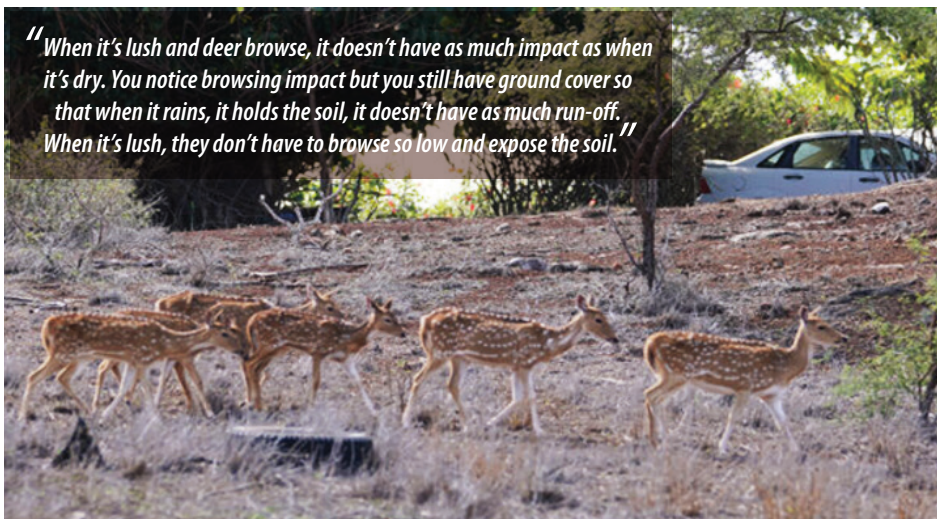




Drought & Non-Native Mammals in Hawai'i

Natural Resource Manager Observations & Considerations

The impacts that non-native mammals have on native species and overall ecosystem health can be amplified during periods of drought. Droughts can reduce the availability of food and water which alters animal behavior as they seek out new sources or more intensively use existing sources. Observations and perspectives shared by land stewards across Hawai'i, summarized here, can help guide management of non-native mammal impacts before, during, and after a drought.



"When it's lush and deer browse, it doesn't have as much impact as when it's dry. You notice browsing impact but you still have ground cover so that when it rains, it holds the soil, it doesn't have as much run-off. When it's lush, they don't have to browse so low and expose the soil."

"When it really gets dry, feral animals, goats, sheep, pigs, deer, cattle, have a very profound effect on the area they're inhabiting. They put additional pressure on agricultural operations, livestock, vegetable farming, as well as native forests and watersheds."

Figure 1: Axis deer on Moloka'i, which are used as subsistence food sources by some, are usually shy animals that feed at night. Daytime sightings near humans become more common during drought.

Credit: Cory Lum/ Honolulu Civil Beat.

Feral Ungulates

Wild goats, deer, sheep, pigs, and cattle change their behavior during drought. They have been observed to:

- Congregate in larger numbers
- Move to areas outside their typical ranges
- Strip bark off of woody plants more frequently
- Increase pressure on fences
- Increase damage to pasture lands, agricultural fields, and residential gardens
- Eat poisonous plants and become more susceptible to disease
- Eat some invasive plants more than others, potentially causing shifts in non-native plant populations
- Pose a public health risk and nuisance when they die in large numbers

Potential Management Actions

- Increase fence inspections & maintenance during drought
- Prepare resources and locations for mass animal burials in case of large die-offs
- Plan for potential climate change-driven shifts in species' ranges
- Monitor the availability of game animals and nutrition resources for communities reliant on subsistence hunting

"Goats and sheep will start debarking trees more than they normally would because they're looking for water. It's affecting their behavior, and it's also affecting the forest, maybe in a manner that's different than if there was normal rainfall."

Rodents

During drought, rodents (including rats and mice) are more likely to:

- Damage irrigation lines in plant restoration areas
- Increase seed and fruit consumption
- Gnaw on plant stems for water

The first rainy season after drought, rodent populations may dramatically increase due to:

- Increased food sources (for example, grass seeds)
- Decreased predator pressure; predator populations may have also declined during drought and don't recover as quickly

Potential Management Actions

- Intensify rodent control around rare plants as part of drought response
- Prepare for post-drought increase in rodent populations
- Increase post-drought public health messaging and resources to mitigate rodent disease vectors

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“When you have a bad drought, when the rains do come, be ready (to do rodent control). In the drought the mouse numbers drop, the feral cats, the owls, mongoose, their populations drop as well.”

When you do get the rain, all of a sudden there's a bunch of grass seed and those field mice can eat grass seed. They proliferate really quickly, the predators don't. You get an explosion of mice until that predator population can catch up.”

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Mahalo to 24 anonymous Hawai'i natural resource managers and land stewards whose interview responses on drought provided most of this factsheet's written content.

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Figure 2: Polynesian rat in the parking lot of Haleakalā National Park, Maui. Credit: Forest & Kim Starr.



Figure 3: Rat-chewing injury to the bark and stem of *Dubautia arborea*, an endangered plant endemic to Hawai'i Island.

Credit: Charles Lamoreux in *Rat-Feeding Injury to Plants in Hawaii* by Scot Neslon.

“During extended dry periods, we've gotten more predation by mice on some of our rare species. They're desperate for water, so they might gnaw an endangered plant, not because they like the taste of it, but because they're seeking liquid.”

Other Sources:

Honoure (January, 2021). *Molokai's Fabled Axis Deer Are Starving To Death In Doves*. [Honolulu Civil Beat](#).

Nelson, S. (2012). [Rat-Feeding Injury to Plants in Hawaii](#)

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