



Climate Change, National Security and STEM

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Abstract

- Sea level rise (SLR) is predicted to be between 0.20m to 0.24m by 2050 and is expected to accelerate. [1]
- Pacific atolls predicted to have severe impacts in this decade and be uninhabitable in perhaps 30 years due to inundation. [2]
- SLR is expected to continue past 2100 regardless of emission policies. Accommodation and retreat (migration) should parallel defensive measures. [3]
- International Organization of Migration projects between 25 million to 1 billion climate refugees by 2050. [4]
- The U.S. Military will face existential threats in next 20 years due to vulnerabilities in nuclear and power infrastructure exacerbated by climate factors. [5]
- Pacific ALLIES is a confidence building activity with international partners which draws attention to challenges on Ebeye Island, in Kwajalein Atoll.

Kwajalein Atoll

- Largest atoll in the Marshall Islands. Location as depicted in Figure 1 below.
- Home to the Ronald Reagan Ballistic Missile Test Site and U.S. Army Garrison-Kwajalein Atoll. Houses around 1,200 military personnel, Army civilians, contractor employees and family members.
- Compacts of Free Association (COFA) outlines U.S. financial and security responsibilities to the Marshall Islands. The subsidiary Military Use and Operating Rights Agreement details terms of U.S. military presence on Kwajalein Atoll.
- Ebeye is the second largest population center in the Marshall Islands, with approximately 15,000 residents, and is one of the world's most densely populated places with 40,000 residents km⁻².
- Most recent census was conducted back in 2011.

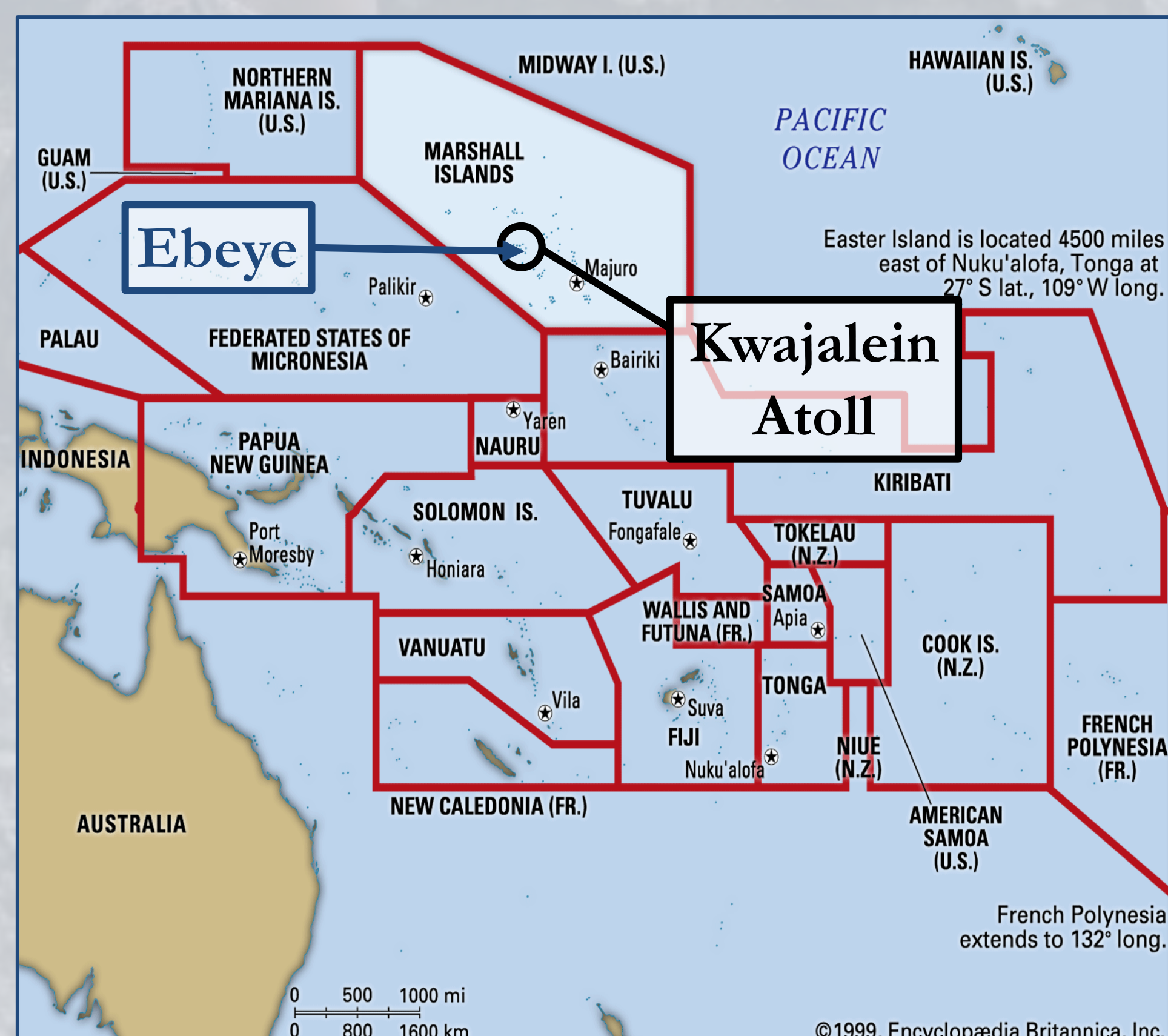


Figure 1: Visual representation of geographical location of Kwajalein Atoll and Ebeye Island.

Pacific ALLIES

- Pacific ALLIES is an internship program that explores climate change implications to national security through project-based learning in the Marshall Islands.
- ALLIES stands for Alliance Linking Leaders in Education and the Services, a civil-military relations group which provides opportunities for civilian college students and cadets at service academies to interact with one another and discuss pertinent national security issues.
- The third iteration of the internship took place in the summer of 2019 with MIDN Yixin Ye, CDT Ani Phelps, CDT Elaine Weaver and Whitman College graduate Skye Goedert as participants.
- Pacific ALLIES intends to promote international collaboration by engaging, as interns, students and cadets from regional partners such as Singapore, Philippines, Japan and China.

ALLIES Projects

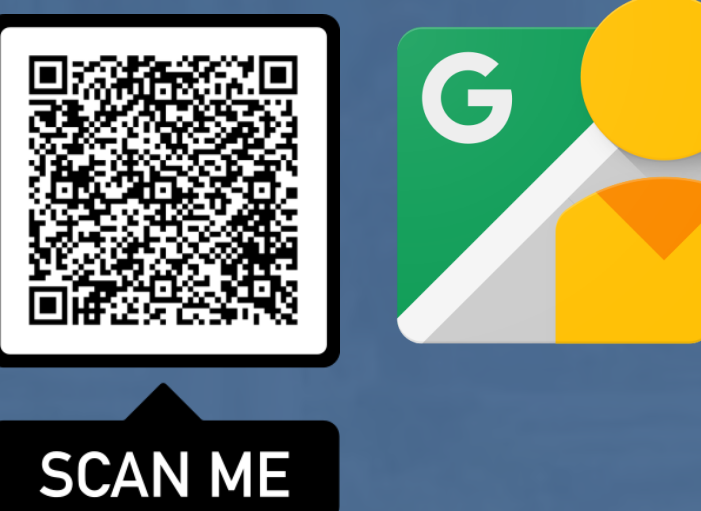

1. Google Streetview – to get Ebeye on the world map, document the effects of climate change and erosion, and empower Marshallese students. 
2. What3Words (w3w) – to provide the people of Ebeye an address that they can utilize, beyond a P.O. Box number. 
3. Coastal Community Human Security Survey (CCHSS) – proof of concept for a mobile app that enables students to update demographic data and establish living conditions baselines using only localized resources, as demonstrated in Figure 2.



Figure 2: Marshallese high school students interviewing residents about their living conditions, using the CCHSS app and w3w addressing. Photo courtesy of Lorenzo Moscia.

References

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3. Brown, S., R. J. Nicholls, P. Goodwin, I. D. Haigh, D. Lincke, A. T. Vafeidis and J. Hinkel, 2018: Quantifying Land and People Exposed to Sea-Level Rise with No Mitigation and 1.5°C and 2.0°C Rise in Global Temperatures to Year 2300, *Earth's Future*, 6, 583–600, <https://doi.org/10.1002/2017EF000738>.
4. Brown, O., 2008, Migration and Climate Change, *IOM Migration Research Series*, 31, 64p.
5. Brosig, M., P. Frawley, A. Hill, M. Jahn, M. Marsicek, A. Paris, M. Rose, A. Shambaljamts, N. Thomas, 2019, "Implications of Climate Change for the U.S. Army." United States Army War College.

A Day in the Life

- Before heading over to Ebeye, Honolulu acted as the staging ground for the interns. We met our partners and mentors from UH-Manoa, INDOPACOM, Pacific Disaster Center, Coast Guard District 14 and the Fish and Wildlife Service by day, and did plans and logistics by night.
- Pacific ALLIES happens in conjunction with the Ebeye Spartan Camp, a month-long STEM summer camp for Marshallese high school students. We worked with local and Guamanian teachers in order to strike a balance between classroom teaching and ALLIES projects. See Figure 3.
- When we were not with the students, we interacted with the local government and traditional leaders to understand pressing issues.
- We were also able to interact with U.S. government and military personnel in the neighboring U.S. installations as seen in Figure 4.



Figure 3: MIDN Ye demonstrating how to upload panoramic pictures to Google Streetview.

Personal Takeaways

- Diplomacy in the Marshall Islands is multi-faceted. We interacted with local government and traditional leaders as midshipmen and cadets representing the U.S. and Singapore.
- People tend to be friendly and trustworthy because as midshipmen and cadets we represent the military but we are also students.
- The Marshall Islands is heavily reliant on the U.S. for funding, and will have to seek alternatives if funding ends with COFA in 2023.
- Keeping these human connections is important as we are not just dealing with a climate crisis from sea-level rise, but also a potential humanitarian disaster from the thinning of the freshwater lens on these islands.
- Getting to Ebeye itself was an opportunity for personal development, with lessons learnt from overcoming bureaucratic obstacles and pushing the envelope.

Attributes of a USNA Graduate:
Adaptable - individuals who understand and appreciate global and cross-cultural dynamics.

Conclusions

- Pacific ALLIES can develop future military leaders by deepening their understanding of the impacts of climate change on local communities and national security.
- STEM education is an excellent vehicle to empower the next generation of Marshallese leaders.
- International collaboration is critical to meet the challenges in the coming decades, and building strong personal and professional relationships is key to making the collaboration possible.

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Marshallese Partners			
Hirata Kabua Mayor of Ebeye	Scott Paul Ebeye City Manager	Jelton Anjan Associate Commissioner for Kwajalein Public School System	
Other Partners			
Lorenzo Moscia Photographer	Google Earth	What3Words	



Figure 4: Photo with U.S. Ambassador to the Marshall Islands, the Honorable Karen Stewart.