IMPLEMENTATION OF A NOVEL VECTOR CONTROL STRATEGY IN THE MARSHALL ISLANDS

74th PIHOA Executive Board Meeting
Honolulu, March 26th

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Project Manager/Medical Entomologist for the RMI SIT Project

Presentation Overview

1. How the project came to be
2. Mosquitoes in the Marshall Islands
3. What are GM *Aedes aegypti mosquitoes?*
4. A quick review: How do Oxitec *Friendly*^{TM} mosquitoes control *Aedes aegypti*?
5. Key Partnerships
6. Pilot Study Site: Ebeye, Kwajalein Atoll
7. Project Phases
8. Key Project Outcomes
9. Lessons Learned So Far

1. How the Project Came to Be

- In 2019, the RMI-MOHHS experienced one of its largest dengue outbreaks
- In 2020, the RMI MOHHS requested support from PIHOA to identify a longer-term solution to address vector-borne diseases.
- In late 2020, PIHOA and CDC coordinated a Stakeholder Meeting with the RMI MOHHS to discuss the use of novel strategies to reduce vector-borne diseases.
- With the RMI MOHHS's approval, PIHOA drafted a comprehensive concept proposal, *Population Suppression of Arboviral Vector Aedes aegpyti in the RMI Using Sterile Males.*
- The RMI-MOHHS leadership reviewed potential vendors of SIT technology, with the final decision being **Oxitec**, the propriety owner of the ***Friendly™*** *Aedes release* technology.
- This technology is designed to suppress the vector population through MALE ONLY **genetically-modified (GM)** ***Aedes aegypti*** releases.

2. *Aedes aegypti* mosquitoes in the Marshall Islands

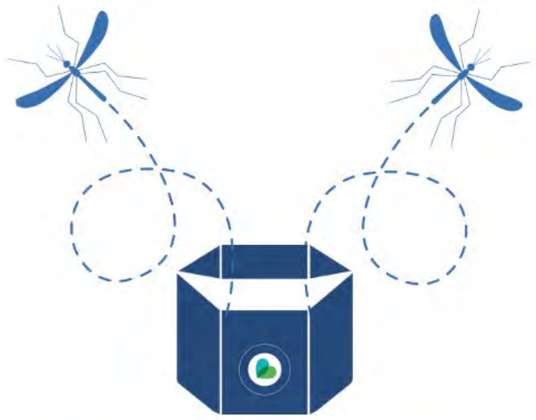
- Aedes aegypti is one of **FIVE** different species of mosquitoes found in the Marshall Islands.
- Aedes aegypti is the most important vector of dengue, Zika, and chikungunya viruses, globally.
- Only female mosquitoes can bite and spread disease.
- Male mosquitoes DO NOT bite.

3. What are Oxitec's Genetically Modified *Aedes aegypti?*

- Oxitec's genetically modified (GM) mosquitoes are called Friendly™ *Aedes aegypti* mosquitoes.
- GM mosquitoes, including Friendly™ mosquitoes, have had part of their genetic material changed.
- They are safe for humans and the environment
- Only MALE Friendly™ mosquitoes are released.
- Male mosquitoes DO NOT BITE and cannot transmit disease.
- Friendly™ *Aedes aegypti* have been used in the United States, Brazil, Panama, and Cayman Islands.

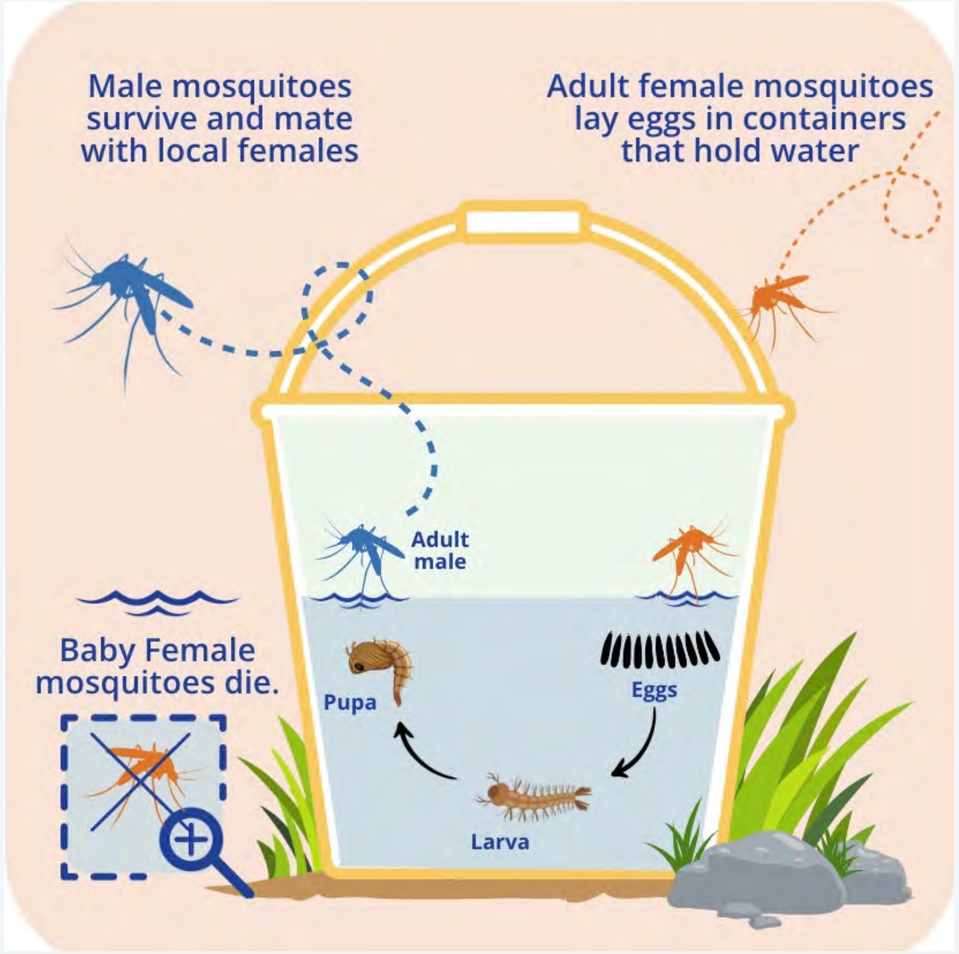
4. A Quick Overview:

How Do Oxitec's *Friendly™* Mosquitoes control *Aedes aegypti*?

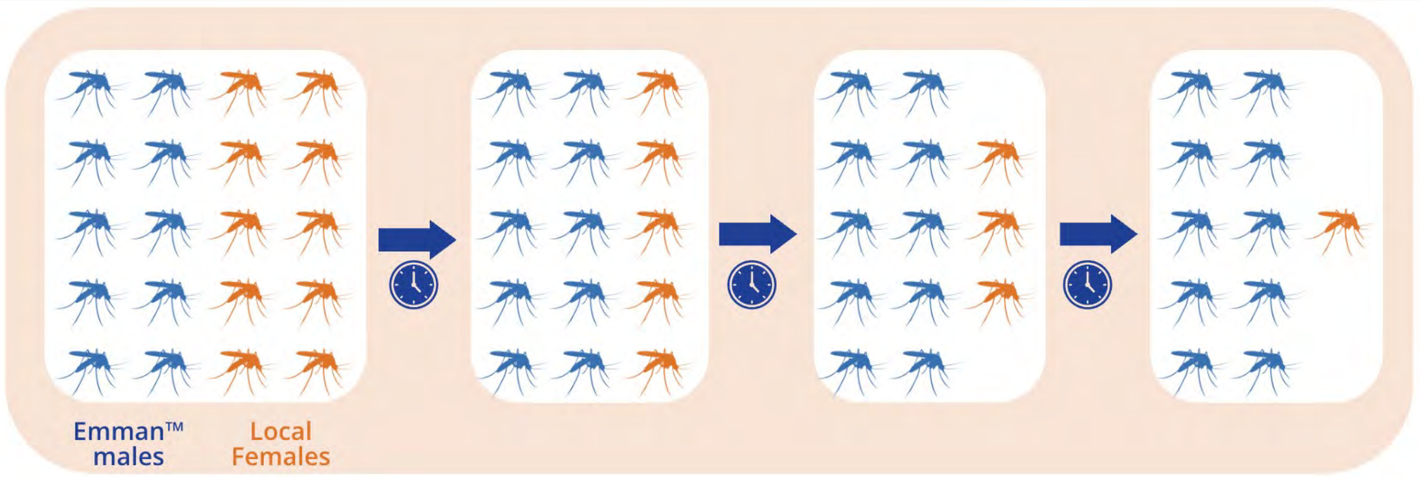


1 Only GM male Aedes aegypti are released into the environment.

2 The GM male mosquito then mates with a local female, passing on the changed genes to his babies.



3 The female lays her eggs in container holding water. The changed genes in the mosquito babies causes the female baby mosquitoes to die.



4 Over time, there are fewer Aedes aegypti mosquitoes. This reduces your risk for diseases like dengue.

5. Key Partnerships

i. Implementation Partners

The **RMI MOHHS** are the lead partner and beneficiary of the project on the ground.

Francyne Wase-Jacklick
Secretary – MOHHS

Erlynda Chutaro
Director of Environmental Health (Majuro) – Project Manager (MOHHS)

Calvin Juda
Environmental Health Officer (Ebeye)

The **CDC Fort Collins Branch – Division of Vector-Borne Diseases**
Provides Funding and Technical Support to the project.

Technical Leads:
Dr. Anna Drexler – CDC Medical Entomologist

Formerly Maggie Silver– Communications Specialist

Kat Ficalora – Public Health Advisor

PIHOA's role is to facilitate the implementation of the project on the ground, including training, and project management in close cooperation with the RMI – MOHHS

Dr. Tamara Buhagiar - Project Manager and Medical Entomologist

Dr. Limb Hapairai – Regional Entomologist

OXITEC is sub-contracted to PIHOA. They are the vendor providing the ***Friendly™ Aedes Release*** technology on the ground, including delivery of technology-specific trainings.

Dr. Kevin Gorman – Chief Development Officer

Ms. Dawn Muddyman
Project Manager

ii. RMI SIT Task Force / Ebeye-based Stakeholders

Taskforce

Advisory Committee:
- Secretary of Health & Human Services
- Deputy Secretary for Primary Health Care Services
- Deputy Secretary for Office of Policy Planning, Preparedness & Epidemiology
- Deputy Secretary of Health, Ebeye
- Majuro Public Health Medical Director
- Ebeye Public Health Medical Director

Allied - Members of Advisory Committee:
- Office of the Chief Secretary
- Environmental Protection Authority
- Ministry of Natural Resources & Commerce
- Ministry of Finance, Division of Customs

Steering Committee:
- Environmental Health Manager, Majuro
- Environmental Health Officer, Ebeye
- Health Promotion & Disease Prevention Director
- Public Relation Officer
- MoHHS Epidemiologists
- Majuro Atoll Local Government (as
- Women United Together Marshall Islands (WUTMI) Representative
- Kwajalein Atoll Local Government
- Majuro Atoll Traditional Leadership
- Kwajalein Atoll Traditional Leadership
- Climate Change Coordinator
- Chief of Quarantine (MNRC)

Additional partners (not TF members):
- Pacific Island Health Officers Association
- The Centers for Disease Control & Prevention
- US Army Garrison Kwajalein (USAG-KA)

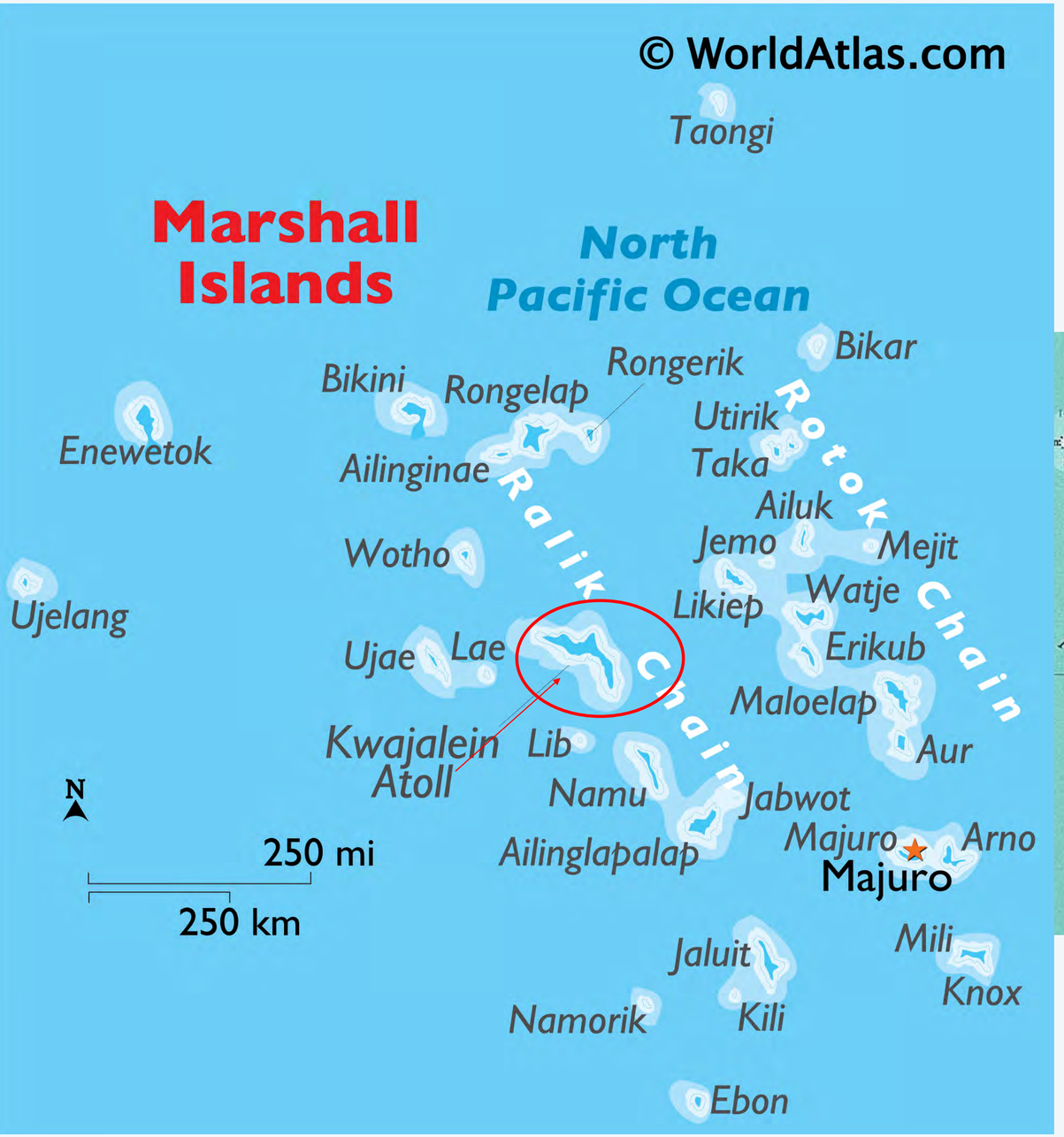
Ebeye-based Community Stakeholders

- Environmental Protection Agency
- RMI Quarantine
- Marshall Island Police Department
- Kwajalein Police Department
- Kwajalein Atoll Joint Utility Resources
- Kwajalein Atoll Stevedore Company (KASCo)
- Kwajalein Atoll Port Authority (KAPA)
- RMI Post Office
- Marshall Islands Social Security Administration (MISSA)
- RMI Customs
- RMI Immigration
- Kwajalein Educators Association (KEA)
- Public School System (PSS)
- National Training Council (NTC)
- International Office of Migration (US Government)
- Red Cross
- Rukjenleen Women’s Group
- Youth to Youth in Health
- Assembly of God Church (AoG)
- Kwajalein Atoll United Church of Christ (KAUCC)
- Queen of Peace Catholic Church
- Salvation Army
- Seventh Day Advntist (SDA)
- Mormon Church
- Ebeye Congregational Church
- Full Gospel Church
- New Beginning Church (NBC)
- Bukot Nan Jesus Church (First BNJ)

- In late 2021 the RMI SIT Taskforce was created
- The RMI SIT Taskforce consists of government leadership from Majuro and both government and traditional leadership on Kwajalein
- In January 2022 the TOR was developed for the Task Force
- The Task Force and Ebeye-based stakeholders have been an essential tool in guiding this project
  - An important outcomes from the Task Force includes obtaining an import permit for Oxitec Friendly™ mosquitoes by working closely with the Division of Quarantine (Ministry of Natural Resources & Commerce).
  - Design of the Project Logo through consultation with the TF
  - Ebeye-based Task Force and Stakeholder members have been key to implementing the project locally on Ebeye, including community engagement, and ongoing mosquito surveillance.
  - Both the Taskforce and local Stakeholders have also been key to gaining essential insight into navigating the local landscape, including approaches in community engagement.
  - Stakeholder group used as focus group to review community engagement learning materials.

6. Pilot Study Site:

Ebeye, Kwajalein Atoll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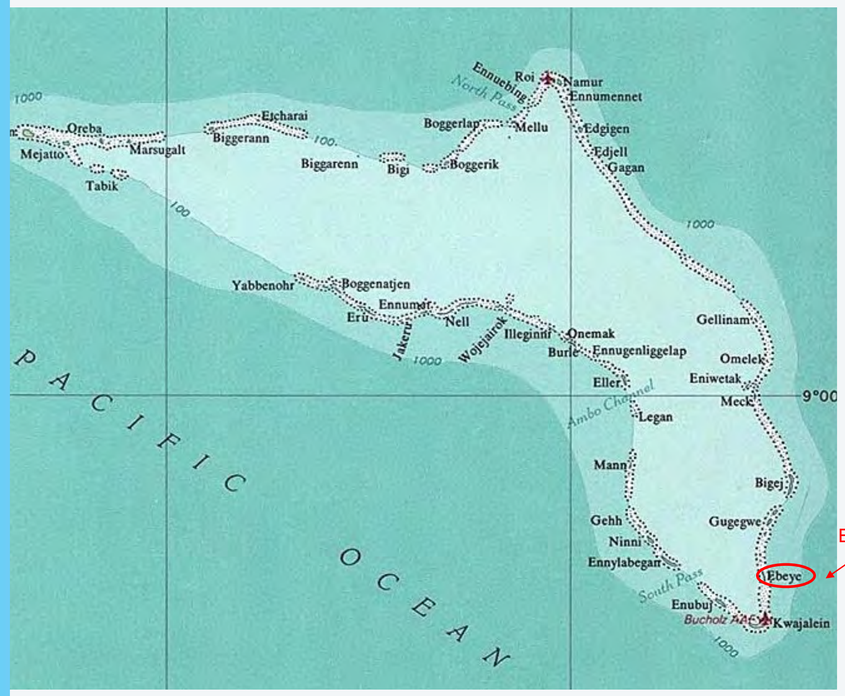
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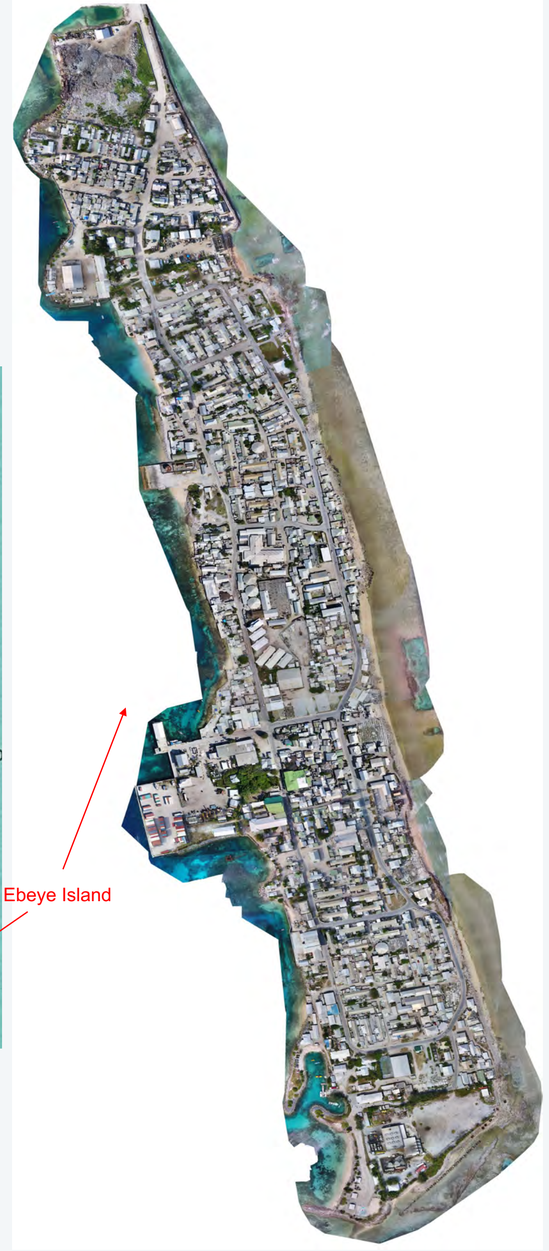

Ebeye Island

7. Project Phases

PHASE	KEY DELIVERABLES	COMPLETION STATUS
Pre-Planning	-MOU -PIHOA/Oxitec subcontract -Confirm regulatory requirements	COMPLETED
Phase 1	-Identify Taskforce RMI Taskforce -Identify Ebeye-based community Stakeholder group -Ebeye recruitment and training of field technicians -Baseline mosquito surveillance -KAB survey completion -Import Permit Approved -Completion of a Vector Lab build at Ebeye Hospital -Oxitec Training delivery to field technicians	COMPLETED
Phase 2	Suppression of Aedes aegypti on Ebeye	April 2024 (awaiting date)

8. Key Project Outcomes

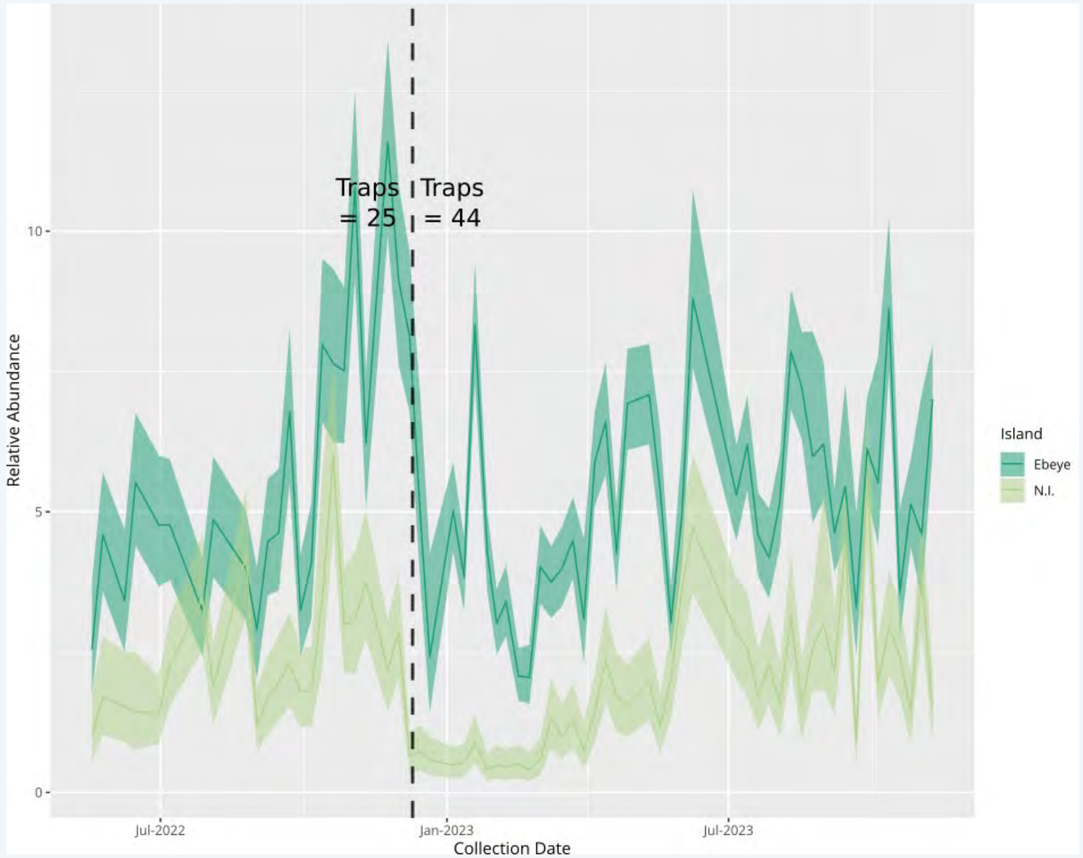
i. Hiring and Training of Ebeye-Based Field Technicians on Mosquito Surveillance and IDs (April/May 2022)

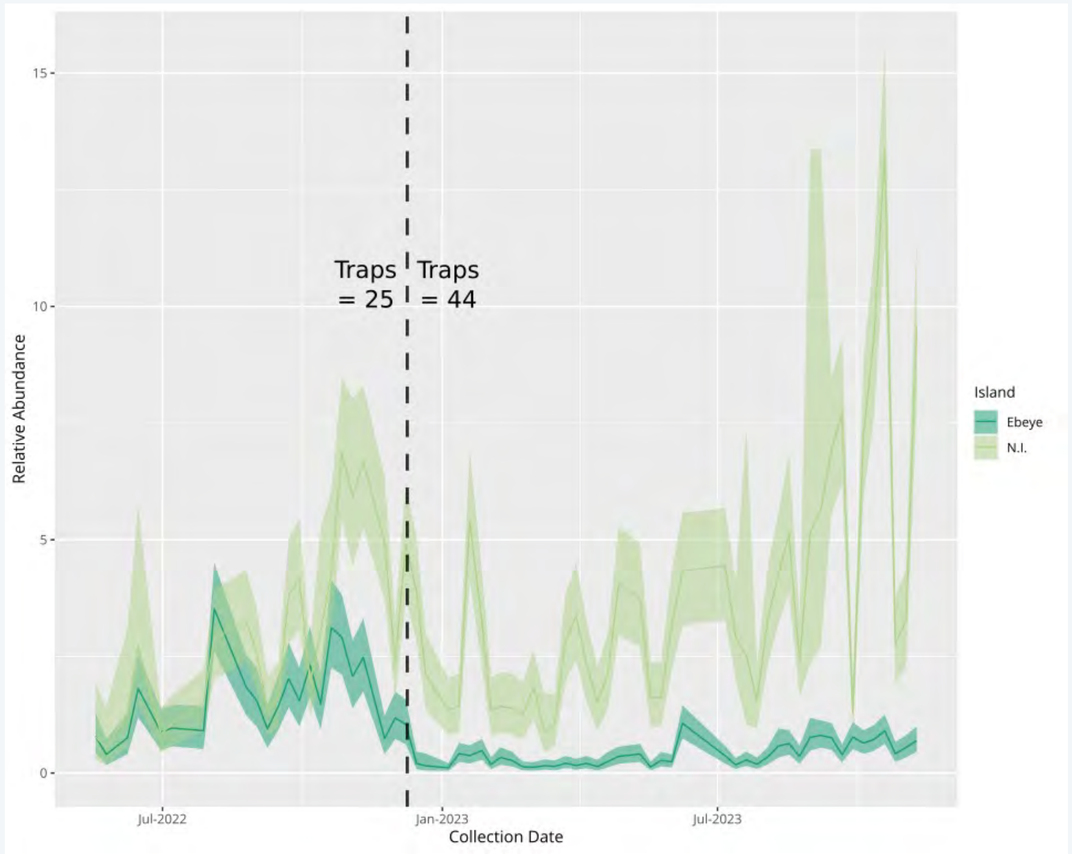
- **MOHHS Ebeye Lead:** Calvin Juda (EHO)

- **PIHOA Senior Field Technicians:**
- Roston Morelik
- Russel Batin

- **PIHOA Field Technicians:**
- Paul Lucky, Nicktemus Arento, Albino Joram, and Burton Joran (August)

ii. Established mosquito baseline survey on Ebeye and northern islets: 22 months completed and ongoing (May 2022 – present)





iii. Project Branding

- The project was officially named “Man Nam Ne”
- Logo developed with input from the Taskforce
- Final brand completed in September 2022.

iii. Community Survey (KAB) Training and Completion on Ebeye

- The first version of the survey went through the RMI Taskforce.
- Based on responses from this survey, we adapted and translated the survey to be circulated through the Ebeye community stakeholder group
- The final KAB survey developed based on responses from both the TF and Stakeholder group
- The final survey was translated and delivered in November 2022.
- The responses from this survey have guided our approach to community engagement since.

Man Nam Ne Formative Evaluation Report

RESULTS FROM BASELINE TASKFORCE, STAKEHOLDER, AND COMMUNITY SURVEYS IN EBEYE

Visited **98 HHs**; **92** surveys completed (**94 % coverage**) – AMAZING!!

Average age of survey participants was **45** (age range: **18-78**)

Equal representation of **men (44)** and **women (48)**

Average # of adults living in the household: **5**

Most respondents have NOT heard of GM mosquitoes (86%)

Most respondents support GM mosquitoes (92%)

Most respondents believe GM mosquitoes will reduce the number of mosquitoes

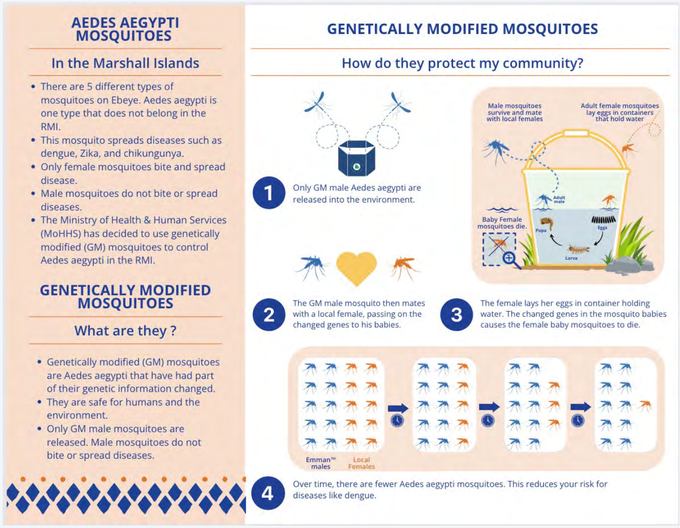
iii. Vector Lab Build Completed in December 2023


MAN NAM NE


First Aid


Easy-Touch

iv. Community Engagement Materials



iv. Onsite Oxitec Training – January through March 2024 (insert pictures)

10. Lessons Learned So Far

1. Challenges in having regular engagement from all Taskforce Members. Could we increase effectiveness of the TF with a smaller membership?

2. Procurement and shipping within the RMI, from Hawaii, and internationally have proven to be very challenging. Understanding shipping routes, and initiating procurement early is essential in order to meet project deadlines.

3. Involving the Stakeholders early on Ebeye and having regular engagement has been very valuable and has enabled significant progress at the community level.

4. Onsite technical training by external expertise is valuable however, it is essential to involve existing MOHHS vector control staff in order to translate and facilitate effective training.

5. Remote management of technical staff is challenging. Improvements seen through increasing frequency of contact (virtually), daily planning, and regular site visits.

6. Important to establish a communication plan for key partners (pathways of communication, frequency of communication, and points of contact.

7. A communication risk management plan in advance of initiating the project in order to ensure rapid, consistent, and accurate responses to community members.

8. Establish a line of communication for the community. The email ebeyemannamne@rmihealth.org is our current contact line.

9. Make sure Man Nam Ne technicians are fluent in understanding and communicating about the project to the community.

10. Work closely with the MoHHS to support ongoing communication with high-level government leadership, including at the Cabinet level.


Thank You!