2017 CNMI Recreational Mooring Buoy Program Enhancement and Maintenance Report

RFP17-BECQ/DCRM-080

Prepared for:

Commonwealth of the Northern Mariana Islands
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Introduction

In fall of 2017, Pacific Coastal Research & Planning in association with Dive Rota was contracted to survey all known buoys on the islands of Saipan, Tinian, and Rota. This report covers the results of these surveys, including updated GPS coordinates, a condition assessment, and a list of repairs needed to maintain each buoy in working order.

Based upon this assessment, the survey team has compiled a list of maintenance needs to update the existing buoys in working order. In addition to these immediate maintenance needs, the team developed a recommended long-term inspection and maintenance plan based upon personal expertise, conversations with CNMI-based users of these buoys, and experts from other jurisdictions.

Mooring Buoy Inventory & Assessment Survey Results

Part 1 of this project was an in-water survey and assessment of the known BECQ-permitted mooring buoys based upon a list of 38 buoys provided to the survey team by BECQ at the start of this project. While conducting the in-water assessment of known mooring buoys, the team also recorded and conducted surface surveys of any non-permitted buoys encountered during the surveys. The survey team first mapped the given buoy coordinates, which were compared with the GPS coordinates taken at each buoy site to validate those on file with BECQ. The dive team conducted an in-water assessment at each BECQ-permitted buoy to determine the material and condition of the attachment method, line, buoy, and other materials, and to note any need for repairs. Listed BECQ-permitted buoys that could not be found are noted as missing in this report.

While surveying the BECQ-permitted buoys the team was on the lookout for any additional buoys that need to be surveyed. Upon finding one, the survey team did a surface assessment using snorkel gear to assess the condition of the mooring and note how the mooring is attached to benthic substrate. In some cases, dependent on weather conditions, time, and proximity to other buoys, a full underwater assessment was completed.

These assessments were conducted during the windy season and some of the more exposed buoys on Saipan could not be fully surveyed due to hazardous in-water conditions. These are noted in the report.

The results listed in the section below are based solely on the in-water survey assessment and the buoys covered were based on the initial list of 38 acquired from BECQ at the start of this project. After the in-water assessments were completed, discussions with stakeholders and other resource managers revealed several additional buoys that were not included on the 38 surveyed. Several of these buoys are alleged by stakeholders to have been permitted by DCRM or BECQ. These additional buoys and recommendations for them are covered under the “Additional Buoy Needs Assessment” of this report.

The repairs and maintenance assessment for the 38 BECQ buoys is summarized in a chart in Appendix 1.

The buoys that were assessed during the in-water surveys are listed below by island in alphabetical order.

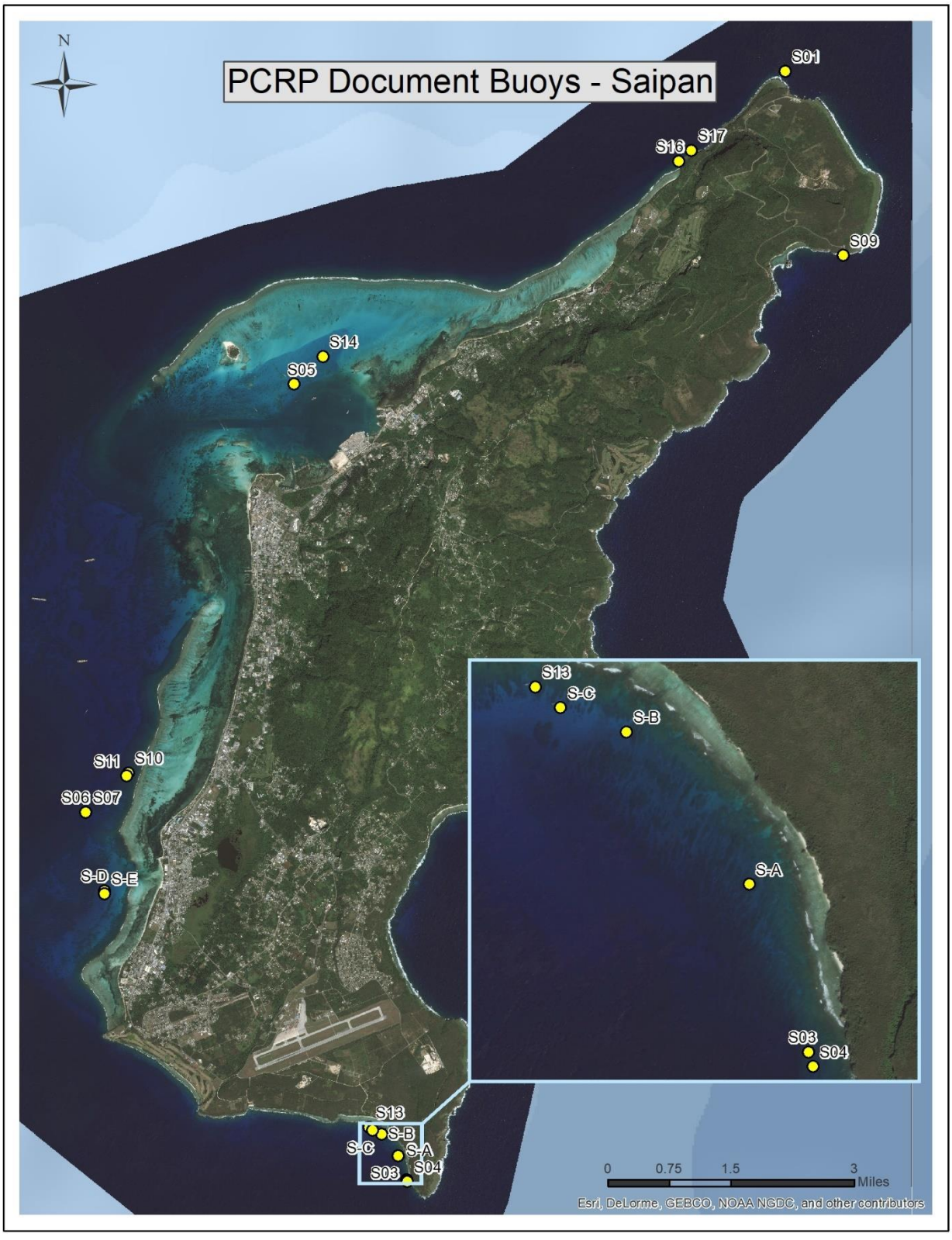
SAIPAN

Survey dates: October 31 – November 2, 2017
Surveyors: Mark Michael, Pip Ball, Tony Flores

Map Code	Site Name	BECQ-given Latitude	BECQ-given Longitude	Recorded Latitude	Recorded Longitude
BECQ-PERMITTED BUOYS					
S01	Banzai 1	15°17'30.55"N	145°48'46.21"E	15° 17' 30"N	145° 48' 47"E
S02*	Banzai 2	15°17'26.25"N	145°48'44.64"E	n/a	n/a
S03	Boy Scout (N)	15° 5'50.55" N	145°44'37.68"E	15° 5' 42"N	145° 44' 42"E
S04	Boy Scout (S)	15° 5'50.55" N	145°44'37.68"E	15° 5' 41"N	145° 44' 43"E
S05	Chinsen Maru	15°14'18.48"N	145°43'26.79"E	15° 14' 8"N	145° 43' 25"E
S06	Dimple 1	15° 9'52.84" N	145°41'1.61"E	15° 9' 35"N	145° 41' 10"E
S07	Dimple 2	15° 9'52.84" N	145°41'1.61"E	15° 9' 35"N	145° 41' 10"E
S08*	Dimple 3	15° 9'52.84" N	145°41'1.61"E	n/a	n/a
S09	Grotto	15°15'28.32"N	145°49'27.44"E	15° 15' 32"N	145° 49' 26"E
S10	Ice Cream 1	15°10'4.77"N	145°41'14.94"E	15° 10' 0"N	145° 41' 38"E
S11	Ice Cream 2	15°10'5.80"N	145°41'13.40"E	15° 9' 58"N	145° 41' 37"E
S12*	Laolao Bay	15° 9'45.83" N	145°45'44.73"E	n/a	n/a
S13	Obyan Beach	15° 6'16.62" N	145°44'19.13"E	15° 6' 15"N	145° 44' 17"E
S14	Saipan Bomber (~~B29~~ Emily)	15°14'34.44"N	145°43'21.75"E	15° 14' 26"N	145° 43' 44"E
S15*	Spotlight	15°17'14.00"N	145°49'8.86"E	n/a	n/a
S16	Wing Beach ~~Arch~~ Crevice	15°16'34.60"N	145°47'35.71"E	15° 16' 32"N	145° 47' 37"E
S17	Wing Beach ~~Crevice~~ Arch	15°16'38.44"N	145°47'42.55"E	15° 16' 39"N	145° 47' 45"E
ADDITIONAL BUOYS SURVEYED					
S-A	Obyan 1			15° 5' 57"N	145° 44' 37"E
S-B	Obyan 2			15° 6' 11"N	145° 44' 26"E
S-C	Obyan 3			15° 6' 13"N	145° 44' 20"E
S-D	Pipe (N)			15° 8' 45"N	145° 41' 23"E
S-E	Pipe (S)			15° 8' 43"N	145° 41' 23"E
S-F**	Wing Beach Arch 2			n/a	n/a

* - This buoy was not found during surveys; therefore no GPS coordinate was taken.

** - A pin and line were found while surveying "S17-Wing Beach Crevice" but no mooring buoy was attached; therefore no GPS coordinate was taken.



Map 1: PCRP surveyed buoys on Saipan.

BECQ-PERMITTED BUOYS

#S01 – BANZAI 1

- Given GPS Coordinates: 15°17’30.55”N 145°48’46.21”E
- Recorded GPS Coordinates: 15° 17' 30"N 145° 48' 47"E

The buoy at this location was found, recorded, and photographed from the surface, but divers were unable to conduct the underwater survey due to strong currents.

The notes below are based on surveys conducted in October 2016 and therefore the condition may not be up to date. This buoy should be surveyed during the calm season to verify condition.

Material & Condition:

- *Depth of anchorage:* 44’
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8” stainless steel shackle
    - *Condition:* good
- *Thimble size/type:* 7/8” galvanized steel thimble
    - *Condition:* poor, needs to be replaced
- *Line size/type:* 7/8” 3-strand nylon
    - *Condition:* good
- *Tension floats – How many?* 1
    - *Depths & Condition:* unknown
- *Mooring buoy type/size:* 24” plastic fender/buoy
    - *Condition:* good
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Repairs Needed:

- Top priority:
    - Survey during calm season to verify condition.
    - Replace thimble
    - Install pick-up line with surface floats
- Medium priority:
    - Shackle safety wire
    - Replace buoy with standard BECQ buoy

#S02 – BANZAI 2

- Given GPS Coordinates: 15°17’26.25”N 145°48’44.64”E
- Recorded GPS Coordinates: n/a

The survey team was unable to find a second buoy at Banzai Cliff. Underwater surveys in search of anchorage or lines could not be conducted due to strong currents.

Material & Condition:

n/a

Repairs Needed:
If BECQ feels it is necessary to have a second mooring buoy at Banzai Cliff, then an entirely new buoy will need to be installed.

#S03 – BOY SCOUT (N)

- Given GPS Coordinates: 15°5'50.55"N 145°44'37.68"E
- Recorded GPS Coordinates: 15° 5' 42"N 145° 44' 42"E

Material & Condition:

- *Depth of anchorage:* 40'
- *Bottom attachment method:* stainless steel pin
    - *Condition:* good
- *Shackle size/type:* 5/8" stainless steel
    - *Condition:* good
- *Thimble size/type:* 5/8" galvanized steel
    - *Condition:* no good
- *Line size/type:* 7/8" 3-strand nylon eye-spliced at 22' to surface buoy; sheep shank rope reducer knot at 25'
    - *Condition:* OK
- *Tension floats – How many?* 1
    - *Depths & Condition:* 22' – no good, flat boat fender
- *Mooring buoy type/size:* seine float 12"
    - *Condition:* good
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Repairs Needed:

- Top priority:
    - Replace thimble
    - Replace tension floats
    - Replace pick-up line
- Medium priority:
    - Shackle safety wire
    - Standardize buoy to BECQ buoy
    - Replace/fix line

#S04 – BOY SCOUT (S)

- Given GPS Coordinates: 15°5'50.55"N 145°44'37.68"E
- Recorded GPS Coordinates: 15° 5' 41"N 145° 44' 43"E

This buoy was installed by Micronesian Environmental Services (MES) in March 2017.

Material & Condition:

- *Depth of anchorage:* 35'
- *Bottom attachment method:* stainless steel pin
    - *Condition:* good
- *Shackle size/type:* 5/8" stainless steel
    - *Condition:* good

- *Thimble size/type:* 7/8” galvanized steel
    - *Condition:* OK
- *Line size/type:* 7/8” 3-strand nylon eye-spliced to mooring polypropylene
    - *Condition:* good
- *Tension floats – How many?* 1
    - *Depths & Condition:* 15’ – good, 18” Taylor buoy
- *Mooring buoy type/size:* Taylor Made Sur-Moor 24”
    - *Condition:* good
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Repairs Needed:

- Top priority:
    - Replace pick-up line
- Medium priority:
    - Replace thimble
    - Shackle safety wire

#S05 – CHINSEN MARU

- Given GPS Coordinates: 15°14’18.48”N 145°43’26.79”E
- Recorded GPS Coordinates: 15° 14' 8"N 145° 43' 25"E

This mooring is the closest to the Chinsen Maru, but is .17 NM from the given coordinates.

Material & Condition:

- *Depth of anchorage:* 30’
- *Bottom attachment method:* galvanized Helix anchor
    - *Condition:* good
- *Shackle size/type:* 5/8” stainless steel
    - *Condition:* good
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 7/8” 3-strand nylon
    - *Condition:* good
- *Tension floats – How many?* n/a
    - *Depths & Condition:* n/a
- *Mooring buoy type/size:* fishing buoy single-eye, 18”
    - *Condition:* good
    - *Buoy line condition:* OK - surface eye starting to shred
- *Pick-up line size/type:* 5/8” to ½” nylon
    - *Condition:* no good

Repairs Needed:

- Top priority
    - Replace thimble
    - Tension floats
    - Replace pick up line
- Medium priority:
    - Replace buoy line
    - Standardize to BECQ buoy
    - Shackle safety wire

#S06 – DIMPLE 1

- Given GPS Coordinates: 15°09'52.84"N 145°41'01.61"E
- Recorded GPS Coordinates: 15° 9' 35"N 145° 41' 10"E

Given coordinates were .33 NM from this mooring buoy.

This buoy was installed by Micronesian Environmental Services in March 2017.

Material & Condition:

- *Depth of anchorage:* 60'
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8" stainless steel, safety wired
    - *Condition:* good
- *Thimble size/type:* 7/8" galvanized steel
    - *Condition:* OK – starting to wear
- *Line size/type:* 7/8" 3-strand nylon
    - *Condition:* OK – starting to shred
- *Tension floats – How many?* 2
    - *Depths & Condition:* 20' – good, 1 mooring buoy & 1 flat float
- *Mooring buoy type/size:* Taylor Made Sur-Moor 24"
    - *Condition:* good
    - *Buoy line condition:* OK - surface eye starting to shred
- *Pick-up line size/type:* 5/8" 3-strand white nylon
    - *Condition:* good

Repairs Needed:

- Medium priority:
    - Replace thimble
    - Replace line
    - Replace buoy line

#S07 – DIMPLE 2

- Given GPS Coordinates: 15°09'52.84"N 145°41'01.61"E
- Recorded GPS Coordinates: 15° 9' 35"N 145° 41' 10"E

Material & Condition:

- *Depth of anchorage:* 59'
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good

- *Shackle size/type:* 5/8” stainless steel
    - *Condition:* good
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 7/8” braided nylon with eye on both ends
    - *Condition:* from bottom to 20’ – good; from 20’ to surface no good needs replacement
- *Tension floats – How many?* n/a
    - *Depths & Condition:* n/a
- *Mooring buoy type/size:* hard plastic buoy, 12”
    - *Condition:* no good
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* 1/2" braided nylon with seine float
    - *Condition:* no good

Repairs Needed:

- Top priority:
    - Replace thimble
    - Mooring line from 20’ to surface
    - Tension float
    - Pick-up line
    - Replace mooring buoy with BECQ buoy
- Medium priority:
    - Shackle safety wire

#S08 – DIMPLE 3

- Given GPS Coordinates: 15°09’52.84”N 145°41’01.61”E
- Recorded GPS Coordinates: n/a

The survey team was unable to find a buoy at or near these given coordinates.

Material & Condition:

n/a

Repairs Needed:

n/a

#S09 – GROTTO

- Given GPS Coordinates: 15°15’28.32”N 145°49’27.44”E
- Recorded GPS Coordinates: 15° 15' 32"N 145° 49' 26"E

Material & Condition:

- *Depth of anchorage:* 56’
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8” stainless steel
    - *Condition:* good
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 7/8” 3-strand nylon
    - *Condition:* good from anchor pin to 20’ depth

- *Tension floats – How many?* 1
    - *Depths & Condition:* 18’ – good, covered in hard growth
- *Mooring buoy type/size:* seine float, small
    - *Condition:* no good
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* 1/2" nylon with water bottle, not to standard
    - *Condition:* needs to be replaced

Repairs Needed:

- Top priority:
    - Thimble
    - Line after 20’
    - Clean tension float
    - Mooring buoy
    - Pick-up line
- Medium priority:
    - Shackle safety wire

#S10 – ICE CREAM 1

- Given GPS Coordinates: 15°10’04.77”N 145°41’14.94”E
- Recorded GPS Coordinates: 15° 10' 0"N 145° 41' 38"E

Material & Condition:

- *Depth of anchorage:* 49’
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8” stainless steel
    - *Condition:* good
- *Thimble size/type:* 5/8” galvanized steel
    - *Condition:* no good
- *Line size/type:* 7/8” 3-strand nylon, at 12’ depth there is a sheep shank rope reducer knot
    - *Condition:* no good
- *Tension floats – How many?* 1
    - *Depths & Condition:* 18’ – OK, large 24” boat fender
- *Mooring buoy type/size:* white boat fender, 18”
    - *Condition:* good
    - *Buoy line condition:* OK - surface eye starting to shred
- *Pick-up line size/type:* 5/8” 3-strand polypropylene
    - *Condition:* no good

Repairs Needed:

- Top priority:
    - Thimble
    - Pick up line
    - Mooring line
- Medium priority
    - Shackle safety wire
    - Standardize mooring buoy
    - Replace buoy line

#S11 – ICE CREAM 2

- Given GPS Coordinates: 15°10’05.80”N 145°41’13.40”E
- Recorded GPS Coordinates: 15° 9' 58"N 145° 41' 37"E

Material & Condition:

- *Depth of anchorage:* 50’
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 7/8” galvanized steel
    - *Condition:* no good
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 7/8” 3-strand eye-to-eye spliced nylon to 27’, to tension float with eye
    - *Condition:* good
- *Tension floats – How many?* 2
    - *Depths & Condition:* 27’ – good
- *Mooring buoy type/size:* seine float, 10”
    - *Condition:* OK
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* 5/8” 3-strand nylon with 3 roller floats
    - *Condition:* no good

Repairs Needed:

- Top priority:
    - Shackle
    - Thimble
    - Pick up line
- Medium priority
    - Shackle safety wire
    - Standardize mooring buoy

#S12 – LAOLAO BAY

- Given GPS Coordinates: 15°09’45.83”N 145°45’44.73”E
- Recorded GPS Coordinates: n/a

The survey team was unable to find a buoy at Laolao Bay.

Material & Condition:
n/a

Repairs Needed:
n/a

#S13 – OBYAN BEACH

- Given GPS Coordinates: 15°06’16.62”N 145°44’19.13”E
- Recorded GPS Coordinates: 15° 6' 15"N 145° 44' 17"E

Material & Condition:

- *Depth of anchorage:* 29’
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8” stainless steel
    - *Condition:* good
- *Thimble size/type:* 5/8” galvanized steel
    - *Condition:* no good
- *Line size/type:* 7/8” 3-strand nylon
    - *Condition:* good
- *Tension floats – How many?* 1
    - *Depths & Condition:* 16’ – good, 12” foam ball
- *Mooring buoy type/size:* seine float 10”
    - *Condition:* good
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* 7/8” 3-strand polypropylene
    - *Condition:* no good

Repairs Needed:

- Top priority:
    - Thimble
    - Pick up line
- Medium priority
    - Shackle safety wire
    - Standardize mooring buoy

#S14 – SAIPAN BOMBER (EMILY)

- Given GPS Coordinates: 15°14’34.44”N 145°43’21.75”E
- Recorded GPS Coordinates: 15° 14' 26"N 145° 43' 44"E

Please note the change in name. This plane wreck is that of a Japanese “Emily”, not a US B29.

This buoy was found .39 NM away from given coordinates. The given coordinates lead to a very shallow sandy area.

Material & Condition:

- *Depth of anchorage:* 30’
- *Bottom attachment method:* Helix anchor
    - *Condition:* good
- *Shackle size/type:* 5/8” stainless steel
    - *Condition:* good
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 7/8” 3-strand nylon eye to 7/8” 3-strand nylon
    - *Condition:* no good

- *Tension floats – How many?* n/a
    - *Depths & Condition:* n/a
- *Mooring buoy type/size:* plastic fishing buoy 18”
    - *Condition:* good
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* mixed up knots
    - *Condition:* no good

Repairs Needed:

- Top priority:
    - Thimble
    - Line
    - Tension floats
    - Pick up line
- Medium priority:
    - Shackle safety wire
    - Standardize mooring buoy

#S15 – SPOTLIGHT

- Given GPS Coordinates: 15°17’14.00”N 145°49’08.86”E
- Recorded GPS Coordinates: n/a

The survey team was unable to find a buoy at or near the given coordinates.

Material & Condition:
n/a

Repairs Needed:
n/a

#S16 – WING BEACH ~~ARCH~~ CREVICE

- Given GPS Coordinates: 15°16’34.60”N 145°47’35.71”E
- Recorded GPS Coordinates: 15° 16' 32"N 145° 47' 37"E

This buoy was installed by Micronesian Environmental Services in March 2017.

This buoy is incorrectly named “Wing Beach Arch”, and should rather be named either “Wing Beach” or “Wing Beach Crevice”.

Material & Condition:

- *Depth of anchorage:* 47’
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 7/8” stainless steel
    - *Condition:* good
- *Thimble size/type:* 7/8” galvanized steel
    - *Condition:* good
- *Line size/type:* 7/8” 3-strand nylon
    - *Condition:* ??
- *Tension floats – How many?* 3

    - *Depths & Condition:* 22’ – good, 1 seine float & 2 flat floats
- *Mooring buoy type/size:* Taylor Made Sur-Moor 24”
    - *Condition:* good
    - *Buoy line condition:* no good, kink at 17’ below surface
- *Pick-up line size/type:* 7/8” 3-strand polypropylene
    - *Condition:* cut – no good

Repairs Needed:

- Top priority
    - Replace buoy line
    - Replace pick up line
- Medium priority:
    - Shackle safety wire

#S17 – WING BEACH ~~CREVICE~~ ARCH

- Given GPS Coordinates: 15°16’38.44”N 145°47’42.55”E
- Recorded GPS Coordinates: 15° 16' 39"N 145° 47' 45"E

This buoy was installed by Micronesian Environmental Services on an existing anchor pin in March 2017.

This buoy is incorrectly named “Wing Beach Crevice”, and should rather be named “Wing Beach Arch”.

During the surveys the team noted that the mooring buoy was barely attached to the line and was likely to break free. Not wanting to lose a brand new, BECQ-issued buoy, the team cut the mooring buoy free and brought it back to shore.

Material & Condition:

- *Depth of anchorage:* 41’
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 7/8” galvanized steel
    - *Condition:* good
- *Thimble size/type:* 7/8” galvanized steel
    - *Condition:* good
- *Line size/type:* 7/8” 3-strand
    - *Condition:* good
- *Tension floats – How many?* 3
    - *Depths & Condition:* 19’ – good, 1 seine float & 2 flat floats
- *Mooring buoy type/size:* Taylor Made Sur-Moor 24”
    - *Condition:* good, cut and brought back to shore
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* 5/8” 3-strand white nylon
    - *Condition:* cut – no good

Repairs Needed:

- Top priority
    - Pick up line
    - Mooring buoy
- Medium priority:
    - Shackle safety wire

ADDITIONAL BUOYS SURVEYED

#S-A – OBYAN AQUARIUM

- Recorded GPS Coordinates: 15° 5' 57"N 145° 44' 37"

Unknown buoy recorded from the boat.

Material & Condition:

- *Depth of anchorage:* unknown
- *Bottom attachment method:* unknown
    - *Condition:* unknown
- *Shackle size/type:* unknown
    - *Condition:* unknown
- *Thimble size/type:* unknown
    - *Condition:* unknown
- *Line size/type:* unknown
    - *Condition:* unknown
- *Tension floats – How many?* unknown
    - *Depths & Condition:* unknown
- *Mooring buoy type/size:* black fishing buoy 18”
    - *Condition:* good
    - *Buoy line condition:* unknown
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Recommendations:
This buoy should be surveyed to identify bottom attachment method and condition of materials. See “Additional Buoy Needs Assessment” for more details.

#S-B – OBYAN UNKNOWN

- Recorded GPS Coordinates: 15° 6' 11"N 145° 44' 26"E

Unknown buoy recorded from the boat.

Material & Condition:

- *Depth of anchorage:* unknown
- *Bottom attachment method:* unknown
    - *Condition:* unknown
- *Shackle size/type:* unknown
    - *Condition:* unknown
- *Thimble size/type:* unknown
    - *Condition:* unknown
- *Line size/type:* unknown
    - *Condition:* unknown
- *Tension floats – How many?* unknown
    - *Depths & Condition:* unknown

- *Mooring buoy type/size:* white rubber boat fender 24”
    - *Condition:* good
    - *Buoy line condition:* unknown
- *Pick-up line size/type:* 7/8”
    - *Condition:* no good

Recommendations:
According to conversations with stakeholders, this location should not have a mooring buoy. This buoy should be surveyed to identify bottom attachment method. Unless the bottom attachment method is an anchor pin or helix screw, this buoy should be removed.

#S-C – OBYAN BEACH 2

- Recorded GPS Coordinates: 15° 6' 13"N 145° 44' 20"E

Unknown buoy recorded from the boat.

Material & Condition:
- *Depth of anchorage:* unknown
- *Bottom attachment method:* unknown
    - *Condition:* unknown
- *Shackle size/type:* unknown
    - *Condition:* unknown
- *Thimble size/type:* unknown
    - *Condition:* unknown
- *Line size/type:* unknown
    - *Condition:* unknown
- *Tension floats – How many?* unknown
    - *Depths & Condition:* unknown
- *Mooring buoy type/size:* black fishing float 12”
    - *Condition:* OK
    - *Buoy line condition:* unknown
- *Pick-up line size/type:* 7/8”
    - *Condition:* no good

Recommendations:
This buoy should be surveyed to identify bottom attachment method and condition of materials. See “Additional Buoy Needs Assessment” for more details.

#S-D – PIPE (N)

- Recorded GPS Coordinates: 15° 8' 45"N 145° 41' 23"E

Material & Condition:
- *Depth of anchorage:* 55’
- *Bottom attachment method:* large cement block
    - *Condition:* good
- *Shackle size/type:* n/a
    - *Condition:* n/a
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 1” braided nylon

    - *Condition:* good
- *Tension floats – How many?* 1
    - *Depths & Condition:* 27’ – good, 24” hard plastic fishermen buoy
- *Mooring buoy type/size:* 10” seine float, 2 pieces
    - *Condition:* good
    - *Buoy line condition:*
- *Pick-up line size/type:* 1” braided nylon
    - *Condition:* OK

Recommendations:
This buoy is used regularly by dive operators and should be permitted by BECQ, with appropriate upgrades and replacements made. See “Additional Buoy Needs Assessment” for more details.

#S-E – PIPE (S)

- Recorded GPS Coordinates: 15° 8' 43"N 145° 41' 23"E

Material & Condition:

- *Depth of anchorage:* 55’
- *Bottom attachment method:* Helix anchor screw
    - *Condition:* good
- *Shackle size/type:* 7/8” stainless steel
    - *Condition:* good
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 7/8” 3-strand nylon
    - *Condition:* good
- *Tension floats – How many?* 1
    - *Depths & Condition:* 22’ – good, seine float, 8”
- *Mooring buoy type/size:* Taylor Made Sur-Moor 18”
    - *Condition:* good
    - *Buoy line condition:*
- *Pick-up line size/type:* 5/8” 3-strand nylon
    - *Condition:* no good

Recommendations:
This buoy should be permitted by BECQ, with appropriate upgrades and replacements made. See “Additional Buoy Needs Assessment” for more details.

#S-F – WING BEACH ARCH 2

- Recorded GPS Coordinates: n/a

Unknown buoy discovered 60-70 feet north of S17 – Wing Beach Arch (formerly recorded as Wing Beach Crevice) buoy. The line and anchor pin were found while surveying “S17-Wing Beach Arch” but no mooring buoy was attached, therefore no GPS coordinate was taken.

It is possible that this is the buoy also known as “Turtlehead / El Toro”.

Material & Condition:

- *Depth of anchorage:* 38’
- *Bottom attachment method:* stainless steel pin
    - *Condition:* good
- *Shackle size/type:* 5/8” stainless steel
    - *Condition:* good
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 7/8” 3-strand
    - *Condition:* good, some small coral growth
- *Tension floats – How many?* 1
    - *Depths & Condition:* 20’ – boat fender, no good
- *Mooring buoy type/size:* n/a
    - *Condition:* n/a
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Recommendations:

This buoy should be permitted by BECQ, with appropriate upgrades and replacements made. See “Additional Buoy Needs Assessment” for more details.

TINIAN

Survey dates: November 1, 2017
Surveyors: Mark Michael, Pip Ball, Tony Flores

Map Code	Site Name	BECQ-Lat	BECQ-Long	PCRP-Lat	PCRP-Long
BECQ-PERMITTED BUOYS					
T01*	Dump Coke	15° 2'58.53" N	145°35'49.05"E	n/a	n/a
T02*	Grotto (N)	15° 2'8.64"N	145°35'15.86"E	n/a	n/a
T03*	Grotto (S)	15° 2'8.64"N	145°35'15.86"E	n/a	n/a
T04	Flemming	15° 1'25.93" N	145°35'1.95"E	15° 1' 23"N	145° 35' 1"E
T05	Two Corals	14°59'20.93"N	145°35'47.07"E	14° 59' 22"N	145° 36' 7"E
ADDITIONAL BUOYS SURVEYED					
T-A	Dump Coke 2			15° 3' 7"N	145° 35' 47"E
T-B	Flemming 2			15° 1' 22"N	145° 35' 2"E
T-C	Flemming 3			15° 1' 2"N	145° 34' 54"E

* - This buoy was not found during surveys; therefore no GPS coordinate was taken.

Map 2: PCRP surveyed buoys on Tinian.

BECQ-PERMITTED BUOYS

#T01 – DUMP COKE

- Given GPS Coordinates: 15°02’58.53”N 145°35’49.05”E
- Recorded GPS Coordinates: n/a

No mooring buoy was found at this location.

Material & Condition:
n/a

Repairs Needed:
There should be one buoy at Dump Coke. This buoy needs to be replaced.

#T02 – GROTTO (N)

- Given GPS Coordinates: 15°02’08.64”N 145°35’15.86”E
- Recorded GPS Coordinates: n/a

No mooring buoy was found at this location.

Material & Condition:
n/a

Repairs Needed:
There should be two buoys at Grotto. This buoy needs to be replaced.

#T03 – GROTTO (S)

- Given GPS Coordinates: 15°02’08.64”N 145°35’15.86”E
- Recorded GPS Coordinates: n/a

No mooring buoy was found at this location.

Material & Condition:
n/a

Repairs Needed:
There should be two buoys at Grotto. This buoy needs to be replaced.

#T04 – FLEMMING

- Given GPS Coordinates: 15°01’25.93”N 145°35’01.95”E
- Recorded GPS Coordinates: 15° 1' 23"N 145° 35' 1"E

Material & Condition:

- *Depth of anchorage:* 46’
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8” stainless steel
    - *Condition:* good
- *Thimble size/type:* n/a
    - *Condition:* n/a

- *Line size/type:* 7/8” 3-strand
    - *Condition:* no good
- *Tension floats – How many?* 1
    - *Depths & Condition:* 16’ – boat fender, no good
- *Mooring buoy type/size:* 18” black fishing buoy
    - *Condition:* good
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* ½” braided line
    - *Condition:* no good

Repairs Needed:

- Top priority
    - Thimble
    - Replace line
    - Replace tension float
    - Replace pick-up line
- Medium priority
    - Shackle safety wire
    - Replace buoy with BECQ standard

#T05 – TWO CORALS

- Given GPS Coordinates: 14°59’20.93”N 145°35’47.07”E
- Recorded GPS Coordinates: 14° 59' 22"N 145° 36' 7"

This buoy was not at the given GPS coordinates.

Material & Condition:

- *Depth of anchorage:* 40’
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8” stainless steel
    - *Condition:* good
- *Thimble size/type:* 7/8” galvanized steel
    - *Condition:* no good
- *Line size/type:* 7/8” 3-strand nylon spliced with 5/8” polypropylene
    - *Condition:* nylon rope is good, poly rope is no good
- *Tension floats – How many?* 1
    - *Depths & Condition:* 11’ – good
- *Mooring buoy type/size:* 10” seine
    - *Condition:* good
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Repairs Needed:

- Top priority:
    - Replace thimble
    - Poly Line
    - Pick up line

- Medium priority
    - Replace buoy with BECQ standard
    - Shackle safety wire

ADDITIONAL BUOYS SURVEYED

#T-A – DUMP COKE 2

- Recorded GPS Coordinates: 15° 3' 7"N 145° 35' 47"E

Unpermitted mooring system found at Dump Coke.

Material & Condition:

- *Depth of anchorage:* 47’
- *Bottom attachment method:* wrapped around a rock
    - *Condition:* no good
- *Shackle size/type:* n/a
    - *Condition:* n/a
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 1” 3-strand
    - *Condition:* no good
- *Tension floats – How many?* n/a
    - *Depths & Condition:* n/a
- *Mooring buoy type/size:* n/a
    - *Condition:* n/a
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* 5/8” 3-strand polypropylene
    - *Condition:* good

Recommendations:
This buoy should be removed.

#T-B – FLEMMING 2

- Recorded GPS Coordinates: 15° 1' 22"N 145° 35' 2"E

Material & Condition:

- *Depth of anchorage:* 52’
- *Bottom attachment method:* wrapped around a rock
    - *Condition:* no good
- *Shackle size/type:* n/a
    - *Condition:* n/a
- *Thimble size/type:* 7/8” galvanized steel
    - *Condition:* no good
- *Line size/type:* 7/8” 3-strand
    - *Condition:* good
- *Tension floats – How many?* 1
    - *Depths & Condition:* 14’ fishing buoy– good, with some coral growth

- *Mooring buoy type/size:* 10” seine float
    - *Condition:* good
    - *Buoy line condition:* ??
- *Pick-up line size/type:* 5/8”
    - *Condition:* no good

Recommendations:
This buoy is used regularly by dive operators and should be permitted by BECQ, with appropriate upgrades and replacements made. See “Additional Buoy Needs Assessment” for more details.

#T-C – FLEMMING 3

- Recorded GPS Coordinates: 15° 1' 2"N 145° 34' 54"E

South of Flemming Point

Material & Condition:

- *Depth of anchorage:* 50’
- *Bottom attachment method:* wrapped around a rock
    - *Condition:* no good
- *Shackle size/type:* n/a
    - *Condition:* n/a
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 7/8” 3-strand
    - *Condition:* no good
- *Tension floats – How many?* 1
    - *Depths & Condition:* good
- *Mooring buoy type/size:* 18” seine float, 1 big foam float
    - *Condition:* no good
    - *Buoy line condition:* ??
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Recommendations:
This buoy should be removed.

ROTA

Survey dates: September 30 – October 1, 2017
Surveyors: Mark Michael, Becky Jordan, Tony Flores

Map Code	Site Name	BECQ-Lat	BECQ-Long	PCRP-Lat	PCRP-Long
BECQ-PERMITTED BUOYS					
R01*	Cable Run	14°07.36N	145°09.59E	n/a	n/a
R02	Coral Gardens #1	14°07.09N	145°10.05E	14° 7' 6"N	145° 10' 6"E
R03	Coral Gardens #2	14°07.02N	145°10.05E	14° 7' 4"N	145° 10' 6"E
R04	Coral Gardens #3	14°07.03N	145°10.02E	14° 7' 4"N	145° 10' 5"E
R05	Fireworks	14°07.31N	145°10.00E	14° 7' 31"N	145° 9' 59"E
R06	Harnom Point	14°07.04N	145°07.17E	14° 7' 4"N	145° 7' 18"E
R07	Jerry's Reef	14°07.98N	145°08.25E	14° 8' 5"N	145° 8' 25"E
R08	Joanne's Reef	14°03.08N	145°09.11E	14° 8' 7"N	145° 9' 12"E
R09	Pinatang	14°08.45N	145°08.23E	14° 8' 41"N	145° 8' 20"E
R10**	Pona Point	14°06.44N	145°09.59E	n/a	n/a
R11	Senhanom Cave	14°07.17N	145°07.16E	14° 7' 18"N	145° 7' 17"E
R12	Senhanom Wall	14°07.27N	145°07.17E	14° 7' 35"N	145° 7' 20"E
R13	Shoun Maru (Shipwreck)	14°07.30N	145°09.50E	14° 7' 30"N	145° 9' 47"E
R14	Subchaser II (Shipwreck)	14°07.19N	145°10.02E	14° 7' 19"N	145° 10' 3"E
R15	Saligai Cove	14°09'54.1"N	145°09'24.1"E	14° 10' 6"N	145° 9' 30"E
R16	Tabletop	14°07.55N	145°09'20E	14° 7' 55"N	145° 9' 19"E
ADDITIONAL BUOYS SURVEYED					
R-A	Pinatang #2			14° 8' 44"N	145° 8' 23"E
R-B	Senhanom Wall 2			14° 7' 28"N	145° 7' 19"E
R-C	Tabletop 2			14° 8' 6"N	145° 9' 1"E

* - This buoy was not found during surveys; therefore no GPS coordinate was taken.

** - An anchor chain wrapped around a rock and a 60 foot line was found at the approximate coordinates but no mooring buoy was attached; therefore no GPS coordinate was taken.

Map 3: PCRP surveyed buoys on Rota.

BECQ-PERMITTED BUOYS

#R01 – "CABLE RUN"

- Given GPS Coordinates: 14°07.36'N 145°09.59'E
- Recorded GPS Coordinates: n/a

Material & Condition:
n/a

Estimated depth at 53'.

According to local experts, this buoy disappeared in early 2017. Project divers surveyed the approximate location of the buoy in search of the pin and were unable to locate the pin.

Repairs Needed:
We recommend spending a full day with a team of divers searching for the pin in the approximate location of the previous buoy. If found, the pin can serve as the anchoring for the installment of a new line and buoy.

If the pin cannot be found, a new one will need to be drilled in and installed.

#R02 – CORAL GARDENS 1

- Given GPS Coordinates: 14°07.09'N 145°10.05'E
- Recorded GPS Coordinates: 14° 7' 6"N 145° 10' 6"E

Material & Condition:

- *Depth of anchorage:* 15'
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 3/8" galvanized steel
    - *Condition:* good
- *Thimble size/type:* 5/8" galvanized steel
    - *Condition:* good
- *Line size/type:* 5/8" 3 strand yellow polypropylene
    - *Condition:* OK – starting to splinter, should be replaced
- *Tension floats - How many?* 2
    - *Depths & Condition:* corroded, need to be replaced
- *Mooring buoy type/size:* Taylor Made Sur-Moor 18"
    - *Condition:* good
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Repairs Needed:

- Top priority:
    - Pick-up line & 3 floats
    - 2 tension floats

- Medium priority:
    - Shackle safety wire
    - Mooring line

#R03 – CORAL GARDENS 2

- Given GPS Coordinates: 14°07.02'N 145°10.05'E
- Recorded GPS Coordinates: 14° 7' 4"N 145° 10' 6"E

Material & Condition:

- *Depth of anchorage:* 15'
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8" galvanized steel
    - *Condition:* good
- *Thimble size/type:* 5/8" galvanized steel
    - *Condition:* OK
- *Line size/type:* 5/8" 3 strand yellow polypropylene
    - *Condition:* OK – top segment starting to splinter and has kinks
- *Tension floats – How many?* 2
    - *Depths & Condition:* cracked, needs to be replaced
- *Mooring buoy type/size:* Taylor Made Sur-Moor 18"
    - *Condition:* good
    - *Buoy line condition:* good
- *Pick-up line size/type:* too short, with only 2 floats
    - *Condition:* needs to be replaced

Repairs Needed:

- Top priority:
    - Pick-up line & 3 floats
    - 2 tension floats
- Medium priority:
    - Thimble
    - Shackle safety wire
        - Mooring line

#R04 – CORAL GARDEN 3

- Given GPS Coordinates: 14°07.03'N 145°10.02'E
- Recorded GPS Coordinates: 14° 7' 4"N 145° 10' 5"E

Material & Condition:

- *Depth of anchorage:* 20'
- *Bottom attachment method:* anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8" stainless steel
    - *Condition:* good

- *Thimble size/type:* 5/8” galvanized steel
    - *Condition:* good
- *Line size/type:* 5/8” 3 strand nylon
    - *Condition:* good
- *Tension floats – How many?* 2
    - *Depths & Condition:* 4’ & 6’ - good
- *Mooring buoy type/size:* Taylor Made Sur-Moor 18”
    - *Condition:* good
    - *Buoy line condition:* good
- *Pick-up line size/type:* make-shift, with only 1 float
    - *Condition:* insufficient

Repairs Needed:

- Top priority:
    - Pick-up line & 3 floats
- Medium priority
    - Shackle safety wire

#R05 – FIREWORKS

- Given GPS Coordinates: 14°07.31’N 145°10.00’E
- Recorded GPS Coordinates: 14° 7' 31"N 145° 9' 59"E

Material & Condition:

- *Depth of anchorage:* 60’
- *Bottom attachment method:* helix anchor in sand
    - *Condition:* needs to be screwed in more
- *Shackle size/type:* 5/8” galvanized steel
    - *Condition:* good
- *Thimble size/type:* 5/8” galvanized steel
    - *Condition:* good
- *Line size/type:* 5/8” 3 strand polypropylene
    - *Condition:* brand new
- *Tension floats – How many?* 2
    - *Depths & Condition:* 10’ & 40’ - good
- *Mooring buoy type/size:* Taylor Made Sur-Moor 18”
    - *Condition:* good
    - *Buoy line condition:* good
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Repairs Needed:

- Top priority:
    - Pick-up line & 3 floats
    - Screw in helix anchor
- Medium priority
    - Shackle safety wire

This mooring was replaced by Mark Michael in September 2017

#R06 – HARNOM POINT

- Given GPS Coordinates: 14°07.04'N 145°07.17'E
- Recorded GPS Coordinates: 14° 7' 4"N 145° 7' 18"E

Material & Condition:

- *Depth of anchorage:* 50'
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8" galvanized steel
    - *Condition:* good
- *Thimble size/type:* 5/8" galvanized steel
    - *Condition:* good
- *Line size/type:* 5/8" 3 strand nylon
    - *Condition:* good
- *Tension floats – How many?* 2
    - *Depths & Condition:* 15' & 38' - good
- *Mooring buoy type/size:* Taylor Made Sur-Moor 24"
    - *Condition:* good
    - *Buoy line condition:* good
- *Pick-up line size/type:* 12 foot, with 3 floats
    - *Condition:* good

Repairs Needed:

- Medium priority
    - Shackle safety wire

#R07 – JERRY'S REEF

- Given GPS Coordinates: 14°07.98'N 145°08.25'E
- Recorded GPS Coordinates: 14° 8' 5"N 145° 8' 25"E

Material & Condition:

- *Depth of anchorage:* 53'
- *Bottom attachment method:* helix screw-in anchor
    - *Condition:* good – should be screwed in more
- *Shackle size/type:* 7/8" galvanized steel
    - *Condition:* good

- *Thimble size/type:* 7/8" galvanized steel
    - *Condition:* OK – worn, should be replaced soon
- *Line size/type:* 7/8" 3 strand nylon
    - *Condition:* lots of splices, should be replaced
- *Tension floats – How many?* 3
    - *Depths & Condition:* 45' – has coral growth, needs to be cleaned; 22' – two together, needs to be cleaned
- *Mooring buoy type/size:* Taylor Made Sur-Moor 18"
    - *Condition:* good
    - *Buoy line condition:* worn, needs to be replaced
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Repairs Needed:

- Top priority:
    - Screw in helix anchor
    - Mooring line
    - Buoy line
    - Pick-up line & floats
    - Shackle safety wire
- Medium priority:
    - Shackle safety wire
    - Thimble

#R08 – JOANNES'S REEF

- Given GPS Coordinates: 14°03.08'N 145°09.11'E
- Recorded GPS Coordinates: 14° 8' 7"N 145° 9' 12"E

*Please note the difference in GPS coordinates.

Material & Condition:

- *Depth of anchorage:* 22'
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 7/8" galvanized steel
    - *Condition:* OK – starting to wear
- *Thimble size/type:* 7/8" nylon thimble
    - *Condition:* OK – starting to wear
- *Line size/type:* 7/8" 3 strand nylon
    - *Condition:* too short, should be replaced
- *Tension floats – How many?* 2
    - *Depths & Condition:* 18' & 6' – need to be cleaned
- *Mooring buoy type/size:* Taylor Made Sur-Moor 24"
    - *Condition:* good
    - *Buoy line condition:* worn, needs to be replaced

- *Pick-up line size/type:* not to standard
    - *Condition:* needs to be replaced

Repairs Needed:

- Top priority:
    - Mooring line
    - Buoy line
    - Pick-up line & floats
    - Clean tension floats
- Medium
    - Replace shackle
    - Replace thimble
    - Shackle safety wire

#R09 – PINATANG

- Given GPS Coordinates: 14°08.45'N 145°08.23'E
- Recorded GPS Coordinates: 14° 8' 41"N 145° 8' 20"E

Material & Condition:

- *Depth of anchorage:* 35'
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8" stainless steel
    - *Condition:* good
- *Thimble size/type:* 5/8" galvanized
    - *Condition:* OK
- *Line size/type:* 5/8" 3 strand nylon
    - *Condition:* bad, unraveling
- *Tension floats – How many?* 2
    - *Depths & Condition:* 5' – needs to be cleaned; 14' – two, both are corroded and need to be replaced
- *Mooring buoy type/size:* Taylor Made Sur-Moor 24"
    - *Condition:* good
    - *Buoy line condition:* good
- *Pick-up line size/type:* too short with only 2 floats
    - *Condition:* need to replace

Repairs Needed:

- Top priority:
    - Mooring line
    - 2 Tension floats
    - Pick-up line & floats
    - Clean third tension float
- Medium priority
    - Thimble
    - Shackle safety wire

#R10 – POÑA POINT

- Given GPS Coordinates: 14°06.44'N 145°09.59'E
- Recorded GPS Coordinates: n/a

Buoy is missing; about 60' of rope found on the bottom, attached to anchor chain wrapped around a rock.

Material & Condition:

- *Depth of anchorage:* 41'
- *Bottom attachment method:* chain around rock
    - *Condition:* good
- *Shackle size/type:* 5/8" galvanized steel
    - *Condition:* good
- *Thimble size/type:* ??
    - *Condition:* good
- *Line size/type:* about 60' of rope
    - *Condition:* good
- *Tension floats – How many?* n/a
    - *Depths & Condition:* n/a
- *Mooring buoy type/size:* n/a
    - *Condition:* n/a
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Repairs Needed:

There is some uncertainty about the legal status of this buoy, whether it is an official BECQ mooring buoy or a non-mooring boundary marker of the Sasanhaya MPA, installed by DFW.

Local experts claim that this was at one point a DCRM mooring buoy, but the buoy was removed and replaced with a MPA marker buoy when the Sasanhaya MPA was established. PCRP recommends that BECQ clarify this with DFW.

If the buoy is to be replaced, the following materials are needed:

- Mooring buoy
- Pick-up line with 3 floats
- 2 tension floats

#R11 – SENHANOM CAVE

- Given GPS Coordinates: 14°07.17'N 145°07.16'E
- Recorded GPS Coordinates: 14° 7' 18"N 145° 7' 17"E

Material & Condition:

- *Depth of anchorage:* 59'
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good

- *Shackle size/type:* 5/8” galvanized steel
    - *Condition:* OK – worn, should be replaced soon
- *Thimble size/type:* n/a
    - *Condition:* needs to be replaced
- *Swivel size/type:* 5/8” galvanized steel
    - *Condition:* OK – worn, should be replaced soon
- *Additional shackle size/type:* 5/8” galvanized shackle
    - *Condition:* needs to be replaced
- *Line size/type:* 7/8” 3 strand nylon
    - *Condition:* good
- *Tension floats – How many?* 2
    - *Depths & Condition:* bottom float has broken free and floated to meet the top at 13’, bottom float needs to be reattached at a lower depth
- *Mooring buoy type/size:* Taylor Made Sur-Moor 24”
    - *Condition:* good
    - *Buoy line condition:* good
- *Pick-up line size/type:* 12 foot with 3 floats
    - *Condition:* good

Repairs Needed:

- Top priority:
    - Thimble
    - Swivel
    - Extra shackle
- Medium priority:
    - Shackle
    - Shackle safety wire
    - Reattached bottom tension float at deeper depth

#R12 – SENHANOM WALL

- Given GPS Coordinates: 14°07.27’N 145°07.17’E
- Recorded GPS Coordinates: 14° 7' 35"N 145° 7' 20"E

Material & Condition:

- *Depth of anchorage:* 45’
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8” galvanized steel
    - *Condition:* OK - worn
- *Thimble size/type:* 5/8” galvanized steel
    - *Condition:* good
- *Line size/type:* 3/4" 3-strand nylon
    - *Condition:* good
- *Tension floats – How many?* 2
    - *Depths & Condition:* 12’ & 36’ - good

- *Mooring buoy type/size:* Taylor Made Sur-Moor 24”
    - *Condition:* good
    - *Buoy line condition:* good
- *Pick-up line size/type:* 12 foot, 3 floats
    - *Condition:* good

Repairs Needed:

- Medium priority:
    - Shackle
    - Shackle safety wire

#R13 – SHOUN MARU (SHIPWRECK)

- Given GPS Coordinates: 14°07.30’N 145°09.50’E
- Recorded GPS Coordinates: 14° 7' 30"N 145° 9' 47"E

Material & Condition:

- *Depth of anchorage:* 101’
- *Bottom attachment method:* shackle attached to Shoun Maru anchor chain on sandy bottom
    - *Condition:* n/a
- *Shackle size/type:* 5/8” galvanized steel
    - *Condition:* needs to be replaced
- *Thimble size/type:* 5/8” galvanized steel
    - *Condition:* needs to be replaced
- *Line size/type:* 7/8” 3 strand nylon
    - *Condition:* covered in coral, needs to be cleaned
- *Tension floats – How many?* 2
    - *Depths & Condition:* 15’ – some coral growth; 50’ covered in dead coral, may need to replace
- *Mooring buoy type/size:* Taylor Made Sur-Moor 24”
    - *Condition:* good
    - *Buoy line condition:* needs to be replaced
- *Pick-up line size/type:* 12 foot, 3 floats
    - *Condition:* good, needs to be cleaned

Repairs Needed:

- Top priority:
    - Shackle
    - Thimble
    - Clean mooring line
    - Replace buoy line
    - Need to clean tension floats, may need to replace
- Medium priority
    - Shackle safety wire
    - Clean pick-up line & floats

#R14 – SUBCHASER II (SHIPWRECK)

- Given GPS Coordinates: 14°07.19'N 145°10.02'E
- Recorded GPS Coordinates: 14° 7' 19"N 145° 10' 3"E

Material & Condition:

- *Depth of anchorage:* 24'
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8" galvanized steel
    - *Condition:* OK
- *Thimble size/type:* 7/8" galvanized steel
    - *Condition:* needs to be replaced
- *Line size/type:* 7/8" 3 strand nylon
    - *Condition:* OK, needs to be cleaned
- *Tension floats – How many?* 2
    - *Depths & Condition:* 8' & 19' – good, needs cleaning
- *Mooring buoy type/size:* Taylor Made Sur-Moor 24"
    - *Condition:* good, needs to be cleaned
    - *Buoy line condition:* needs to be replaced
- *Pick-up line size/type:* 12 foot, with 3 floats
    - *Condition:* good, needs cleaning

Repairs Needed:

- Top priority:
    - Thimble
    - Clean mooring line
    - Clean tension floats
    - Buoy line
- Medium priority:
    - Shackle safety wire
    - Shackle

#R15 – SALIGAI COVE

- Given GPS Coordinates: 14°09.541'N 145°09.241'E
- Recorded GPS Coordinates: 14° 10' 6"N 145° 9' 30"E

Material & Condition:

- *Depth of anchorage:* 18'
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 3/8" galvanized steel
    - *Condition:* good, but too small, replace with 5/8"
- *Thimble size/type:* 5/8" galvanized steel
    - *Condition:* OK – getting worn

- *Line size/type:* 5/8" 3 strand polypropylene
    - *Condition:* good
- *Tension floats – How many?* 1
    - *Depths & Condition:* 12' - good
- *Mooring buoy type/size:* Taylor Made Sur-Moor 18"
    - *Condition:* good
    - *Buoy line condition:* good
- *Pick-up line size/type:* 12 foot, with 3 floats
    - *Condition:* good, with a knot

Repairs Needed:

- Top priority:
    - Replace shackle with larger size
- Medium priority:
    - Thimble
    - Shackle safety wire

#R16 – TABLETOP

- Given GPS Coordinates: 14°07.55'N 145°09.20'E
- Recorded GPS Coordinates: 14° 7' 55"N 145° 9' 19"E

Material & Condition:

- *Depth of anchorage:* 22'
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8" galvanized steel
    - *Condition:* good
- *Thimble size/type:* 5/8" galvanized steel
    - *Condition:* good
- *Line size/type:* 5/8" 3 strand polypropylene
    - *Condition:* needs to be replaced
- *Tension floats – How many?* 2
    - *Depths & Condition:* 7' & 15' – need to be cleaned, may need replacing
- *Mooring buoy type/size:* Taylor Made Sur-Moor 24"
    - *Condition:* good
    - *Buoy line condition:* good
- *Pick-up line size/type:* 12 foot, with 3 floats
    - *Condition:* good, recently replaced

Repairs Needed:

- Top priority:
    - Mooring line
    - Shackle safety wire

ADDITIONAL BUOYS SURVEYED

#R-A - PINATANG #2

- Recorded GPS Coordinates: 14° 8' 44"N 145° 8' 23"E

Located about 50 feet from the official BECQ buoy at Pinatang.

Material & Condition:

- *Depth of anchorage:* 18’
- *Bottom attachment method:* chain wrapped around the reef
- *Tension floats – How many?* 1
    - *Depths & Condition:* very corroded
- *Mooring buoy type/size:* small, unofficial
    - *Condition:* good

Recommendations:

This buoy should be removed.

SENHANOM WALL 2

- Recorded GPS Coordinates: 14° 7' 28"N 145° 7' 19"E

Material & Condition:

- *Depth of anchorage:* 45’
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 3/8” galvanized steel
    - *Condition:* good, needs to be replaced with a 5/8”
- *Thimble size/type:* 3/8” galvanized steel
    - *Condition:* good, needs to be replaced with a 5/8”
- *Line size/type:* 5/8” 3 strand polypropylene
    - *Condition:* needs to be replaced
- *Tension floats – How many?* 3
    - *Depths & Condition:* two at 22’ – one is OK, one is bad; 8’ - good
- *Mooring buoy type/size:* non-regulation
    - *Condition:* needs to be replaced with BECQ buoy
    - *Buoy line condition:* good
- *Pick-up line size/type:* 12 foot, with 3 floats
    - *Condition:* good

Recommendations:
This buoy should be permitted by BECQ and the necessary upgrades and repairs made, including:

- Upgrade shackle to larger size
- Upgrade thimble to larger size
- Replace line
- Replace buoy with BECQ buoy
- Shackle safety wire

TABLETOP 2

- Recorded GPS Coordinates: 14° 8' 6"N 145° 9' 1"E

Material & Condition:

- *Depth of anchorage:* 21'
- *Bottom attachment method:* stainless steel anchor pin
    - *Condition:* good
- *Shackle size/type:* 5/8" galvanized steel
    - *Condition:* OK
- *Thimble size/type:* 5/8" galvanized steel
    - *Condition:* OK
- *Line size/type:* 5/8" 3 strand polypropylene
    - *Condition:* needs to be replaced
- *Tension floats – How many?* 2
    - *Depths & Condition:* 16' – has coral growth; at surface – needs to be replaced and lowered
- *Mooring buoy type/size:* Taylor Made Sur-Moor 24"
    - *Condition:* good
    - *Buoy line condition:* good
- *Pick-up line size/type:* short, with one float
    - *Condition:* needs to be replaced

Recommendations:
This buoy should be permitted by BECQ and the necessary upgrades and repairs made, including:

- Replace line
- Replace pick-up line
- Shackle safety wire

Additional Buoy Needs Assessment

In addition to the 38 buoys listed by BECQ as permitted, PCRP is recommending that 14 new buoy locations be permitted and added to this list. These buoy locations fall into three distinct categories:

1. Existing buoys that were at some point permitted by DCRM or BECQ[1] but were not included on the list of official buoys.
2. Existing buoys that were installed without permission or permits from DCRM but are located in a high use area and therefore should be permitted and properly installed and maintained.
3. Locations without current mooring buoys in place but where stakeholders identified would be beneficial to add one or more mooring systems.

Adding these buoys to the current list will require varying degrees of cost and effort. Some buoys, primarily those that fall under the first category, are fully operational with sound anchor systems and well-maintained materials and may only need minor maintenance and repairs. Others, both in the first and second categories, have existing mooring systems in place that are functional but may not meet BECQ standards. PCRP recommends that BECQ allow these to continue to be used by stakeholders and be incorporated into the buoy maintenance program described below, with the eventual goal of fully updating each buoy (including proper substrate anchorage or attachment). And finally, the locations in the third category have no mooring systems in place and therefore will require the full installation of a mooring system before being operational.

EXISTING BUOYS ALREADY PERMITTED BY DCRM

Based on conversations with stakeholders and local experts, in-water observations, and additional documentation, it is evident that there are several buoys not included on the provided BECQ list of 38 that were actually permitted by DCRM or BECQ before installation. Many of these buoys were encountered during the in-water surveys and therefore are included under the "Additional Buoys Surveyed" in-water survey results section of this report, but will be repeated here.

Moorings encountered during the in-water surveys that were not included on the BECQ list of 38 but have attachment methods that require specialized drilling equipment (anchor pins or helix screws) are assumed to have been installed with DCRM/BECQ permission. Others are listed here based on conversations with stakeholders who helped to install these buoys with DCRM's approval and may have provided additional documentation.

These buoys are listed by island, starting at the northern-most point of the island going counter-clockwise.

[1] In these cases a distinction is made between DCRM and BECQ because at the time many of these buoys were installed, DCRM was an autonomous agency and BECQ did not exist.

SAIPAN

#S-F – WING BEACH ARCH 2

- Recorded GPS Coordinates: n/a

Unknown buoy discovered 60-70 feet north of "S17 – Wing Beach Arch" (formerly recorded as Wing Beach Crevice) buoy. The line and anchor pin were found while surveying "S17-Wing Beach Arch" but no mooring buoy was attached, therefore no GPS coordinate was taken.

It is possible that this is the buoy also known as "Turtlehead / El Toro".

Material & Condition:

- *Depth of anchorage:* 38'
- *Bottom attachment method:* stainless steel pin
    - *Condition:* good
- *Shackle size/type:* 5/8" stainless steel
    - *Condition:* good
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 7/8" 3-strand
    - *Condition:* good, some small coral growth
- *Tension floats – How many?* 1
    - *Depths & Condition:* 20' – boat fender, no good
- *Mooring buoy type/size:* n/a
    - *Condition:* n/a
    - *Buoy line condition:* n/a
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Recommendations:

Stakeholders from NMDOA claim that this buoy is one of two buoys at Wing Beach Arch that were installed by NMDOA members under the authority of DCRM. This mooring line is anchored with a stainless steel anchor pin that would have required specialized equipment to install.

This buoy should be permitted by BECQ, with appropriate upgrades and replacements made.

OLEAI POINT 2 (NORTH)

- Recorded GPS Coordinates: n/a

This buoy was not recorded during in-water surveys under this project, but had been identified by surveyors under a different project in October 2016. According to this previous survey, this buoy is anchored at 37 feet by a rope wrapped around a rock.

Stakeholders from NMDOA claim that two buoys were installed outside the reef at Oleai by NMDOA members under the authority of DCRM.

PCRP recommends that additional surveys of this buoy be conducted before recommendations or decisions are made. However, it should be noted that stakeholders from NMDOA listed the two Oleai locations as high need areas.

OLEAI POINT 1 (SOUTH)

- Recorded GPS Coordinates: n/a

This buoy was not recorded during in-water surveys under this project, but had been identified by surveyors in October 2016. According to this previous survey, this buoy is anchored at 23 feet by a rope wrapped around metal. This survey lists the mooring line as frayed and needing replacement.

Stakeholders from NMDOA claim that two buoys were installed outside the reef at Oleai by NMDOA members under the authority of DCRM.

PCRP recommends that additional surveys of this buoy be conducted before recommendations or decisions are made. However, it should be noted that stakeholders from NMDOA listed the two Oleai locations as high need areas.

#S-D – PIPE (N)

- Recorded GPS Coordinates: 15° 8' 45"N 145° 41' 23"E

Material & Condition:

- *Depth of anchorage:* 55’
- *Bottom attachment method:* large cement block
    - *Condition:* good
- *Shackle size/type:* n/a
    - *Condition:* n/a
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 1” braided nylon
    - *Condition:* good
- *Tension floats – How many?* 1
    - *Depths & Condition:* 27’ – good, 24” hard plastic fishermen buoy
- *Mooring buoy type/size:* 10” seine float, 2 pieces
    - *Condition:* good
    - *Buoy line condition:*
- *Pick-up line size/type:* 1” braided nylon
    - *Condition:* OK

Recommendations:

Stakeholders from NMDOA claim that this buoy is one of two buoys at Pipe that were installed by NMDOA members under the authority of DCRM.

Dive operators claim that at two buoys are needed at Pipe, which would include Pipe (N) and Pipe (S). This buoy is used regularly by dive operators. PCRP recommends that it should be permitted by BECQ, with appropriate upgrades and replacements made.

#S-E – PIPE (S)

- Recorded GPS Coordinates: 15° 8' 43"N 145° 41' 23"E

Material & Condition:

- *Depth of anchorage:* 55’
- *Bottom attachment method:* Helix anchor screw
    - *Condition:* good
- *Shackle size/type:* 7/8” stainless steel
    - *Condition:* good
- *Thimble size/type:* n/a
    - *Condition:* n/a
- *Line size/type:* 7/8” 3-strand nylon
    - *Condition:* good
- *Tension floats – How many?* 1
    - *Depths & Condition:* 22’ – good, seine float, 8”
- *Mooring buoy type/size:* Taylor Made Sur-Moor 18”
    - *Condition:* good
    - *Buoy line condition:*
- *Pick-up line size/type:* 5/8” 3-strand nylon
    - *Condition:* no good

Recommendations:

Stakeholders from NMDOA claim that this buoy is one of two buoys at Pipe that were installed by NMDOA members under the authority of DCRM.

Dive operators claim that at two buoys are needed at Pipe, which would include Pipe (N) and Pipe (S). This buoy is used regularly by dive operators. PCRP recommends that it should be permitted by BECQ, with appropriate upgrades and replacements made.

FORBIDDEN ISLAND

- Documented GPS Coordinates: 15° 15' 32"N 145° 48' 53"

This buoy was installed by Micronesian Environmental Services (MES) in March 2017 as part of the mitigation for the Puerto Rico Dump project. Because this buoy is within an MPA, it is unclear whether this buoy falls under BECQ or DFW jurisdiction. This jurisdictional issue is one that BECQ should address and clarify.

The below description is based on data obtained from MES.

Material & Condition:

- *Depth of anchorage:* 42’
- *Bottom attachment method:* anchor pin with cement
    - *Condition:* unknown
- *Shackle size/type:* unknown
    - *Condition:* unknown
- *Thimble size/type:* unknown
    - *Condition:* unknown

- *Line size/type:* unknown
    - *Condition:* unknown
- *Tension floats – How many?* unknown
    - *Depths & Condition:* unknown
- *Mooring buoy type/size:* unknown
    - *Condition:* unknown
    - *Buoy line condition:* unknown
- *Pick-up line size/type:* unknown
    - *Condition:* unknown

Recommendations:
This buoy should be surveyed to identify materials and condition, and added to BECQ's list of official buoys.

BIRD ISLAND

- Documented GPS Coordinates: 15° 8' 55"N 145° 47' 29"

This buoy was installed by Micronesian Environmental Services (MES) in March 2017 as part of the mitigation for the Puerto Rico Dump project. Because this buoy is within an MPA, it is unclear whether this buoy falls under BECQ or DFW jurisdiction. This jurisdictional issue is one that BECQ should address and clarify.

The below description is based on data obtained from MES.

Material & Condition:
- *Depth of anchorage:* 26'
- *Bottom attachment method:* anchor pin with cement
    - *Condition:* unknown
- *Shackle size/type:* unknown
    - *Condition:* unknown
- *Thimble size/type:* unknown
    - *Condition:* unknown
- *Line size/type:* unknown
    - *Condition:* unknown
- *Tension floats – How many?* unknown
    - *Depths & Condition:* unknown
- *Mooring buoy type/size:* unknown
    - *Condition:* unknown
    - *Buoy line condition:* unknown
- *Pick-up line size/type:* unknown
    - *Condition:* unknown

Recommendations:
This buoy should be surveyed to identify materials and condition, and added to BECQ's list of official buoys.

#S-A – OBYAN AQUARIUM

- Recorded GPS Coordinates: 15° 5' 57"N 145° 44' 37"

Unknown buoy recorded from the boat.

Material & Condition:

- *Depth of anchorage:* unknown
- *Bottom attachment method:* unknown
    - *Condition:* unknown
- *Shackle size/type:* unknown
    - *Condition:* unknown
- *Thimble size/type:* unknown
    - *Condition:* unknown
- *Line size/type:* unknown
    - *Condition:* unknown
- *Tension floats – How many?* unknown
    - *Depths & Condition:* unknown
- *Mooring buoy type/size:* black fishing buoy 18”
    - *Condition:* good
    - *Buoy line condition:* unknown
- *Pick-up line size/type:* n/a
    - *Condition:* n/a

Recommendations:

According to additional survey documents obtained and conversations with stakeholders, this buoy should be attached by a stainless-steel anchor pin. This needs to be confirmed through additional surveys to identify bottom attachment method, materials, and condition.

Stakeholders from NMDOA claim that this buoy is one of three at Obyan that were installed by NMDOA members under the authority of DCRM.

Dive operators claim that at least three buoys are needed at Obyan. This would include Obyan Aquarium, Obyan Beach 1 (listed as permitted), and Obyan Beach 2.

#S-C – OBYAN BEACH 2

- Recorded GPS Coordinates: 15° 6' 13"N 145° 44' 20"E

Unknown buoy recorded from the boat.

Material & Condition:

- *Depth of anchorage:* unknown
- *Bottom attachment method:* unknown
    - *Condition:* unknown
- *Shackle size/type:* unknown
    - *Condition:* unknown
- *Thimble size/type:* unknown
    - *Condition:* unknown

- *Line size/type:* unknown
    - *Condition:* unknown
- *Tension floats – How many?* unknown
    - *Depths & Condition:* unknown
- *Mooring buoy type/size:* black fishing float 12”
    - *Condition:* OK
    - *Buoy line condition:* unknown
- *Pick-up line size/type:* 7/8”
    - *Condition:* no good

Recommendations:
According to additional survey documents obtained and conversations with stakeholders, this buoy should be attached by a stainless-steel anchor pin. This needs to be confirmed through additional surveys to identify bottom attachment method, materials, and condition.

Stakeholders from NMDOA claim that this buoy is one of three at Obyan that were installed by NMDOA members under the authority of DCRM.

Dive operators claim that at least three buoys are needed at Obyan. This would include Obyan Aquarium, Obyan Beach 1 (listed as permitted), and Obyan Beach 2.

TINIAN

#T-B – FLEMMING 2

- Recorded GPS Coordinates: 15° 1' 22"N 145° 35' 2"E

Material & Condition:
- *Depth of anchorage:* 52’
- *Bottom attachment method:* wrapped around a rock
    - *Condition:* no good
- *Shackle size/type:* n/a
    - *Condition:* n/a
- *Thimble size/type:* 7/8” galvanized steel
    - *Condition:* no good
- *Line size/type:* 7/8” 3-strand
    - *Condition:* good
- *Tension floats – How many?* 1
    - *Depths & Condition:* 14’ fishing buoy– good, with some coral growth
- *Mooring buoy type/size:* 10” seine float
    - *Condition:* good
    - *Buoy line condition:* ??
- *Pick-up line size/type:* 5/8”
    - *Condition:* no good

Recommendations:
Stakeholders from NMDOA claim that this buoy is one of two at Flemming that were installed by NMDOA members under the authority of DCRM. Dive operators claim that two buoys are necessary at Flemming, therefore this buoy should be properly installed and maintained.

ROTA

SENHANOM WALL 2

- Recorded GPS Coordinates: 14° 7' 28"N 145° 7' 19"E

Material & Condition:

- Depth of anchorage: 45’
- Bottom attachment method: stainless steel anchor pin
    - Condition: good
- Shackle size/type: 3/8” galvanized steel
    - Condition: good, needs to be replaced with a 5/8”
- Thimble size/type: 3/8” galvanized steel
    - Condition: good, needs to be replaced with a 5/8”
- Line size/type: 5/8” 3 strand polypropylene
    - Condition: needs to be replaced
- Tension floats – How many? 3
    - Depths & Condition: two at 22’ – one is OK, one is bad; 8’ - good
- Mooring buoy type/size: non-regulation
    - Condition: needs to be replaced with BECQ buoy
    - Buoy line condition: good
- Pick-up line size/type: 12 foot, with 3 floats
    - Condition: good

Recommendations:
This buoy was installed under the authority of DCRM and therefore should be permitted by BECQ with the necessary upgrades and repairs made, including:

- Upgrade shackle to larger size
- Upgrade thimble to larger size
- Replace line
- Replace buoy with BECQ buoy
- Shackle safety wire

TABLETOP 2

- Recorded GPS Coordinates: 14° 8' 6"N 145° 9' 1"E

Material & Condition:

- Depth of anchorage: 21’
- Bottom attachment method: stainless steel anchor pin
    - Condition: good

- Shackle size/type: 5/8” galvanized steel
    - Condition: OK
- Thimble size/type: 5/8” galvanized steel
    - Condition: OK
- Line size/type: 5/8” 3 strand polypropylene
    - Condition: needs to be replaced
- Tension floats – How many? 2
    - Depths & Condition: 16’ – has coral growth; at surface – needs to be replaced and lowered
- Mooring buoy type/size: Taylor Made Sur-Moor 24”
    - Condition: good
    - Buoy line condition: good
- Pick-up line size/type: short, with one float
    - Condition: needs to be replaced

Recommendations:
This buoy was installed under the authority of DCRM and therefore should be permitted by BECQ with the necessary upgrades and repairs made, including:

- Replace line
- Replace pick-up line
- Shackle safety wire

EXISTING BUOYS NOT PERMITTED BY DCRM THAT SHOULD BE

All of the unlisted buoys surveyed under this project were either buoys that had been installed under the authority of DCRM or BECQ but were not included on the official list, or buoys that should be removed. However, conversations with local experts and stakeholders coupled with the results of previously conducted buoy surveys revealed one additional existing buoy on Saipan that was not surveyed under this project. This buoy was not installed under the authority of DCRM or BECQ, but is used often. As such, it would benefit the community and the benthic habitat in the area for this buoy to be permitted by BECQ, with additional surveys of this buoy to be conducted and appropriate upgrades and replacements made.

LAÑAS

- Recorded GPS Coordinates: n/a

This buoy was not recorded during in-water surveys under this project but had been identified by other surveyors in October 2016. According to this previous survey, this buoy is anchored at 47 feet by a rope wrapped around a rock.

LOCATIONS WITHOUT EXISTING BUOYS IDENTIFIED AS HIGH NEED AREAS

These locations were identified based on conversations with stakeholders, specifically members of the dive operators community. Several of these locations are places where NMDOA members claim to have previously installed buoys under authority from DCRM, but the buoys have since disappeared.

These buoys are all located on Saipan and are listed starting at the northern-most point of the island going counter-clockwise.

- **WING CREVICE:** Stakeholders claim that at one point three buoys had been installed at Wing Crevice, whereas now only one still exists. There was not consensus about how many were necessary at this location, and maintaining the one that remains may be adequate for now.
- **CHINSEN MARU:** Also referred to as the Shoan Maru. Stakeholders claim that three buoys had previously been installed, whereas now only one remains. This is a very popular dive site, and there was consensus that installing at least one, preferably two more buoys here would be beneficial.
- **SAIPAN BOMBER (EMILY):** Stakeholders claim that at one point two buoys had been installed at the Emily, with one remaining at present. This is also a popular dive site, and installing a second buoy would be beneficial.
- **360 REEF:** A new location that NMDOA representatives would like to see have a mooring buoy is outside the fringe reef in line with the 360 Restaurant. Specific locations can be discussed further with members of the NMDOA community.
- **NAFTAN:** Stakeholders claim that two buoys had previously been installed under authority from DCRM around Naftan Point. No surveys were conducted in this area; therefore no buoys were discovered. PCRP recommends that surveys be conducted in the area to identify the possible locations of these buoys. If none are discovered, at least one should be installed.

Proposed Long-Term Maintenance Plan

After the recommended repairs that are outlined in this report are completed, PCRP recommends that BECQ implement a routine long-term buoy maintenance plan in order to maintain the official buoys in safe, working order. This maintenance plan comprises regular inspections and cleanings of the mooring buoys and lines, the storage of an adequate inventory of replacement parts and material, and the establishment of more regular communication between BECQ (or a contractor) and the stakeholders who use the buoys.

REGULAR INSPECTIONS AND MAINTENANCE

PCRP recommends that the following inspection and maintenance schedule be followed to ensure that all buoys are kept in working order:

Monthly or Every 2 months:

1. Inspect the condition of all mooring buoys and pick-up lines.
2. Clean the marine growth from buoys & pick-up lines.
3. Take spares (mooring buoys & pick-up lines) and replace if necessary.
4. Replace any damaged or missing blue reflective tape on buoys.

3 or 4 Months:

1. Inspect mooring - to include SS Anchor pin / shackle(s), thimble, chaffing protection, mooring line, tension float(s), mooring buoy, through buoy line, pick-up line and surface floats to determine current condition of mooring.
2. Check each item for wear and condition, especially the anchor pin/shackle contact area.
3. Repair or replace as necessary.
4. Clean the SS anchor pin and inspect the immediate surrounding area of the drilled hole. Look for any indications that the pin is loose in the cement core or the surrounding substrate area.
5. Clean the mooring line.

6 Months:

1. Replace pick-up lines
2. Replace mooring buoy through line if the mooring is used on a regular basis

Every Year:

1. Replace mooring line to anchor pin shackle pin (Or as needed depending on wear)

Every 2 Years:

1. Replace mooring line if necessary

PCRP also recommends including additional inspections after extreme weather events that may cause mooring buoys to be damaged or break away.

STANDARDIZE MATERIAL SYSTEM & MAINTAIN INVENTORY

PCRP recommends that a standardized material system be implemented in the BECQ mooring buoy program. This will facilitate a more streamlined inventory process allowing for more expedited maintenance and repairs. PCRP recommends the following standardized material list be used for all future installations and repairs:

Helix screw (sand) OR stainless steel anchor pin in cement (hard substrate)

¾" galvanized steel shackle (with stainless steel safety wire)

¾" stainless steel thimble

7/8" 3-strand nylon rope (mooring line)

1-2 tension floats (depending on depth) with 1" center hole

7/8" 3-strand nylon rope (buoy through line)

Taylor Made Sur-Moor 18" mooring buoy

12-ft, 5/8" 3-strand nylon pick-up line with 3 floats

In cases where the mooring buoy is in a location subjected to strong tides or currents, PCRP recommends adding a swivel to the mooring system to prevent wrapping or knotting of the line.

PCRP views the pick-up line as optional and at the discretion of BECQ. At present pick-up lines are standard issue on all BECQ buoys. They make using the mooring buoys more user friendly and easier to tie up to (thereby potentially reducing the strain or breakage on other parts of the mooring). Their location at the surface also makes them easy to remove and quick to break. However, they are relatively inexpensive to replace. For these reasons PCRP leaves the decision of whether or not to include pick-up lines as standard on BECQ buoys up to BECQ.

However, if BECQ decides not to include pick-up lines on its buoys then PCRP recommends using a chaffing hose around the eye on top of the buoy to protect the buoy line and allow boats to more easily hook up.

This standardized material will be installed as repairs are needed on each buoy. Only in a few specific cases does PCRP recommend exchanging the old material for the new due to safety concerns over current materials that may be too small to support the weight requirements of the mooring system. However, PCRP does recommend replacing all existing mooring buoys with a standard 18" Taylor Made Sur-Moor[2] white buoy with blue reflective tape. These have been established in recent years as the BECQ standard mooring and are easy for users to identify.

PCRP recommends that BECQ (or a third-party contractor) maintains an adequate inventory of replacement materials that can be used in response to missing or damaged mooring systems. At present there is some material stored with BECQ, NMDOA, Dive Rota, and possibly other third-party entities

[2] Some of the newly installed BECQ issued Taylor Made Sur-Moor buoys are 24" not 18". PCRP recommends using only 18" mooring buoys moving forward, but does not believe it is necessary to replace the brand new 24" buoys with the slightly smaller model.

who have worked with the mooring buoy program in the past. It would be worthwhile to inventory the existing materials and collect them into a centralized location on Saipan and Rota. These supply inventories can be housed with BECQ or with a third-party contractor, however PCRP does recommend that there be an adequate supply of spare materials on both Rota and on Saipan.

REGULAR COMMUNICATION WITH STAKEHOLDERS

PCRP recommends the establishment of more regular and open communication between BECQ (or a contractor) and the stakeholders that use the mooring buoys on a regular basis. One recommendation made by several stakeholders was the establishment of a hotline or call number that stakeholders can use to report missing or damaged buoy systems so that BECQ or its representative can work to replace or repair the buoy in a timely manner. NMDOA has two members dedicated to buoy monitoring and repairs that BECQ or their designated representative can work closely with to ensure that stakeholder needs are met.

This regular communication could also help identify other locations where new buoy installations might be beneficial.

Discussion & Next Steps

In summary, based upon the in-water surveys, discussions with stakeholders and other local experts, and outside research outlined in this report, PCRP recommends the following actions be implemented in order to improve and maintain the BECQ Recreational Mooring Buoy Program:

1. Carry out all of the top and medium priority repairs recommended in this report to the 38 listed permitted buoys and certain "unpermitted" buoys, based upon the in-water surveys. Survey the buoys that were inaccessible due to weather conditions.

The first priority for the BECQ Recreational Mooring Buoy Program should be making the necessary repairs to existing permitted buoys. This includes the 38 buoys from the list provided to PCRP by BECQ as well as four "unpermitted" buoys that are attached by either anchor pin or helix screw and were likely permitted by DCRM before installation. These four are:

- Wing Beach Arch 2 - Saipan
- Pipe (S) - Saipan
- Senhanom Wall 2 – Rota
- Table Top 2 - Rota

All but three of the permitted buoys (Dimple 1 on Saipan, Harnom Point and Senhanom Wall on Rota) have both top and medium priority

While cost limitations may dictate that only the top priority repairs are completed, PCRP does not recommend this approach. A large portion of the cost of the repairs will be the time and fuel required to reach and dive on each buoy. It is most cost-effective if all necessary repairs be made to each buoy on a single trip. Repairs should be made with the materials that follow the agreed upon standardized buoy material system, as recommended in this report.

In addition, the buoys at Banzai 1 and Spotlight should be located and surveyed during the calm season, with needed repairs being addressed. Surveys should also be conducted at Bird Island and Forbidden Island to identify needed repairs and Naftan to locate any existing buoys.

If BECQ is looking for cost savings, it would be possible to hold off on repairs to the three buoys that have only medium priority repairs until a routine maintenance visit is schedule to be conducted.

2. Incorporate existing buoys into the "permitted" BECQ Recreational Mooring Buoy Program, survey these buoys and carry out necessary repairs (except for drilling operations).

In addition to the four "unpermitted" buoys listed above, an additional five existing buoys should be incorporated into the Recreational Mooring Buoy Program. Two of these buoys were surveyed under this project and were found to be anchored by rope wrapped around a rock:

- Pipe (N) – Saipan
- Flemming 2 – Saipan

PCRP recommends that the necessary repairs and upgrades be made to these buoys to incorporate them into the program. The long-term goal should be to properly attach these two buoys to the substrate through either anchor pin or helix screw.

Three buoys should be surveyed before appropriate next steps are determined:

- Obyan Aquarium – Saipan
- Obyan Beach 2 – Saipan
- Lañas – Saipan

Assuming that all three of these buoys are also anchored by rope wrapped around a rock, PCRP would recommend that the necessary repairs and upgrades be made to these buoys to incorporate them into the program. The long-term goal should be to properly attach these three buoys to the substrate through either anchor pin or helix screw, when drilling operations become an option.

3. Implement the recommended long-term maintenance schedule.

After the recommended repairs have been made and the list of BECQ permitted buoys has been updated (to also include Bird Island and Forbidden Island, if appropriate), a regular maintenance schedule as described in this report should be implemented. PCRP recommends that all permitted buoys be inspected and cleaned of marine growth following a monthly schedule. Necessary repairs can be noted at the time of the inspections and executed when deemed appropriate based on urgency. Some supplies may be carried on the boat to allow for minor repairs to be conducted during the inspections.

As part of this maintenance plan, PCRP also recommends that BECQ or its representative implement a more open relationship with NMDOA and other stakeholders. Stakeholders can therefore be active participants in the upkeep of buoys that are under BECQ jurisdiction.

4. Prioritize possible new buoy installations.

The needs assessment under this project identified possible opportunities for new buoy installations. PCRP recommends that a more detailed scoping process, including benthic surveys and more specific GPS coordinates, be conducted in order to prioritize any new potential buoy locations.

5. Install new buoy pins and systems in locations with missing buoys, inadequately installed anchoring systems, or new locations (requires drilling).

When drilling new buoy anchors becomes an option, PCRP recommends installing new buoys in the listed locations with missing buoys, as well as replacing “wrap around” anchors with either anchor pins or helix screws.

Appendix 1: Proposed Repairs & Maintenance for 38 BECQ Buoys

Island	Buoy	Depth	Bottom attachment method	Shackle size/type	Shackle safety wire	Thimble size/type	Line size/type	Tension float 1	Tension float 2	Tension float 3	Buoy line	Mooring buoy size/type	Pick-up line size/type	Other
Saipan	Banzai 1	44'	SS anchor pin	5/8" SS	No	7/8" galvanized	7/8" 3-strand nylon	yes	-	-	n/a	plastic fender/buoy 24"	n/a	Survey
Saipan	Banzai 2	missing	-	-	-	-	-	-	-	-	-	-	-	Survey
Saipan	Boy Scout (N)	40'	SS anchor pin	5/8" SS	No	5/8" galvanized	7/8" 3-strand nylon	flat boat fender, 22'	-	-	n/a	12" seine float	n/a	
Saipan	Boy Scout (S)	35'	SS anchor pin	5/8" SS	No	7/8" galvanized	7/8" 3-strand nylon	18" Taylor buoy, 15'	-	-	n/a	BECQ - 24" Taylor Made Sur-Moor	n/a	
Saipan	Chinsen Maru	30'	galvanized Helix	5/8" SS	No	n/a	7/8" 3-strand nylon	n/a	-	-	should be replaced	fishing buoy, 18"	5/8" 3-strand nylon	
Saipan	Dimple 1	60'	SS anchor pin	5/8" SS	Yes	7/8" galvanized	7/8" 3-strand nylon	mooring buoy, 20'	flat float, 20'	-	should be replaced	BECQ - 24" Taylor Made Sur-Moor	5/8" 3-strand nylon	
Saipan	Dimple 2	59'	SS anchor pin	5/8" SS	No	n/a	7/8" braided nylon	n/a	-	-	n/a	12" hard plastic	1/2" braided nylon	
Saipan	Dimple 3	missing	-	-	-	-	-	-	-	-	-	-	-	Need to be replaced
Saipan	Grotto	56'	SS anchor pin	5/8" SS	No	n/a	7/8" braided nylon, need replaced after 20'	needs cleaning, 18'	-	-	n/a	small seine float	1/2" nylon with water bottle	
Saipan	Icecream 1	49'	SS anchor pin	5/8" SS	No	5/8" galvanized	7/8" 3-strand nylon	large 24" boat fender	-	-	should be replaced	18" white boat fender	5/8" 3-strand poly	
Saipan	Icecream 2	50'	SS anchor pin	7/8" galvanized	No	n/a	7/8" 3-strand nylon	27'	27'	-	n/a	10" seine float	5/8" 3-strand nylon	
Saipan	Laolao	missing	-	-	-	-	-	-	-	-	-	-	-	Need to decide if new buoy should be installed
Saipan	Obyan	29'	SS anchor pin	5/8" SS	No	5/8" galvanized	7/8" 3-strand nylon	12" foam, 16'	-	-	n/a	10" seine float	7/8" 3-strand poly	

Saipan	Saipan Bomber (Emily)	30'	Helix	5/8" SS	No	n/a	7/8" 3-strand nylon	n/a	-	-	n/a	18" plastic fishing buoy	no good	
Saipan	Spotlight	missing	-	-	-	-	-	-	-	-	-	-	-	survey
Saipan	Wing Beach Arch	47'	SS anchor pin	7/8" SS	No	7/8" galvanized	7/8" 3-strand nylon	seine float, 22'	flat float, 22'	flat float, 22'	no good	BECQ - 24" Taylor Made Sur-Moor	7/8" 3-strand poly	
Saipan	Wing Beach Crevice	41'	SS anchor pin	7/8" galvanized	No	7/8" galvanized	7/8" 3-strand nylon	seine float, 19'	flat float, 19'	flat float, 19'	n/a	BECQ - 24" Taylor Made Sur-Moor	5/8" 3-strand nylon	
Tinian	Dump Coke	missing	-	-	-	-	-	-	-	-	-	-	-	
Tinian	Grotto (N)	missing	-	-	-	-	-	-	-	-	-	-	-	
Tinian	Grotto (S)	missing	-	-	-	-	-	-	-	-	-	-	-	
Tinian	Flemming	46'	SS anchor pin	5/8" SS	No	n/a	7/8" 3-strand	boat fender, 16'	-	-	n/a	18" black fishing buoy	no good	
Tinian	Two Corals	40'	SS anchor pin	5/8" SS	No	7/8" galvanized	7/8" 3-strand nylon	11'	-	-	n/a	10" seine float	n/a	
Rota	Cable Run	missing	-	-	-	-	-	-	-	-	-	-	-	Survey
Rota	Coral Gardens 1	15'	SS anchor pin	3/8" galvanized	No	5/8" galvanized	5/8" 3-strand poly	corroded	corroded	-	n/a	BECQ - 18" Taylor Made Sur-Moor	n/a	
Rota	Coral Gardens 2	15'	SS anchor pin	5/8" galvanized	No	5/8" galvanized	5/8" 3-strand poly	corroded	corroded	-	good	BECQ - 18" Taylor Made Sur-Moor	too short	
Rota	Coral Gardens 3	20'	SS anchor pin	5/8" SS	No	5/8" galvanized	5/8" 3-strand nylon	4'	6'	-	good	BECQ - 18" Taylor Made Sur-Moor	too short	
Rota	Fireworks	60'	helix anchor	5/8" galvanized	No	5/8" galvanized	5/8" 3-strand poly	10'	40'	-	good	BECQ - 18" Taylor Made Sur-Moor	n/a	
Rota	Harnom Point	50'	SS anchor pin	5/8" galvanized	No	5/8" galvanized	5/8" 3-strand poly	15'	38'	-	good	BECQ - 24" Taylor Made Sur-Moor	good	
Rota	Jerry's Reef	53'	helix anchor	7/8" galvanized	No	7/8" galvanized	7/8" 3-strand nylon	45'	22'	-	worn	BECQ - 18" Taylor Made Sur-Moor	n/a	
Rota	Joanne's Reef	22'	SS anchor pin	7/8" galvanized	No	7/8" nylon	7/8" 3-strand nylon	18'	6'	-	worn	BECQ - 24" Taylor Made Sur-Moor	no good	
Rota	Pinatang	35'	SS anchor pin	5/8" SS	No	5/8" galvanized	5/8" 3-strand nylon	14'	14'	5'	good	BECQ - 24" Taylor Made Sur-Moor	no good	

Rota	Pona Point	41'	chain around rock	5/8" galvanized	No	good	60' of rope	n/a	-	-	n/a	n/a	n/a	If this is a BECQ buoy, need to replace
Rota	Senhanom Cave	59'	SS anchor pin	5/8" galvanized	No	n/a Swivel is bad Extra shackle also bad	7/8" 3-strand nylon	13' - move to lower depth	13'	-	good	BECQ - 24" Taylor Made Sur-Moor	good	
Rota	Senhanom Wall	45'	SS anchor pin	5/8" galvanized	No	5/8" galvanized	3/4" 3-strand nylon	12'	36'	-	good	BECQ - 24" Taylor Made Sur-Moor	good	
Rota	Shoun Maru	101'	shackle attached to shipwreck anchor	5/8" galvanized	No	5/8" galvanized	7/8" 3-strand nylon	15'	50'	-	worn	BECQ - 24" Taylor Made Sur-Moor	needs to be cleaned	
Rota	Subchaser II	24'	SS anchor pin	5/8" galvanized	No	7/8" galvanized	7/8" 3-strand nylon	8'	19'	-	worn	BECQ - 24" Taylor Made Sur-Moor	needs to be cleaned	
Rota	Saligai Cove	18'	SS anchor pin	3/8" galvanized	No	5/8" galvanized	5/8" 3-strand poly	12'	-	-	good	BECQ - 18" Taylor Made Sur-Moor	good	
Rota	Tabletop	22'	SS anchor pin	5/8" galvanized	No	5/8" galvanized	5/8" 3-strand poly	7'	15'	-	good	BECQ - 24" Taylor Made Sur-Moor	good	

Appendix 2: Proposed Materials & Cost Sheet

The following is an approximation of the cost of each of the standard materials recommended in this report. All of these ranges depend on the load rating necessary for the moorings to have, which is up to BECQ. It will be necessary to determine load bearing ranges for BECQ moorings before the materials are selected and purchased.

These are estimates only; this is not a price quote. The prices may change depending on supplier, and shipping & handling fees are not included.

Shackle: ¾" galvanized steel	$6.19-$54.99 ea.
Thimble: ¾" Heavy Duty, 316 stainless steel	$19.99-$34.99 ea.
Swivel: ¾" eye-to-eye galvanized	$14.99-$47.99 ea.
Mooring line: 7/8" 3-strand nylon rope, 600 ft	$329-545
Tension floats: 12", center hole, trawl float	$29.56 ea.
Mooring Buoy: Taylor,Sur-Moor, T3C hard shell 18"	$143-170 ea.
*Pick-up Line: 5/8" 3-strand nylon rope, 600 ft	$254.68-$277
Pick-up Line Floats	$1.89-5.99 ea.

* BECQ has the option to go with a less expensive UV resistant polypropylene or polypropylene/nylon mix rope that floats on its own, which therefore wouldn't require pick-up line floats. However, the strength of this type of rope is significantly less, which may lead to more breakage.