



# Feral Swine Update

## Havasu National Wildlife Refuge

Presented by Chris Tiffany  
Feral Swine Specialist  
USDA APHIS Wildlife Services



# Objective

- *Removal of all feral swine from Havasu National Wildlife Refuge*



# Who is involved?

- USDA APHIS Wildlife Services
- Wildlife Damage
- National Feral Swine Damage Management Program
- “Aims to protect agriculture, natural resources, property, and human/animal health and safety through proper management”



# National Feral Swine Damage Management Program

- Established 2014
- Coordination between additional federal agencies, states and local governments, tribes, universities, organizations, the public and individual cooperators
- Management in the U.S. varies based on population densities and localized factors
- The overall goal of the program is to minimize damage inflicted by feral swine through management or eradication depending on population densities and other local factors

# Funding Overview

- Funding is allocated to each WS state program
- Distribution of funds:
  - Feral swine population and distribution
  - Damage and potential damage to resources
  - State, territorial, tribal, or local regulations impacting management efforts

# Funding Structure

## FY 2019 Allocations

Level 5 - \$334,000

Level 4 - \$303,000

Level 3 - \$242,000

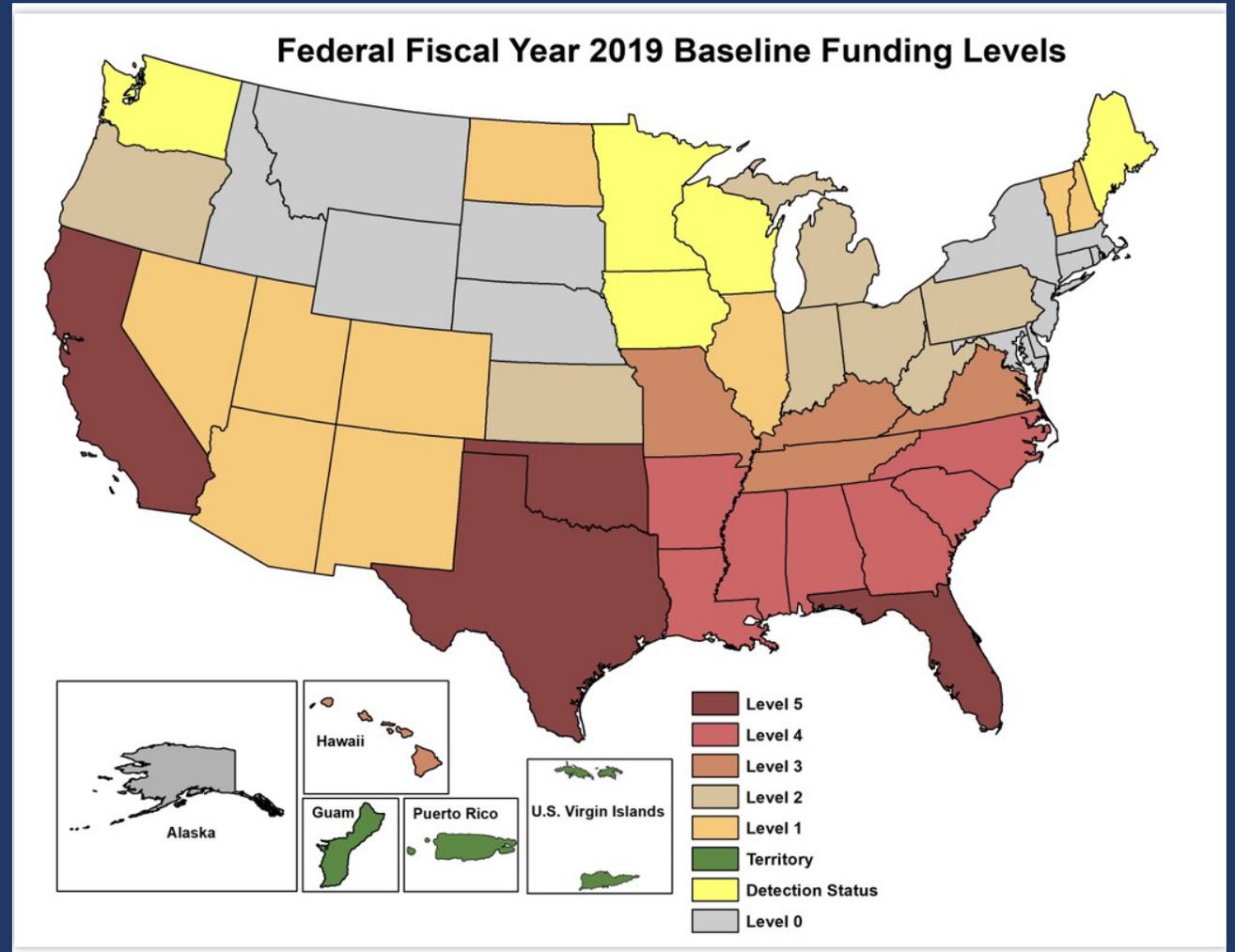
Level 2 - \$165,000

Level 1 - \$68,000

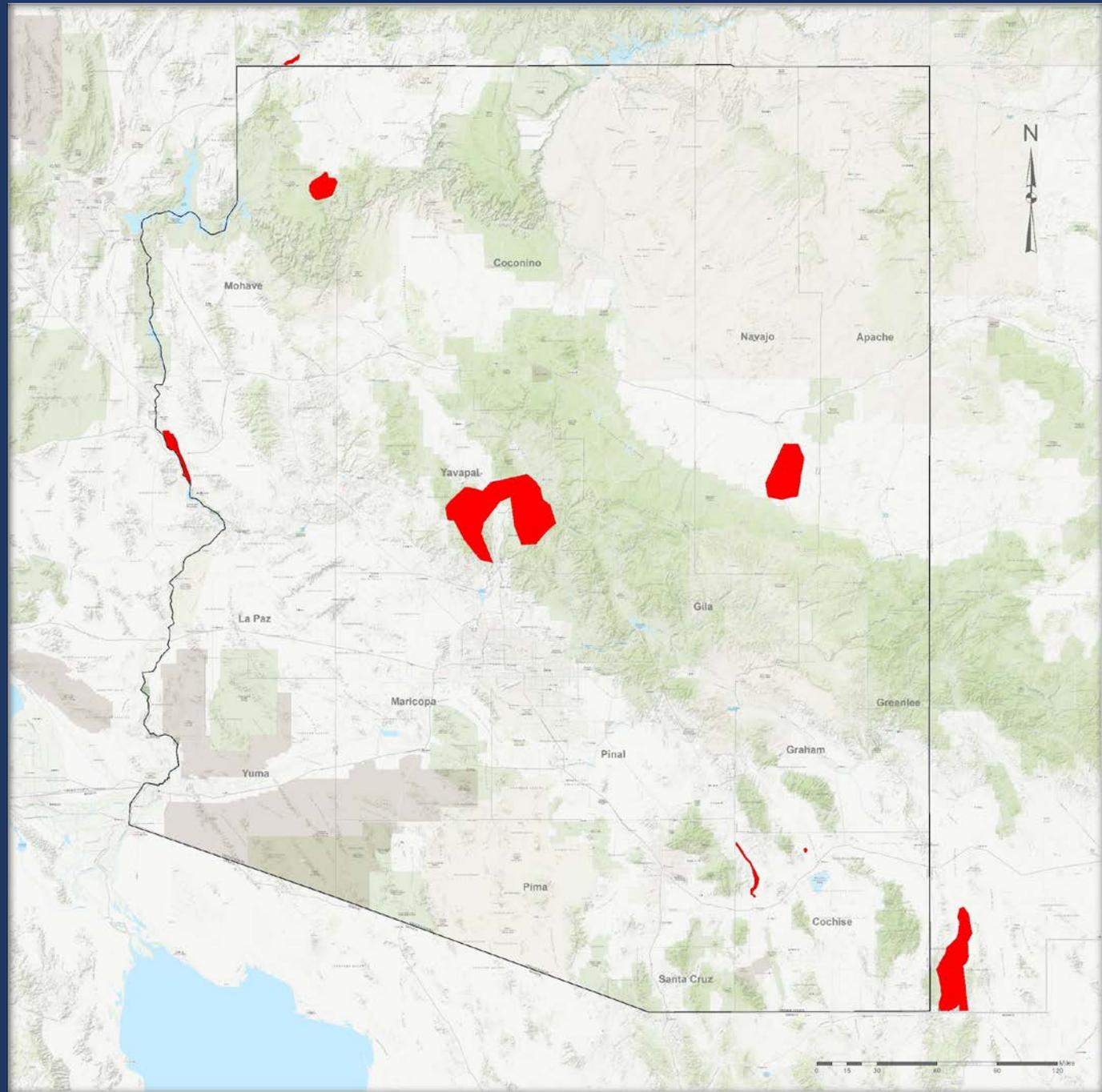
Level 0 - \$0

Territory - \$100,000

Detection Level - \$42,000



# Distribution in Arizona



# Havasu National Wildlife Refuge

- Established by President Franklin D. Roosevelt in 1941 for the primary purpose of providing migratory bird habitat
- Encompasses 37,515 acres adjacent to the lower Colorado River, spanning from Mohave Valley, Arizona, to Lake Havasu City
- Protects 300 shoreline miles
- Approximately 47% (17,600 acres) of the refuge is designated as a Wilderness Area

# Feral Swine Background



***Sus scrofa***

- First documented sighting in the 1970s
- 2 genetically distinct populations
- Western Domestic Breed in Topock Marsh
- European Wild Boar/Hybrid in Topock Gorge

# Habitat

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- Persistent water and River
- Backwaters
- Marsh
- Emergent wetlands
- Uplands



# Feral Swine Preferred Habitat



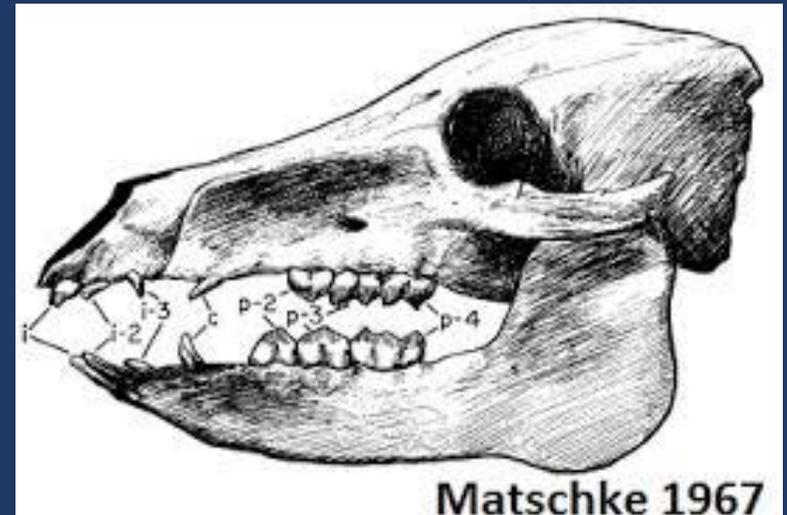
- Prefer thick stands of salt-cedar and willows near the water's edge
- Prefer to sleep (bed) under salt-cedars and mesquite thickets
- Prefer to travel the edges of cattails buffered by heavy cover
- Generally: Any habitat with access to water

# Feral Swine Characteristics

# Biology

## Age Class

- Life span: 4-8 years
- Low natural mortality Tooth eruption - lower jaw
- Juvenile (< 2 Mths): Incisors 2 absent
- Sub adult (2 Mths – 1 Yr): Incisor 2 erupted and deciduous canines
- Adult (> 1 Yr): Canines permanent
- Others: body size, scarring and size of shoulder plate/shield



# Reproduction

- High Reproductive Rate
- Breed year-round
- Sexual maturity at 4-6 months and breed
- Give birth 2x per year
- Average litter size of 6-8 piglets (1 to 6 survive)
- Male biased litters

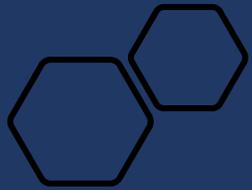
# Physical Characteristics

- Lean and muscular
- Long tail (Topock Gorge) or corkscrew tail (Topock Marsh)
- Thicker hide and coat than domestics
- Elongated snout
- Pronounced canines
- Round cloven hooves
- Large erect ears
- Shoulder plate/shields

# Body Size

- Driven by genetics and food resources
- Sows 125-300 lbs.
- Boars 200-400 lbs.
- 3-4 feet in length





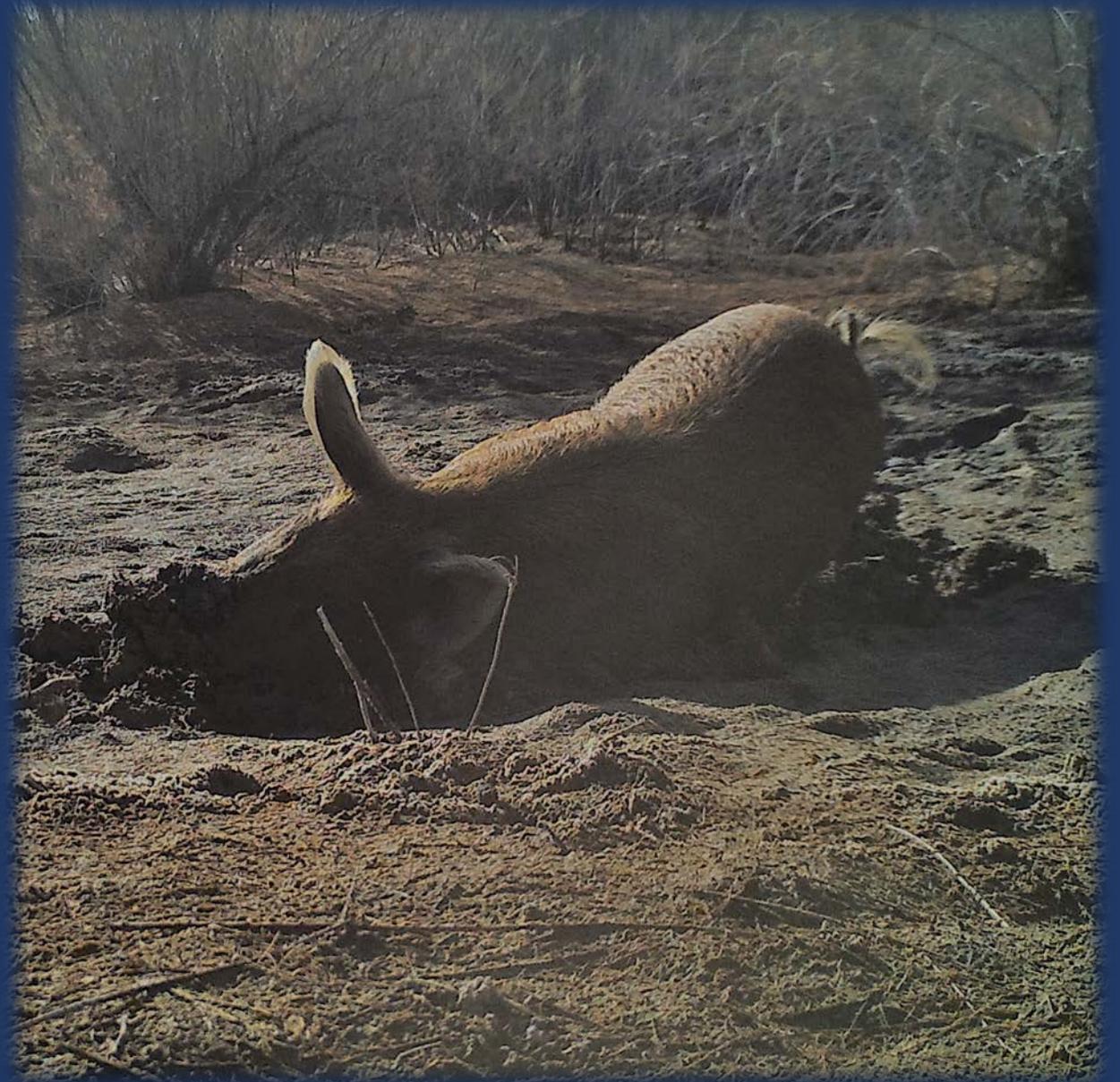
# Coloration

- Topock Marsh: Black, brown, red, tan (red-brown and calico)
- Topock Gorge: Solid black with distal ends
- Coat Pattern: Solid, mottled/blotched
- Piglets in Topock Gorge mini versions of parents



# Behavior

- Habitat Generalists
- Opportunistic omnivores
- Adaptable
- Excellent swimmers
- Rooting
- Wallows
- Rubs
- Beds/nests
- Social



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# Behavior

- Crepuscular (Twilight), Nocturnal (Night) and Diurnal (Day)
- Typically do not travel when windy
- Sounder groups: Matriarch and females of subsequent generations
- Males mostly solitary
- Bachelor groups
- Home range: .25 – 5 miles (males > females)

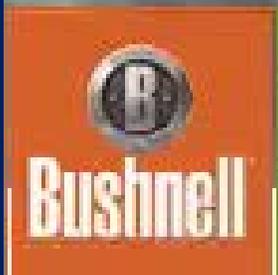


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# Food Resources

- Veracious feeders
- Cattail tubers and shoots, mesquite bean pods and various grasses, roots, forbs
- Small mammals, fish (carp), snakes, lizards, frogs, salamanders, birds, eggs, insects

# Problems Associated with Feral Swine

# Damage to Property and Natural Resources

- Rooting
- Wallows
- Tree rubbing
- Wetlands: water quality and soil erosion
- Trampled vegetation
- \$1.5 billion per year

# Human Health/Safety

- Aggressive nature
- Disease threat to humans, livestock, pets



# Threat to Biodiversity

- Competition for resources
- Predation
- Impacts on threatened and endangered species
- Yuma Ridgway's Rail
- Southwestern Willow Flycatcher
- Yellow-Billed Cuckoo
- Northern Mexican Garter Snake

# Damage Management Efforts

- Cooperation with U.S. Fish & Wildlife Service
- Special Use Permit (SUP) allows the implementation of direct control methods such as trapping, shooting and monitoring
- Disease sampling/and /agricultural threats
- Aerial gunning began in February 2017 and continues to be ongoing biannually: February and September
- Monitoring trail cameras
- Visual observation (optics, driving roads)
- Tracking (tracks, scat)

# Damage Control Techniques

- Fencing
- Harassment
- Vaccination of Livestock
- Contraception
- Trapping
- Snaring
- Hunting Dogs
- Ground Shooting
- Aerial Culling
- Toxicants
- Telemetry

# Aerial Culling

- Helicopter with marksman
- Disease and genetic sampling carried out by APHIS ground-control personnel
- Conducted every February and September

Year	*2017	2018	2019
Removed	65	102	36

Only 1 aerial operation



# Snaring

- Neck snares
- Cost effective
- Efficient
- Working 24/7
- Check daily
- Un-set/re-set
- Single use

# Ground Shooting

- Safety concerns
- Shot placement
- Time consuming
- Seasonal
- Cost: Equipment/gear



# Difficulties Surrounding Eradication Efforts

- Abundance of food resources
- Crepuscular, Nocturnal and Diurnal (Seasonal)
- Random and unpredictable travel habits
- Lack of suitable baits/lures
- Excellent senses (smell; hearing)
- Inaccessible areas
- The smart ones prevail

# Disease Sampling

## **DISEASES**

- Classical Swine Fever
- Genetic
- Plague
- Pseudorabies
- Swine Brucellosis
- Tularemia
- Parasites



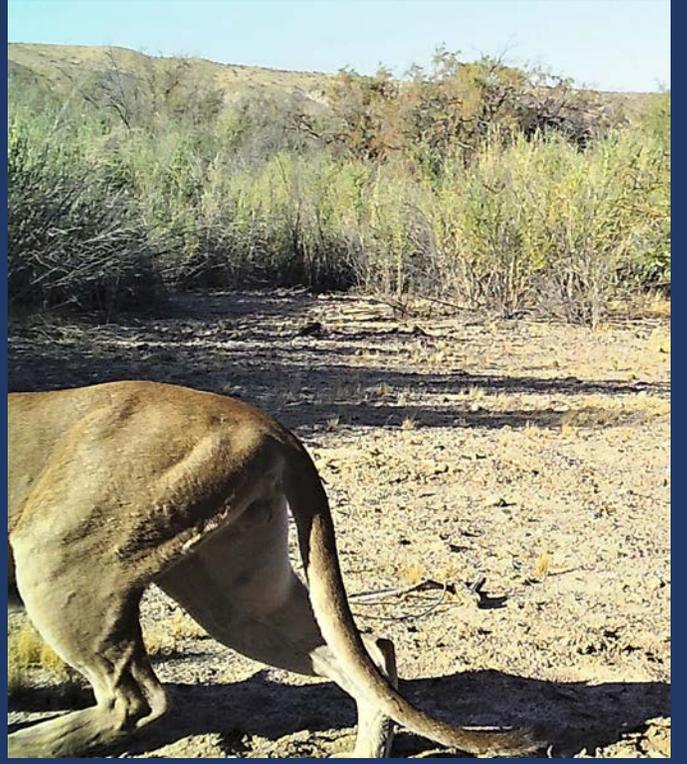
Disease	Sample Type	Samples
Classical Swine Fever	Blood/Serum/Swab/Tissue	409
E. coli	Tissue	22
Genetic	Tissue	83
Hepatitis E	Blood/Serum	14
Leptospirosis	Blood/Serum/Tissue	60
Plague	Nobuto	145
Pseudorabies	Blood/Serum	310
Swine Brucellosis	Blood/Serum	310
Swine Influenza	Blood/Serum/Swab	84
Toxoplasmosis	Blood/Serum/Tissue	168
Tularemia	Nobuto	145
	Total Samples	1750

# Total Feral Swine Removed from Arizona

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Removed	62	44	30	35	33	29	32	23	37	49	48	84	108	51

# Moving Forward

- Remaining population density will dictate future efforts and actions at Havasu NWR
- New surveillance/control techniques: Aerial drones; GPS Collars
- Potential research
- Pig-free South of I-40 by next year
- Eradication help from predators (coyotes, bobcats, mountain lion)
- Monitor introduction of new animals



Questions?

