

Friends of the Island Fox's notes from the

Island Fox Conservation Working Group Meeting May 21, 2019



CIC photo courtesy of Catalina Island Conservancy

Island Fox Status Update 2019

In 2018 most island fox populations were stable, but not without risk factors. As expected, high temperatures and below average rainfall contributed to lower pup numbers and reduced adult survivorship across all islands. Fortunately, normal rainfall levels in 2019 should benefit all island fox populations.

In 2019 Channel Island foxes face four major threats:

- **climate change:** increasing regional temperatures and decreasing annual rainfall, which reduce food resources; increase wildfire threat, and promote parasite numbers
- **biosecurity**—the introduction of non-native plants, animals, and diseases
- **parasites**—rising tick numbers and tick-borne diseases; increased internal parasites (San Miguel Island is the greatest concern, see individual island notes.)
- **reduction of management funding**

The following is an update from the 2019 meeting organized by USFWS and hosted by the Santa Barbara Zoo. Population numbers reported here are the official estimates from each island, calculated from the fall 2018 count and reported May 21, 2019.

Historical Summary: Island fox populations plummeted on California's northern Channel Islands in 1998 due to golden eagle predation. Simultaneously, the population on Santa Catalina Island was decimated by introduced disease—canine distemper virus (CDV). Island foxes on San Miguel, Santa Rosa, and Santa Cruz and Catalina Islands were listed as Endangered by the U.S. Fish and Wildlife Service (USFWS) in 2004. August 11, 2016 the northern subspecies were delisted from Endangered status and the Catalina Island fox subspecies was downlisted to Threatened. California Fish & Wildlife Service (CAFWS) moved all island fox subspecies to Threatened status in August 2019.

Since the height of the crisis, the Island Fox Conservation Working Group has met annually to update population status, discuss problems, consider strategies, and determine actions. *Friends of the Island Fox* supports the Working Group and participates in their annual meeting.

The recovery of this endangered species highlights the dedicated efforts of private conservation organizations, government agencies, academic institutions, and individuals working together. The Island Fox Conservation Working Group continues to act as the organizing force behind island fox conservation efforts and provides a forum for sharing successes and considering island-fox issues. (revised 8/20/19)

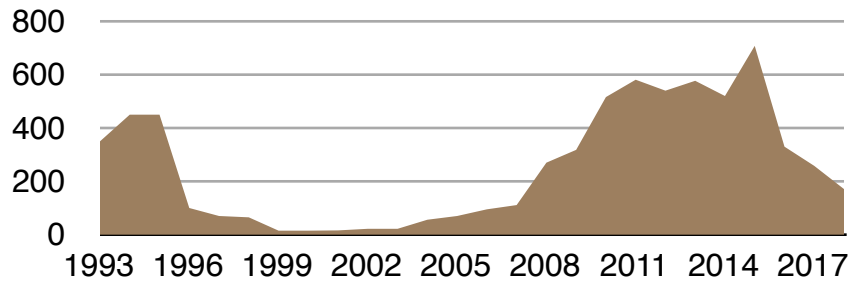
Friends of the Island Fox

2390 C Las Posas Road, Suite #120, Camarillo CA 93010

www.islandfox.org islandfoxnews@islandfox.org

San Miguel Island, land manager: Channel Islands National Park**Status:** Threatened (CAFWS); concern due to recent declinesPopulation:**Revised Historical est.: 200-350****Low Point: 15**

Recent est. high of 700 in 2015

2018 est.: 171

The general body condition of San Miguel Island foxes (*Urocyon littoralis littoralis*) improved in 2018, but the population declined for a third consecutive year (Shaskey 2019b). Parasites continue to be a factor in mortality (Shaskey 2019b, Shaskey 2018a, Coonan 2015a). In 2018, all deceased foxes receiving necropsy carried intestinal and/or pulmonary parasites (Shaskey 2019b). From 2010-2013, individual island foxes on Miguel had a 90% chance of survival each year (Coonan 2014a) and densities reached 20 foxes per sq km. In 2018, the individual survival rate returned to ~90%, but density has dropped to 4.6 foxes per sq km (Shaskey 2019b). The average age at mortality was six years old (Shaskey 2019b). The potential for the San Miguel Island fox's possible extinction in the next fifty years increased to 10% (Shaskey 2019b). This is a statistical warning sign. The National Park Service proposes the island's carrying capacity is less than previously projected and the lower population may represent a more sustainable density (Shaskey 2019b). Estimating the population on this island has been revised several times; FIF questions the peak estimate from 2015.

Captive breeding of the San Miguel Island fox ended in 2007 and all foxes were returned to the wild. Annual counting uses mini-grids. Health checks include microchipping all first-time animals, vaccinating ~100 individuals against rabies and distemper, and radio collaring ~60 individuals. The NPS remains committed to monitoring. FIF will refurbish 10 radio collars to be used across San Miguel and Santa Rosa Islands in 2019.

Concerns: This population is fragile. Climate-change impacts on food and parasites pose a real threat to survival. Recovery of native vegetation has been hampered by drought. Island foxes may have switched their diet to native terrestrial snails, which infect the foxes with lungworm. Since 2013, the intestinal parasite *Spirocerca* has been found in 79% of necropsies (Shaskey 2019b).

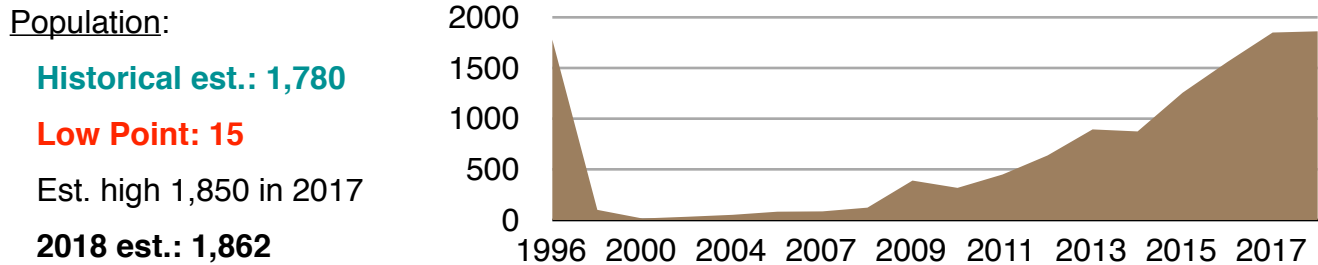
Other dietary changes may be the source of another parasite. A species of *Acanthocephala* or spiny-headed worm (*Prosthenorchis* sp.) plays a role in island fox fatalities (Shaskey 2019b, Shaskey 2017a). Over 54 island foxes are known to have died from this parasite since 2013; (Coonan 2014a, Woods 2014, Coonan 2015a, Shaskey 2017a). From 2013-2018, the spiny-headed worm was found in 74% of necropsies (Shaskey 2019b). The vector of worm transmission remains unknown (Shaskey 2019b). Lung worm, pulmonary nematodes, hookworm, and tick-borne diseases also threaten these foxes (Shaskey 2019b, Shaskey 2018a).

Positive Note: CINP has increased the target number of radio collared animals to monitor more individual foxes; 20-30 yearlings were collared in 2018 (Shaskey 2019b). In partnership with the Fresno Chaffee Zoo Wildlife Conservation Fund, FIF helped fund efforts to detect intestinal parasites before they cause fox mortality in 2018 and 2019. CINP has received a USGS grant to further investigate parasites on Miguel (Shaskey 2019b). FIF's 2018 Research Grant recipient, Juliann Schamel, is using stable isotopes in whisker samples to investigate dietary changes on Miguel and possible parasite vectors. Efforts to restore native vegetation are moving forward.

Friends of the Island Fox

2390 C Las Posas Road, Suite #120, Camarillo CA 93010

www.islandfox.org islandfoxnews@islandfox.org

Santa Rosa Island, land manager: Channel Islands National Park**Status:** Threatened (CAFWS); recovered and stable

The Santa Rosa Island fox (*Urocyon littoralis santarosae*) population appears to have reached natural carrying capacity. In 2018, annual individual survivability was just below 90% and the subspecies has maintained a less than 5% risk of immediate extinction for over five years (Shaskey 2018b). Fox density remained very similar to 2017 (Shaskey 2019a). Relapsing fever (*Borrelia miyamotoi*), a tick-borne pathogen related to Lyme disease, was identified on Santa Rosa in 2017–2018 (Shaskey 2018b) and the potential threat to foxes is still under investigation.

Captive breeding on Santa Rosa continued until 2008 when all foxes were returned to the wild. Monitoring includes annual counting using small grids. Health checks include microchipping all first-time animals, vaccinating ~150 individuals against rabies and distemper, and monitoring 40–50 individuals by radio collar. (Shaskey 2019a). The NPS is committed to monitoring, however they are proposing reducing the size of sampling grids. FIF will fund 10 radio collars to be used across San Miguel and Santa Rosa Islands in 2019.

Concerns: *Leptospira*, a parasite which causes kidney failure, continues to be a concern. First noted in 2010 (Coonan 2011b), *Leptospira* has been a threat since 2015 (Shaskey 2019a, Shaskey 2017b). To date the parasite has been limited to island foxes and spotted skunks (Guglielmino, 2011). It is believed to be transmitted directly via ingestion or indirectly through prey, still water, or contact with sea lions. Angela Guglielmino, at UCLA, continues to research this disease threat (Shaskey 2019a). *Spirocera* was documented in 2018 (Shaskey 2019a). Drought conditions have increased ectoparasites as well. Tick-borne disease is a new threat for both foxes and people on this island (Shaskey 2018b).

As island fox numbers have recovered, the island spotted skunk on Santa Rosa has declined (Shaskey 2018b). Investigation of links between the island fox and the spotted skunk are ongoing with Ellie Bolas at UC Davis.

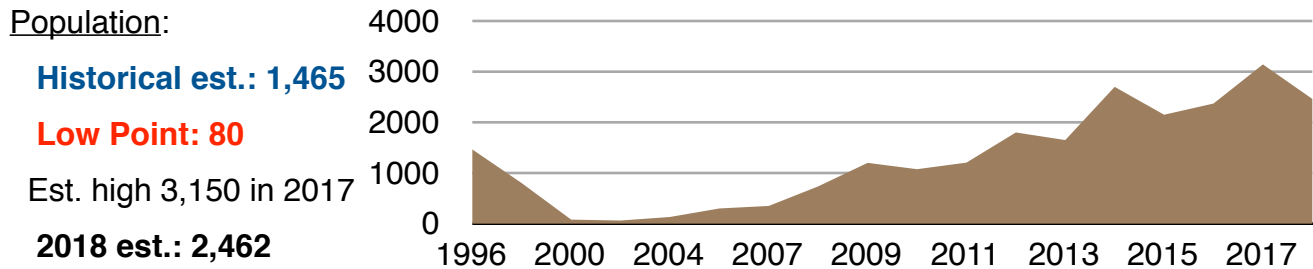
Positive Note: Twenty yearling foxes were collared in 2018 (Shaskey 2019a). Since the removal of deer and elk in 2011, there is little to attract golden eagles and native vegetation is recovering. Nesting bald eagles continue to keep golden eagles away and there have been no known golden eagle attacks since 2010 (Shaskey 2019a).

Tick samples have been collected since 2010 on CINP islands. CINP is collaborating with Northern Arizona University to investigate the presence of pathogens in tick specimens (Shaskey 2019a). Findings should be available in 2019. FIF's 2018 Research Grant recipient, Juliann Schamel, is using stable isotopes in whisker samples to investigate dietary changes related to drought and habitat on Santa Rosa Island.

Friends of the Island Fox

2390 C Las Posas Road, Suite #120, Camarillo CA 93010

www.islandfox.org islandfoxnews@islandfox.org

Santa Cruz Island, land managers: Nature Conservancy & Channel Islands National Park**Status:** Threatened (CAFWS); stable

The Santa Cruz Island fox (*Urocyon littoralis santacruzae*) is recovered and experiencing normal population fluctuation. Despite the population decline, individual survival rate has increased from 67% to 74% (Boser 2018, Boser 2019). The island appears to be at carrying capacity and the downward adjustment was expected due to the lower rainfall in 2018 (Shaskey 2018).

Golden eagle predation caused the fox's near extinction between 1996 and 2000. Bald eagle nesting continues and no golden eagle predation has been documented in years.

Captive breeding ended in 2007. Annual counting continues on mini-grids (Boser 2018). During annual health checks all first-time animals are microchipped, ~150 individuals are vaccinated against rabies and canine distemper (Boser 2019). ~50 individual foxes (mostly sentinels) are monitored by radio collar from the air, optimally every 7-10 days (Boser 2018). FIF refurbished 20 radio collars for use on Santa Cruz in 2019.

Concerns: Disease introduced via human visitation or nonnative animal life continues to pose the greatest potential threat to the Santa Cruz Island fox. In 2017-18, Lyme disease (*Borrelia burgdorferi*) was detected and a fox was diagnosed with meningitis (Boser 2018). Drought is increasing ectoparasites and tick-borne diseases are a new threat (Shaskey 2018).

FIF is concerned that decreased funding for capturing a large enough sample of individual island foxes puts accurate monitoring in jeopardy and makes it more difficult to observe a negative trend before it becomes a problem. Reduced telemetry tracking may compromise collection of carcasses in a timely manner, making it more difficult to gather quality information from necropsies.

Increased threat from wildfire is part of drought and climate change impacts (Boser 2017). Dry nonnative grasses also shed foxtails which imbed in fox fur. Foxtails near the eye can cause blindness; in the ear or inhaled, they can track through the body causing infection or physical damage (Boser 2017).

Positive Note: The fox population remains stable. Native vegetation on Santa Cruz offers greater dietary biodiversity than on most of the other islands.

As fox density increases, the threat of infectious disease is magnified (Hugens, 2014a; Ferrara, Hudgens & Garcelon, 2008). Vaccination coverage at the island's isthmus and near campground areas has increased (Boser 2018, Shaskey 2018). Biosecurity warning signs have been posted at entrances into TNC areas (Boser 2015).

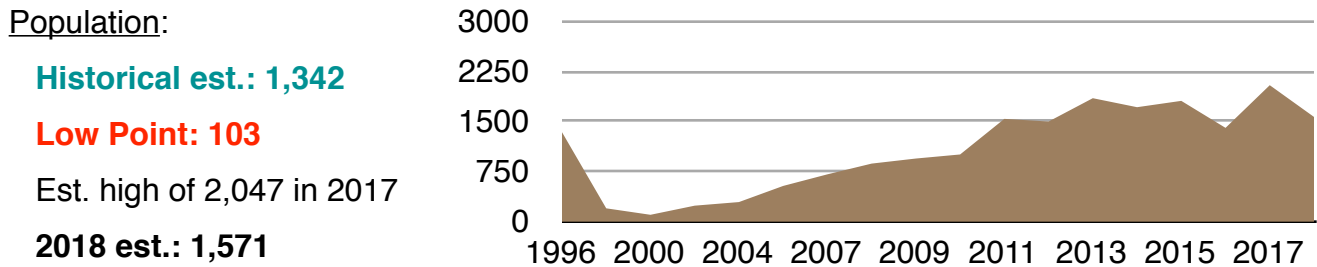
Friends of the Island Fox

2390 C Las Posas Road, Suite #120, Camarillo CA 93010

www.islandfox.org islandfoxnews@islandfox.org

Santa Catalina Island, land manager: Catalina Island Conservancy

Status: Threatened (USFWS); Threatened (CAFWS); stable



The Santa Catalina Island fox (*Urocyon littoralis catalinae*) is recovered and experiencing normal population fluctuation. Fox density reached a documented high in 2017: ~10.24 individuals per sq. km (Brenner 2018). As expected (Brenner 2018), drought conditions reduced pup numbers in 2018 and density declined to 8.09 individuals per sq. km (Hamblen 2019). The correlation between rainfall and successful birthrates/pup survival was first documented on Catalina. In heavy rain years, pups may constitute 40% of the population, in drought years 6% (King 2015). Catalina has reached carrying capacity and climate impacts to food resources have a direct impact on island foxes. Death from car strike increased from 11 in 2017 to 24 individuals in 2018 and may be due to new car rentals (Hamblen 2019).

Captive breeding ended in 2006 and the population has been recovered since 2011. Annual counting uses cages along transects. During health checks all first-time animals are microchipped, all are treated for ear mites (to prevent cancerous tumors), ~300 individuals are vaccinated against rabies & canine distemper, 50-60 radio-collared foxes are monitored weekly (Hamblen 2019). In 2019, FIF funded 5 new radio collars and, in partnership with the Fresno Chaffee Zoo Wildlife Conservation Fund, blood testing to ascertain disease threats and testing of tick samples.

Concerns: 72% of captured foxes in 2018 had ectoparasites (ticks, lice, and/or fleas) (Hamblen 2019). Lyme disease (*Borrelia burgdorferi*) was detected in 2017 (Brenner 2018). FIF is funding a second year of tick testing.

Over a million people visit Avalon annually and foxes face threats from vehicles, disease, feral cats, pet dogs, & wild animals transported from the mainland on private boats (King 2016). Stow-away raccoons and opossums reach the island an average of once a year and continue to be a disease threat (Hamblen 2019).

Serology testing in 2018 identified canine herpes virus in one fox (Hamblen 2019); in dogs this disease is 100% fatal to pups. Serology is vitally important to detecting disease threats as they arise.

Positive Note: Serology testing in 2010 first identified canine Adenovirus (origin of “kennel cough” and canine hepatitis). Up to 85% of the population was exposed in 2017, but samples in 2018 showed a decrease by 14% (Hamblen 2019).

Fatal ceruminous gland carcinoma has been notably reduced by effective treatment of ear mites (Vickers, et al 2015; King 2016). Similar preventative treatment for ectoparasites may need investigation. The practice of vaccinating foxes throughout the island’s interior, and not just at the isthmus, provides the best protection against disease transmission (Brenner 2018, Hudgens 2014a).

Traffic signs and “Fox-Saver” bins installed at high traffic areas for people and island foxes reduces fox fatalities to cars. FIF provided funds for both efforts in 2018.

Friends of the Island Fox

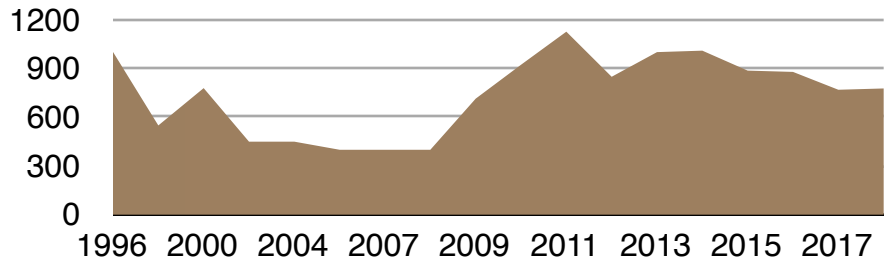
2390 C Las Posas Road, Suite #120, Camarillo CA 93010

www.islandfox.org islandfoxnews@islandfox.org

San Clemente Island, land manager: United States Navy**Status:** Threatened (CAFWS); stable**Population:****Historical est.: 1,000**

minimal data between 2004-2008

Est. high of 1,128 in 2011

2018 est.: 778

The San Clemente Island fox (*Urocyon littoralis clementae*) population remains stable, but climate warming poses increased threats (Booker 2019, Booker 2018). Drought in 2018 negatively impacted food resources and pup production remained low for a second year (Booker 2019, Booker 2018). High heat temperatures in June/July 2018 added stress and caused the death of 8 foxes over four weeks (Booker 2019). Competition for limited resources increased and 6 foxes were treated for fox-on-fox inflicted injuries. The highest density of foxes continues to be in dune areas, but what these foxes are surviving on remains unknown (Booker 2019). Reproduction on this most southern island has been documented two months earlier than on northern islands, with pups born in February (Booker 2014). Different social behavior has also been observed: polygamy (one male with two breeding females) and females helping raise another female's pups (Booker 2011). Individual annual survival rate declined from 88% to 71% (Booker 2019, Booker 2018). Fox density remains high, but ~8% of the population is clustered around human habitation (Booker 2018) which contributes to greater negative human impacts (Booker 2019).

Counting takes place annually on 18 mini-grids. During annual health checks all first-time animals are microchipped. 53 foxes were vaccinated in 2019 and 290 blood samples were taken to test for disease markers (Booker 2019). 60–70 individuals are radio collared for monitoring (Booker 2018). Collared animals are monitored every 5 days (Booker 2019).

Concerns: Pneumoconiosis, airborne minerals impacting the lungs (Booker 2014, Woods 2014), continues to increase. Similar isolated deaths have occurred on all islands (Woods, 2014). Seven mortalities occurred in a limited area on Clemente in 2014, but in 2017 80% of mortalities and the majority of 2018 mortalities from across the island exhibited lung damage from micro-crystalline quartz material (Booker 2019). Symptoms were also found in a raven, but not in feral cats (Booker 2019) The source and cause remains unknown (Booker 2019).

Positive Note: In 2018, the number of fox deaths due to vehicular traffic dropped dramatically to only 25 (Booker 2019). In 2017, car strike was the major cause of fox death on this island: 62 individuals (Booker 2018). Success is attributed to orphaned fox ambassador, Wayne, and direct interaction with personnel (Booker 2019).

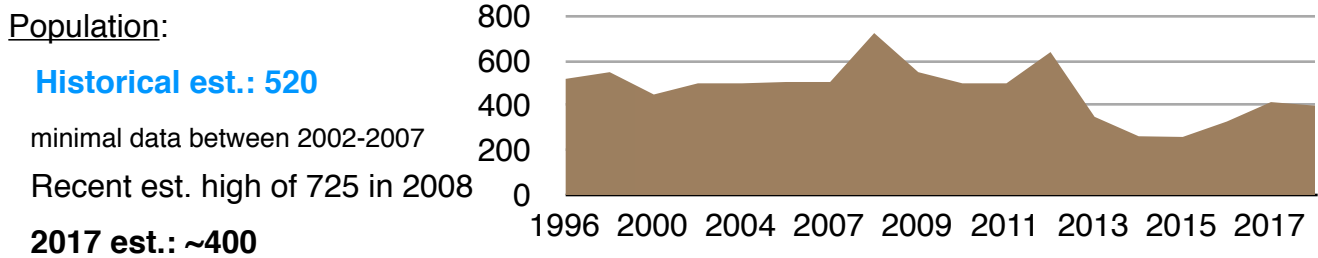
There were no incidences of rodenticide poisoning in 2018 (Booker 2019). Rehabilitation of native plant habitats continues and maturing plants will provide more resources for island foxes (Booker 2018). While ticks increased on this island, testing did not find any tick-borne disease (Booker 2018).

Orphaned pups make up the mainland zoo population: 1 male "Beau" (2013) at the Living Desert in Palm Springs, 2 brothers (2015) at the Santa Barbara Zoo, and 2 sisters (2016) at the CA Living Museum, Bakersfield.

Friends of the Island Fox

2390 C Las Posas Road, Suite #120, Camarillo CA 93010

www.islandfox.org islandfoxnews@islandfox.org

San Nicolas Island, land manager: United States Navy**Status:** Threatened (CAFWS); improved and stable

The San Nicolas Island fox (*Urocyon littoralis dickeyi*) has stabilized (Ferrara 2019) after a population adjustment during multiple years of drought (Ferrara 2018). From 2008–2012 San Nicolas had the greatest fox density in the world. As the drought intensified the population dropped 41%. In 2018, despite lower rain levels, a larger percent of the foxes were pups or young adults, showing the population has rebalanced (Ferrara 2019). This is another case that shows island fox risk of extinction increases with rising summer temperatures and reduced rainfall (Ferrara 2019). Channel Islands Restoration now maintains a native plant nursery on San Nicolas Island and habitat restoration of native food-producing vegetation is benefiting island foxes (Ferrara 2019). Foxes on this island also seem to have modified their behavior by becoming less territorial and more likely to roam larger areas in search of resources (Ferrara 2019). Greater individual movement increases probable interaction with humans. Half of all mortalities on this island are now related to humans, either car strike or foxes becoming trapped in manmade objects.

Counting takes place annually on mini-grids and there is a suggestion to reduce the number of grids. During annual health checks first-time animals are microchipped, ~100 individuals are vaccinated against rabies and canine distemper, ~45 individuals are currently radio collared for monitoring (Ferrara 2019).

Concerns: As on other islands, warming regional temperatures decrease resources and may exacerbate population declines (Ferrara 2019). Genetic research has revealed that a low population in the 1970s created a genetic bottleneck for this subspecies leaving it with the least genetic diversity of any known mammal, including the cheetah and Tasmanian devil (Robinson 2016). How this impacts the subspecies' ability to adapt to environmental change or disease threats is not known.

As foxes roam further (Ferrara 2019) and potentially cross roads and investigate human structures (Ferrara 2016), they are more susceptible to entrapment and injury. The Navy has begun a personnel education initiative to reduce threatening situations for island foxes (Ferrara 2019).

Reduced budgeting for monitoring tends to make it more difficult to spot survival threats until they become major. In the long run, this can negatively impact the long-term survival of an island's fox population.

Positive Note: San Nicolas Island foxes now have greater diversity in native food resources which can help them during periods of drought (Ferrara 2019). Channel Island Restoration has planted food-producing native plants, like prickly pear cactus, vital to the island fox's long-term survival (Ferrara 2015, Ferrara 2018).

Research on fox diet (Cypher, et al 2014) and close monitoring enabled biologists to take action and reverse a population decline while San Nicolas Island fox numbers were reasonably high (Ferrara 2018, Hudgens 2014b).

Friends of the Island Fox

2390 C Las Posas Road, Suite #120, Camarillo CA 93010

www.islandfox.org islandfoxnews@islandfox.org

Island Fox Update 2019

References:

- Brenner, L. (2018, May 23) *Santa Catalina Island Fox Update*. Paper presented at 2018 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA
- Booker, M. (2019, May 21) *San Clemente Island Fox Update*. Paper presented at 2019 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA
- Booker, M. (2018, May 23) *San Clemente Island Fox Update*. Paper presented at 2018 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA
- Booker, M. (2014, June 17). *San Clemente Island Update*. Paper presented at 2014 Annual Meeting, Island Fox Conservation Working Group, Ventura, CA.
- Booker, M. (2011, June 14). *San Clemente Island Update*. Paper presented at 2011 Annual Meeting, Integrated Island Fox Recovery Team, Ventura, CA.
- Bosner, C. (2019, May 21) *Santa Cruz Island Fox Update*. Paper presented at 2018 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA
- Bosner, C. (May 2018) *Santa Cruz Island Fox Update*. Paper presented at 2018 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA
- Bosner, C. (2017, May 16). *Santa Cruz Island Update*. Paper presented at 2017 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA.
- Bosner, C. (2015, June 16). *Santa Cruz Island Update*. Paper presented at 2016 Annual Meeting, Island Fox Conservation Working Group, Ventura, CA.
- Coonan, T. (2015, June 16, a) *San Miguel Island Fox Update*. Paper presented at 2015 Annual Meeting, Island Fox Conservation Working Group, Ventura, CA.
- Coonan, T. (2014, June 17, a). *San Miguel Island Update*. Paper presented at 2014 Annual Meeting, Island Fox Conservation Working Group, Ventura, CA.
- Coonan, T. (2011, June 14, b). *Santa Rosa Island Update*. Paper presented at 2011 Annual Meeting, Integrated Island Fox Recovery Team, Ventura, CA.
- Cypher, B., et al. (2014) "Multi-population comparison of resource exploitation by island foxes: Implications for conservation." *Global Ecology and Consensus*, 2, 255-266
- Ferrara, F. (2019, May 21). *San Nicolas Island Update*. Paper presented at 2019 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA.
- Ferrara, F. (2018, May 23) *San Nicolas Island Fox Update*. Paper presented at 2018 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA
- Ferrara, F. (2015, June 16) *San Nicolas Island Update*. Paper presented at 2015 Annual Meeting, Island Fox Conservation Working Group, Ventura, CA.
- Ferrara, F. J., Hudgens, B. R., & Garcelon, D. K. (2008, February 5-7). *Automated remote telemetry: Developing a management plan for the San Nicolas Island fox*. Paper presented at Seventh California Island Symposium, Oxnard, CA.
- Guglielmino, A. (2011, June 14). *Leptospira Infection in Santa Rosa Island Foxes*. Paper presented at 2011 Annual Meeting, Integrated Island Fox Recovery Team, Ventura, CA.
- Hamblen, E. (2019, May 21) *Santa Catalina Island Fox Update*. Paper presented at 2019 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA
- Hudgens, B. (2014, June 17, a). *Mapping Epidemic Risk in Island Foxes*. Paper presented at 2014 Annual Meeting, Island Fox Conservation Working Group, Ventura, CA.
- Hudgens, B. (2014, June 17, b). *San Nicolas Island Update*. Paper presented at 2014 Annual Meeting, Island Fox Conservation Working Group, Ventura, CA.
- King, J. (2016, June 14). *Santa Catalina Island Update*. Paper presented at 2016 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA.
- Robinson, J., Wayne, B., (2016, June 14) *Genome Sequencing of Island Foxes Shows Accumulation of Deleterious Variation*. Paper presented at 2016 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA.
- Shaskey, L. (2019, May 21, b) *San Miguel Island Fox Update*. Paper presented at 2019 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA

Friends of the Island Fox

2390 C Las Posas Road, Suite #120, Camarillo CA 93010

www.islandfox.org islandfoxnews@islandfox.org

- Shaskey, L. (May 2018) Notes in addition to Santa Cruz Island Fox Update
- Shaskey, L. (May 2018a) San Miguel Island Fox Update. Paper presented at 2018 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA
- Shaskey, L. (May 2017a) San Miguel Island Fox Update. Paper presented at 2017 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA
- Shaskey, L. (2019, May 21, a) Santa Rosa Island Fox Update. Paper presented at 2019 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA
- Shaskey, L. (May 2018b) Santa Rosa Island Fox Update. Paper presented at 2018 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA
- Shaskey, L. (May 2017b) Santa Rosa Island Fox Update. Paper presented at 2017 Annual Meeting, Island Fox Conservation Working Group, Santa Barbara, CA
- Vickers, W., Moriarty, M., King, J., & Hendricks, S., (2015, June 16). *Ear Tumors: Mite Treatment and Genetics*. Paper presented at 2015 Annual Meeting, Island Fox Conservation Working Group, Ventura, CA.
- Woods, L. (2014, June 17). *Island Fox Pathology Update*. Paper presented at 2014 Annual Meeting, Island Fox Conservation Working Group, Ventura, CA.

Friends of the Island Fox

2390 C Las Posas Road, Suite #120, Camarillo CA 93010

www.islandfox.org islandfoxnews@islandfox.org