Economic Value of Coral Reefs in Palau

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PICRC Technical Report 18-12

February 2018
Abstract

The aim of this research is to estimate how much Palauan people value coral reefs in the Rock Island Southern Lagoon (RISL) in Palau by using the Contingent Valuation Method, which is one of the methods used in Environmental Economics. According to some surveys, Palauan people are comparatively more environmentally-conscious than those from other countries. However, in recent years, land development has been rapidly increased, and the number of tourists has been drastically increasing as well. Climate change is a global phenomenon that is affecting the condition of the marine environment. These trends cause serious damages to the natural environment. Since coral reefs provide some of the most important resources to the Palauan people, we conducted this study to understand the value of coral reefs to the people of Palau, and as a result develop appropriate and effective conservation policy for Palau’s coral reefs. As a result of CVM survey conducted in Koror and Airai states, people’s “Willingness to Pay” and “Willingness to Work” is estimated at $8.00 (USD) per month with a total annual value that is estimated at $452,448 (USD). These estimated values can be used as critical information for compensation for coral damage, evaluation of economic efficiency of conservation policy, and improving awareness or education for Palauan residents.
Introduction

Palau is a small island developing country in the Micronesian Region. The population is 17,661, and 80.5% of the population is concentrated in Koror State and Airai State [2]. The target area of this research, The Rock Islands Southern Lagoon (RISL) area is one of the foremost natural sites in Palau and was designated as a UNESCO Mixed Cultural and Natural World Heritage Site in 2012. Coral reefs in this area provide various useful ecosystem services to Palauan residents and their community. Some ecosystem services include the preservation of marine biodiversity, spawning and nurturing space for marine life, purifying water, fishing area and source of food, recreational/tourism sites, beautiful ocean view, effective natural breakwater, and so on. Therefore, The Palau National Government and Koror State Government establish laws and guidelines to maintain good condition of coral reefs including this area. Also, many people in Palau recognize that coral reefs are important for themselves. However, in recent years, people’s livelihoods have drastically changed. Construction of road and hotel causes the contamination of sea water and damage coral reefs by sediments. Additionally, the number of tourists has been increasing since 2014, and not every visitor is as environmentally-conscious, thus resulting in negative use of the marine resources. Though some would rather conserve and preserve the environment, others are more in favor of economic development. This conflict between preserving the environment and economic development is ongoing, not only in Palau, but also in other small island countries in the world.

Thus, in order to make the proper decisions for sustainable economic development, the country must identify its top priority and its subsequent value to society. It is necessary to draw comparisons between the profits from economic development and the benefits of
environmental conservation. In other words, there needs to be some discussions regarding environmental conservation and economic development under the same conditions. For this purpose, there are various methods for economic valuation that were developed in the field of Environmental Economics. Thus, with economic valuation, the non-market value of nature can be evaluated in monetary terms.

**Methods**

Figure 1 shows the categories of the economic valuation method for environment. All methods are divided into Preference-independent method and Preference-dependent method. Preference-independent methods estimate the value of nature by market price or cost. Preference-dependent method is suitable to estimate non-use values of natural environment (e.g. beautiful views, biodiversity, cultural value, recreational function, etc.). The aim of this

![Figure 1. Methods of Economic Valuation](image-url)
study is to estimate how much Palauan people value coral reefs and its conservation. Therefore, the Contingent Valuation Method (CVM), which is one of the stated-preference methods, was chosen in order to estimate the subjective values of Palauan people. A famous case back in 1989 was that of the Exxon Valdez oil spill incident which happened off the coast of Alaska. Due to the extent of the damages as a result of the oil spill, Exxon was required to compensate the State for the loss of ecosystem, in addition to recovery cost and fishery product loss (use value). The CVM method was used to estimate the non-use value of the ecosystem for citizens. CVM is a useful method to estimate non-market value of the environment by estimating a person’s Willingness to Pay (WTP) for environmental conservation. It is important to know resident’s WTP because it shows the level of individual preferences for the environment.

This study consisted of a multi-layer approach to obtaining the WTP using the CVM method. First, focus group meetings and interviews were done. Then, a questionnaire was used to ask residents’ “WTP” for environmental conservation.

**Focus group meetings and interviews**

In order to obtain preliminary information about resident’s attitudes and perception towards coral reefs, eight focus group meetings were held, with a total of 81 participants. These participants consisted of community members, non-government organizations staff, tour guides, and government staff. During these focus group meetings, the CVM questionnaire was pretested and finalized.
Hypothetical change of coral reefs in the future

With the CVM, the hypothetical scenario of future conditions of coral reefs and conservation measurement needs to be illustrated within the questionnaire. WTP estimated by CVM means the amount that people wants to pay for prevention or mitigation of the environmental deterioration in the future. The survey respondents need information about the change of environment to decide their WTP. The hypothesis scenario is helpful for the respondents to image clearly about the nature condition which they evaluate. Additionally, for credibility of survey result, the respondents need to have the same image or their imaged should be hardly any differences. Therefore, the scenario of hypothetical change of natural condition should be provided in CVM survey. Within the questionnaire, photos are shown, illustrating the hypothetical change of coral reef condition in the RISL area with no conservation efforts for the next 30 years. (See Appendix)

![Diagram](image)

**Figure 2. How to Estimate the Total Value**
Hypothetical measurement

In this hypothetical scenario, NGOs and other environmental organizations conduct regular monitoring of coral reef condition in the area, as well as conduct awareness programs to Palauan residents and tour guides to teach the importance of coral reefs. Normally with the CVM, respondents are only asked for their willingness to pay. However, with this study, through focus group meetings and interviews, it was found that many people hesitate to pay money, but they also would like to do something for environmental conservation. This means they have positive value for coral reefs. Thus, in the questionnaire, a “Willingness to work as a volunteer (WTW)” question was added as an additional measurement to people’s WTP. A time value was also added in order to convert the time to wage rate, thereby calculating the WTP.

How to estimate the total value

WTW were converted into monetary term by minimum wage rate in Palau. By converting the WTW with the wage rate, the WTP was calculated as a result. Then, with these calculations done, the mean and median WTP per household was calculated. To obtain the amount of the total value as a result, multiply the WTP per household multiplied by the total number of household in Koror and Airai States.

Results

Figure 3 is the outline of survey. This research was conducted in Koror State and Airai State where 78% of the Palauan population is concentrated. The enumerators were hired from each hamlet and worked in their own communities in order to obtain high response rate.
Figure 4 illustrates the stated WTP of residents per month. WTPs in this graph are the sum of WTP converted from WTW by minimum wage rate (US$3 per hour [3]) and the WTP for donation. The majority of the respondents stated their WTP was $5-10 per month. On the other hand, 279 respondents stated their negative preference to the question.

Figure 5 shows the estimated economic values. “Willingness to Pay” in the first row of this table is derived from the answers by the respondents who chose “donation.” “Willingness to Work” in the second row is derived from the answers by the respondents who chose “volunteer work.” “WTP+WTW” in the fourth row is the sum of these two values, and these are the results of WTP which can be used to estimate the annual total value. However, average (mean) values are higher than the median, for all the items due to the impact of a few extreme answers. Due to the high likelihood of over-estimation, the median was used in order to provide more reliable results. That is to say, $8(USD) is to be the base of estimation of the total value. As a result, estimated annual total value of coral reefs in RISL is US$452,448 for the residents in
Koror and Airai States. The calculation is as follows: \((WTP + WTW) \times 12 \text{ months} \times \text{total number of households of Koror and Airai.}\)

**Figure 4. Histogram of WTP per month**

<table>
<thead>
<tr>
<th>WTP / WTW per household</th>
<th>Mean</th>
<th>Median</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willingness to Pay ($/month)</td>
<td>4.9</td>
<td>2.5</td>
<td>50(7)</td>
</tr>
<tr>
<td>Willingness to Work (hours/month)</td>
<td>5.5</td>
<td>4</td>
<td>30(2)</td>
</tr>
<tr>
<td>WTW multiplied by Minimum Wage Rate ($3.5/h)</td>
<td>19.3</td>
<td>14</td>
<td>105</td>
</tr>
<tr>
<td>WTP+WTW ($/month)</td>
<td>13.2</td>
<td>8</td>
<td>155(1)</td>
</tr>
</tbody>
</table>

**Figure 5. Estimated Economic Value**
Note that the target of this research are the residents in Koror and Airai states. It means that the total values for all the Palauan residents including other states would probably be higher than it.

**0 dollar bid and protest bid**

Due to the scheme of the CVM survey, respondents were asked to provide the reasons as to why they hesitate both to donate and to work as a volunteer. The top two options, “I am not interested in coral reefs,” and “It is not important/necessary to protect coral reefs”, shows their preference that those respondents do not want to preserve coral reefs in RISL positively. This type of answer is called “0-dollar bid”. A “0-dollar bid” means they don’t appreciate coral reefs and their WTP is at 0 dollar. Those answers should be included in estimation of the total value. Others are called “Protest bid.” These respondents are interested in coral reefs, but for some reasons, they don’t want to do anything in this scenario. They could possibly change their mind if the hypothetical policies/future condition in the scenario would be different. We have to remove those answers for estimation of total value to prevent from under-estimation. Figure 6 shows the distribution of the reasons why they hesitated to do something for coral reefs conservation. Red bars are 0-dollar bids, and blue bars are protest bids. Top answer shows that they do not have extra money and time spending coral reefs conservation. The second one is “Government should do it with the current revenue,” and next one is “It should be done with Green Fee.” These answers express their incredulity at the government’s policy or plans. Others are about the responsibility of payment for conservation effort.
Discussion and conclusion

This research shows that Palauan residents value the coral reefs in the RISL, which is their significant resource for food, recreational sites, economy, tourism resources and so on. How can the estimated value in monetary term be applied to policy-making? First possibility is to calculate amount of compensation to the coral reefs’ damage caused by boat stranding, overuse/misuse by tourists, non-sustainable way of fishing (using dynamite, toxic chemicals, etc.). The estimated value will provide useful information for court or negotiation. Second is to evaluate the economic efficiency of conservation measurements by cost-benefit analysis. CVM results can be used as “cost” or “benefit” in cost-benefit analysis and it is necessary information...
for the policy assessment. Finally, it will be beneficial to engage with the people in order to raise awareness on the importance of the RISL coral reefs, and how much coral reefs benefit people and human society as non-use values. It will also be beneficial to promote public involvement in conservation activities and promoting community-based management. At the end of this paper, we propose two policy recommendations as the conclusion to this research. First recommendation is to conduct an evaluation of conservation policies in terms of economic rationality by cost-benefit analysis regularly and continuously. A monitoring scheme using economic analysis can help improve the conservation policies and be more cost-efficient and effective. Cost-benefit analysis is important for as it can help identify priority among different policies. Second recommendation is to estimate the value of ecosystem services in monetary terms by economic valuation methods for natural environment. Economic valuation research is
conducted to obtain parameters for cost-benefit analysis (e.g. benefits from conservation, damage cost caused by natural disruption). In addition, the estimated values in monetary terms can be used as indicators for appropriate decision-making about environmental policy and economic development. Also, it shows how much important the nature is for Palauan people, and it helps to improve environmental awareness/education. For a small island country like Palau, the power and effort of the residents and local communities are extremely critical for conservation and natural resource management. In order to deepen people’s understanding in these matters, they should be more involved in such activities or challenges for coral preservation. To encourage people more to join environmental activities, it is necessary to inform how much valuable for them the nature is. Estimated economic values can be effective information to raise people’s awareness of importance of natural conservation for themselves. In the end, in order to be more efficient in making policy decisions, economic valuation methods can be utilized to ensure better decision making for a more sustainable management scheme in Palau.
Acknowledgment

The authors wish to acknowledge Dr. Yimnang Golbuu (CEO, PICRC), Ms. Geraldine Rengil (Research Director, PICRC), Dr. Seiji Nakaya (P-CoRIE Project Coordinator) and Ms. Vallin Kloulechad (P-CoRIE Research Assistant) for all the support and useful suggestions for conducting this research in Palau. Finally, we are grateful to all the residents in Palau who kindly cooperated with our research in these five years. This research is supported by the project of “Science and Technology Research Partnership for Sustainable Development (SATREPS)” by Japan International Cooperation Agency (JICA) and Japan Science and Technology Agency (JST).

References


Appendix: CVM Survey Sheet

Please read the following about coral reefs in the Rock Islands Southern Lagoon (RISL) before you go forward with the questionnaire.

Moutekangel el chemuiu aika el omesodel a kereker me a debel a Rock Islands Southern Lagoon eruche er a omolemolem el mo er a ker

The Rock Islands Southern Lagoon (RISL) is the foremost natural site in Palau, and was designated as a UNESCO Mixed Cultural and Natural Heritage Site in 2012. According to UNESCO’s description of the RISL, over 385 species of corals are found in this area. Coral reefs in this area provide various useful services to the Palauan people. The services are as follows: preservation of marine biodiversity, spawning and nurturing space for marine life, water purification, fishing area, recreational/tourism site, beautiful ocean view, natural breakwater, and so on.

The Palau National Government and Koror State Government have been struggling to maintain good condition of coral reefs in the RISL for years. Palau International Coral Reef Center (PICRC), Palau Conservation Society (PCS) and The Nature Conservancy Palau (TNC Palau) also engage in monitoring the current situation and educational programs for kids and residents. As such, these efforts are highly ranked by UNESCO.

According to the nationwide survey conducted by the P-CoRIE Project in 2014, about 500 out of 1,497 surveyed Palauan residents chose the RISL and coral reefs as the most important natural environment in Palau.

However, the condition of coral reefs has gradually deteriorated in these decades due to the impact of climate change, sedimentation, pressures from tourism activities, etc. In consideration of the long term preservation of this area, UNESCO points out the need for prevention of negative impacts from tourism and development of infrastructure and facilities in the Koror area.

UNESCO* Oiechotel a ilekl el Kerresel a Klebelau er a Chelebacheb el Ulidimukl er a Kereker me a di mla Bleob el ngar me a diak el ngor er a rechnodel el met. A dotirakl a omesodel a UNESCO eng betok er a edei el dart ma okai ma eim (385) el bedengel a merangd a ngar er ngii er tiang el basio. A kereker me a debel tia el basio a rolel a kerrual el mo er a beluu, tokuni a Oreor. Aikakid a bebil er a klungiaol me a urerel me a sebechkel tia el basio el
kirel a belu: A chesul a dao, me a chelli ne sa dao a mengeluol e a kereker me a ngarngii el klao, el ngar me a diak el ngar; ng ometheroll, e okeroull ntikel me a cherrmel me a ngar el delomel me a cherrmel a dao; ngomicho a raln, rolel a omenged er a rebelu, rolel a omelil me a klakangkodang, klebokel osenged er ngii el di mla rolel a enatelel a dao me a le mut el bebi er a betok el dodengei me a diak dodengei el uchul tia el basio a kmal ileakl el cheketeel a klingiao a debedik er a chelsel.

Ng mla mo betok el rak el Kabelment er Belau me a Kabelment er Oreor a oorrut er a urceo el olengeseu me di le beches el ungil a kereker me a debel a RISL. Palau International Coral Reef Center (PICRC) me a Palau Conservation Society (PCS) me a The Nature Conservancy (TNC Palau) a dirrek el mengkar e mesuub a teletelel tia el basio e olisechak el a rengaek er a skuli me a rechad er a belun el kirel. A urceo el uitaat er tia el basio a kmal el ungil osengel a UNESCO el kirel.

A omesuub el le kilimeklil a P-CoRIE Project er a 2014 er a chelsel Belau el rokir, eng bekord el eim el dart el chad er a chelsir a re 1,497 el kie er Belau a ngilelil a RISL me a ikei el kereker me a debel el kot el klou a belkul el teletelel a kereker, me a debel el lukei a klingar er a chelsel Belau.

Meng nausei, eng di a kereker me a debel tia el basio e le du ng mla modiak el uai a klingiolel me a cherrengeel el na ngaramong. A utelechak el melnik er a ngedechei me a telemellet a kereker me a manari er ngii a mesuhiel er a ngedechei a keldelel a belau me a daoob (climate change) me a dengitech, me a omeriul el melineki er a ika el daoob me a basio el ielisir a returist a uchul me a kubwili er a tererekel el omeriul. Me ngkini a udlasu me a reng el kirel a omengeluuel tia el basio el mo er nebad, ea UNESCO a kmo ng kma el klou a belkul a le mekesadel a temmel el me lechub eng ato eerti el basio el okiu a klakangkodang (tourism) me a okedecherul a melkou el tatemono, me a rolel el kerruel el melineki (er a manari) er a Oreor.
[Hypothetical Scenario]

Please see and read the following “hypothetical scenario,” and then, go to next page.

Current condition in 2016 / Teletael er chelechang el 2016

Coral coverage: 80%

Diversity & Density of Reef Fishes

If there is no conservation effort, it will become as follows...

Hypothetical condition 30 years later without any conservation management

Teletael ra okedel el rak er medad a lak a ureor er a omengetulu

Coral coverage: less than 1%

Diversity & Density of Reef Fishes
The pictures on the previous page show the hypothetical change of coral reef condition in the RISL area with no conservation efforts for the next 30 years.

In this hypothetical scenario, non-governmental organizations (NGOs) or other organizations for the environment conduct regular monitoring of coral reef condition in the RISL and awareness programs to Palauan residents (including tour guides) to learn the importance of coral reefs. Imagine that these monitoring and awareness programs are funded only by donations from contributors like you. Your donation to these NGOs or other environmental organizations will only be used for these activities.

Also, in order to maintain the current condition of coral reefs in the RISL, public involvement is important and dependent on voluntary efforts. In this hypothetical scenario, the activities are “beach cleanup (ex. picking up trash and driftage, etc.)” and “assisting with conservation efforts that are led by the NGOs/other environmental organizations (ex. water quality check, checking the condition of coral reefs, assistance in awareness seminars, etc.)” Imagine you join one or both of these volunteer activities in your leisure time, without compensation.

A stasing el ngar a kadekmel tia el babier a olechoit a ike el chokesial a sebechel el duubech eng mengdengodech el teletelel a kerek er a debel a chelsel a RISL a lak a urreor er chomengeluolu er a chelsel a 30 el rau.

Chelsel tia el okestu eng sebecchel el duubech el teletaial, e a ikei el chelechad el diak el orrurt a kabelment, (NGOs)*, me a ike el chelechad el oureor el kirel a sebechekel a lukel a klengar, a omes e mengedmoki e mesuub a teletelel a kerek er a merangd me a debel a RISL. E obengkel a ika el omesuub, e te dirrek el oltschekel e olechoit er a rechad er Belau me a re kie a Belau (el molmuut er a ruunggerachel er a returist) el kmo ng kmal klou a belkul a ika el kerek er a debel tia el basio. Ka di molebedebek el kmo omko uaika el urreor a lorrurt el olab a udoud el rechad el di uaikael el nutsul el chad a oltobed. E aika el udoud a di NGOs* me a ikei el chelechad el oureor el kirel a sebechekel a lukel a klengar, a sebechel el ouubech.

Ng dirrek el soad a di lungen el selebechakel a kerek er a debel a RISL eng klou a belkul a rebeluu, me a re bek el chad, a le klou a ngerchelir el a techellir er a ika el urreor er omengeluolu. Me a chelsel tia el okestu eng sebecchel el duubech e mengdengodoch el teletaial (hypothetical scenario) e a urrerall a “omengedmekel e rriil (el uaijang: omerru el besbas me a urrachad)” e olngesu el urreor er omengeluolu el lorrurt a NGOs* me a kukbebil er a chelechad el oureor el kirel a sebechekel a lukel a klengar (el uaijang: siraber a chesul el a lechub eng telomelel a raln, teletelel a kerek er a daob, me a dirrek el urreor er osisechakel).” Kamomes e molebedebek el kmog sebechel el mesekau el teloi er a ouaika el urreor engdi diak mudeudel.

*(Non-Governmental Organizations) – Chelechad el diak el nga er euneg a ngii dii kabelment.

NEXT: Please answer the following questions.
To answer the following questions, please think back on the “Hypothetical Scenario” from page 4 and 5.
Bo mo nger aika el ker el beldukl e riou lultuil er a chesemel a uldasu el mchiliuui.

**Q1** : Which of the following would YOU be willing to do to prevent degradation of coral reefs in the RISL? Please choose only **ONE** of the following options from [A] to [B], in the table below.

*Ng ngera se el kot el soam el ngesou el sebechedelkudmekli melakelmetemall a kereker era RISL? Momes er a tebel el ngariou e mngiltii a di TANG er a [A], [B], [C] ma lechub eng [D]*

<table>
<thead>
<tr>
<th>Options what you want to do</th>
<th>YOUR ANSWER</th>
<th>Next Question for you</th>
</tr>
</thead>
<tbody>
<tr>
<td>[A] I want to donate to NGO or environmental organization. <em>Ng soak el ongseu era NGO me a lechub engkak di ta er a chelechader alukel a klanglar</em></td>
<td>If you chose [A], go to Q2. Alsekum me kengileltii a [A], e bo er a Q2.</td>
<td></td>
</tr>
<tr>
<td>[B] I want to help NGO or environmental organizations as a volunteer <em>Ng soak el di olngeuseu a NGO me a lechub eng chelechad er a lukel a klanglar el diak kudeulel</em></td>
<td>If you chose [B], go to Q3. Alsekum me kengileltii a [B], e bo er a Q3.</td>
<td></td>
</tr>
<tr>
<td>[C] I want to do both [A] and [B]. <em>Ng soak el muurul er a [A] me a [B]</em></td>
<td>If you chose [C], go to both Q2 &amp; Q3. Alsekum me kengileltii a [C], e bo er a Q2 &amp; Q3.</td>
<td></td>
</tr>
<tr>
<td>[D] I don’t want to do either [A] or [B]. <em>Ng diak el soak el muurul er a [A] me a lechub eng [B].</em></td>
<td>If you chose [D], go to Q4. Alsekum me kengileltii a [D], e bo er a Q4.</td>
<td></td>
</tr>
</tbody>
</table>
Q2: for those who chose [A] or [C]

Mo er tirke el mellilt er a [A] me a lechub eng [C]

How much is your household willing to pay per month (for one year) for these management strategies? Please note that your donation comes from your household income, which means you cannot use this amount of money for any other purpose.

Ngeta el udoud a omkengei el harau er a chelse a ta el buil (el kesengil eng ta er a tal rak el olengeseu er a ika el urreor er a omengeluolu?

Mlechesi a olangch er se el kot el kmeed er a mo er se el momdasu er ngol. Me a da alii se el ngelsuim el tuobed er a kerkerengel a blim, a diak el sebechem el ousbecher engii el mo er a kukbebil er a tekoi.

You are willing to pay...(for one year)

Kekongei el harau...(el ta el rak el omuchel er chelechang)

Please check ONE that applies.

Dimngilti a TANG er a ika el ngar e riou el rodemii se el soam.

[ ] $1.00 per month  [ ] $2.50 per month  [ ] $5.00 per month
[ ] $7.50 per month  [ ] $10.00 per month  [ ] $12.50 per month
[ ] $15.00 per month  [ ] $17.50 per month  [ ] $20.00 per month
[ ] $22.50 per month  [ ] $25.00 per month  [ ] $27.50 per month
[ ] $30.00 per month  [ ] $32.50 per month  [ ] $35.00 per month
[ ] $37.50 per month  [ ] $40.00 per month  [ ] $42.50 per month
[ ] $45.00 per month  [ ] $47.50 per month
[ ] $50.00 or more per month
**Q3 : for those who chose [B] or [C]**

*Mo er tirke el mellilt er a [B] me a [C]*

How many hours a month are you willing to spend for these volunteer work (without pay) aside from your regular work? Please note that you have to dedicate this time to the volunteer activities, and you cannot do anything else during this time.

*Ng tela el sikang er a chiesel a ta el buil omkengei el olngeeu el diak mudeuel el ileakl er a kuk didurrerem? Mlechesi a olangch er se el kot el kneed el mo er se el momdasu erngii.
Alii a ike etaem el mkilenget el olngeeu el kirel, a kirem el othiraal, mngdiak el sebechem el kukmeruul a ngodech el tekoi me a lechub ng ureor er a chiesel a ikei el taem.*

You are willing to spend...(for one year)

*Kekonei el chemoit a ....*

Please check ONE that applies.

*Di mggilii TANG er a ika el ngar e riou el rodemii se el soam.*

<table>
<thead>
<tr>
<th>[ ] 2 hours per month</th>
<th>[ ] 4 hours per month</th>
<th>[ ] 6 hours per month</th>
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<tbody>
<tr>
<td>[ ] 8 hours per month</td>
<td>[ ] 10 hours per month</td>
<td>[ ] 12 hours per month</td>
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<td>[ ] 14 hours per month</td>
<td>[ ] 16 hours per month</td>
<td>[ ] 18 hours per month</td>
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<td>[ ] 20 hours per month</td>
<td>[ ] 22 hours per month</td>
<td>[ ] 24 hours per month</td>
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<td>[ ] 26 hours per month</td>
<td>[ ] 28 hours per month</td>
<td></td>
</tr>
<tr>
<td>[ ] 30 or more hours per month</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q4: For those who chose [D]  

Mo er tirke el mellilt er a [D]

Why do you hesitate to do both donation and volunteer work?

Ng ngera me komai er a rengum el oltobed a ududem me a lechub eng mededaes el temem el olengosou?

Please check ONE that applies. Di mngiltii a TANG er a ika el ngar iou el rodemii se el soaam.

[ ] I am not interested in coral reef conservation in the RISL.
   Ng diak semerier er a omengeluvel el a kerek me a debel a RISL.

[ ] I don’t think coral reef conservation in the RISL is necessary or important.
   A omengeluvel el a kerek me a debel a RISL a diak el klou a belkul me a diak a ultutelel.

[ ] These hypothetical conservation plans are useful and necessary, but conservation efforts
   should be done by government with the current revenue.
   A ika el okesiul a uldasu el kirel a urreor er a omengeluvel a meklou a belkul a kirel el nga erngii,
   engdi a orretel a urreor er a omengeluvel a kirel a kablemetal melorrut elousbeche a udoud er a
   kabelment er chele chang

[ ] These hypothetical conservation plans are useful and necessary, but I am not responsible.
   A ika el okesiul a uldasu el kirel a urreor er a omengeluvel a meklou a belkul e kirel el nga
   erngii, engdingdiakangerchelel er ngii.

[ ] These hypothetical conservation plans are useful and necessary, but I cannot afford the
   donation and the volunteer work.
   Ak kongei el kirel aika el uldasu er a teko ei er a omengereomel, engdi ngdiak el sebechek el
   londgesou lokoi a udoud me a urreor el diak mudoud er ngii.

[ ] Conservation efforts are necessary for coral reefs in the RISL, but I do not agree with the
   hypothetical scenario (future condition, conservation strategies).
   A urreor er omengeluvel a kerek me a debel a RISL a meklou a ultutelel, engdingdiak kengel a
   ika el kora okesiul me a kora teleta el a urreor er omengeluvel (el kirel angamaed, me a kerbila
   urreor er omengeluvel).

[ ] The Palau National Government imposes the Green Fee on tourists, so Palauan residents
   do not have to do anything for the environment of Palau.
   A National Kabelmenter Belau a mla mo melal a taxer er a returist me a rekang kodang el cheral
   osengir er Belau (Green Fee), ma le waisel a e rekiel er Belau a dikea belkul a lourul a ngaer el
   kirel a lual a kengar er Belau.

[ ] Only beneficiaries from coral reefs (tourists, tour company, fisherman, etc.) should be
   responsible for conservation.
   Ng ditirke el nga erngii a ngliulir er a ika el kerek me a daob (el rua returists, rekang kodang, me
   a kombali er a returist, rechad er omenged, me a re lmuit el bebil), tireka ia kirir el
   oungerachel a rolel omengeluvel

[ ] Other (Please specify):  Kuk bebil (Bo bleketaki, em komakai):
For the Respondents:  Mora chad luling a ker:

The following are questions about yourself.  
A ika el ker el nga er iou a di meluk el kirem.

Q5. What is your gender?  Kengerang?

[ ] Male (Sechal)  [ ] Female (Redil)

Q6. What is your age?  (check ONE)

Tela rekim?  (dim chersengii a di TANG er a ikang)

[ ] 20's  [ ] 30's  [ ] 40's  [ ] 50's  [ ] 60's  [ ] 70's  [ ] 80's and over

Q7. How many people are living in your household, including yourself?  (check ONE)

Komtela el chad el kiei er a blimiu, kau me kuldimu k er a ochur?  (dim chersengii a di TANG er a ikang)

[ ] 1  [ ] 2  [ ] 3  [ ] 4  [ ] 5  [ ] 6  [ ] 7 or more

Q8. Where were you born?  (check ONE)

Kemlechell er ker?  (dim chersengii a di TANG er a ikang)

[ ] Palau => please specify your state (State el omichell emngi) _____________

[ ] Philippines  [ ] Japan  [ ] Korea  [ ] China

[ ] Bangladesh  [ ] Taiwan  [ ] America  [ ] Australia

[ ] Federated States of Micronesia (FSM)

[ ] Others => please specify your country ______________

Q9. What is your primary residence in Palau?  (check ONE)

Ke kiei er a ker el beluu er Belau?  (dim chersengii a di TANG er a ikang)

[ ] Koror  [ ] Airai

Please specify Hamlet (Ngkloel a hang el omkiei er ngii) ______________

Q10. How many years in total have you been living in Palau?  (check ONE)

Mla mo telal rak el mktiei er belau? (mchirsengii a chimong)

[ ] 0 to 5 years  [ ] 6 to 10 years  [ ] 11 to 15 years  [ ] 16 to 20 years

[ ] 21 to 25 years  [ ] 26 to 30 years  [ ] 31 years or more
Q11. Which best represents the pattern of years you have lived on Palau? (check ONE)

Ng uangera ildisel el rak el nkiei er Belau? (dim chersengii a di TANG er a ikang)

[ ] I was born in Palau and have lived here my entire life.
   Ak mliechell er Belau, e kiei er Belau el me Imuut er chelechang.

[ ] I was born in Palau, left for some years, then returned.
   Ak mliechell er Belau, e tuobed el mo er a ikrel Belau, e mla Imuut el me remei.

[ ] I was born elsewhere, but then moved to Palau and have lived here continuously since that time.
   Ak mliechell er a ikrel Belau, e mla me kiei er Belau, e ngak tiang er a kiei el mei er chelechang.

[ ] I have moved back and forth from Palau for two or more times
   Ng mla mo betok er cherung el kiei er Belau, e kuk mo er a ta er a beluu el mela rak, e mei e Imuut el merael, e Imuut el mei.

Q12. How often do you visit the Rock Islands Southern Lagoon? (check ONE)

Ng uangera itekngel el bo moldingel ra Rock Island Southern Lagoon?

[ ] Almost every day
   Bekord el bek el sils

[ ] Several times a week
   Betok el taem er a tal sandei

[ ] Once a week
   Tang er a tal sandei

[ ] 1-2 times a month
   Tang el mo eru el taem er a tal buil

[ ] 4-6 times a year
   4-6 taem er a ta el rak

[ ] a few times a year
   di kesai el taem er a ta el rak

[ ] I do not visit RISL. => If you check this one, please skip Q13.
   Ng diak bo er a RISL. =>alsekum ke chorsengii tiang e bo er a Q13.

Q13. What is your purpose of visiting RISL? (check all items that applies)

Ng ngera uchul e koldingel er a RISL? (mcheris a ikei el uchulerkau)

[ ] Regular work
   Ng urerek a uchul

[ ] Fishing / Taking seafood for subsistence
   Ak ngara chei el rolel omeingot el mo er a blai

[ ] Fishing for leisure
   Kuk di ngara chei el omilil

[ ] Swimming / Snorkeling / Diving for leisure
   Mangedub/Snorkel/Di Melecheibakl el omilil

[ ] Kayaking for leisure
   Ou kayak el omsueus

[ ] Others (please specify______________________)
   Kuk bebil (Bo bleketakl, em komokai______________________)
Q14. Which of the following best describes your line of work? (check ONE)

| [ ] Government / Semi-government officer/staff |
| Amt |
| [ ] Self-employed |
| Di ngak |
| [ ] NGO or NPO staff |
| Diak el ureor ra Amt |
| [ ] Educator (teacher, professor etc.) |
| Sensei |
| [ ] Retired |
| Mla retire |
| [ ] Housewife |
| Di mechas er a blai |
| [ ] Student |
| Ngalek er a skuul |
| [ ] Other (Please specify_______________)
| Kuk di ngodech (bom komakai) |

Q15. (Only for those who chose “Private sector employee” or “Self-Employed” in Q14)

(Tia di mo er tirke el ngileltii a “Diak el oureor er a Kabelment ma lechub eng di ngii elorrurt er a urrerel el ngar a Q14)

What type of field are you mainly working in now? (check ONE)

| [ ] Agriculture |
| Ureor er a sers |
| [ ] Fishery / Fisheries |
| Chad er omenged |
| [ ] Forestry |
| Ureor er a chereomel |
| [ ] Construction |
| Kidaiksang |
| [ ] Manufacturing |
| Kombali lomeob a klalo |
| [ ] Transportation |
| Oldioul |
| [ ] Energy (electricity, gas etc.) |
| Dengkibu |
| [ ] IT / Communication |
| Oldioul er a teko |
| [ ] Broadcasting |
| Oldioul er a teko loku a rasio |
| [ ] Finance (Bank, etc.) |
| Tekoi ra Udoud |
| [ ] Retailing |
| Oterullel a klalo |
| [ ] Restaurant |
| Biil a blengur |
| [ ] Tourism (tour company, diving shop, hotel, etc.) |
| Orrurt a ureor er a klekangkodang |
| [ ] Others (Please specify_______________)
| Kuk bebil (Bo bleketaki, em komakai _________________) |
Q16. What was your household’s **annual** income in 2015 (before tax deductions)?  
(check ONE)  
*Uangerang a klungel a udoud el lulsiebii a delengcheklem er a uchei ra tax er a 2015?*

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] No income</td>
<td></td>
</tr>
<tr>
<td>[ ] $5,000-$7,499</td>
<td></td>
</tr>
<tr>
<td>[ ] $7,500-$9,999</td>
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<tr>
<td>[ ] $10,000-$12,499</td>
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<td>[ ] $12,500-$14,999</td>
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<td>[ ] $15,000-$17,499</td>
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<td>[ ] $17,500-$19,999</td>
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<td>[ ] $20,000-$22,499</td>
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<td>[ ] $22,500-$24,999</td>
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<tr>
<td>[ ] $25,000-$27,499</td>
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<td>[ ] $27,500-$29,999</td>
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<tr>
<td>[ ] $30,000-$34,999</td>
<td></td>
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<tr>
<td>[ ] $40,000 or more</td>
<td></td>
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</tbody>
</table>

Q17. What do you think about coral reef conservation in the Rock Island Southern Lagoon?  
*Ngera uldesuem el kirel a omengerremelel a kereker er a Rock Island Southern Lagoon?*

Thank you very much for your time and cooperation!