Pohnpei Community Vulnerability Assessments

April 2018 – February 2019

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Introduction

From April 2018 – February 2019 a resource team led by the Conservation Society of Pohnpei (CSP) and Pohnpei Environmental Protection Agency (EPA), met with 10 communities across Pohnpei to conduct a community based mangrove vulnerability assessments. Approximately 12-44 community members attended each meeting including traditional leaders, men, women, elders, and youth. The same vulnerability assessment process was completed during each community session. This document provides the results of these meetings.

Methods

The following steps and methods were carried out to conduct the community based mangrove vulnerability assessments.

Step One: Vulnerability Assessment and Adaptation Planning Process Development
The contractor reviewed existing tools available in the region that can support an understanding of vulnerability and adaptation planning for mangrove ecosystems and the communities that depend on them. The contractor worked closely with MCT and CSP during this step to ensure that local context was considered and included in the process development.

Specifically, the *Adapting to a Changing Climate: Guide to Local Early Action Planning (LEAP) and Management Planning*[1] tool, developed in Micronesia, was used a foundation for the process. The LEAP tool has been used by CSP for several years for general community-based climate change adaptation outreach and planning. The LEAP tool considers socio-ecological linkages at the community level, and has the ability to integrate local knowledge and climate science to support greater understanding of impacts, and inform the development of locally relevant adaptation actions to address both climate change and other anthropogenic threats.

Other tools that were utilized to inform the process are more directly focused on coastal mangrove systems to integrate relevant information into the LEAP process. These include:

- *Coastal Change in the Pacific Islands: A Facilitators Guide to Support Community Understanding and Decision Making on Coastal Erosion and Flooding Issues*. This tool responds to communities' requests for guidance on how to address and reduce the exposure and sensitivity to climate stressors of their coastlines to sea level rise, and associated changes in the frequency and magnitude of coastal inundation events and the potential impacts of shoreline change.[2]

- *Climate Change Vulnerability Assessment and Adaptation Planning for Mangrove Systems.* This tool provides a methodology for assessing the vulnerability of mangrove

[1] Gombos, M., S. Atkinson, and, S. Wongbusarakum 2015. Adapting to a Changing Climate: Guide to Local Early Action Planning (LEAP) and Management Planning (3rd ed.). Micronesia Conservation Trust: Pohnpei, Federated States of Micronesia. 118 pp.
[2] Gombos, M., Ramsay, D., Webb, A., Marra, J., Atkinson, S., & Gorong, B. (Eds.). (2014). Coastal Change in the Pacific Islands, Volume One: A Guide to Support Community Understanding of Coastal Erosion and Flooding Issues. Pohnpei, Federated States of Micronesia: Micronesia Conservation Trust.

ecosystems to climate change to support a better understanding of specific impacts to these ecosystems and strategies that can best support adaptation to future climate scenarios.[3]

Community Vulnerability Assessment Process

Based on the existing tools, the community VA process developed for the project includes a combination of outreach and participatory vulnerability assessment activities.

Outreach Component: The outreach component included a power point to ensure stakeholders have a good understanding of mangrove ecosystem services, links to upland and marine resources, and how threats to these ecological systems can have negative socio-economic impacts. The power point was translated into Pohnpeian by CSP. The power point is found in Appendix A.

Participatory Vulnerability Assessment Component: The vulnerability assessment component includes mapping resources and changes over time, and guided focus groups to discuss and rank vulnerability. Two focus groups were included, one to discuss the vulnerability of mangroves and the second to discuss the vulnerability of the community (in relation to mangroves). The contractor developed templates for CSP with a series of questions to ask each focus group that helped to identify and describe various components of vulnerability. Each question had both a numerical ranking and open-ended portion to discuss and collect details. The summation of the numerical rankings provides the vulnerability ranking at the end of each focus group. Templates are found in Appendix B.

Step Two: Training and Pilot of Community-based Mangrove Vulnerability Assessment Process

Prior to implementing the process throughout Pohnpei, a workshop was held with the contractor and staff from the Conservation Society of Pohnpei who are community facilitators to review the revised LEAP tool process and ensure there is a clear understanding of new outreach material, engagement, and assessment activities focused on mangrove ecosystems. This workshop also provided time for the CSP team to more directly revise or adapt the process to meet local needs and/or situations.

Upon completing the training the contractor assisted the CSP team in implementing the process in 2 communities to address any technical questions and confirm that the process is effective and gathers necessary information for vulnerability assessments. Small revisions were made to the process based on the pilot workshops in collaboration with the CSP team.

[3] Ellison, J. C. (2012). Climate Change Vulnerability Assessment and Adaptation Planning for Mangrove Systems. Washington, DC: World Wildlife Fund (WWF).

Step Three: Implementation of Vulnerability Assessment Process in 2 communities in all 5 of Pohnpei High Island Municipalities.

Based on the revised process, the CSP team then completed an additional 8 community vulnerability assessments over the following year. To begin each community session, a short interactive outreach presentation (see Appendix A) was developed to discuss information on the benefits of mangroves, and causes of changes to mangroves over time (including natural events, human activities, and climate change). A short climate change video was also utilized to reinforce the understanding of the potential impacts of climate change and messages about how healthy resources and organized communities will face less negative impacts (found at: https://www.youtube.com/watch?v=YR2y1TIyEWA&t=3s)

After the outreach presentation, communities participants were split into two focus groups to complete the participatory vulnerability assessment process. One group focused on the vulnerability of mangroves, and the other focused on the vulnerability of the community and their relationship with mangroves (socio-ecological links). Each focus group began by developing a perception map that was used to visually review and capture key information related to vulnerabilities. Large maps of the municipality provided by USGS were also used as a reference.

Facilitators continued to go through the vulnerability questions on the template with each focus group that helped to identify and describe various components of vulnerability. With this information, communities were able to begin to determine what impacts they are most concerned about and management actions that may be required over the short and long term to reduce the exposure and sensitivity of their natural resources, and increase their own adaptive capacity. Upon completing the vulnerability assessment, each focus group was asked to develop a list of actions they would like to implement to address the various problems identified (e.g. threats, root causes, management, dependence on mangroves, or access to resources). The list from each group was reported back to the larger group in plenary and where possible everyone was asked to individually mark their top two priorities.

The table below provides a list of communities who completed the vulnerability assessment and approximate number of participants who attended the session.

Date	Community	Municipality	Approximate # of Participants
4/4/18	Peidie	Sokehs	26
4/6/18	Saladak Nihmoak	U	44
4/15/18	Seinwar	Kitti	42
4/29/18	Nanwap	Madolenihmw	27
5/6/18	Lenger	Nett	18

7/14/2018	Wone	Kitti	18
8/04/18	Depehk/Takaiou	U	42
10/14/18	Palikir	Sokehs	28
1/12/2019	Parem	Nett	12
2/02/19	Senpehn	Madolenihmw	43

The map below shows the location of each community on Pohnpei.

Community Vulnerability Assessment Results

The rest of the document provides the results of the community meetings.

Peidie, Sokehs

Peidie is located in Sokehs Municipality, which is on the North coast of Pohnpei. Peidie is a community on Sokehs Island that is connected to the main island by a causeway and a field of mangroves. The community of Peidie consists of a local population of about 1000+ including 700 children.

Status and Trends of Natural Defenses

- Current Condition – – the community perceives that most of their natural defenses (i.e. coral reefs, seagrass beds, forests, and rivers) are in a degraded state. However, mangroves are perceived to be in fair condition. The community notices that sea grasses are declining over time but they are not sure of the cause. There are no rivers in Sokehs or Peidie but water sources like ground water or springs, are declining in health because of soil erosion that causes sedimentation and a lack of management by people. There is only a small forest in Peidie where farming activities are happening that they believe

- Changes over time and reason for changes – The community believes that mangroves are getting somewhat better over time. In the past people would cut down the trees mainly for building material. Additionally, there were oil spills that destroyed some areas of the mangroves. Today those areas are recovered and better. More recently the Peidie community began to manage their mangrove area, began cleaning them up, and created a mangrove protected area.

Threat and Vulnerability Assessment

This section provides the results of the focus group discussion and summation vulnerability ranking. The full table of numerical ranking is provided below.

Threats to Mangroves & Root Causes

The community feels there are only some non-climate threats impacting their mangroves. These are trash (e.g. metals, plastic, cans), pigpens, and dredging. The community has begun working together to pick up trash and clean their community from plastics and other kind of debris. Pigpens are built close to the mangrove and the shoreline causing excess nutrients to enter the system. Dredging is also carried out by people in neighboring communities to make access easy for their boats. The community perceives this as an impact to their resources as well. The community does not perceive that there are any areas where mangroves can migrate because most of the community is living close to the shoreline, and the roads will block them from moving inland. The land is also quite steep behind the mangroves.

Management Effectiveness of Mangroves

The community feels the management of the mangroves is effective. They have begun working together to improve the mangrove areas and recently developed a Mangrove Protected Area in 2017. The purpose for mangrove protected area management plan is "to respond to effects of climate change and to mitigate its effects through the protection, rehabilitation and wise use of Peidie mangrove ecosystems through processes that maintain their protective function, values and biodiversity while meeting the socio-economic development and environmental protection needs in estuarine and coastal areas." General objectives in the plan include

raising awareness about management within the community, 2) identifying and monitoring resources in the protected area, 3) cleaning up trash in the area, and 4) amending laws and rights for regulating dredging in Sokehs Municipality.

Community Dependence on Mangroves for Livelihood
A moderate amount of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years. Also, a significant amount of infrastructure and community buildings are located in this unsafe area. Specifically, the school, main road and court are in this area that provide the community access to the rest of the island including the hospital, stores, etc. A significant amount (~75%) of community members are dependent on the mangroves as a source of food. However, none are dependent on them for and building materials and or as a source of income.

Adaptive Capacity of Community
Community members feel they only have no information, skills, resources, and/or support to address flooding and erosion issues. They also feel they have no options or resources available for families, and infrastructure to be relocated unless the government designated land for these needs. There are no options for alternative food sources and they feel that community agreements or rules to ensure safe development practices in the face of climate change are poorly effective.

Vulnerability Ranking

- Mangroves - Based on the discussions, the community ranked the vulnerability of the mangroves as highly vulnerable to the impacts of climate change. This is mostly due to the degraded condition of the linked ecosystems including seagrass beds, and reefs, and existing non-climate threats such as trash, piggeries, and dredging. Additionally, due to existing infrastructure and steep terrain behind the mangroves, there is little areas behind the mangroves to possibly migrate with sea level rise. However, the community is taking action to address some of these threats and improve

management of the resources. They've declared and mangrove protected area and have begun to clean up the trash. Further actions will help address other threats to the ecosystem.

- Community - Based on the discussions, the community ranked the vulnerability of the community in relation to mangroves (or active shorelines) as very highly vulnerable. This is mostly due to the fact that much of the community is living within or near mangroves and there is little ability to relocate. The road, school, and court area also in this hazard prone area. Additionally most of the community relies on the mangrove ecosystem as source of food and they felt they have little alternatives to this source of food if it were not available.

Early Actions to Reduce Impacts of Climate Change to Mangroves and the Community

The table below shows the full list of actions developed by the community. Priorities were not defined.

Actions
1. *Dredging* • *Need enforcement to the dredging laws or regulations* • *Community and Sokehs office to stop the dredging* • *Community to have power to make the decision within their community to pan dredging*
2. *Trash/littering* • *There's littering law but need to be enforce* • *Need trash pin on the road sides* • *Community to have awareness program on trash/littering* • *Village chief to designate some community members to enforce or take the lead in making sure that trash are dispose where it should be*
3. *Mangrove tree clearing* • *Need to stop the mangrove tree cutting* • *Re-plant mangrove trees* • *Need to revisit mangrove regulations*
4. *Develop community based management plan to address climate change issues*
5. *Ship Port or dock* • *Office need to check the ship or vessels and make sure they are following the rules and regulations*

Vulnerability Ranking Tables

Table 1: Mangrove Ecosystem Vulnerability (E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)						
	1 Very Healthy	2 Healthy	3 Fair	4 Degraded	5 Very Degraded	**Score**
(S) Rank the current condition of your **Mangroves**	1	2	3	4	5	3
(S) Rank the current condition of your **Reefs**	1	2	3	4	5	4
(S) Rank the current condition of your **Seagrass Beds**	1	2	3	4	5	4
(S) Rank the current condition of your **Rivers**	1	2	3	4	5	4
(S) Rank the current condition of your **Forests**	1	2	3	4	5	4
How have mangroves changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	2
How have rivers changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4
How are the non-climate threats to your mangroves /rivers and streams?	1 None	2 Some	3 Moderate	4 Significant	5 Very Significant	2
How much areas behind mangroves or beside lower streams is free from any structures (e.g. roads, buildings, steep	1 Migration/ Resres areas	2 Migration/ Resres areas	3 Some Migration/	4 Few Migration/	5 No Migration/ Resres areas	5

cliffs) that would allow them to move inland ?	very highly available	well available	Resres areas are available	Resres areas are available	are available	
How effective are current management efforts to protect mangroves?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	2
					TOTAL RANKING	34

The following rankings provide general guidance about how to determine vulnerability ranking.

___Not Vulnerable: (5-9)
___Low Vulnerability: (10 -19)
___Moderate Vulnerability: (20 – 29)
__X_High Vulnerability: (30 – 39)
___Very High Vulnerability: (40 -50)

Table 2: Social Vulnerability

(D = Dependence, SAC = Social Adaptive Capacity)

	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	**Score**
D) How much of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	3
(D) How much major infrastructure placed in the active shoreline and currently or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	4
(D) How much of the community is highly dependent on mangroves for livelihood?	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	4
(SAC) How much information, skills, resources, and/or support are available to the community to address flooding and erosion issues?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	5
(SAC) How many options and resources are available for families, and infrastructure to be relocated?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	5
SAC) How many options and resources are available for families who are dependent on	1 More than	2 Enough	3 Moderate	4 Little	5 None	5

mangroves for livelihood to access alternatives for food, income, or building material?	enough		amount			
(SAC) How effective are community agreements or rules to ensure safe development practices that consider climate impacts such as sea level rise and more intense storms?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	4
					TOTAL RANKING	30

The following rankings provide general guidance about how to determine vulnerability ranking.

___Not Vulnerable: (7)
___Low Vulnerability: (8-14)
___Moderate Vulnerability: (15 – 21)
___High Vulnerability: (22 – 28)
_X__Very High Vulnerability: (29 – 35)

Saladak Nihmoak, U

The Saladak Nihmoak community is located in the municipality of U, which is on the northeast part of Pohnpei State. According to the 2010 census the population is 304.

Status and Trends of Natural Defenses

- Current Condition – the community perceives that all of their natural defenses (i.e. coral reefs, seagrass beds, mangroves, rives, and forests) are in a degraded state.

- Changes over time and reason for changes – Mangroves and are perceived to be getting worse over time. The main reasons for these changes are trash, king tides; and erosion of stream banks and sedimentation from upland filling in mangroves. Rivers area also perceived to be getting worse. The quantity of water is not flowing like it used to due to upland development for homes and farming that destroyed the area near where the river water begins. The quality has also gotten work due to pigpens and human waste that runs into the water. This is to due to the fact that people are living and using land adjacent to streams.

Threat and Vulnerability Assessment

This section provides the results of the focus group discussion and summation vulnerability ranking. The full table of numerical ranking is provided in Appendix A.

Threats to Mangroves & Root Causes

The main threats to mangroves perceived by the community are trash, dredging of channels that change the currents, and filling of land for small buildings and homes. People locate small landfills in the mangroves as a convenient place to dispose of trash. However as high tides occur (and are getting higher), the trash moves around and gets all over the mangroves. People clear and fill in mangroves to increase their land along the shoreline and have easy access to the ocean. Dredging occurs offshore by private companies through municipal and state government concessions to provide fill for development. This changes the currents of the near shore and impacts mangroves. Channels are also dredged through the mangroves to store and protect boats. Threats to rivers are mostly due to development, which causes sedimentation into streams, and piggeries and human waste that pollute the water. Rules are not in place to protect mangroves. Although a permit is required to cut mangroves, there are no regulations about how much or where they can be cut.

Management Effectiveness of Mangroves

The main road runs behind all the mangrove areas in this community and many individual houses are also located in the mangroves, thereby eliminating the ability for most mangroves to migrate. Most "lower areas" of streams also have homes adjacent to them as well, which would block migration of mangroves inland. There is one area in the community that has taro patches adjacent to the stream, which are regularly flooded by rainwater. This area may be possible for mangroves to move into. There are no regulations for the protection of mangroves. However the chief is very interested in doing more and has organized clean ups by youth group to begin community efforts. The youth group and women's group are currently helping the community to carry out regular trash clean ups. The chief wants to move forward with more actions like addressing piggeries. The women's group also planted vegetation (i.e., pandanas) on backside of mangroves and in front of the road around 2015 to protect the shoreline.

Community Dependence on Mangroves for Livelihood

A very significant amount of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years. Additionally, a very significant amount of infrastructure and community buildings are also located in this unsafe area. Specifically, the main road and bridges are in this area that provide the community access to the rest of the island including the hospital, stores, etc. Few community members (1-25%) are dependent on the mangroves as a source of food and building materials and none of them are dependent on mangroves as a source of income. However, they feel the population is increasing and putting more pressure on the mangroves for food.

Adaptive Capacity of Community

Community members feel they have enough access to information, skills, resources, and/or support to address flooding and erosion issues. The school is a higher safe zone in times of disaster and the building was designed as a shelter. It also has water tanks to provide fresh water in times of need. For flooding and erosion that will get worse with climate change, they don't feel they have the resources to cope with these changes so are depending on the government to provide resources. They have land that they can relocate to outside the community but don't they have funds to relocate or build new houses. There are currently no rules or policies to prevent people from developing in unsafe areas that are subject to flooding and erosion over time.

Vulnerability Ranking

- Mangroves - Based on the discussions, the community ranked the vulnerability of the mangroves as highly vulnerable to the impacts of climate change. This is mostly due to the degraded condition of mangroves and streams, high number of threats, and lack of management of these systems.

- Community - Based on the discussions, the community ranked the vulnerability of the community in relation to mangroves (or active shorelines) as very highly vulnerable. This is mostly due to the fact that most of the community is living within or near mangroves and there is little ability to afford to relocate, as well as the lack of policies to prevent people from developing in unsafe areas.

Early Actions to Reduce Impacts of Climate Change to Mangroves and the Community

The table below shows the full list of actions developed and the ***top three priority actions identified by the community in bold.***

1. ***Utilize youth and municipal government to address trash***
2. ***Have the community build collaboration to address the water pollution /contamination sources. To address also address the low flow – do outreach with community that lives upland about clearing riverbanks. Also stop clearing of mangroves.***
3. *Degrading of mangroves – address the dredging. Propose the community should have a voice in the process.*
4. ***Community wants to meet U municipal government or council representative to develop a policy that will protect the mangroves.***
5. *Start planning for relocation of community members who are in unsafe areas*

Vulnerability Ranking Tables

Table 1: Mangrove Ecosystem Vulnerability (E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)						
	1 Very Healthy	2 Healthy	3 Fair	4 Degraded	5 Very Degraded	**Score**
(S) Rank the current condition of your **Mangroves**	1	2	3	4	5	4
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(S) Rank the current condition of your **Seagrass Beds**	1	2	3	4	5	4
(S) Rank the current condition of your **Rivers**	1	2	3	4	5	4
(S) Rank the current condition of your **Forests**	1	2	3	4	5	4
How have mangroves changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4
How have rivers changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4

How are the non-climate threats to your mangroves /rivers and streams?	1 None	2 Some	3 Moderate	4 Significant	5 Very Significant	4
How much areas behind mangroves or beside lower streams is free from any structures (e.g. roads, buildings, steep cliffs) that would allow them to move inland ?	1 Migration/ Resres areas very highly available	2 Migration/ Resres areas well available	3 Some Migration/ Resres areas are available	4 Few Migration/ Resres areas are available	5 No Migration/ Resres areas are available	3
How effective are current management efforts to protect mangroves?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	4
					TOTAL RANKING	39

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (5-9)**
- — **Low Vulnerability: (10 -19)**
- — **Moderate Vulnerability: (20 – 29)**
- **X High Vulnerability: (30 – 39)**
- — **Very High Vulnerability: (40 -50)**

Table 2: Social Vulnerability

(D = Dependence, SAC = Social Adaptive Capacity)

	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	**Score**
D) How much of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	5
(D) How much major infrastructure placed in the active shoreline and currently or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	5
(D) How much of the community is highly dependent on mangroves for livelihood?	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	2
(SAC) How much information, skills, resources, and/or support are available to the community to address flooding and erosion issues?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	2
(SAC) How many options and resources are available for families, and infrastructure to be relocated?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	5
SAC) How many options and resources are available for families who are dependent on	1 More than	2 Enough	3 Moderate	4 Little	5 None	5

mangroves for livelihood to access alternatives for food, income, or building material?	enough		amount			
(SAC) How effective are community agreements or rules to ensure safe development practices that consider climate impacts such as sea level rise and more intense storms?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	5
					TOTAL RANKING	29

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (7)**
- — **Low Vulnerability: (8-14)**
- — **Moderate Vulnerability: (15 – 21)**
- — **High Vulnerability: (22 – 28)**
- **X Very High Vulnerability: (29 – 35)**

Seinwar, Kitti

The Seinwar community is located in the municipality of Kitti, which is on the southwest part of Pohnpei State. According to the 2010 census the population is 114.

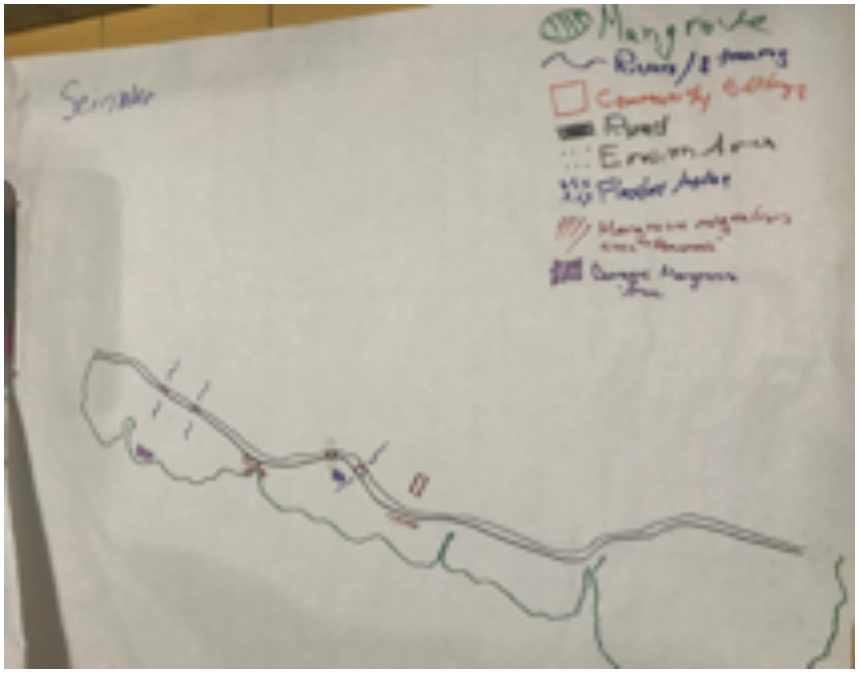
Status and Trends of Natural Defenses

- Current Condition – – the community perceives that all of their natural defenses (i.e. coral reefs, seagrass beds, mangroves, and rives) are in a degraded state. However, forests are perceived to be in healthy condition.

- Changes over time and reason for changes – Additionally these degraded systems are getting somewhat worse of time. The mangrove and seagrass are degraded because of dredging and trash. The dredging causes the current or changes of the water flow and impacts both the mangroves, sea grass and marine life. In the past people could fish close to the mangrove areas but now they cannot because there are no more fish. Mangroves are also degraded from trash. Rivers have also changed for the worse due to soil erosion. The size of the rivers are larger because of soil erosion but the quantity of the water is lower. There two main rivers in the community but they both have houses or buildings close to them. River water is also not clean due to pigpens and trash.

Threat and Vulnerability Assessment

This section provides the results of the focus group discussion and summation vulnerability ranking. The full table of numerical ranking is provided in Appendix A.



Threats to Mangroves & Root Causes
The two major human activities threatening the mangroves currently is dumping trash within the mangrove and washing waste from pigpens into rivers and mangroves. While dredging is not happening now, the area is still affected from the past offshore dredging done by state and municipal government concessions for fill to be used in development. The community does not perceive that there are any areas where mangroves can migrate because the road is behind it and some of the community is living close to the shoreline, building their houses near mangroves or using the mangrove as trash areas.

Management Effectiveness of Mangroves
Traditional resource management practices are not being implemented. There are regulations from government that prohibit the disposal of trash in the mangroves. Most people are aware of and understand these regulations but do not comply and it is not enforced. There was an awareness program done in 2017 by the Catholic mission called Mobil that has encouraged some community members to work together to clean up their areas of land. They've started collecting trash and making sure that its not going into the mangrove or the shoreline but this is not consistent.

Community Dependence on Mangroves for Livelihood
A moderate amount of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years. However, a very significant amount of infrastructure and community buildings are also located in this unsafe area. Specifically, the school, main road and bridges are in this area that provide the community access to

the rest of the island including the hospital, stores, etc. Few community members (1-25%) are dependent on the mangroves as a source of food and building materials and none of them are dependent on mangroves as a source of income.

Adaptive Capacity of Community

Community members feel they only have a moderate amount of information, skills, resources, and/or support to address flooding and erosion issues. Specifically, information like emergency & disaster broadcast is insufficient. People do not get disaster warning information before natural events occur. For example, in March 2018, there was a storm that brought extreme rains and flooding. There was no public broadcast about the storm to warn people about the possible safety hazards. People only became aware of the situation after the bridges and roads were unsafe to use.

Some community members have skills on how to cope with negative impacts of flooding events such as evacuating from their houses to safe zones like the church building, which is a storm shelter. While, most people do not have monetary resources they do feel they can access food in times of need through support from neighboring communities that are not affected.

Families have the ability to temporarily evacuate to higher land areas, and stay with other families or stay at the church when needed. However permanent relocation is very hard because they don't have the resources to move and build new homes. There is also a school in the low lying area that is likely to flood over time. , The community believes that one day the school will need to relocated to a safer place. The community also feels they have options for alternative food sources as they have local foods planted like banana, breadfruit, yam and soft taro in areas safe from flooding and erosion. Currently most of the community members are not using the mangrove as source of income so they have other options available to them. They are not using the mangroves as a source of building materials as most of them buy imported materials. Its unclear how this could change if costs of imported materials were to change over time.

There are currently no community agreements or rules to ensure safe development practices. They expressed that now that they are aware of climate change, they understand that their development practices are not working within their community. They do know that one day they will need to move their school building from the shoreline. However, most of the houses are also built close to the shore or mangrove areas because of easy access and it's unclear how they will address this challenge.

Vulnerability Ranking

- Mangroves - Based on the discussions, the community ranked the vulnerability of the mangroves as very highly vulnerable to the impacts of climate change. This is mostly due to the degraded condition of mangroves, seagrass beds, and streams, past and present threats, and lack of management of these systems and compliance with regulations, and finally lack of areas for mangroves to possibly migrate with sea level rise.

- Community - Based on the discussions, the community ranked the vulnerability of the community in relation to mangroves (or active shorelines) as highly vulnerable. This is mostly due to the fact that most of the community is living within or near mangroves and there is little ability to afford to relocate. The only school is also in a low–lying hazard prone area. There is also a lack of warning systems about natural hazards and a lack of policies to prevent people from developing in unsafe areas. However, people also felt they have some good coping mechanisms through social networks, access to food and income sources, and some support from government agencies to relocate the school.

Early Actions to Reduce Impacts of Climate Change to Mangroves and the Community

The table below shows the full list of actions developed and the ***top three priority actions identified by the community in bold.***

Actions
1. Have the community work together to improve their areas to clean up trash and use dry litter pigpens
2. Install water tanks (tied for 3rd)
3. Use a petition to stop future dredging from happening. (tied for 3rd)
4. Develop a mangrove management plan
5. ***Conduct more Awareness on climate change***
6. Start planning on how people who live close to mangroves can move inland or to safer areas.

Vulnerability Ranking Tables

Table 1: Mangrove Ecosystem Vulnerability (E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)						
	1 Very Healthy	2 Healthy	3 Fair	4 Degraded	5 Very Degraded	**Score**
(S) Rank the current condition of your **Mangroves**	1	2	3	4	5	4
(S) Rank the current condition of your **Reefs**	1	2	3	4	5	4
(S) Rank the current condition of your **Seagrass Beds**	1	2	3	4	5	4
(S) Rank the current condition of your **Rivers**	1	2	3	4	5	4
(S) Rank the current condition of your **Forests**	1	2	3	4	5	2
How have mangroves changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4
How have rivers changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4
How are the non-climate threats to your mangroves /rivers and streams?	1 None	2 Some	3 Moderate	4 Significant	5 Very Significant	4
How much areas behind mangroves or beside lower streams is free from any structures (e.g. roads, buildings, steep	1 Migration/ Resres areas	2 Migration/ Resres areas	3 Some Migration/	4 Few Migration/	5 No Migration/ Resres areas	5

cliffs) that would allow them to move inland ?	very highly available	well available	Resres areas are available	Resres areas are available	are available	
How effective are current management efforts to protect mangroves?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	4
					TOTAL RANKING	42

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (5-9)**
- — **Low Vulnerability: (10 -19)**
- — **Moderate Vulnerability: (20 – 29)**
- — **High Vulnerability: (30 – 39)**
- **X Very High Vulnerability: (40 -50)**

Table 2: Social Vulnerability (D = Dependence, SAC = Social Adaptive Capacity)						
	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	**Score**
D) How much of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	3
(D) How much major infrastructure placed in the active shoreline and currently or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	5
(D) How much of the community is highly dependent on mangroves for livelihood?	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	2
(SAC) How much information, skills, resources, and/or support are available to the community to address flooding and erosion issues?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	3
(SAC) How many options and resources are available for families, and infrastructure to be relocated?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	2
SAC) How many options and resources are available for families who are dependent on	1 More than	2 Enough	3 Moderate	4 Little	5 None	4

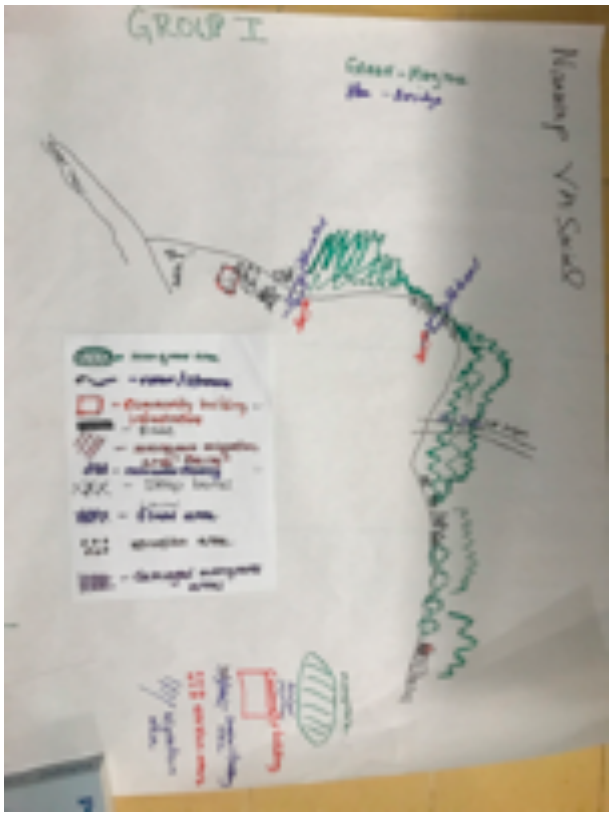
mangroves for livelihood to access alternatives for food, income, or building material?	enough		amount			
(SAC) How effective are community agreements or rules to ensure safe development practices that consider climate impacts such as sea level rise and more intense storms?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	4
					TOTAL RANKING	23

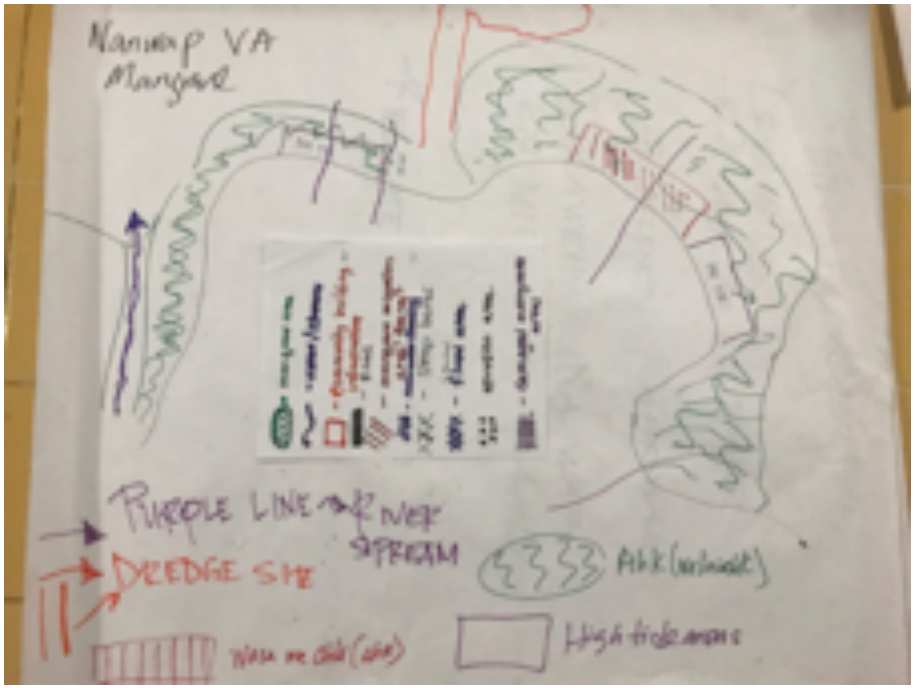
The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (7)**
- — **Low Vulnerability: (8-14)**
- — **Moderate Vulnerability: (15 – 21)**
- **X High Vulnerability: (22 – 28)**
- — **Very High Vulnerability: (29 – 35)**

Nanwap, Madolenihmw

Nanwap is located in the municipality of Madolenihmw, and is on the eastern part of Pohnpei State. The total population size for Nanwap from the 2010 Pohnpei census is 579.





Status and Trends of Natural Defenses

Current Condition – the community perceives that their natural defenses (i.e. coral reefs, seagrass beds, mangroves, and forests) are mostly degraded except their mangroves, which are healthy and forests, which are in fair condition.

Changes over time of mangroves and rivers and reason for changes – Mangrove conditions are getting somewhat better because they are growing and recovering from previous dredging activities that cleared mangroves from the area. Reefs are degrading including a decline in fish and coral health. These systems are not the same as 10-20 years prior, which they believe is in part due to dredging that changed the ocean current, which had negative impacts to the reef. The community also perceives their seagrass beds are degrading due to of hot weather and bigger waves. Rivers however are also getting somewhat worse. Flooding of the community was not previously experienced before the construction of the road and bridge. They believe the flow of the river water was changed with this construction, causing flooding events during heavy rains and low quantity when there's no rain.

Threat and Vulnerability Assessment

This section provides the results of the focus group discussion and summation vulnerability ranking. The full table of numerical ranking is provided below.

Threats to Mangroves & Root Causes

The mangroves are perceived to be healthy and improving over time from previous dredging which is noted as the main threat from human activity. However, the dredging is no longer happening and they community wants to see the mangroves continue to recover.

Management Effectiveness of Mangroves

The community does not feel that mangroves are able to migrate inland over time as sea levels rise due to the road which blocks migration inland. The Madolenihmw municipal government requires people to get a permit if they want to cut mangrove trees. The community also has a guard

house in the mangrove area to monitor their marine protected area. The community actively enforces their MPA and was the site of a recent Rare Pride campaign that helped foster improved enforcement of the site. The MPA however does not include protections of the mangroves.

Community Dependence on Mangroves for Livelihood
Almost all of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years. Additionally parts of the main road is adjacent to the mangroves that currently experiences flooding during heavy rains and will get worse in next ten years with sea level rise and extreme rain events. The road and bridge changed the waterways (streams and rivers) and this causes flooding in the community during heavy rains when some people cannot cross the bridge and access emergency services. The community guardhouse is also in the mangrove area, which will be exposed to coastal flooding. While the guardhouse itself is on stilts, the road to get to the guardhouse is low-lying and will likely experience more flooding over time. Only a small amount of the community is dependent mangroves for food sources (~5%), and about a quarter dependent on mangroves for income and/or building materials. Additionally during hot and dry weather there is less water available in the community.

Adaptive Capacity of Community
The community does not feel that they have access to resources to help reduce their vulnerability to future storms and flooding events. Based on the their observations, the school is in safe zone and it can be used as a shelter when comes to disaster like flooding or storm surges etc. During times of emergencies, the municipal government opens the school as a community storm shelter. They also have a community house close to the school area, which can also be used as a shelter in cases of emergency. Option for relocation to safer areas is not perceived as an option. There are no agreements or rules to ensure safe development practices that consider climate impacts.

Vulnerability Ranking

- Mangroves - Based on the discussions, the community ranked the vulnerability of the mangroves as highly vulnerable to the impacts of climate change. While the condition seems to be improving over time and they feel their management is effective in protecting these ecosystems, there are some serious challenges. The main reason for the high ranking is that their coastal road runs adjacent to the mangroves and changes water flow from rivers. The road therefore blocks water flow into the mangroves (and flooding the community) and also will block the mangroves from being able to retreat inland.

- Community - Based on the discussions, the community ranked the vulnerability of the community in relation to mangroves (or active shorelines) as highly vulnerable. This is mostly due to the fact that most of the community is on or near mangroves including their main road. They feel there are few resources available to help support relocation of homes, few alternatives available if they are not able to continue using the mangroves for livelihoods, and a lack of policies to prevent people from developing in unsafe areas.

Early Actions to Reduce Impacts of Climate Change to Mangroves and the Community

The table below shows the full list of actions developed by the community.

Social Group Actions
1. People that are living at the unsafe areas, need to start planning to move or relocate to safe areas, however, this will require a lot of money which the community does not have.
2. The community believes that there's something that can be done, but that they first need to understand their situation better. They would like to develop a community awareness program that can help people understand the impacts of climate change and ways to prevent risks and how to develop safety guidelines when comes to disaster.

Vulnerability Ranking Tables

Table 1: Mangrove Ecosystem Vulnerability (E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)						
	1 Very Healthy	2 Healthy	3 Fair	4 Degraded	5 Very Degraded	**Score**
(S) Rank the current condition of your **Mangroves**		2				2
(S) Rank the current condition of your **Reefs**				4		4
(S) Rank the current condition of your **Seagrass Beds**				4		4
(S) Rank the current condition of your **Rivers**				4		4
(S) Rank the current condition of your **Forests**			3			3
How have mangroves changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	2
How have rivers changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4
How are the non-climate threats to your mangroves /rivers and streams?	1 None	2 Some	3 Moderate	4 Significant	5 Very Significant	3
How much areas behind mangroves or beside lower streams is free from any structures (e.g. roads, buildings, steep cliffs) that would allow them to move	1 Migration/ Resres areas very highly	2 Migration/ Resres areas well	3 Some Migration/ Resres	4 Few Migration/ Resres	5 No Migration/ Resres areas are available	5

inland ?	available	available	areas are available	areas are available		
How effective are current management efforts to protect mangroves?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	2
					TOTAL RANKING	33

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (5-9)**
- — **Low Vulnerability: (10 -19)**
- — **Moderate Vulnerability: (20 – 29)**
- **X High Vulnerability: (30 – 39)**
- — **Very High Vulnerability: (40 -50)**

Table 2: Social Vulnerability

(D = Dependence, SAC = Social Adaptive Capacity)

	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	**Score**
D) How much of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years?						5
(D) How much major infrastructure placed in the active shoreline and currently or will be exposed to flooding or erosion within the next 10 years?						5
(D) How much of the community is highly dependent on mangroves for livelihood?	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	2
(SAC) How much information, skills, resources, and/or support are available to the community to address flooding and erosion issues?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	2
(SAC) How many options and resources are available for families, and infrastructure to be relocated?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	2
SAC) How many options and resources are available for families who are dependent on	1 More than	2 Enough	3 Moderate	4 Little	5 None	5

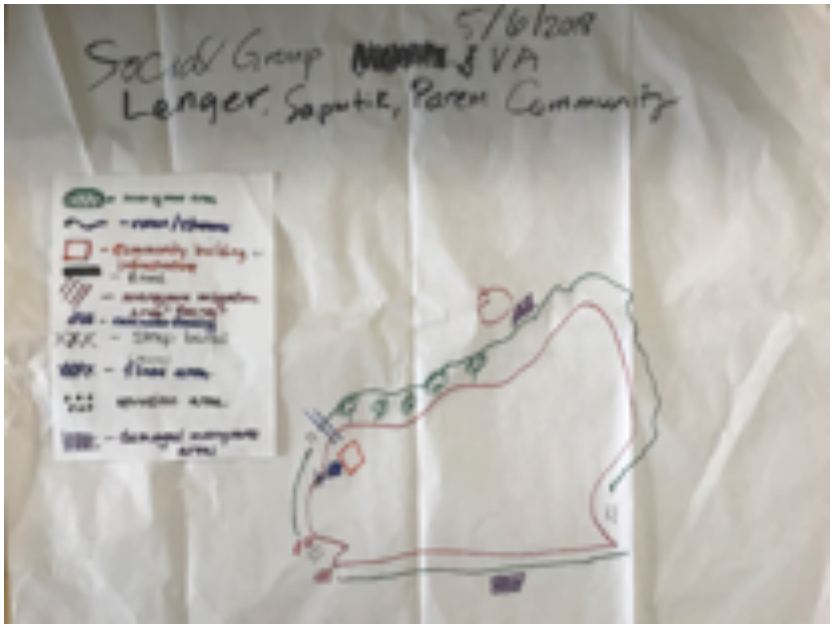
mangroves for livelihood to access alternatives for food, income, or building material?	enough		amount			
(SAC) How effective are community agreements or rules to ensure safe development practices that consider climate impacts such as sea level rise and more intense storms?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	5
					TOTAL RANKING	26

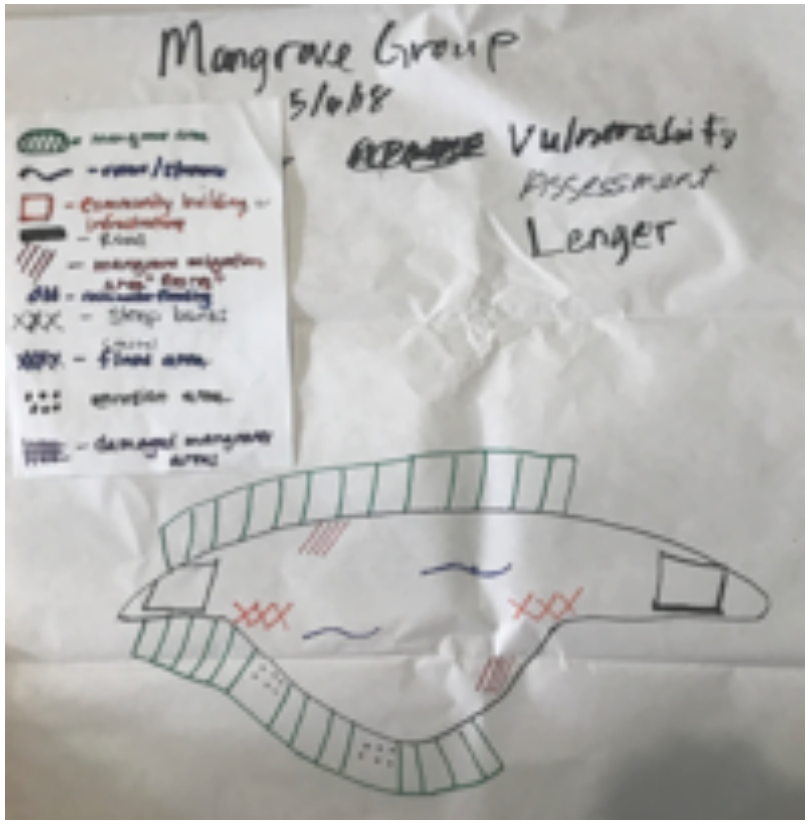
The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (7)**
- — **Low Vulnerability: (8-14)**
- — **Moderate Vulnerability: (15 – 21)**
- **X High Vulnerability: (22 – 28)**
- — **Very High Vulnerability: (29 – 35)**

Lenger, Nett

Lenger and Parem are communities located on a small island in the municipality of Nett, which is on the northern part of Pohnpei State. The total population size for Lenger/Parem from the 2010 Pohnpei census is 669, with 528 males and 141 females.





Status and Trends of Natural Defenses

Current Condition – the community perceives that their natural defenses (i.e. coral reefs, seagrass beds, mangroves, and forests) are in various degrees of health.

- **Mangrove:** mangroves are perceived to be healthy because they are growing back and expanding in some areas.
- **Reefs:** reefs are perceived to be in fair condition, staying the same with no big changes over time.
- **Sea grass:** seagrasses are perceived to be healthy because they notice them growing and expanding.
- **River:** there are no rivers as this community is on a small island. There is a dam and some groundwater springs that provide freshwater which are considered in degraded condition. Freshwater is one of the main issues on the island as the quantity is low and they do not have enough water when there is hot weather or no rain.
- **Forest**: because this is a small island there is only a small area of forest with smaller trees than the main island of Pohnpei. The forest was perceived to be in degraded condition.

Changes over time of mangroves and rivers and reason for changes – The community has seem mangroves grow and new seedlings in areas where they did not growing in the past. There are some areas with no mangrove trees growing and where soil erosion is also taking place. There are no rivers but freshwater sources have declined due to weather such as high heat and lack of rain.

Threat and Vulnerability Assessment

This section provides the results of the focus group discussion and summation vulnerability ranking. The full table of numerical ranking is provided below.

Threats to Mangroves & Root Causes

While the mangroves are perceived to be healthy and improving over time, there are some human threats. The main issue or threat from humans is trash and littering. Many people from the main island use Lenger island as a recreational area and picnic on the island. However they often leave their trash behind at the picnic area, which ends up on the shoreline and in the mangroves.

Management Effectiveness of Mangroves

The community discussed and identified some areas where mangroves might able to migrate inland over time as sea levels rise. These are small areas around the island that are not blocked by any infrastructure or homes. Currently the main regulation protecting mangroves is a permitting process, which requires people to get a permit if they want to cut mangrove trees. However, the permit does not limit the number of trees they can cut so they are concerned about the effectiveness of that regulation. They also feel there is a need to improve enforcement of the permitted activities.

Community Dependence on Mangroves for Livelihood
Almost all of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years. They do not have roads; only foot trails for walking and there are few infrastructure or community buildings that are located in this unsafe area. There is a picnic area and basketball court located near the shoreline. A significant amount of the community is also dependent mangroves for livelihood with up to a quarter dependent on them for food sources and half to three quarters dependent on mangroves for building materials.

Adaptive Capacity of Community
While funding is not available for relocation, the Nett Government is providing support to help identify places that the community can move to if needed due to natural disasters. Some families are receiving remittances from families living in US or support from families working for the government and private sectors in Pohnpei, which could help with relocation. There are no agreements or rules to ensure safe development practices that consider climate impacts. The decision on where and how to build is entirely up to a landowner so anyone can build close to the shoreline at their own risk. While the community would like to consider climate risk in decision-making, alternatives for building in other areas or using safer construction practices are also dependent on resources, which they don't feel they have access to.

Vulnerability Ranking

- Mangroves - Based on the discussions, the community ranked the vulnerability of the mangroves as highly vulnerable to the impacts of climate change. While the condition seems to be improving over time, they considered the threats to be severe and management as ineffective in protecting these ecosystems. However, in discussions, the threats were only about trash so it's not clear that threats are actually severe. Additionally "rivers" and changes to "rivers" were ranked as degraded and gotten worse. The group considered "freshwater springs and a damn" instead of rivers/streams which may have skewed the results and otherwise ranked moderately. The community also identified some areas for mangroves to be able to migrate over time.

- Community - Based on the discussions, the community ranked the vulnerability of the community in relation to mangroves (or active shorelines) as very highly vulnerable. This is mostly due to the fact that most of the community is on or near mangroves and there is a high dependence on mangroves for building material and in some cases food. They feel there are few resources available to help support relocation of homes, few alternatives available if they are not able to continue using the mangroves for livelihoods, and a lack of policies to prevent people from developing in unsafe areas.

Early Actions to Reduce Impacts of Climate Change to Mangroves and the Community

The table below shows the full list of actions identified by the community.

Social Group Actions
• The community would like to work with local government increase awareness on climate change impacts and find ways that the community can cope with climate change such as flooding and storms
• The community itself will work together to make sure that no new buildings will be build in an unsafe areas, but they will need resources and help from the local government and state
• For future development the land owners need to consider in their planning ways to improve their building and how to minimize building new houses close to unsafe areas
Mangrove Group Actions
• Trash: The community can work with Nett municipal government and state government develop a law or regulation to help stop littering on the island or at the picnic areas. They also need awareness program and enforcement program to help stop the littering.
• Water issues: seek support from the legislature or congressman to help provide water tank for the community
• Soil erosion: find ways to plant mangrove trees or seedlings around the area where soil is starting to erode.

- It has identified in the mapping session that there are some places that the mangrove can migrate toward the landside. Since its small parts of areas that mangroves can migrate community can work together and set aside these areas for mangrove migration over time. The community can agree and work together to protect such areas for migration but they really need support from the government to include it in the regulations.

Vulnerability Ranking Tables

Table 1: Mangrove Ecosystem Vulnerability (E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)						
	1 Very Healthy	2 Healthy	3 Fair	4 Degraded	5 Very Degraded	**Score**
(S) Rank the current condition of your **Mangroves**	1	2	3	4	5	2
(S) Rank the current condition of your **Reefs**	1	2	3	4	5	3
(S) Rank the current condition of your **Seagrass Beds**	1	2	3	4	5	2
(S) Rank the current condition of your **Rivers**	1	2	3	4	5	4
(S) Rank the current condition of your **Forests**	1	2	3	4	5	4
How have mangroves changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	2
How have rivers changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4
How are the non-climate threats to your mangroves /rivers and streams?	1 None	2 Some	3 Moderate	4 Significant	5 Very Significant	4
How much areas behind mangroves or beside lower streams is free from any structures (e.g. roads, buildings, steep cliffs) that would allow them to move	1 Migration/ Resres areas very highly	2 Migration/ Resres areas well	3 Some Migration/ Resres	4 Few Migration/ Resres	5 No Migration/ Resres areas are available	3

inland ?	available	available	areas are available	areas are available		
How effective are current management efforts to protect mangroves?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	4
					TOTAL RANKING	32

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (5-9)**
- — **Low Vulnerability: (10 -19)**
- — **Moderate Vulnerability: (20 – 29)**
- **X High Vulnerability: (30 – 39)**
- — **Very High Vulnerability: (40 -50)**

Table 2: Social Vulnerability (D = Dependence, SAC = Social Adaptive Capacity)						
	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	**Score**
D) How much of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	5
(D) How much major infrastructure placed in the active shoreline and currently or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	2
(D) How much of the community is highly dependent on mangroves for livelihood?	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	4
(SAC) How much information, skills, resources, and/or support are available to the community to address flooding and erosion issues?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	5
(SAC) How many options and resources are available for families, and infrastructure to be relocated?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	4
SAC) How many options and resources are available for families who are dependent on	1 More than	2 Enough	3 Moderate	4 Little	5 None	4

mangroves for livelihood to access alternatives for food, income, or building material?	enough		amount			
(SAC) How effective are community agreements or rules to ensure safe development practices that consider climate impacts such as sea level rise and more intense storms?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	5
					TOTAL RANKING	29

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (7)**
- — **Low Vulnerability: (8-14)**
- — **Moderate Vulnerability: (15 – 21)**
- — **High Vulnerability: (22 – 28)**
- **X Very High Vulnerability: (29 – 35)**

Wone, Kitti

The Wone community is located in the municipality of Kitti, which is on the southwest part of Pohnpei State. According to the 2010 census, the population of the community is 868.

Status and Trends of Natural Defenses

Current Condition – the community perceives that some of their mangroves are in very healthy condition, their reefs are in fair condition, and the other natural defenses (i.e. seagrass, rivers, and forests) are in a degraded state.

Changes over time and reason for changes: Mangroves are perceived to be healthy getting somewhat better over time because there are more mangroves now and growing as compared to 40 years ago. However the community also noted that 60 years ago mangrove crab and other living creatures in the mangroves where what people depended on for a main food source. Today people collect mangrove crabs and other creatures to sell for income and buy imported goods instead. Additionally, in the past, people could fish close to the shore but now they have to go all the way to the reef to fish and it's really hard to find fish close to mangrove or the shore. Therefore, mangroves themselves are improving but overharvesting is causing the species that live in the mangroves to decline. Reef are perceived to be in fair condition with some areas of the reefs being good where the community can catch fish and other areas being degraded from sediment. Seagrass beds are perceived to be declining because of turbidity.

Additionally, Rivers are perceived to be getting somewhat worse over time. They've noticed more algae growing than in the past. The community believes the Pohnpei weather in the past was much cooler than now. Additionally the population is growing and more people are building their houses close to the rivers, and have pig pens and out houses nearby, causes the changes to water quality of the rivers. They also notice that the rivers are much wider now, but they are shallower. Clearing of forests for sakau planting also causes more sediment into the rivers. Finally forests are declining because of upland clearing for sakau farming which is also causing sedimentation on sea grass beds and reefs and contributing to their decline.

Threat and Vulnerability Assessment

This section provides the results of the focus group discussion and summation vulnerability ranking. The full table of numerical ranking is provided in Appendix A.

Threats to Mangroves & Root Causes

While mangroves are currently healthy and improving over time, the associated target species (fish and invertebrates) are no longer easy to find as compared to the past. This is perceived to be due to the cash economy and over-harvesting to sell these species for income. Other threats to mangroves included contamination from pigpens, soil erosion/sediment from sakau planting, and trash such as plastics. Local rivers are in degraded condition. Rivers are being contaminated from outhouses and washing waste from pigpens into rivers. Additionally clearing of forest for building houses near streams and for sakau planting is increasing the amount of sediment in rivers.

Management Effectiveness of Mangroves

There are no roads or settlement close to the mangrove area and the community believes there's a lot of space available to allow the mangrove to move in land as sea levels rise. There's only the end of one road that's close to the mangrove. However, they do not believe that management is effective at protecting mangroves. Mangrove permits allow people from outside the municipality to cut trees in Kitti. They have been working together to clear up trash along the road side which is something they feel has been working well.

Community Dependence on Mangroves for Livelihood

Only a small amount (1-25%) of community households live on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years and very little infrastructure with only one road (not a main road). Few community members (1-25%) are dependent on the mangroves as a source of food and building materials and none of them are dependent on mangroves as a source of income.

Adaptive Capacity of Community

While community members feel they only have no access to information, skills, resources, and/or support to address flooding and erosion issues, they also have not experienced these events. From the mapping exercise, its clear that people are living away from the shoreline and houses are built inland so there is no need to relocate homes from impacts of sea level rise and coastal flooding. However some people live close to the rivers and these are areas that could need attention in the future. Currently only a small amount of the community members are using the mangrove as source of food, building materials, and income. They feel they have a moderate amount of options and resources available if these were no longer available, mostly through support from their families who live in the US.

There are currently no community agreements or rules to ensure safe development practices. They expressed management is not effective because there's no zoning law and no one obeys the set back regulations. Permitting system for mangrove cutting is also not effectively monitored and enforced.

Vulnerability Ranking

- Mangroves - Based on the discussions, the community ranked the vulnerability of the mangroves as highly vulnerable to the impacts of climate change. While the mangroves are currently healthy and growing, they no longer find the amount of important species they used to find in them. This is mostly due to over-harvesting. Other threats including contamination from pigpens, sedimentation from forest clearing for sakau planting, and trash. There is a permitting process for mangrove cutting but it's not monitored or enforced.

- Community - Based on the discussions, the community ranked the vulnerability of the community in relation to mangroves (or active shorelines) as moderately vulnerable. This is mostly due to the fact that most of the community is not living within or near mangroves and there very little infrastructure in this area. They also feel they have moderate amount of resources to cope with changes through social networks. However, there are no zoning laws to ensure people develop in safe areas and building near rivers is a concern especially with potential for flooding.

Early Actions to Reduce Impacts of Climate Change to Mangroves and the Community

The table below shows the full list of actions developed by the community.

Mangrove Group Actions
• Use of Bio Gas piggery system/dry litter system
• Work with the farmers to decrease forest clearing
• Recycle cans and each family need to take care of their own trash
• Regulations need to be revisited and amend
Social Group
• To develop safety guidelines for development - Each municipality needs to consider and include safety regulations for future development but especially for building houses. Need to have safety guidelines that people can use for future development. This will be cheaper than relocating families from unsafe areas.

Vulnerability Ranking Tables

Table 1: Mangrove Ecosystem Vulnerability (E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)						
	1 Very Healthy	2 Healthy	3 Fair	4 Degraded	5 Very Degraded	**Score**
(S) Rank the current condition of your **Mangroves**	1	2	3	4	5	1
(S) Rank the current condition of your **Reefs**	1	2	3	4	5	3
(S) Rank the current condition of your **Seagrass Beds**	1	2	3	4	5	4
(S) Rank the current condition of your **Rivers**	1	2	3	4	5	4
(S) Rank the current condition of your **Forests**	1	2	3	4	5	4
How have mangroves changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	2
How have rivers changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4
How are the non-climate threats to your mangroves /rivers and streams?	1 None	2 Some	3 Moderate	4 Significant	5 Very Significant	3
How much areas behind mangroves or beside lower streams is free from any structures (e.g. roads, buildings, steep	1 Migration/ Resres areas	2 Migration/ Resres areas	3 Some Migration/	4 Few Migration/	5 No Migration/ Resres areas	1

cliffs) that would allow them to move inland ?	very highly available	well available	Resres areas are available	Resres areas are available	are available	
How effective are current management efforts to protect mangroves?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	5
					TOTAL RANKING	31

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (5-9)**
- — **Low Vulnerability: (10 -19)**
- — **Moderate Vulnerability: (20 – 29)**
- **X High Vulnerability: (30 – 39)**
- — **Very High Vulnerability: (40 -50)**

Table 2: Social Vulnerability (D = Dependence, SAC = Social Adaptive Capacity)						
	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	**Score**
D) How much of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	2
(D) How much major infrastructure placed in the active shoreline and currently or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	2
(D) How much of the community is highly dependent on mangroves for livelihood?	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	2
(SAC) How much information, skills, resources, and/or support are available to the community to address flooding and erosion issues?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	5
(SAC) How many options and resources are available for families, and infrastructure to be relocated?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	
SAC) How many options and resources are available for families who are dependent on	1 More than	2 Enough	3 Moderate	4 Little	5 None	3

mangroves for livelihood to access alternatives for food, income, or building material?	enough		amount			
(SAC) How effective are community agreements or rules to ensure safe development practices that consider climate impacts such as sea level rise and more intense storms?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	5
					TOTAL RANKING	19

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (7)**
- — **Low Vulnerability: (8-14)**
- **X Moderate Vulnerability: (15 – 21)**
- — **High Vulnerability: (22 – 28)**
- — **Very High Vulnerability: (29 – 35)**

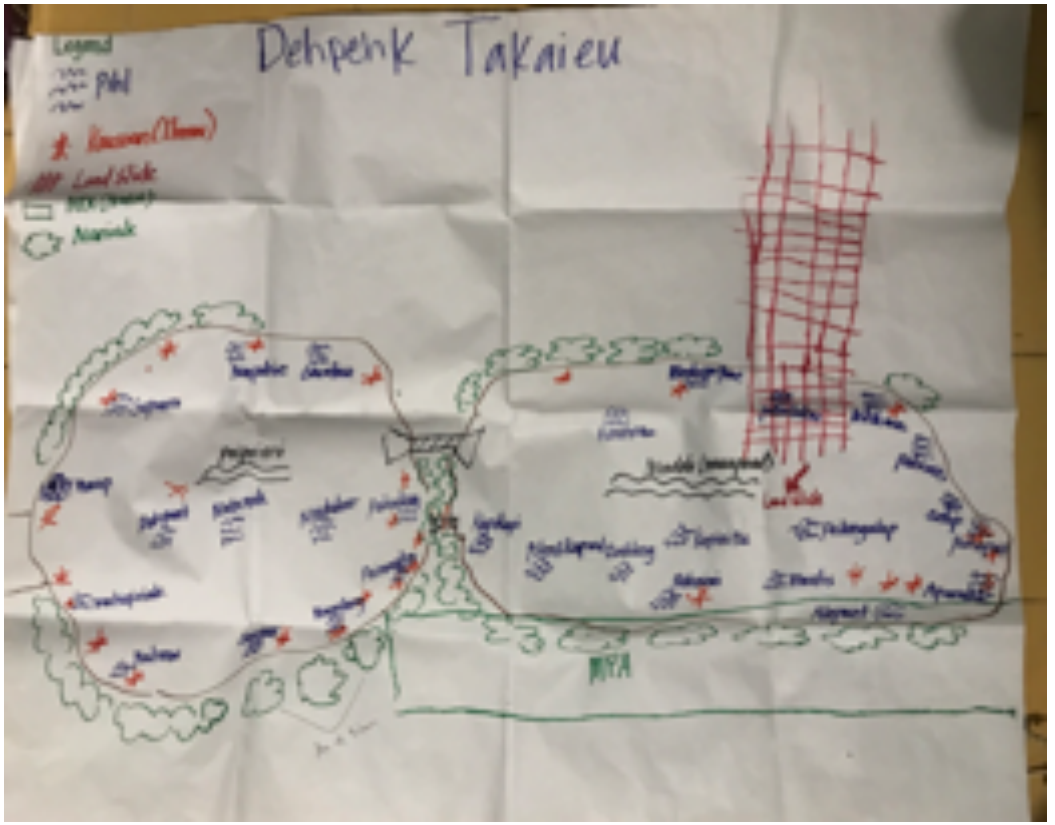
Depehk/Takaiou, U

Depehk/Takaiou is on an island located in the municipality of U, which is on the northeast part of Pohnpei State. The population of the community is roughly 168.

Status and Trends of Natural Defenses

Current Condition – the community perceives that their natural defenses (i.e. coral reefs, seagrass beds, mangroves, rives, and forests) are in various degrees of health.

- Mangroves are perceived to be healthy in general.
- Reefs are perceived to be in fair health.
- Sea grass populations are perceived to be in degraded condition and that they are not growing as they did in the past.
- There are no rivers on the island but there are springs and ground water, which are perceived to be in a very degraded condition. The quantity of water has decreased and is really low. It is believed this is due to changes in the weather because when there is no rain, so the community has a problem with the quantity of water available to them. There



is also a community belief that if people who were not born in community clean the water source it can cause the quantity of water to get low.

- Forest areas are considered degraded because the trees in the past were much bigger in size, and both the trees and forest area are now smaller. A landslide occurred recently in March 2018.

Changes over time and reason for changes – Mangroves and are perceived to be getting better over time. Community members noticed that mangroves areas have been growing in size. One of the elders of the community wondered if mangroves were invasive because as a boy the area that now has mangroves was and area where people could walk and see people on their canoes from the shoreline. Today the mangroves are everywhere on the island and covering their view out to sea from land. Mangroves are also continuing to grow. Groundwater sources such as springs have changed for worse and the quantity is declining mainly due to hot weather and lack of rain. However, the community is noticing a decline in the species that grow in the mangroves that they target for fishing.

Threat and Vulnerability Assessment

This section provides the results of the focus group discussion and summation vulnerability ranking. The full table of numerical ranking is provided below.

Threats to Mangroves & Root Causes
In some areas of the shoreline, people cleared mangroves to improve their views and air circulation. The main threats the community perceives to mangroves are trash like from Pohnpei main-island and pigpens on the shoreline. It is believed that trash from plastic its also one of the reasons that seagrasses are no longer growing.

Management Effectiveness of Mangroves
The community identified some migration areas are available for mangroves and have noticed more mangroves growing. Approximately 60 years ago, mangroves did not surround the island. Today, mangroves are growing or covering the whole area. The community has a Marine Protected Area and associated management plan in which mangroves are listed as a target. However the priorities actions are more related to fish in the MPA than mangroves. U municipal government also has a permitting process to regulate the harvest mangrove trees. However the community feels that it is not really enforced or designated officer that will

follow up and check the status of the permit when someone is collecting the mangrove trees. For these reasons they feel management of the mangroves in ineffective.

Community Dependence on Mangroves for Livelihood
All of the households except one lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years. There is no infrastructure or community buildings located in this unsafe area. Only a few members are dependent on the mangrove for livelihood. This includes about 10% for food sources, 10% for income sources and 5% for building materials.

Adaptive Capacity of Community
Community members feel they have a moderate amount of information, skills, resources, and/or support to address flooding and erosion issues. The two communities have experiences major impacts including a landslide and were not able to cope well with the impacts. They feel they have sufficient options available for families and infrastructure to be relocated. They indicated they have other lands that can move to if needed but the main barrier is cost of relocation, they don't have funds to relocate at this time. They felt other options include working with government to help support costs of relocation or seeking support from family members (grown kids) who live on Pohnpei's main island. They also have sufficient options and resources available for families who are dependent on mangroves for livelihood to access alternatives for food, income, or building material. There are currently no rules or policies to prevent people from developing in unsafe areas that are subject to flooding and erosion over time that consider climate change impacts in Pohnpei.

Vulnerability Ranking

- Mangroves - Based on the discussions, the community ranked the vulnerability of the mangroves as highly vulnerable to the impacts of climate change. While the condition seems to be improving over time and there are some areas for them to migrate, they feel the threats are severe, and management is not effective in protecting these ecosystems. However, "rivers" and changes to "rivers" were ranked as degraded and gotten worse. The group considered "freshwater sources/ springs" instead of rivers/streams, which may have skewed the results and otherwise ranked moderately.

- Community - Based on the discussions, the community ranked the vulnerability of the community in relation to mangroves (or active shorelines) as highly vulnerable. This is mostly due to the fact that most of the community is on or near mangroves and there is the lack of policies to prevent people from developing in unsafe areas. However, they do feel they have access

to land to relocate and alternatives to food, building material, and income sources if they are not able to use mangroves for these purposes.

Early Actions to Reduce Impacts of Climate Change to Mangroves and the Community

The table below shows the full list of actions developed by the community.

Mangrove Group Actions
• Dry litter piggery - Pig pens on the shoreline: since they have limited space they would like to have dry litter piggery system, they want to work with local government and NGO like CSP to help get funding support to build dry litter pig pen
• Pick up trash- Trash/plastic from main island or Pohnpei: this is really hard to control but the community will work together to pick up trash or plastic on the shoreline
• Stop mangrove tree cutting - areas with mangrove clearing: community to work together and stop cutting down the mangrove trees even if they need air, they will start protecting the mangroves.
Social Group Actions
• The community did not have place to go when there's typhoon or storm. There's a need to work together to have a safe place ready for the community to stay during typhoons or storms.

Vulnerability Ranking Tables

Table 1: Mangrove Ecosystem Vulnerability (E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)						
	1 Very Healthy	2 Healthy	3 Fair	4 Degraded	5 Very Degraded	**Score**
(S) Rank the current condition of your **Mangroves**	1	2	3	4	5	2
(S) Rank the current condition of your **Reefs**	1	2	3	4	5	3
(S) Rank the current condition of your **Seagrass Beds**	1	2	3	4	5	4
(S) Rank the current condition of your **Rivers**	1	2	3	4	5	5
(S) Rank the current condition of your **Forests**	1	2	3	4	5	5
How have mangroves changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	2
How have rivers changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4
How are the non-climate threats to your mangroves /rivers and streams?	1 None	2 Some	3 Moderate	4 Significant	5 Very Significant	4
How much areas behind mangroves or beside lower streams is free from any structures (e.g. roads, buildings, steep cliffs) that would allow them to move	1 Migration/ Resres areas very highly	2 Migration/ Resres areas well	3 Some Migration/ Resres	4 Few Migration/ Resres	5 No Migration/ Resres areas are available	3

inland ?	available	available	areas are available	areas are available		
How effective are current management efforts to protect mangroves?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	5
					TOTAL RANKING	37

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (5-9)**
- — **Low Vulnerability: (10 -19)**
- — **Moderate Vulnerability: (20 – 29)**
- **X High Vulnerability: (30 – 39)**
- — **Very High Vulnerability: (40 -50)**

Table 2: Social Vulnerability (D = Dependence, SAC = Social Adaptive Capacity)						
	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	**Score**
D) How much of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	5
(D) How much major infrastructure placed in the active shoreline and currently or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	5
(D) How much of the community is highly dependent on mangroves for livelihood?	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	2
(SAC) How much information, skills, resources, and/or support are available to the community to address flooding and erosion issues?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	3
(SAC) How many options and resources are available for families, and infrastructure to be relocated?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	2
SAC) How many options and resources are available for families who are dependent on	1 More than	2 Enough	3 Moderate	4 Little	5 None	2

mangroves for livelihood to access alternatives for food, income, or building material?	enough		amount			
(SAC) How effective are community agreements or rules to ensure safe development practices that consider climate impacts such as sea level rise and more intense storms?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	4
					TOTAL RANKING	23

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (7)**
- — **Low Vulnerability: (8-14)**
- — **Moderate Vulnerability: (15 – 21)**
- **X High Vulnerability: (22 – 28)**
- — **Very High Vulnerability: (29 – 35)**

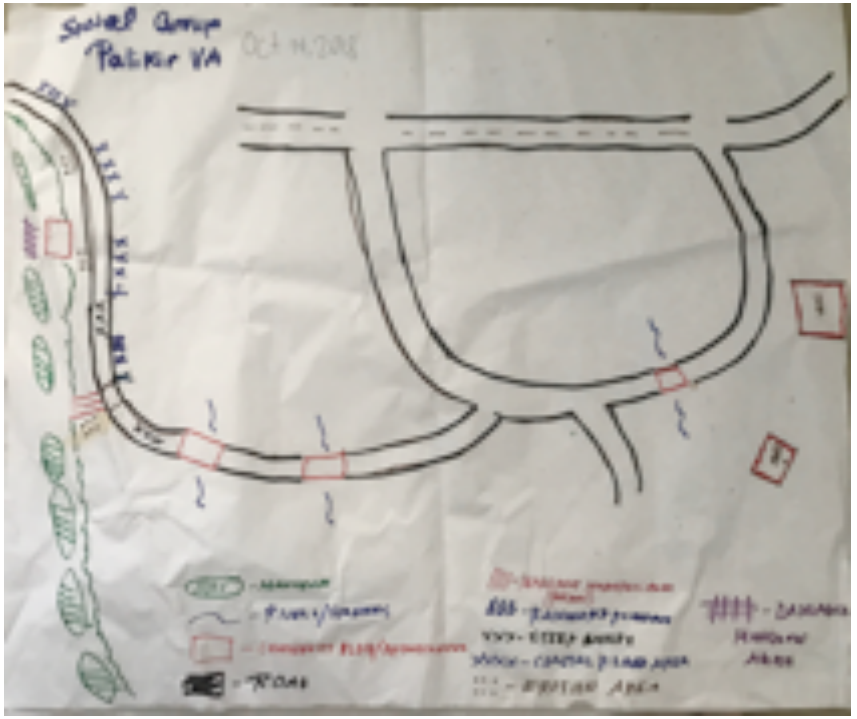
Palikir, Sokehs

Palikir is in Sokehs Municipality which is on the Northwest coast of the island. According to the 2010 census, the community of Palikir consists of a local population of 74.

Status and Trends of Natural Defenses

Current Condition – the community perceives that their mangroves and seagrass beds are in healthy condition and more exist than in the past. Rivers and forests are perceived to be in fair condition. Reefs however are considered degraded because fisherman are noticing a decline in fish populations compared to the past in areas they usually fish. The corals are also dying and it's believed to be due to oil and waste from the tuna fishing vessels that anchor offshore nearby.

Changes over time and reason for changes – Mangroves in Palikir have improved over time because of landslides in 1997 and a recent one in March 2018. The community perceives these events to have a positive impact on the forests and mangroves. For example, the forest and the mangrove areas affected by the 1997 landslide have recovered and have more trees today. There are no perceived threats from human activity to mangroves.



There are six streams and one out of these six is contaminated from nearby human settlement of one of their rivers. Forests are in fair condition and while people in the community farm sakau, yam, and other crops for their everyday living, they don't feel farming is negatively impacting their forest.

Threat and Vulnerability Assessment

This section provides the results of the focus group discussion

and summation vulnerability ranking. The full table of numerical ranking is provided below.

Threats to Mangroves & Root Causes

The community feels there are a moderate amount of non-climate threats impacting their mangroves. Threats to streams include contamination of one river by pig waste and human waste. For the other five streams the quantity of the water is lower than it was in the past. The community believes this is due to PUC water pumps that pump water for other areas of Sokehs. However, human activities are also viewed as having unintended positive impacts to mangroves. Human settlements in upland areas have triggered landslides. These landslides are creating high amounts of resres areas (migration areas) by filling in coastal areas where the mangroves can migrate inland.

Management Effectiveness of Mangroves

The community feels the management of the mangroves is effective through the traditional system called Pelien tiahk.

Community Dependence on Mangroves for Livelihood

About 25% or less of the community live on the active shoreline (in or near mangroves) and no major infrastructure is located in this area. A moderate amount (26-50%) of the community is dependent on mangroves for livelihood including food, income, and building materials.

Adaptive Capacity of Community

Community members feel they have no access to information, skills, resources, and/or support to address flooding and erosion issues. They also feel there are few options or resources available for families, and infrastructure to be relocated unless the government designated land for these needs. In the past, families that have been impacted by flooding or erosion events have moved and stayed with extended families while waiting for government to support like shelter, food and clothes. Additionally after the landside event around 1999, the government helped the community identify public lands, build new houses, and move them away from the shore. The school was also moved inland. Today it's unclear if this government support is available. However, if their food sources from mangroves were impacted they feel they have enough resources to get by because, most of the families have children that are in school or working and living off island that could help support them. They feel that community agreements or rules to ensure safe development practices in the face of climate change are poorly effective.

Vulnerability Ranking

- Mangroves - Based on the discussions, the community ranked the vulnerability of the mangroves as moderately vulnerable to the impacts of climate change. This is mostly due to the degraded or fair condition of the linked ecosystems including reefs, rivers/streams, and forest from non-climate threats such as contamination from piggeries and human waste and pumping from PUC. Interestingly, landslide events that may have been caused in part by extreme rainfall have increased the amount of migration areas for mangroves to migrate and they are noticing more mangrove trees in these areas. They also feel they have a strong traditional system that helps to protect mangrove resources.

- Community - Based on the discussions, the community ranked the vulnerability of the community in relation to mangroves (or active shorelines) as highly vulnerable. While there are not a lot of people or infrastructure located within or near mangroves and there are few resources available to relocate and few rules to prevent development in unsafe areas. Additionally most of the community relies on the mangrove ecosystem for food and income.

Early Actions to Reduce Impacts of Climate Change to Mangroves and the Community

The table below shows the full list of actions developed by the community to build resilience of mangroves and the community.

Mangrove Group Actions
• Survey and assess potential sources of pollution contaminating the streams. Conduct community meeting to mitigate the contaminating sources
Social Group Actions
• Conduct environmental assessment to Identify safe areas to build houses or any construction. This includes working with EPA and other offices on the environmental assessment and development of community safety guidelines.

Vulnerability Ranking Tables

Table 1: Mangrove Ecosystem Vulnerability (E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)						
	1 Very Healthy	2 Healthy	3 Fair	4 Degraded	5 Very Degraded	**Score**
(S) Rank the current condition of your **Mangroves**		X				2
(S) Rank the current condition of your **Reefs**				X		4
(S) Rank the current condition of your **Seagrass Beds**	X					1
(S) Rank the current condition of your **Rivers**			X			3
(S) Rank the current condition of your **Forests**			X			3
How have mangroves changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	2
How have rivers changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4
How are the non-climate threats to your mangroves /rivers and streams?	1 None	2 Some	3 Moderate	4 Significant	5 Very Significant	3
How much areas behind mangroves or beside lower streamsis free from any structures (e.g. roads, buildings, steep	1 Migration/ Resres areas	2 Migration/ Resres areas	3 Some Migration/	4 Few Migration/	5 No Migration/ Resres areas	1

cliffs) that would allow them to move inland ?	very highly available	well available	Resres areas are available	Resres areas are available	are available	
How effective are current management efforts to protect mangroves?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	2
					TOTAL RANKING	25

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (5-9)**
- — **Low Vulnerability: (10 -19)**
- **X Moderate Vulnerability: (20 – 29)**
- — **High Vulnerability: (30 – 39)**
- — **Very High Vulnerability: (40 -50)**

Table 2: Social Vulnerability (D = Dependence, SAC = Social Adaptive Capacity)						
	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	**Score**
D) How much of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years?						2
(D) How much major infrastructure placed in the active shoreline and currently or will be exposed to flooding or erosion within the next 10 years?						1
(D) How much of the community is highly dependent on mangroves for livelihood?	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	5
(SAC) How much information, skills, resources, and/or support are available to the community to address flooding and erosion issues?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	5
(SAC) How many options and resources are available for families, and infrastructure to be relocated?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	4
SAC) How many options and resources are available for families who are dependent on	1 More than	2 Enough	3 Moderate	4 Little	5 None	2

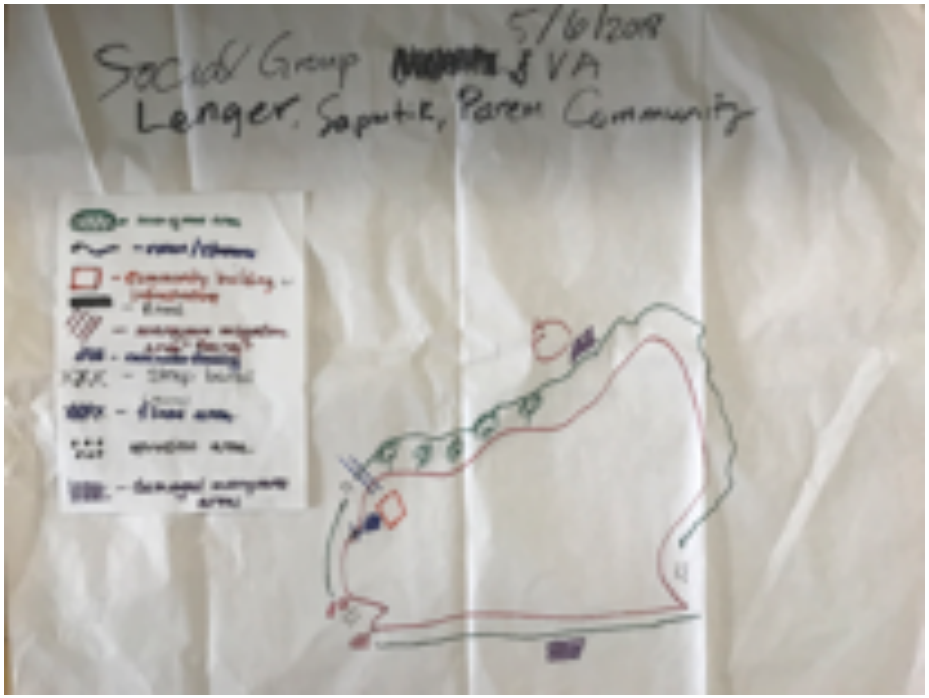
mangroves for livelihood to access alternatives for food, income, or building material?	enough		amount			
(SAC) How effective are community agreements or rules to ensure safe development practices that consider climate impacts such as sea level rise and more intense storms?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	4
					TOTAL RANKING	26

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (7)**
- — **Low Vulnerability: (8-14)**
- — **Moderate Vulnerability: (15 – 21)**
- **X High Vulnerability: (22 – 28)**
- — **Very High Vulnerability: (29 – 35)**

Parem, Nett

Lenger and Parem are communities located on a small island in the municipality of Nett, which is on the northern part of Pohnpei State. The total population size for Lenger/Parem from the 2010 Pohnpei census is 669.



Status and Trends of Natural Defenses

Current Condition and Changes over Time – the community perceives their mangroves to be in degraded condition because in the past they had more. Seagrass beds are perceived healthy. There are less seagrass beds but it's believed they are still healthy.

Reefs are perceived to be degraded. The area called Nankepin Parem was known as a place for clams and specific fish called pakas, but today it's hard to find any clams or pakas. The community members feel these changes are due to sand-mining.

There are no rivers and the forest area is small but in healthy condition.

Threat and Vulnerability Assessment

This section provides the results of the focus group discussion and summation vulnerability ranking. The full table of numerical ranking is provided below.

Threats to Mangroves & Root Causes
Mangrove health is believed to have gotten worse over time according to community elders who believe they had more healthy mangroves in the past. Causes of changes are perceive to mainly be due to some families that cut the mangroves for building materials to make local houses or use for firewood. The only source of water on the islands is from rainwater and a spring.

Management Effectiveness of Mangroves
The community discussed and identified some areas where mangroves might able to migrate inland over time as sea levels rise but it's not a lot due the community being on an island with some coastal areas that are steep. Currently the main regulation protecting mangroves is a permitting process by the Nett government, which requires people to get a permit if they want to cut mangrove trees. However, the permit does not limit the number of trees they can cut so they are concerned about the effectiveness of that regulation. The community believes that this process should be revisited and improved.

Community Dependence on Mangroves for Livelihood
Almost all of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years. About half of the community relies on mangrove ecosystems for food and building materials, and approximately 10% generate income from the mangroves. There is one school building and two church buildings that are located in areas that will be exposed to flooding and erosion events in the next 10 years. However, the community has not yet been impacted by flooding or negative impacts to the shoreline. They do understand that in the near future there might be changes that will impact their island. Some of the community members are aware of the climate change and they are seeking support from CSP and partners to help them prepare for future changes.

Adaptive Capacity of Community
The community feels there are few other options for families who are dependent on the mangroves for food, wood, and income. They do not have alternative livelihoods options for fishing and rely on the mangroves for their building materials and fuel. They also do not have alternate areas to relocate if need because they are on a small island. Their only option would likely be to find a place in Kolonia town or other municipalities in Pohnpei's main island. They also believe that state and municipal rules to ensure safe development practices that consider climate impacts such as sea level rise and more intense storms exist but are not effective.

Vulnerability Ranking

- Mangroves - Based on the discussions, the community ranked the vulnerability of the mangroves as moderately vulnerable to the impacts of climate change. The condition of their mangroves is declining over time mainly due to local threats of clearing for building material and fuel and ineffective management in protecting these ecosystems. The community identified some small areas for mangroves to be able to migrate over time but other areas are too steep for mangroves to be able to move inland.

- Community - Based on the discussions, the community ranked the vulnerability of the community in relation to mangroves (or active shorelines) as highly vulnerable. This is mostly due to the fact that most of the community is on or near mangroves and there is a high dependence (about half of the community) on mangroves for building material and food. They feel there no alternatives available if they are not able to continue using the mangroves for livelihoods, no options for moving inland because they are on a small island, and also a lack of policies to prevent people from developing in unsafe areas.

Early Actions to Reduce Impacts of Climate Change to Mangroves and the Community

The table below shows the full list of actions developed by the community in bold.

Social Group Actions
• Community to start planning on how to address the issue of sea level rise. To start planning to relocate
• Schools and churches to expand to accommodate more people during times of disaster
• To have a disaster preparedness training for Parem island community.
Mangrove Group Actions
• The community needs help on how to raise mangrove seedlings and how to re plant them again.
• The permit from Nett government needs to be reviewed and improved

Vulnerability Ranking Tables

Table 1: Mangrove Ecosystem Vulnerability (E = Exposure, S = Sensitivity, NAC = Natural Adaptive Capacity)						
	1 Very Healthy	2 Healthy	3 Fair	4 Degraded	5 Very Degraded	**Score**
(S) Rank the current condition of your **Mangroves**	1	2	3	4	5	4
(S) Rank the current condition of your **Reefs**	1	2	3	4	5	4
(S) Rank the current condition of your **Seagrass Beds**	1	2	3	4	5	2
(S) Rank the current condition of your **Rivers**	1	2	3	4	5	NA
(S) Rank the current condition of your **Forests**	1	2	3	4	5	2
How have mangroves changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4
How have rivers changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	NA
How are the non-climate threats to your mangroves /rivers and streams?	1 None	2 Some	3 Moderate	4 Significant	5 Very Significant	2
How much areas behind mangroves or beside lower streams is free from any structures (e.g. roads, buildings, steep cliffs) that would allow them to move	1 Migration/ Resres areas very highly	2 Migration/ Resres areas well available	3 Some Migration/ Resres	4 Few Migration/ Resres	5 No Migration/ Resres areas are available	3

inland ?	available		areas are available	areas are available		
How effective are current management efforts to protect mangroves?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	4
					TOTAL RANKING	25

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (5-9)**
- — **Low Vulnerability: (10 -19)**
- **X Moderate Vulnerability: (20 – 29)**
- — **High Vulnerability: (30 – 39)**
- — **Very High Vulnerability: (40 -50)**

Table 2: Social Vulnerability (D = Dependence, SAC = Social Adaptive Capacity)						
	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	**Score**
D) How much of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	5
(D) How much major infrastructure placed in the active shoreline and currently or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	1
(D) How much of the community is highly dependent on mangroves for livelihood?	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	4
(SAC) How much information, skills, resources, and/or support are available to the community to address flooding and erosion issues?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	4
(SAC) How many options and resources are available for families, and infrastructure to be relocated?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	4
SAC) How many options and resources are available for families who are dependent on	1 More than	2 Enough	3 Moderate	4 Little	5 None	4

mangroves for livelihood to access alternatives for food, income, or building material?	enough		amount			
(SAC) How effective are community agreements or rules to ensure safe development practices that consider climate impacts such as sea level rise and more intense storms?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	4
					TOTAL RANKING	22

The following rankings provide general guidance about how to determine vulnerability ranking.

- — **Not Vulnerable: (7)**
- — **Low Vulnerability: (8-14)**
- — **Moderate Vulnerability: (15 – 21)**
- **X High Vulnerability: (22 – 28)**
- — **Very High Vulnerability: (29 – 35)**

Senpehn, Madolenihmw

Senpehn is located in the municipality of Madolenihmw, on the eastern part of Pohnpei State. According to the 2010 census the population of Senpehn is 696.

Status and Trends of Natural Defenses

Current Condition – the community perceives that their natural defenses (i.e. coral reefs, mangroves, rivers, and forests) are mostly degraded except their seagrass beds, which are healthy.

Changes over time – Mangroves and river conditions are getting somewhat worse over time mainly because of forest clearing activities. The community has observed that this is causing more sediment to enter into the rivers and into the mangroves. Changes to the rivers have also been impacted by nearby houses, and planting of sakau. The community also perceives their reefs as degraded due to destructive fishing practices where fishers move the corals and destroy the reef habitat. Forests are also perceived to be very degraded because of clearing for planting sakau. Sakau is important to the families and community because of traditional use for ceremonies and funerals and also one of the main sources of income for most families.

Threat and Vulnerability Assessment

This section provides the results of the focus group discussion and summation vulnerability ranking. The full table of numerical ranking is provided below.

Threats to Mangroves & Root Causes
The main threats to mangroves and rivers are sediment caused by upland clearing for sakau planting, as well as contamination from houses near the rivers with out houses and pigpens.

Management Effectiveness of Mangroves

The community perceives there are few areas that mangroves would be able to migrate inland over time as sea levels rise due to the road and homes which blocks migration inland. They also feel management of mangroves is poorly effective. While there's an area designated for people to harvest trees for making houses or other uses, people are not complying with this designation and clearing in other areas. The community also noted a state watershed law that protects the upland forest but feel it is not being enforced. The community is moderately dependent on mangroves for livelihoods with 26-50% of the community that uses mangroves for food, building materials, and income.

Community Dependence on Mangroves for Livelihood
About 26-50% of the community lives on the active shoreline (in or near mangroves) that currently is, or will be exposed to flooding or erosion within the next 10 years. Most houses and the main road are in the middle of the land so won't be impacted by sea level rise. However, there is a community building, roads, and bridges that will be affected by flooding from rivers.

Adaptive Capacity of Community
The community feels they have little skills to address flooding and erosion issues. In past flooding events, they have worked together and help each other to address impacts. They feel that there are moderate amount of options for relocation of families that face issues of shoreline erosion because they have inland properties. However they would face problems with funding to build new houses and need financial assistance from municipal governments and their families. Additionally, flooding from the rivers is a problem the community faces during heavy rains and needs to be considered. The community identified sufficient or "enough" alternative sources of food, income, and building materials but noted it would be difficult for families. The alternatives noted would be farming, plant home gardens and vegetables for food and income sources. For timber, they would have to plant more mangrove trees and set areas where they can collect wood. There are no community agreements or rules to ensure safe development practices that consider climate impacts.

Vulnerability Ranking

- Mangroves - Based on the discussions, the community ranked the vulnerability of the mangroves as highly vulnerable to the impacts of climate change. The main reason for the high ranking is that their natural defenses (i.e. coral reefs, mangroves, rivers, and forests) are mostly degraded except their seagrass beds, which are healthy. Mangroves and rivers are also getting worse over time. The degraded and worsening condition is mainly due to upland forest clearing near rivers that are causing sedimentation, as well as contamination from pig and human waste.

- Community - Based on the discussions, the community ranked the vulnerability of their community in relation to mangroves (or active shorelines) as moderately vulnerable. Most of the community and main infrastructure is more inland and not in low lying areas near mangroves. There is upland land available for families near areas that will be subject to flooding however it will be hard to find funding to build new houses and there is also concerns about flooding from rivers. They also they are somewhat able to identify alternative sources for food, building materials, and income through backyard gardens, farming, and replanting mangroves. There is a lack of policies to prevent people from developing in unsafe areas.

Early Actions to Reduce Impacts of Climate Change to Mangroves and the Community

The table below shows the full list of actions developed by the community.

Mangrove Group Actions
• Improve watershed management and monitoring
• Enforce Pohnpei state watershed law
• Tree planting or restoration - Community needs to work together and replant more trees on areas where there has been deforestation
Social Group Actions
• Work with municipal government to develop safety guidelines for future development.
• Work with government and NGO's to get support on alternative resources such as home gardens.

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(S) Rank the current condition of your **Sea grass Beds**	1	2	3	4	5	2
(S) Rank the current condition of your **Rivers**	1	2	3	4	5	4
(S) Rank the current condition of your **Forests**	1	2	3	4	5	5
How have mangroves changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4
How have rivers changed over time?	1 A lot better	2 Somewhat better	3 Stayed the same	4 Somewhat worse	5 A lot worse	4
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How much areas behind mangroves or beside lower streams is free from any structures (e.g. roads, buildings, steep cliffs) that would allow them to move	1 Migration/ Resres areas very highly	2 Migration/ Resres areas well	3 Some Migration/ Resres	4 Few Migration/ Resres	5 No Migration/ Resres areas are available	4

inland ?	available	available	areas are available	areas are available		
How effective are current management efforts to protect mangroves?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	4
					TOTAL RANKING	38

The following rankings provide general guidance about how to determine vulnerability ranking.

___Not Vulnerable: (5-9)
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(D) How much major infrastructure placed in the active shoreline and currently or will be exposed to flooding or erosion within the next 10 years?	1	2	3	4	5	2
(D) How much of the community is highly dependent on mangroves for livelihood?	1 None 0%	2 Few 1- 25%	3 Moderate amount 26-50%	4 Significant amount 51-75%	5 Very Significant amount >76%	3
(SAC) How much information, skills, resources, and/or support are available to the community to address flooding and erosion issues?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	4
(SAC) How many options and resources are available for families, and infrastructure to be relocated?	1 More than enough	2 Enough	3 Moderate amount	4 Little	5 None	3
SAC) How many options and resources are available for families who are dependent on	1 More than	2 Enough	3 Moderate	4 Little	5 None	2

mangroves for livelihood to access alternatives for food, income, or building material?	enough		amount			
(SAC) How effective are community agreements or rules to ensure safe development practices that consider climate impacts such as sea level rise and more intense storms?	1 Very effective	2 Effective	3 Fairly effective	4 Poorly effective	5 Not effective	4
					TOTAL RANKING	21

The following rankings provide general guidance about how to determine vulnerability ranking.

___Not Vulnerable: (7)
___Low Vulnerability: (8-14)
_X__Moderate Vulnerability: (15 – 21)
___High Vulnerability: (22 – 28)
___Very High Vulnerability: (29 – 35)