Hawaiian Monk Seal Health Threats & Mitigations

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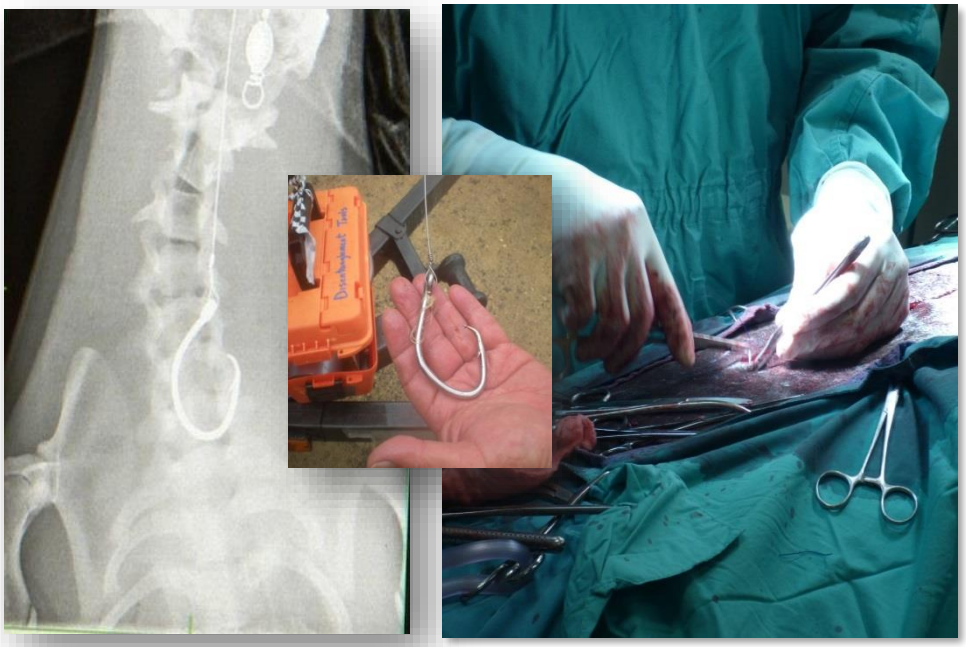
Marine Mammal Commission Annual Meeting

May 21, 2019



Hooks

Disease

Malnutrition

Mobbing injuries

Abscesses

Vaccination

Target: Morbillivirus

Vaccine: Canine distemper virus (recombinant)

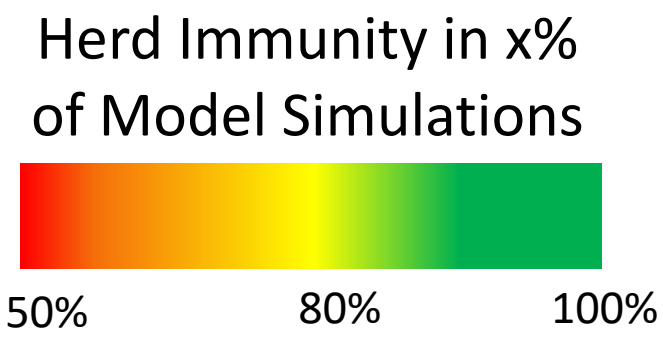
Method: Hand/pole syringe; 2 injections (3-5 weeks apart)

Region	Est. Pop. Size	# Vax to-date	% Vax to-date
MHI	300	63	21%
NWHI	1100	634	57%

NMFS permit 16632

NWHI Herd Immunity Approximations

Site	Pop. Size (2017)	Vaccinated (2017-2018)	Goal 2019
FFS	202	147	30
LAY	234	189	30
LIS	154	134	15
PHR	139	82	50
MDY	79	23	25
KUR	117	59	15



Disease Outbreak Preparedness: Quarantine

Lag between suspecting & confirming new disease

Handheld rapid diagnostic tests (FUTURE)

Safe holding of exposed (suspected) seals (NOW)

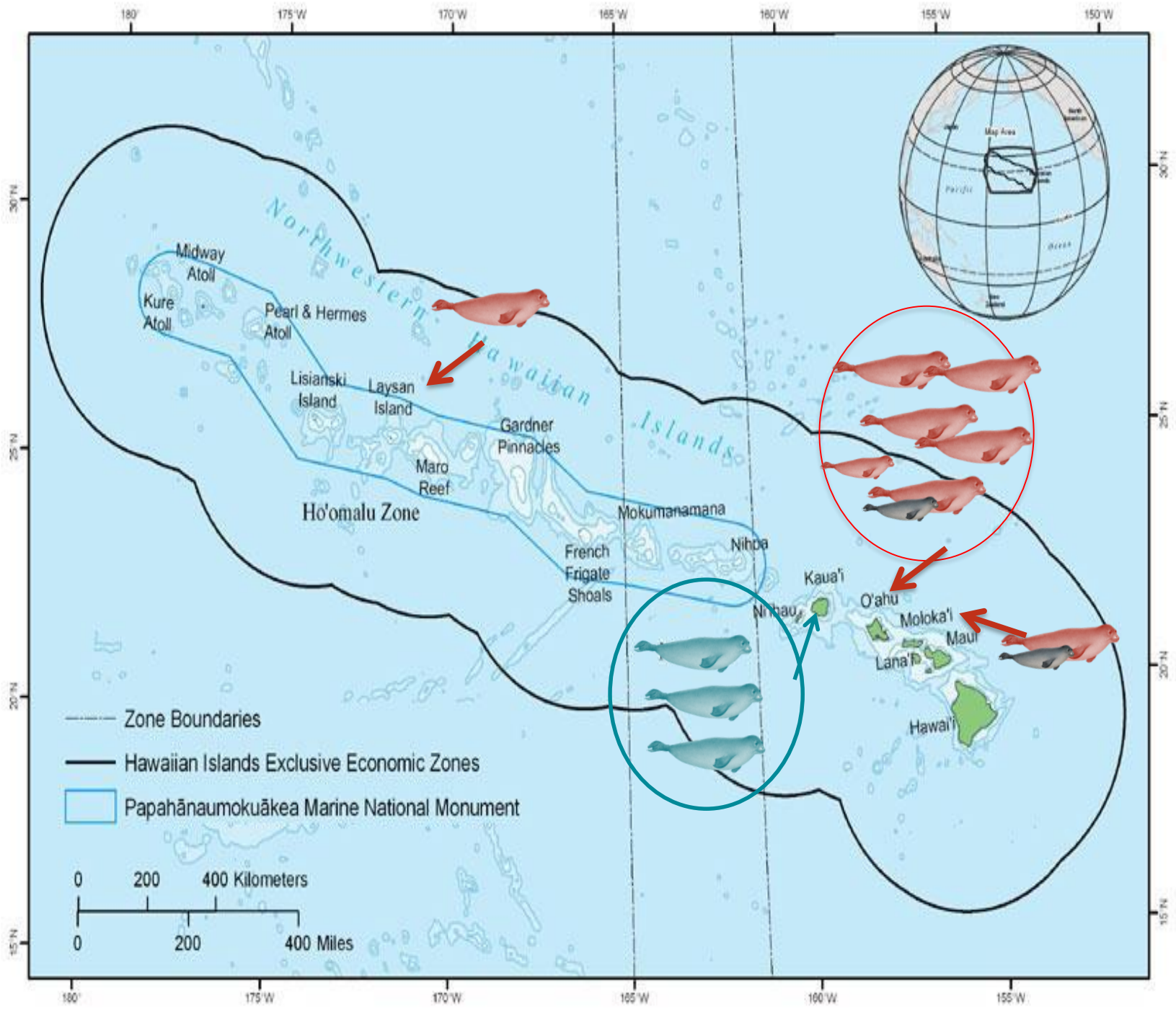
Reduce likelihood of disease spread

Toxoplasmosis

Land-to-sea flow

Long-lived oocysts exclusively from cat feces

Leading disease-related cause of mortality in HMS


Northwestern Hawaiian Islands
Midway Atoll
Kure Atoll
Pearl & Hermes Atoll
Lisianski Island
Laysan Island
Gardner Pinnacles
Maro Reef
Ho'omalu Zone
Mokumanamana
Nihoa
French Frigate Shoals
Kaua'i
Ni'ihau
O'ahu
Moloka'i
Maui
Lana'i
Hawai'i
Zone Boundaries
Hawaiian Islands Exclusive Economic Zones
Papahānaumokuākea Marine National Monument
0 200 400 Kilometers
0 200 400 Miles

Toxoplasmosis

Monk seal with toxoplasmosis → necropsy

Vs.

Monk seal with ingested fish hook → returned to wild

Next Steps: Toxoplasmosis Research

Convene workshop
Identify data gaps
Begin pilot studies
Prioritize future research

Questions?

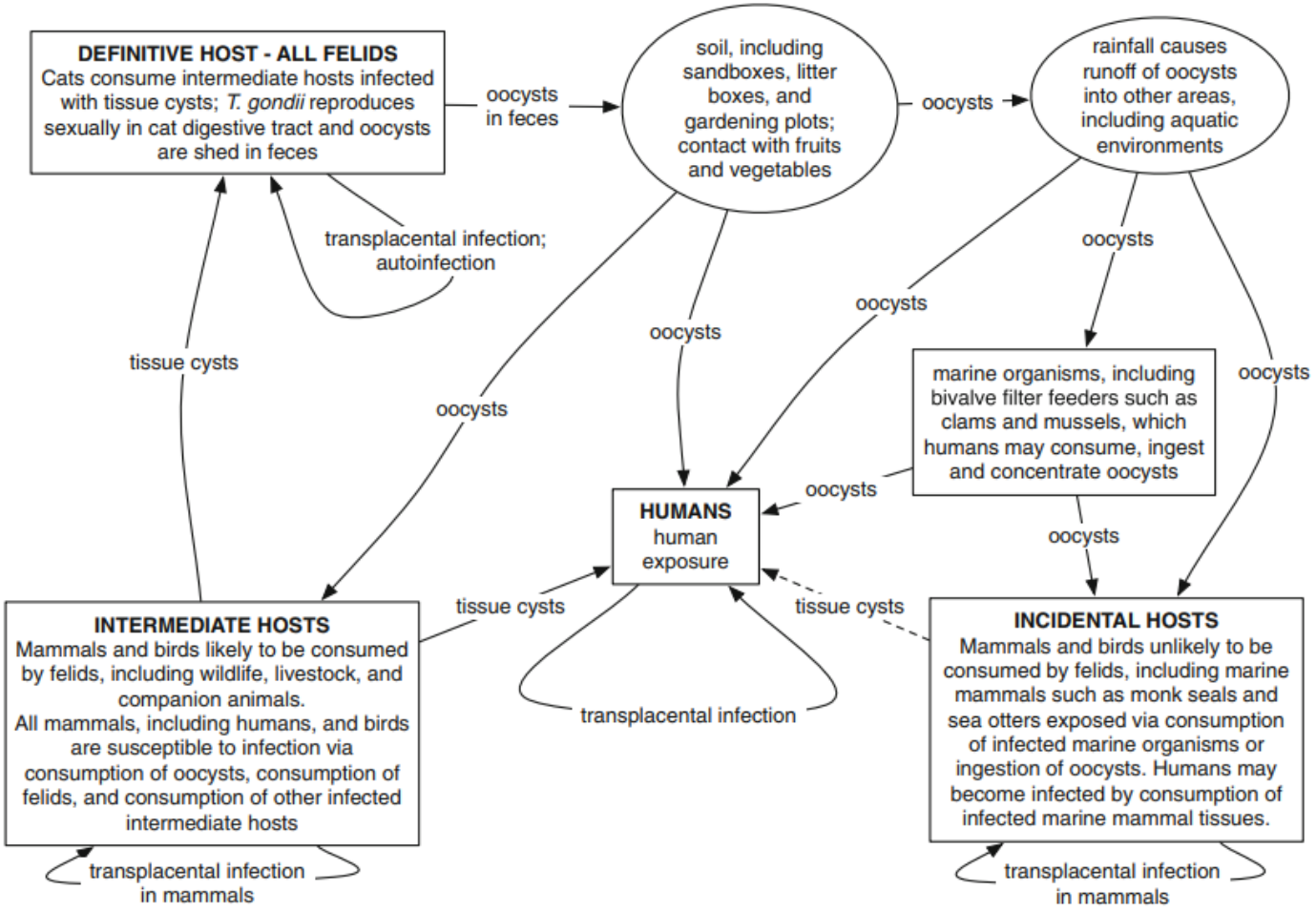


Figure 1. Life cycle of *Toxoplasma gondii* and transmission in humans, domestic animals, wildlife and ecosystems

From Aguirre *et al.* 2019 EcoHealth

NWHI Herd Immunity Approximations

Site	Pop. Size (2017)	Vaccinated (2017-2018)	Herd Immunity in X% of Model Simulations			Goal 2019
			80%	90%	100%	
FFS	202	147	161	168	176	30
LAY	234	189	212	219	227	30
LIS	154	134	119	126	**134**	15
PHR	139	82	113	120	128	50
MDY	79	23	32	39	47	25
KUR	117	59	**58**	65	73	15