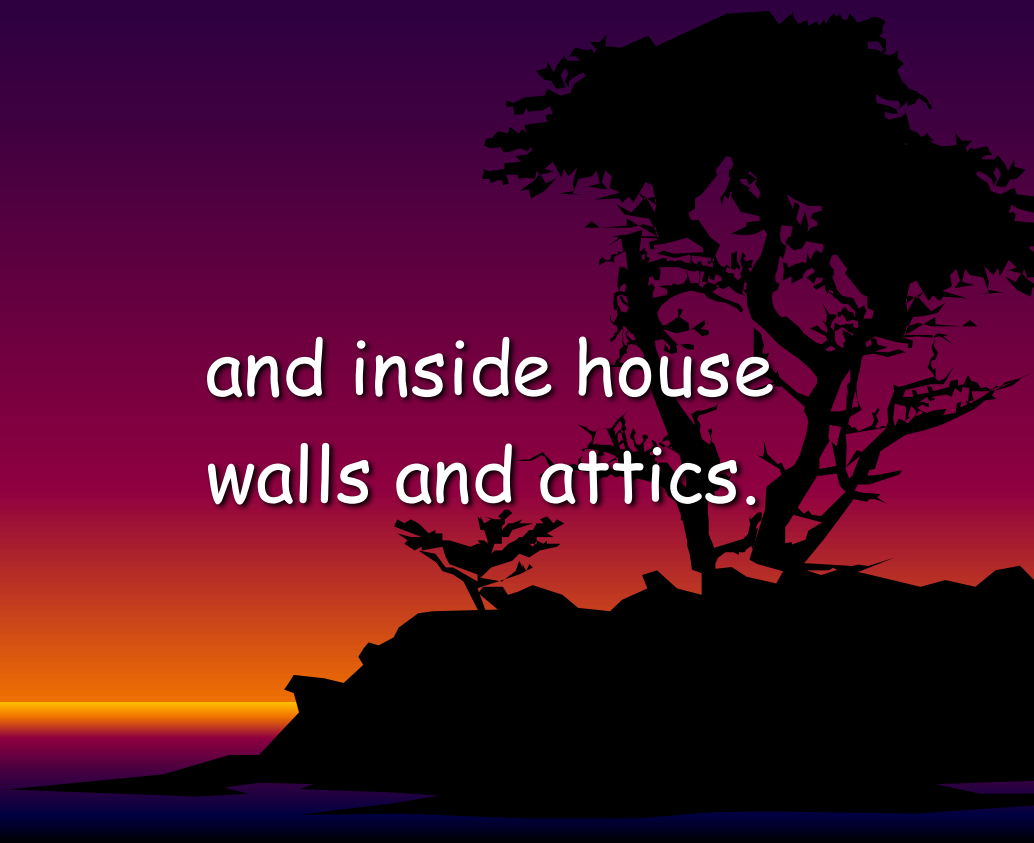
Rats often leave behind rub or grease marks. Their greasy fur rubs the walls as they come and go from your home.



Can you spot the rat?

Common Rat Habitats

Rats live in
thick vegetation . . .



and inside house
walls and attics.

Common Rat Habitats

They are found in woodpiles . . .

. . . and in trash and debris.

5 Simple Steps to Get Rid of Rats

1. Rodent Proof Your Home and Storage Buildings

- Check outside for holes and gaps
- Repair holes and gaps with rodent-proof material
- Put metal weather stripping under doors to seal large gaps

Rats can get through openings the size of a quarter or larger.

Seal gaps under doors!

Rodent Proofing Continued

Check under your stucco drip edge

Check in your cabinets

Check your utility connections

Check your floor drains

Tools to Rodent Proof Your Property Available at Hardware Stores

Sheets of wood can also be used to cover and seal up holes.

$\frac{1}{4}$ inch 18-22 gauge **hardware cloth** should be used to cover and seal holes and openings around the home

Tools to Rodent Proof Your Property Available at Hardware Stores

Using hardware cloth with expanding foam insulation is another way to seal up holes in your home.

2. Remove Food & Water Sources from Your Property

Close garbage cans tightly.

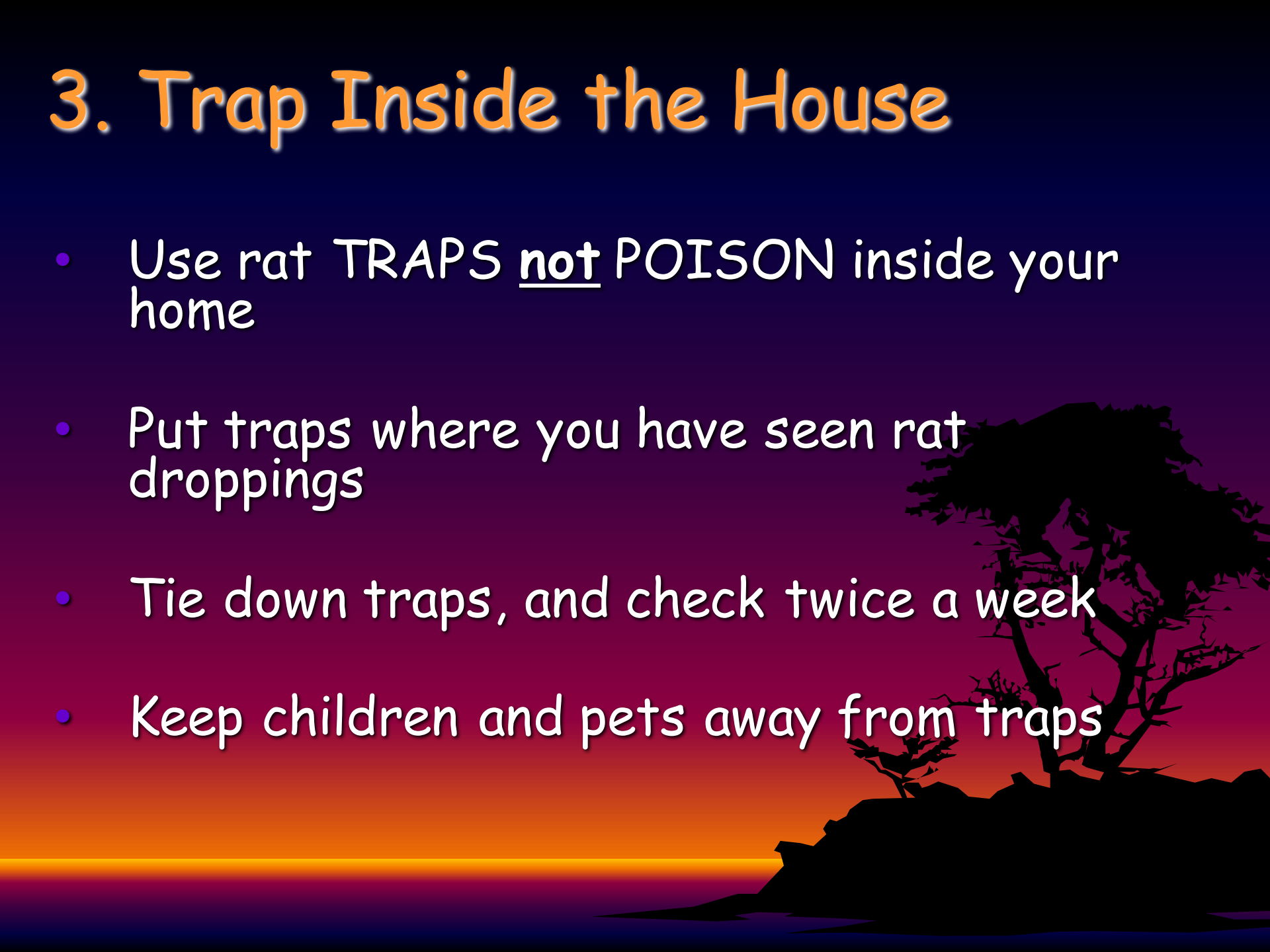
Remove pet food bowls promptly after feeding.

Pick ripe fruit routinely.

Can you spot the rat?

3. Trap Inside the House

- Use rat TRAPS **not** POISON inside your home
- Put traps where you have seen rat droppings
- Tie down traps, and check twice a week
- Keep children and pets away from traps

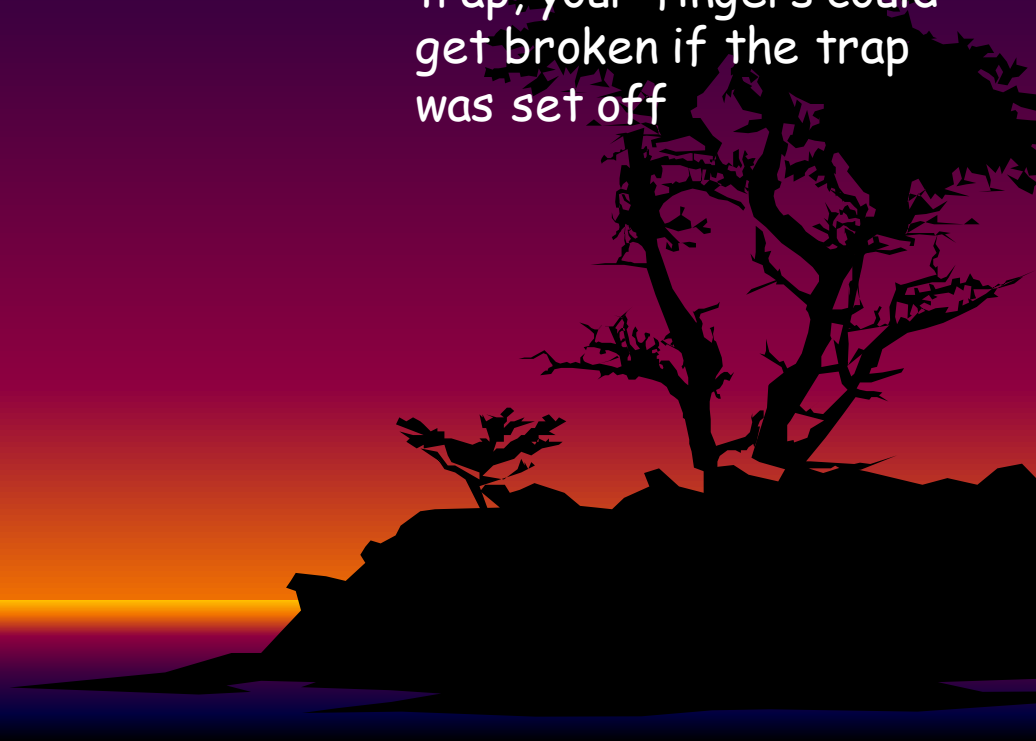


Safe Trapping

- Use peanut butter or dog food for bait
- Use several traps to increase your chances of catching rats
- Use CAUTION when setting and placing traps
  - •Place bait end of trap next to the wall
  - •Place the edges of the trap square against the wall

RIGHT way to hold a trap

WRONG way to hold a trap, your fingers could get broken if the trap was set off



4. Bait Outside the Home

- Only use bait AFTER rat proofing has been completed
- Use poison bait OUTSIDE the home
  - READ and FOLLOW poison label and directions carefully
- Put poison bait in a secured bait station
- Place bait stations in protected areas (under woodpiles, thick vegetation)
- Check stations twice a week

5. Eliminate Rat Habitat

- Remove trash and debris
- Trim trees, bushes, and vines 4 feet away from home and roof
- Remove heavy vegetation away from buildings and fences
- Stack wood and household items at least 18 inches above the ground and 12 inches from walls or fences

5. Eliminate Rat Habitat

Heavy Vegetation

Bougainvillea, like this, is commonly found in San Diego County. The thick plant provides a perfect cover for rats.

Can you spot the rat?

Diseases Carried by Rats

- Bubonic Plague
- Food Poisoning
- Tapeworm/
  Trichinosis
- Rat-bite Fever

Vector Control Can Help

- On site property assessment
- Rat prevention tips and education
- Rodent Control Starter Kit

Vector Control Can Help

- Visit our website: **www.SDVector.com** to fill out a rat complaint form

- Contact us by phone: (858) 694-2888

- Contact us by email: **vector@sdcounty.ca.gov**

Questions?