



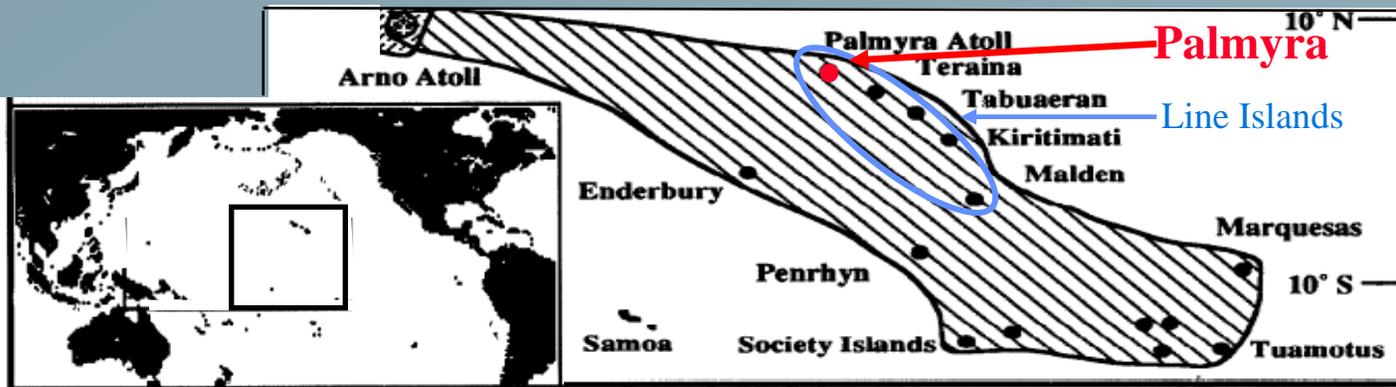
Assessment of the Terrestrial Herpetofauna of Palmyra Atoll, Line Islands



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Introduction



(Modified from *Radtkey et al. 1995*)

Map of the 'Central Pacific gecko' distribution (diagonals) from review of 10,000+ specimens of *Lepidodactylus* in museums

Why Palmyra?

- No historical human habitation and only a brief period of intensive use in the 1940s; Recently designated FWS NWR
- Many small islets allow for possible experimental manipulations
- Historic samples: 1913 (BPBM), through 1960's (SI) and very little has been reported more recently
- Historic presence of the 'Central Pacific gecko' that has potentially declined across its distribution
- Presence of non-native herpetofauna species
- Risk of invasion from non-native vertebrates from Hawai'i; non-native rats could be mediating new invasions?
- Baseline data for monitoring management actions



Herpetofauna Known from Palmyra Atoll

Historical records:

‘Central Pacific gecko’ (*Lepidodactylus n. sp.*)



Mourning gecko (*Lepidodactylus lugubris*)



House gecko (*Hemidactylus frenatus*)



Marine toad (*Bufo marinus*) reported 1960's



Other native Line Island lizards that could occur in Palmyra Atoll

Skinks:

Snake eyed skink (*Cryptoblepharus peocilopleurus*)



Azure tailed skink (*Emoia cyanura*)



Blue tailed skink (*Emoia impar*)

Moth skink (*Lipinia noctua*)



Geckos:

Oceanic gecko (*Gehyra oceanica*)



Stump tailed gecko (*Gehyra mutilata*)



Photo by Gordon Rodda

Preliminary Questions for Palmyra Atoll

1. What terrestrial herpetofaunal species are occurring on Palmyra Atoll? Is the undescribed native species ('Central Pacific gecko') still present? Are there other natives? Are there new non-native species?
2. What can we learn about habitat use and distribution of the three geckos known from Palmyra Atoll?
3. What are the risks to the native gecko ('Central Pacific gecko') posed by the invasive house gecko?

Field Survey Methods

In 2006, 2007, and 2008:

Daytime: Visual Encounter Surveys

- walked majority of atoll during appropriate conditions
- searched under cover materials

(Sticky traps were not used due to abundance of land crabs)

Nighttime: Time constrained searches

- walked majority of atoll
- counted individual geckos and collected vouchers
- recorded habitat usage



Areas surveyed at Palmyra Atoll day and/or night



Green areas have not yet been surveyed



Laboratory Methods

Using a dissecting scope examined specimens for:

- external parasites by manipulating the skin and especially the toes of each specimen to view parasites present

- internal parasites were examined by opening the stomach and examining the contents and stomach lining

Preliminary Results

Daytime:

- No additional species were detected.

Significance: Skinks are still not reported from the atoll making Palmyra the largest atoll in the Central Pacific without skinks.

Nighttime:

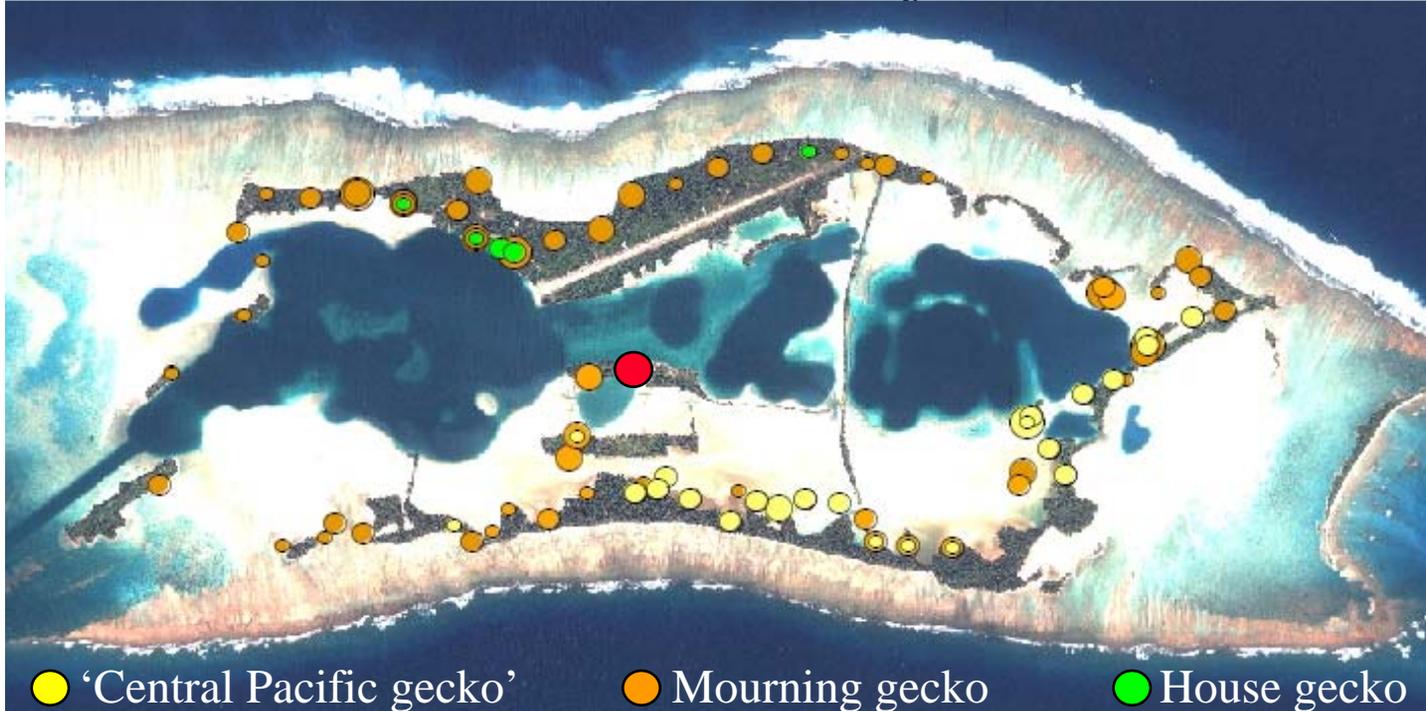
- All 3 historically known gecko species detected
- No amphibians detected.

Significance: Understanding why/how these toads became extirpated may help in the management of this invasive species in other places where it has become a pest.

- No additional species detected.



Lizard detections at Palmyra Atoll



● All 3 species overlap

Preliminary Results continued...

	House gecko n=59	Mourning gecko n=518	'Central Pacific gecko' n=114
Parasites:			
External (mites)	81%	2%*	0
Internal (nematodes)	24%	4%	2%
(tapeworm)	10%	0	0



*all infected animals were collected from buildings

Significance: Non-native house geckos and rats may be transmitting parasites that could weaken host health

Preliminary Conclusions

‘Central Pacific gecko’ –present! mostly on more natural islets.

–found on various tree and shrub species.

–may be acting as a paratenic host for a rat parasite.

House gecko –restricted primarily to lighted buildings and on islets most intensely used by humans.

–most are infected with mites that may spread to other species; may be acting as a paratenic host for a rat parasite.

*These species do not generally overlap. It is unclear whether the house gecko is able to persist on the atoll far beyond areas of human habitation or if/how it displaces this native species.

*The impacts of the mourning gecko on the ‘Central Pacific gecko’ are also unclear.

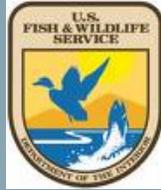


Management Recommendations

- Ensure control of house geckos within Palmyra Atoll.
- Increase biosecurity for Palmyra from Hawai'i especially in the wake of the rat removal project.
- Monitor changes in gecko frequencies in response to rat removals and long term forest recovery.
- Continue surveys for cryptic species, especially after rat removal, which may currently be at very low densities making them difficult to detect.



Acknowledgements



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Thank You!!