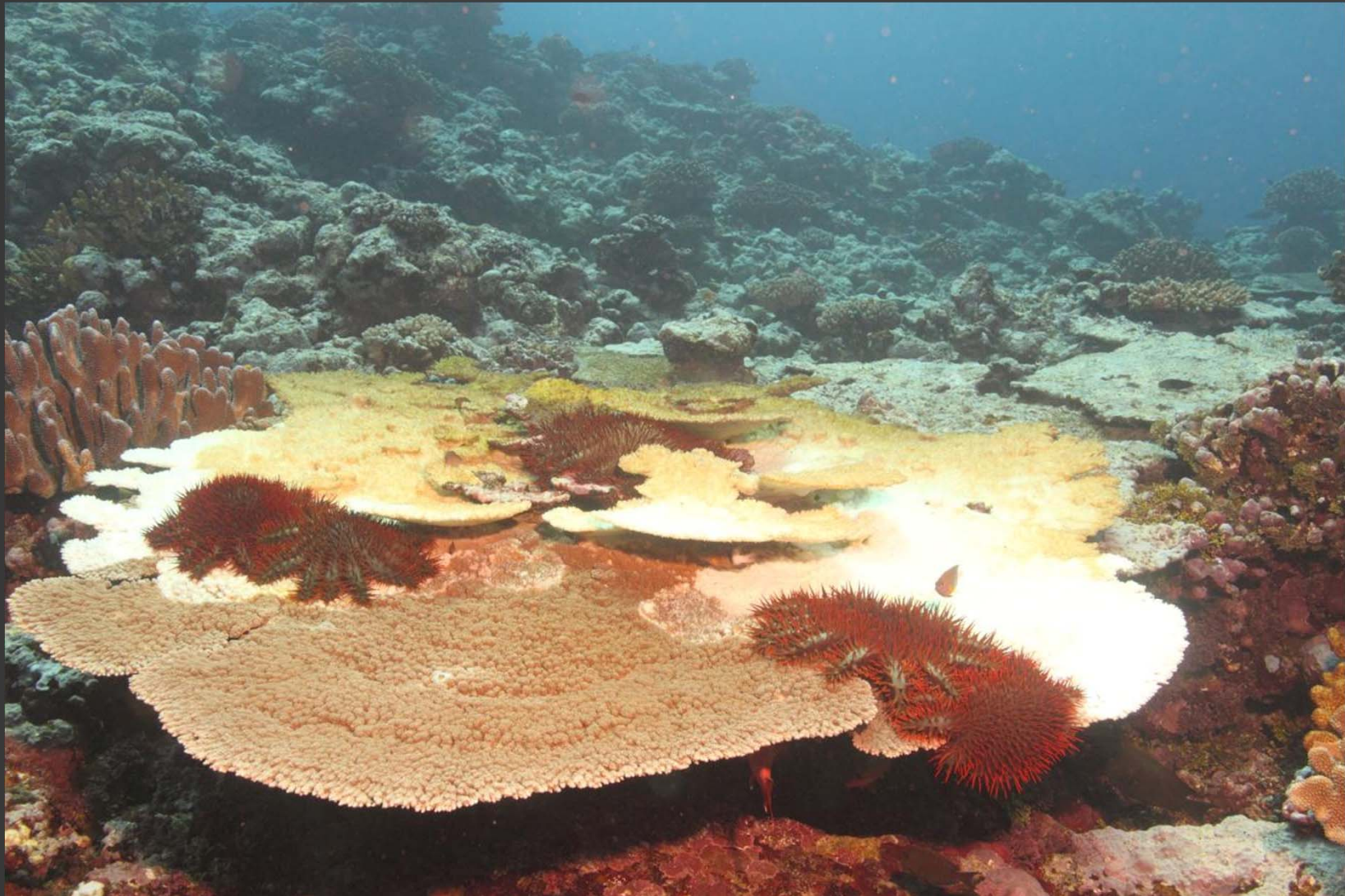




Crown of Thorns (Alamea) Control Efforts in American Samoa



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National Park of American Samoa



A group of alamea eating a coral colony off the coast of Tutuila



Alamea Biology

- Can consume 150-250 cm² coral per day
- Synchronized spawning in summer months
- Highly fecund - 65 million eggs/female/year
- Larvae stage limited by food availability
- Juveniles highly cryptic and nocturnal
- Sexual maturity at 2 years age
- Outbreaks start deep, move towards shallow waters



Alamea Outbreak Timeline

- 2011: Over 100 alamea observed in single dive on South side of Tutuila
- 2012-2013: High densities of alamea observed at multiple locations on South side of Tutuila
- 2013: First sightings of alamea on North side of Tutuila
- 2013: Control efforts begin
- 2014: Control efforts expanded
- 2015: Bleaching confounds tow board surveys



Response by the National Park of American Samoa

- Personnel increase (blitz, interns)
- Monthly surveys by towed snorkelers
- Eradication via injection of poisonous oxbile solution
- Collection of size/age data



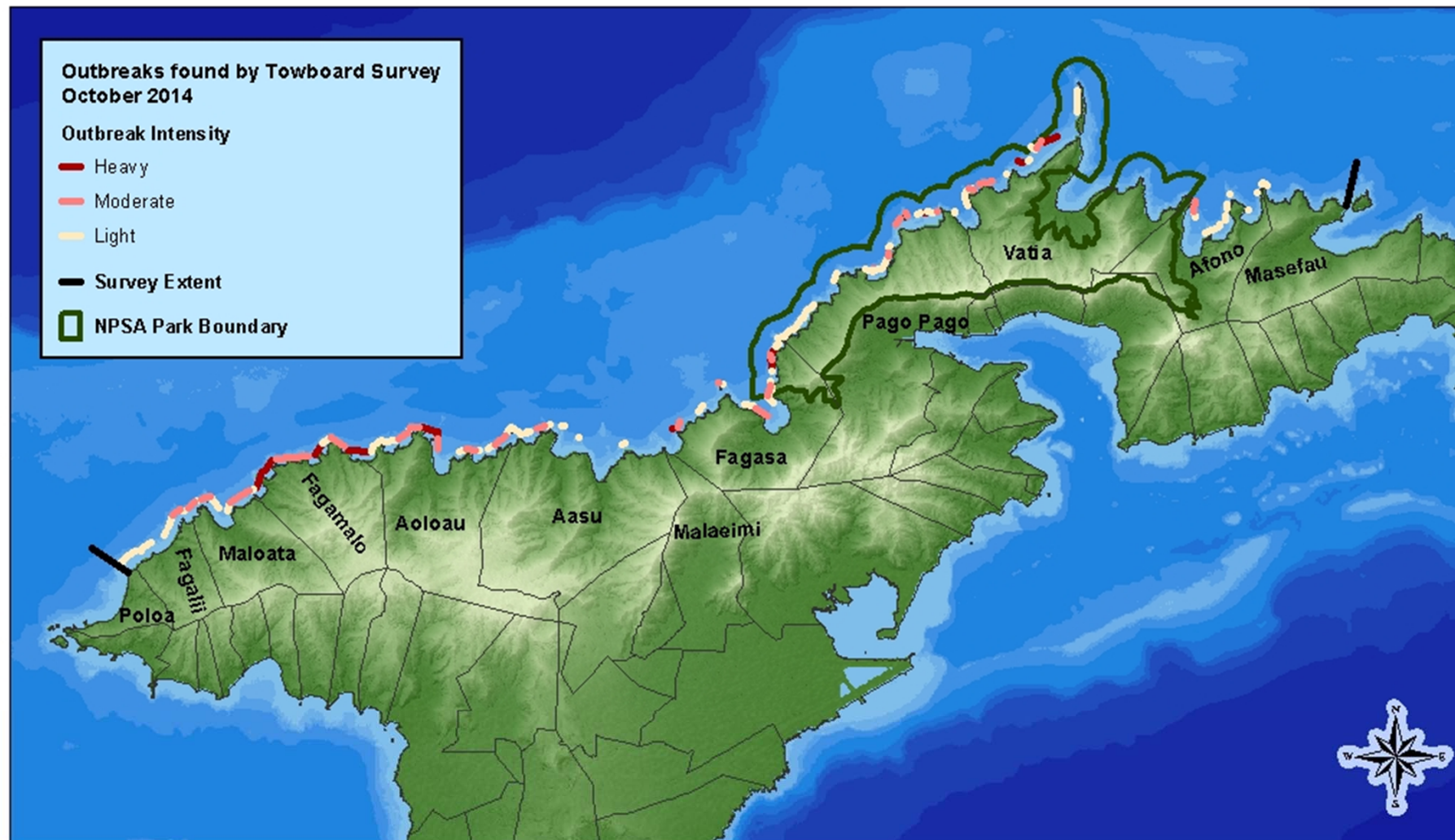




National Park of American Samoa

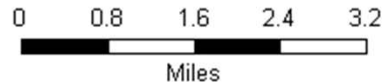
Alamea Outbreaks October 2014

National Park Service
U.S. Department of the Interior



1:100,000

Map coordinate system: WGS84 UTM Zone 2S

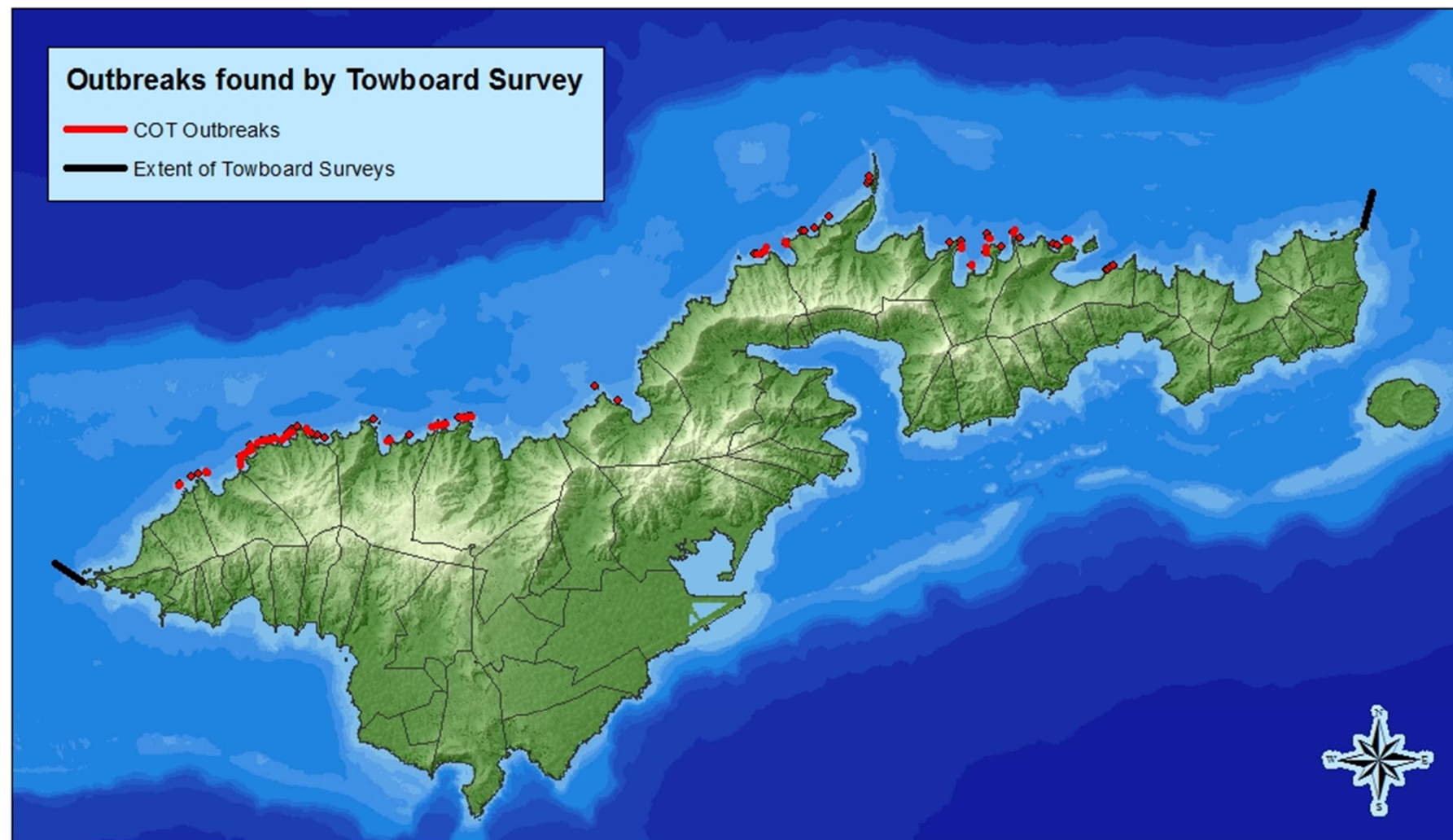


Map produced 11/5/14

National Park of American Samoa

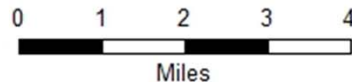
Crown of Thorns Outbreaks March 2015

National Park Service
U.S. Department of the Interior



1:130,000

Map coordinate system: WGS84 UTM Zone 2S



Map produced 3/27/15

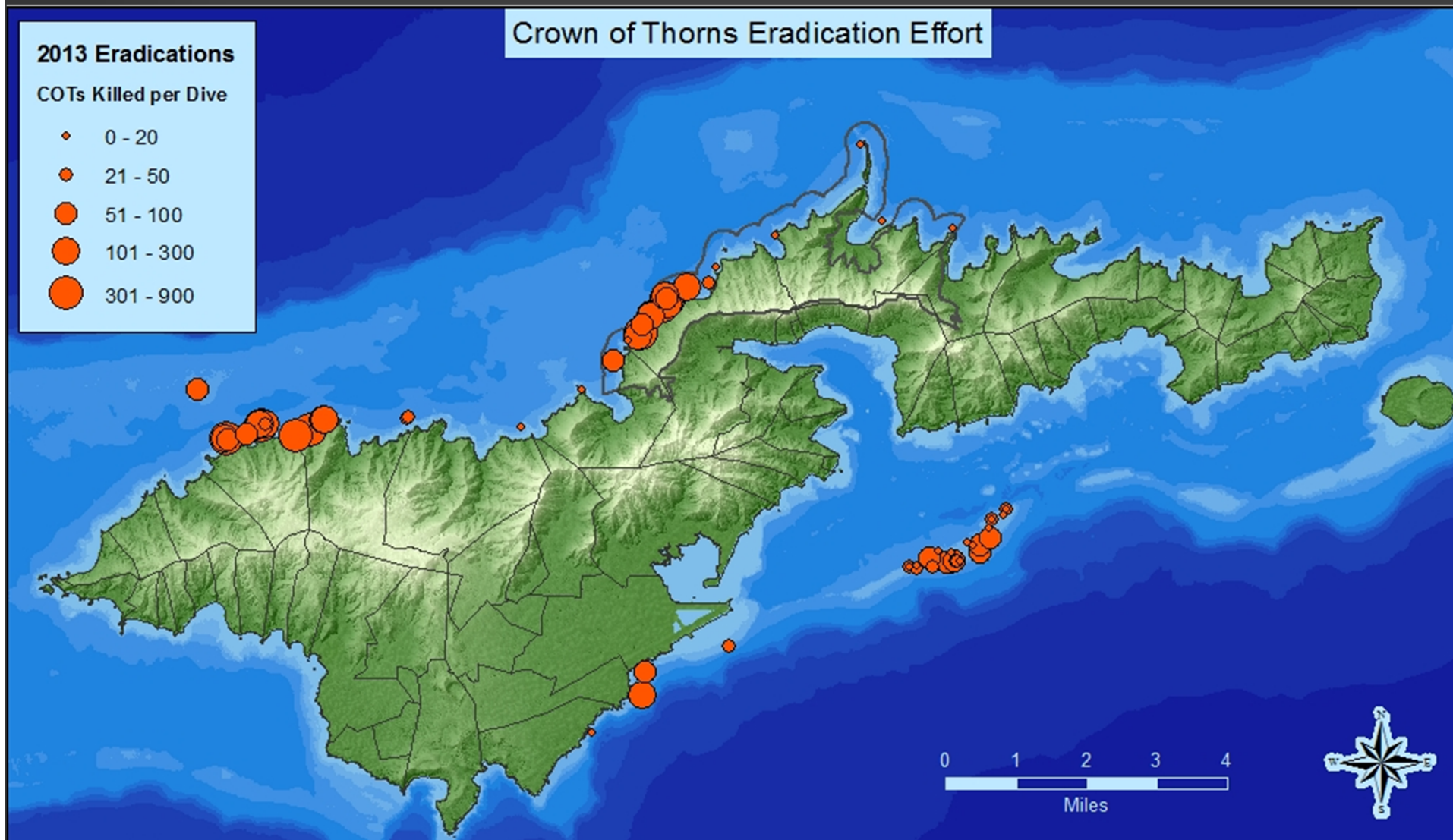


Crown of Thorns Eradication Effort

2013 Eradications

COTs Killed per Dive

- ◊ 0 - 20
- 21 - 50
- 51 - 100
- 101 - 300
- 301 - 900



E X P E R I E N C E Y O U R A M E R I C A

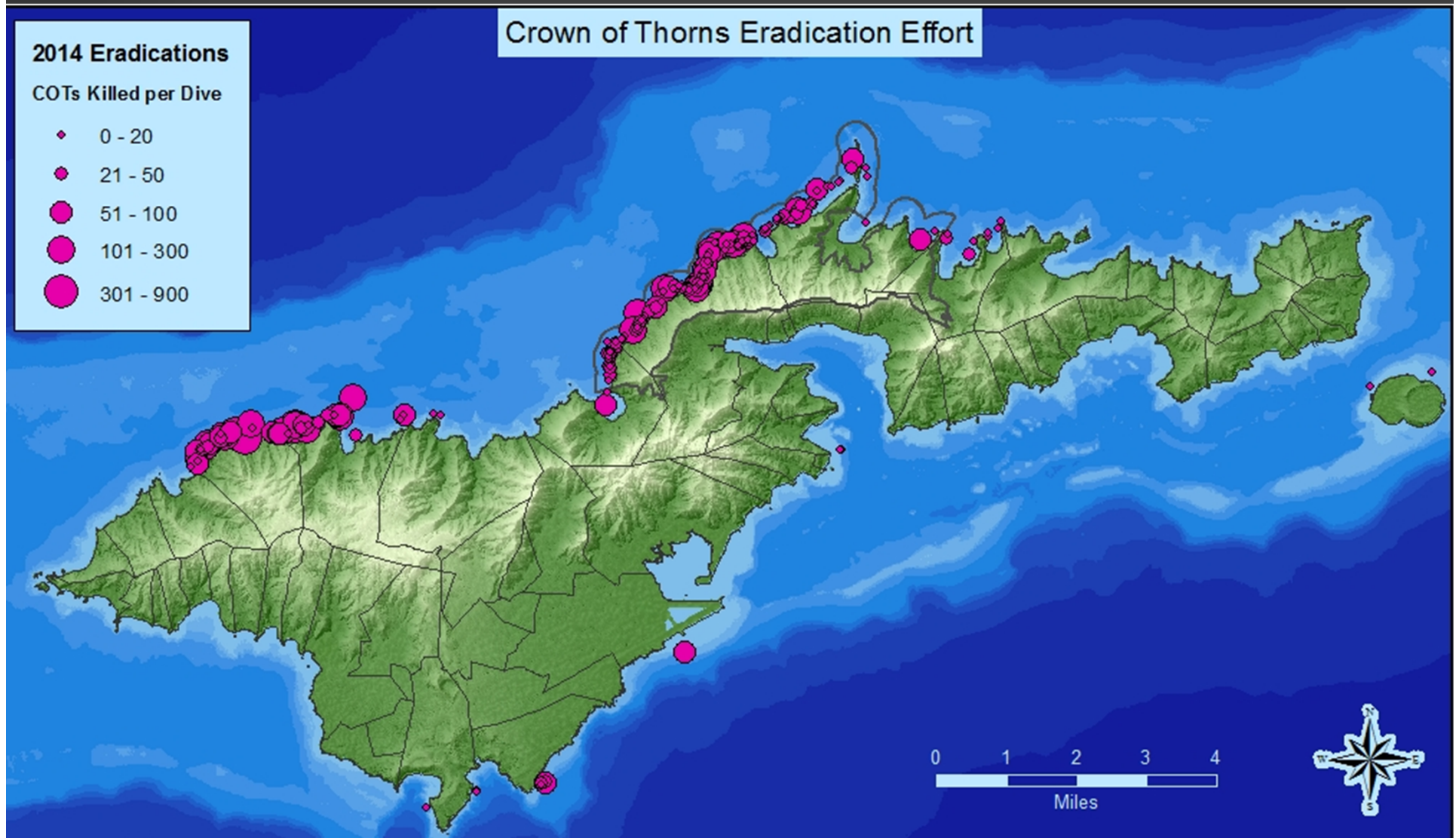


Crown of Thorns Eradication Effort

2014 Eradications

COTs Killed per Dive

- ◆ 0 - 20
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- 101 - 300
- 301 - 900



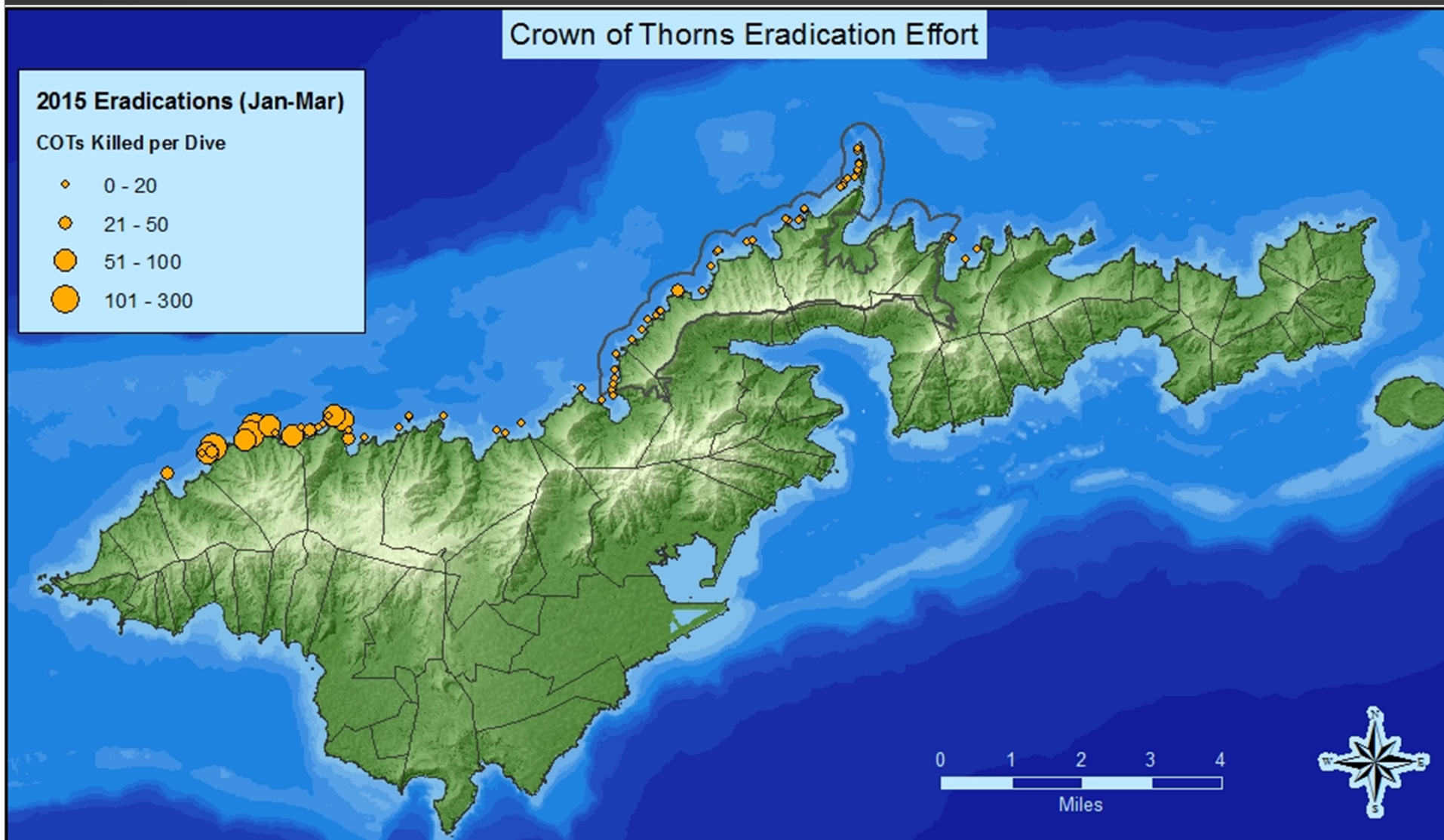


Crown of Thorns Eradication Effort

2015 Eradications (Jan-Mar)

COTs Killed per Dive

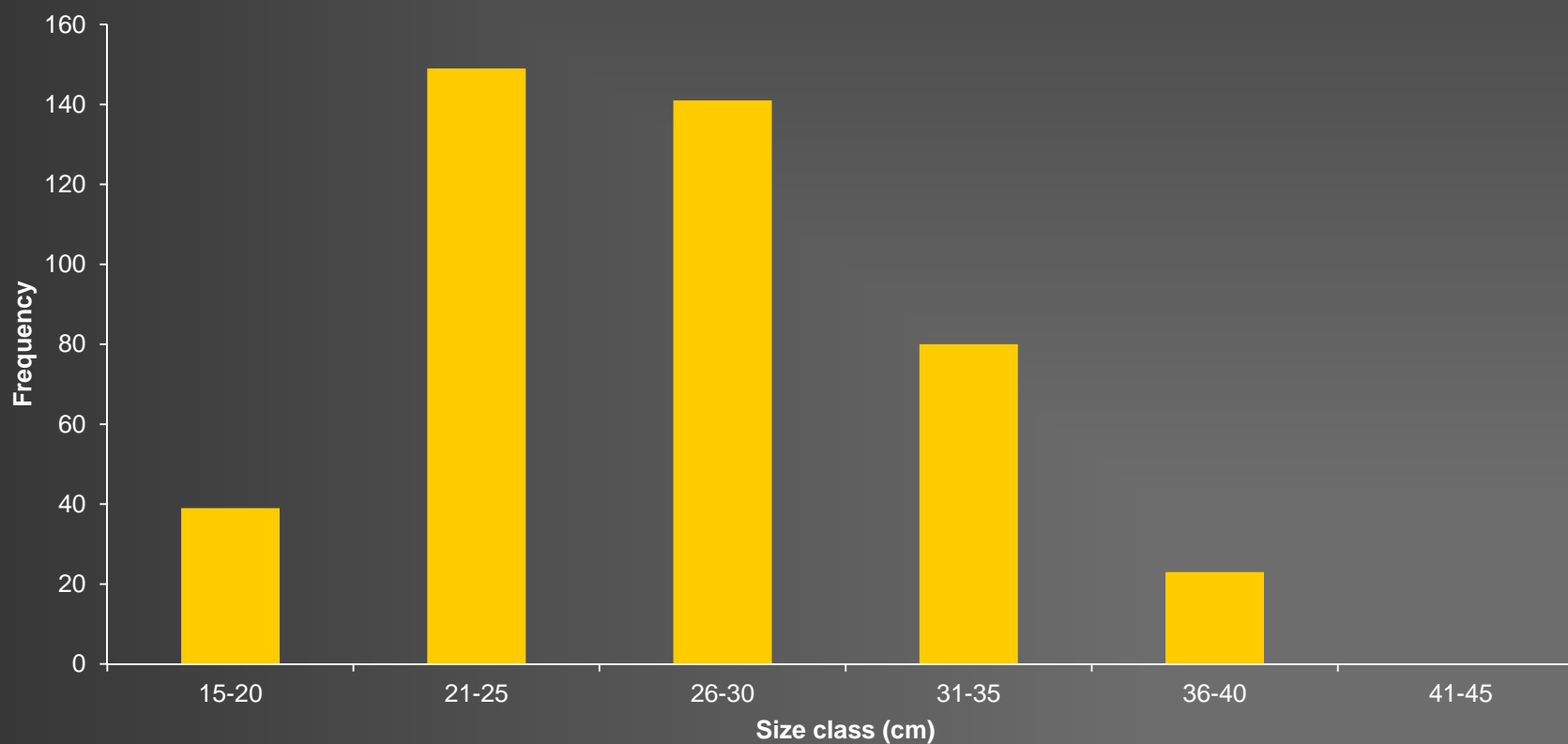
- ◊ 0 - 20
- 21 - 50
- 51 - 100
- 101 - 300





2013 Size Data

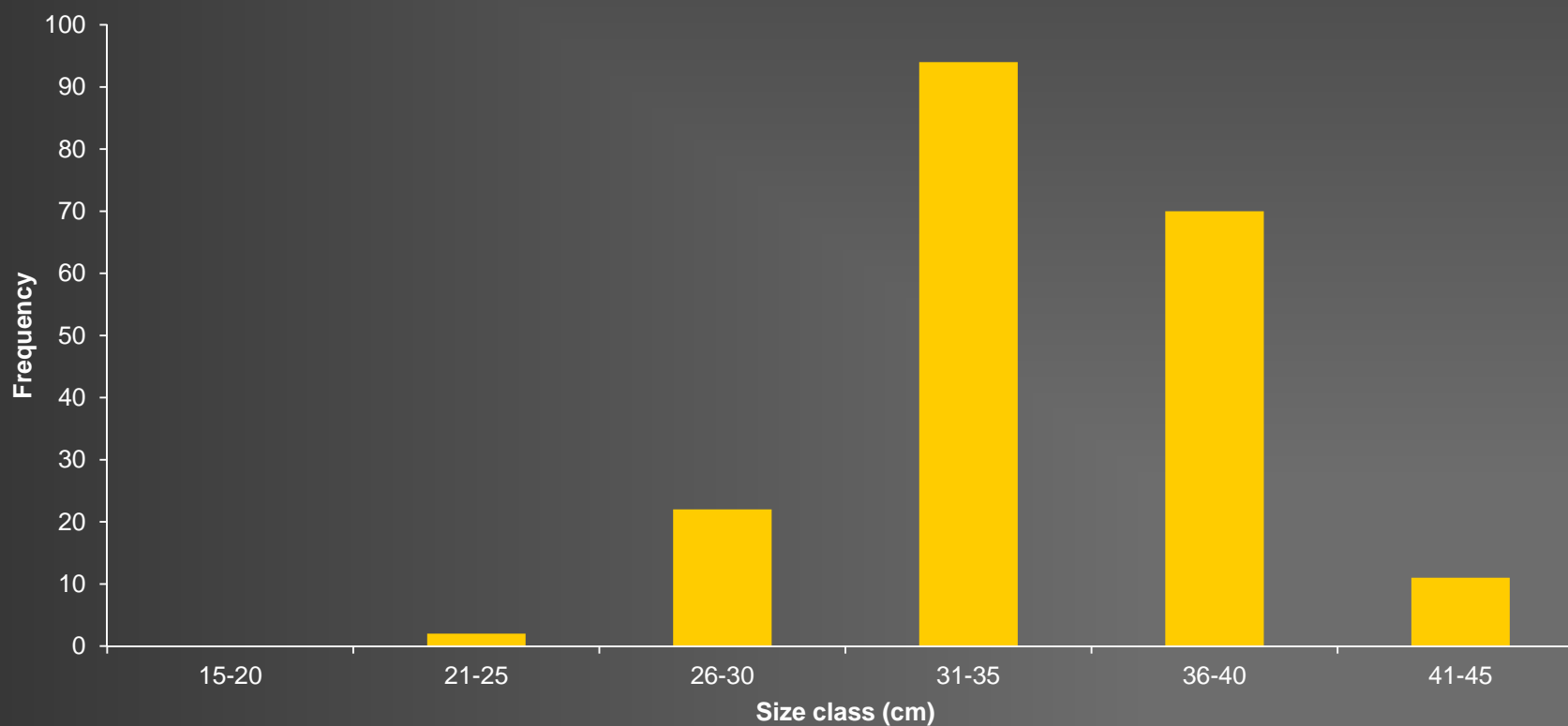
432 CoTs sampled
Mostly 2-3 year olds (born 2010-2011)





2014 Size Data

199 CoTs sampled
Mostly 3-4 year olds (born 2010-2011)





Problems and Solutions

- Tens of thousands of COTs on reefs
 - COTs blitzes were initially beneficial but have diminishing returns with lower densities COTs
 - Dive interns have been successful in removing COTs from limited areas (National Park)
 - Continued effort needed to keep area COT free
- Local agencies constrained by funding and capacity
 - Funding needed to specifically address COTs
 - Additional personnel and boats needed for eradication efforts
- Outbreak likely fueled by high nutrient levels around island
 - Reduction of land based sources of pollution critical



Fa'afetai!





Cause of Outbreak?

- 2009 Tsunami suspends nutrients
- 2011 –Primary outbreak
 - Outbreak limited to South side of Tutuila
 - Nutrients possibly supplied by two sewage pipes, tuna cannery waste pipe, and Pago Pago harbor
- 2013 – Secondary outbreak
 - North and South sides of Tutuila
 - Two years after primary outbreak
 - Hurricane Wilma in 2011