JOB PROGRESS REPORT
DEVELOPMENT PROJECT SEGMENT

STATE: Territory of Guam **PROJECT NO:** F-3-D
SEGMENT: 3

PROJECT TITLE: Maintenance and Redeployment of DAWR FADs and SWMs (2323)

PERIOD COVERED: October 1, 1998 to September 30, 1999

OBJECTIVES

1. To maintain, preserve and efficiently replace DAWR's fish aggregating devices.

2 To maintain, preserve and efficiently replace DAWR's shallow water moorings.

SUMMARY

FADs

The coordinates of the sixteen operational sites in the Division of Aquatic & Wildlife Resources' (DAWR) Fish Aggregating Device (FAD) program and their relative locations to the island are depicted in Figure 1. As of September 30, 1999, three FADs were confirmed to be off-station: Pati Point, Agat Bay, and Fadian Point. Figure 2 diagrams the design and construction of the FAD system presently being used at each of the sites.

Seven FADs came off station in FY99. The average lifespan was approximately 21 months, with a range from 1.5 months to 43.25 months. If the average time on station is calculated following the Hawaii FAD program practice of only including FAD lifespans that have exceeded six-months (i.e., not include the Agat Bay and Fadian Point FADs that were on station for only 2.5 and 1.5 months respectively), the FY99 FAD average lifespan would instead be just over 29 months. The argument for not including lifespans of less than six months is based on the belief that such systems were lost as the result of a faulty deployment and does not consider the possibility that the loss was the result of fishing activity or fishbite. Table 1 lists the seven FADs lost in FY99, the date deployed, when they were reported to be off-station, the recovery date and length of time on station.

Table 1. FAD Losses - FY99

Site	Date Deployed	Date Lost	Date Recovered	Time on Site
Agat Bay	07/29/98	10/13/98	not recovered	2.50 months
Fadian Point	09/04/98	10/21/98	not recovered	1.50 months
Nine-mile	08/24/95	01/15/99	not recovered	40.00 months
Uruno Point	07/13/95	02/23/99	not recovered	43.25 months
Cocos Island	09/05/97	03/21/99	not recovered	18.50 months
Pati Point	08/07/96	08/22/99	not recovered	36.50 months
Agat Bay	01/28/99	09/17/99	09/17/99	7.75 months
			Average:	**21 months**

(Average lifespan not including losses where FAD was on station for less than 6 months: **29 months**)

The average replacement period for a FAD system in FY99 was 3.4 months, with a range from 0.7 to 5.9 months. How soon a FAD can be reestablished depends primarily on prevailing sea conditions because deployments are typically conducted during calm seas to ensure the safest working conditions. Therefore, the 5.9 months that it took to replace the Uruno FAD was greatly affected by the fact that this FAD was lost during the trade-wind season when there were much fewer periods of calm seas to work with. Table 2 lists the location, redeployment dates and replacement time for the six FADs that were reestablished in FY99.

Table 2. Reestablished FADs - FY99

Site	Date Reestablished	Date Recorded Lost	Replacement Period
No. 2	01/13/99	10/26/98	2.6 months
Agat Bay	01/28/99	10/13/98	3.5 months
Facpi 2	01/29/99	09/14/98	2.5 months
Nine-Mile	02/05/99	01/15/99	0.7 months
Uruno	08/20/99	02/23/99	5.9 months
Cocos Island	08/27/99	03/21/99	5.2 months
		Average:	**3.4 months**

The average replacement cost for a 500-fathom FAD system for FY99 was $7,956.18; down just over $1,000.00 from the previous year. This was the result of a majority of the replacements being located the closer to port. Table 3 lists the major costs for the replacement of a 500-fathom FAD system. A 1,000-fathom FAD system costs an extra $1,860.00 due to the additional 3,000 feet of polypropylene rope necessary to complete the system. Table 4 provides a summary of recovery and replacement activity for FY99.

Table 3. Average Replacement Cost per 500-Fathom FAD System - FY99

Item/Service	Cost
Buoy	$ 518.50
Buoy preparation*	$ 494.00
Anchor block	$ 368.96
Pre-spliced mooring system (500 fa)**	$ 3,575.00
Solar-powered navigation light	$ 329.72
Loading and Deployment	$ 2,670.00
	Total: $7,956.18

* Includes sanding, painting, welding and moving services.
** Additional $1,860.00 for 1000-fathom system

Table 4. Operations & Maintenance Activity and Costs - FY99

Activity	Date	Cost
Recovery of No.2 FAD (Direct Payment)	10/26/98	$1,818.00
Reestablish No.2 FAD; replace lights: No.1, Ledge	01/13/99	$2,849.00
Reestablish Agat Bay FAD; replace light: Facpi	01/28/99	$2,356.00
Reestablish Facpi 2 FAD; replace light: Umatac	01/29/99	$2,332.00
Reestablish Nine-mile FAD	02/05/99	$2,239.00
Replace lights: No.4, Old NOAA, No.5, No.6	02/23/99	$2,064.00
Reestablish No.3 FAD; replace lights:		

Nos. 1-5, Ledge, Old NOAA	08/20/99	$3,277.00
Reestablish Cocos FAD; replace lights:		
Agat Bay, Facpi, Facpi 2, 9-Mile, Umatac	08/27/99	$2,968.00
Recovery of Agat FAD	09/17/99	$1,044.00
	Total:	**$20,947.00***

***** Does not include personnel costs and benefits

DAWR has further streamlined the predeployment preparation of FAD systems by ordering prespliced 500- and 1000-fathom systems according to DAWR specifications. The prespliced lines add little to the total cost of the FAD system, however save considerable manpower time and further facilitate convenient short-notice replacements of lost FADs. An example of this was the replacement of the Agat FAD in July 1998 only one day after it was recovered by using a prespliced 1,000-fathom system right out of the original shipping carton. Given the continued success of this strategy, future orders of FAD lines will consist primarily of prespliced systems

In FY99 twenty solar-powered navigation lights were acquired to replace the battery-powered navigational lights used over the years. The solar-powered lights (including mounting bracket) cost approximately $330.00, have a virtually maintenance-free operating life of 5-8 years and weigh less than 3 pounds. The battery-powered navigation lights on the other hand, cost $258.00 for the light unit alone, $150.00 per battery set and weigh nearly 20 pounds. With a battery set life span of between 4-6 months, the battery-powered navigation lights would cost nearly $1,000.00 to operate over a two-year period (assuming the FAD remains on site that long), not including the additional costs of hiring a vessel and crew to transport DAWR staff out to the buoy to be serviced. If the newly-acquired solar-powered lights live up to expectations, the switch to these lights should result in significant savings in the overall maintenance costs of the DAWR FAD program.

Shallow Water Moorings (SWMs)

Installation of thirty-four SWMs was completed in April, 1999. Figure 3 depicts the approximate locations of the SWMs; Figure 4 illustrates the design of the system.

Several maintenance trips were subsequently made in August, 1999, to inspect the general condition of the first series of mooring systems installed. The primary concern at this early stage of SWM maintenance is to prevent the safety shackle nut from permanently seizing onto the bolt as normal corrosion of the threads sets in, especially in light of the fact that the anchor pin and shackle are dissimilar metals. The current strategy is to change out the safety shackles before the nut has a chance to seize. It was also observed that most of the decals on the first series of SWMs installed had apparently washed off. A potential solution to this problem is to apply a spray-on adhesive to the buoy to strengthen the adhesion of the decals to the surface of the SWM buoy.

Of the thirty-four SWMs installed in FY99, only one system was lost: the Alutom Island SWM sometime around June, 1999. The mooring line was apparently severed just below the buoy and was found resting on the seafloor still attached to the anchor pin. The parting of the buoy from the mooring line so close to the surface has led to speculation that the Alutom Island SWM was either intentionally cut or struck by a vessel. The original mooring system was eventually removed and a new system was assembled and installed in its place.

RECOMMENDATIONS

The project to maintain and reinstall FADs and SWMs should be continued with the following recommendations for FY99:

1. Reestablish the open account to prepare FAD systems for deployment, conduct actual deployments, recover errant buoys, and perform on-site replacement of expired navigation lights and worn FAD buoys on an as-is-needed basis.

2. Identify and contract a private vendor to conduct SWM maintenance and reinstallation services on a short notice and as-is-needed basis similar to that of the FAD project.

3. Reorder buoys, concrete anchors, prespliced ropes, chains and other miscellaneous mooring hardware to establish an inventory sufficient to replace up to ten 500-fathom FAD systems and twenty 10-fathom SWM systems.

4. Purchase a new workboat to allow for some minor maintenance routines to be conducted for both the FAD and SWM projects.

5. Establish and maintain an inventory of other miscellaneous equipment, supplies and materials, such as navigation lights and batteries, necessary for both the FAD and SWM projects.

PROGRAM COST

The estimated cost for the project to continue maintenance and reinstallation of FADs and SWMs is $81,337.

Prepared by Andrew A. Torres

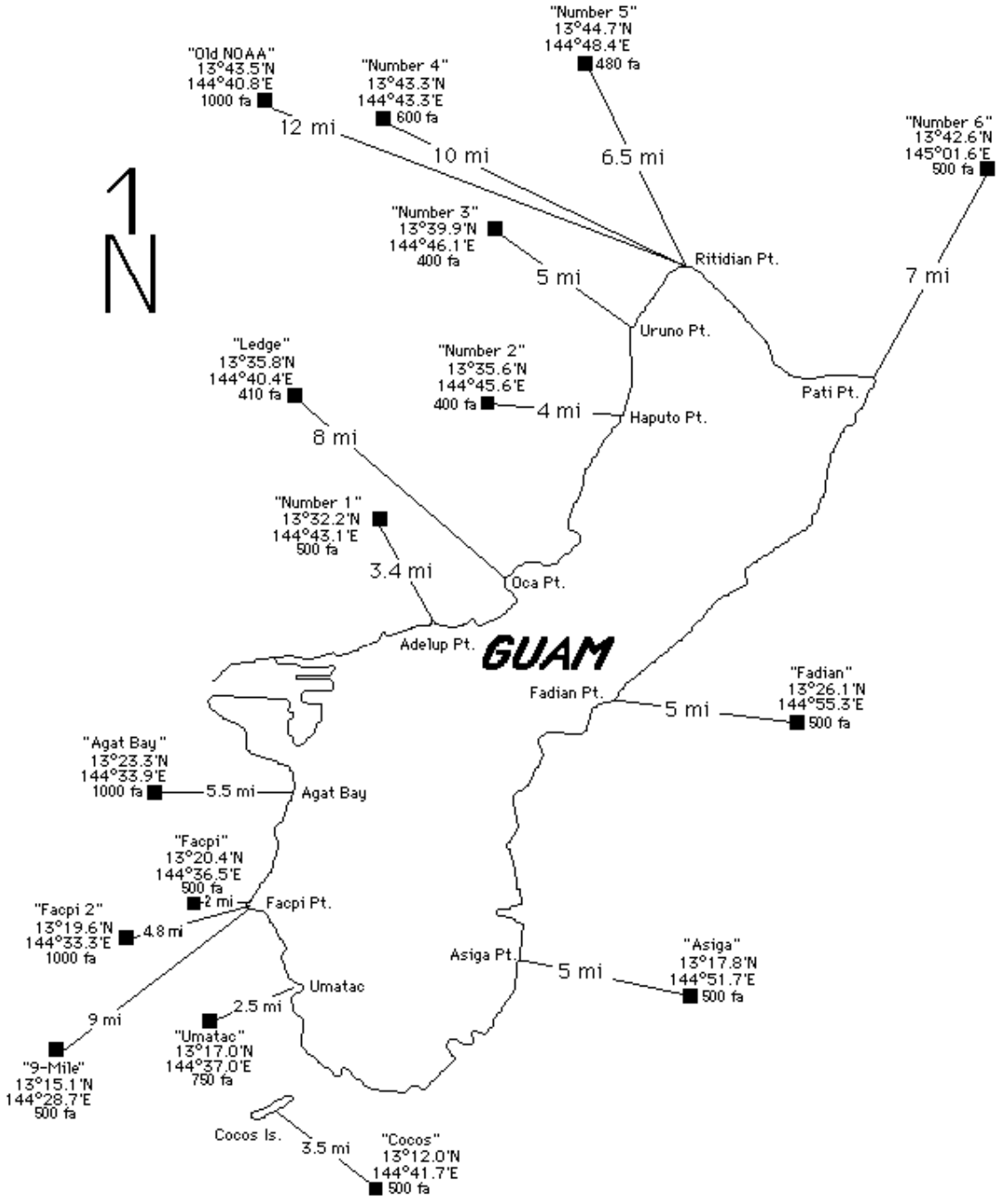

Figure 1. DAWR FAD Sites

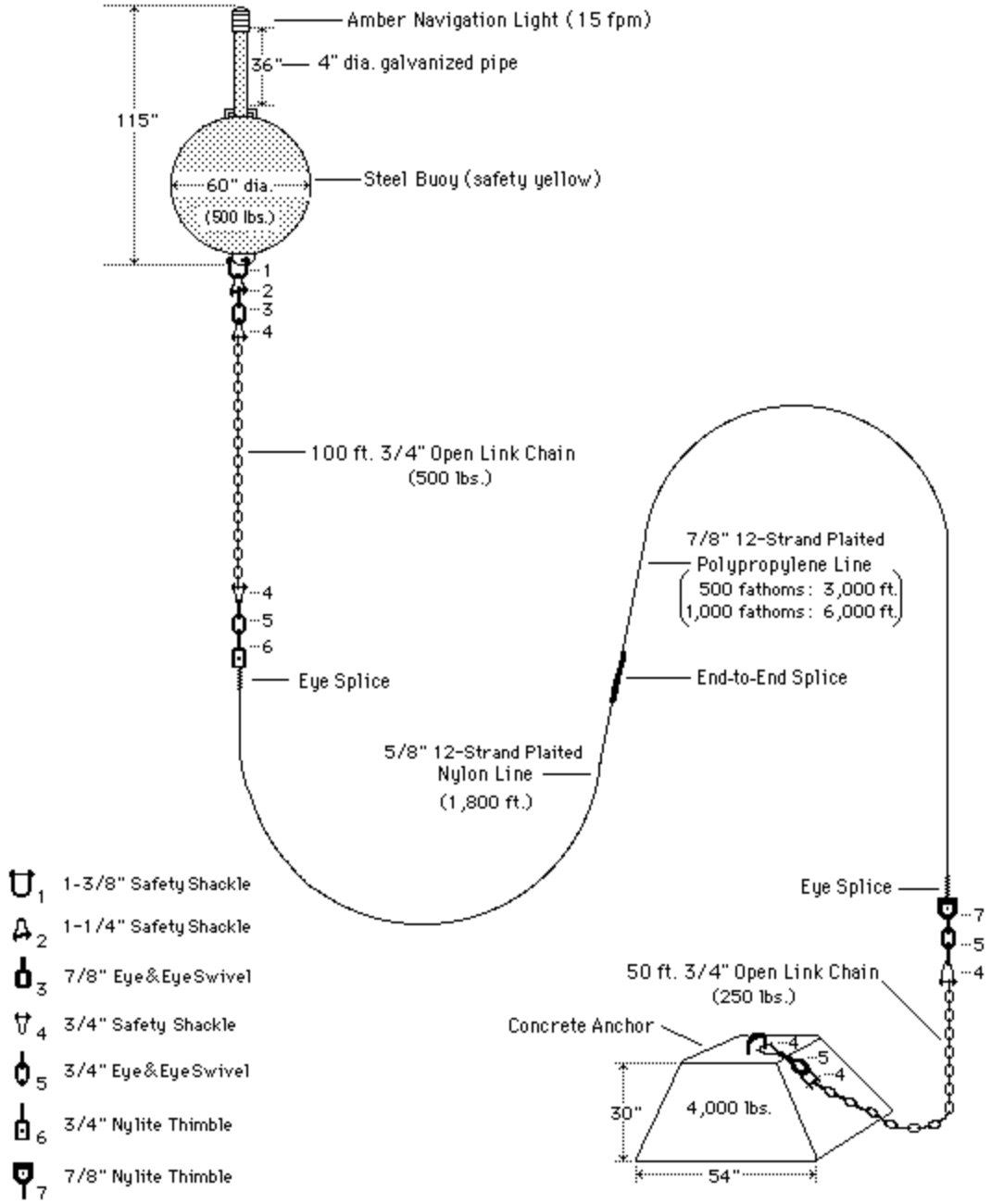

Figure 2. FAD with Spherical Steel Buoy

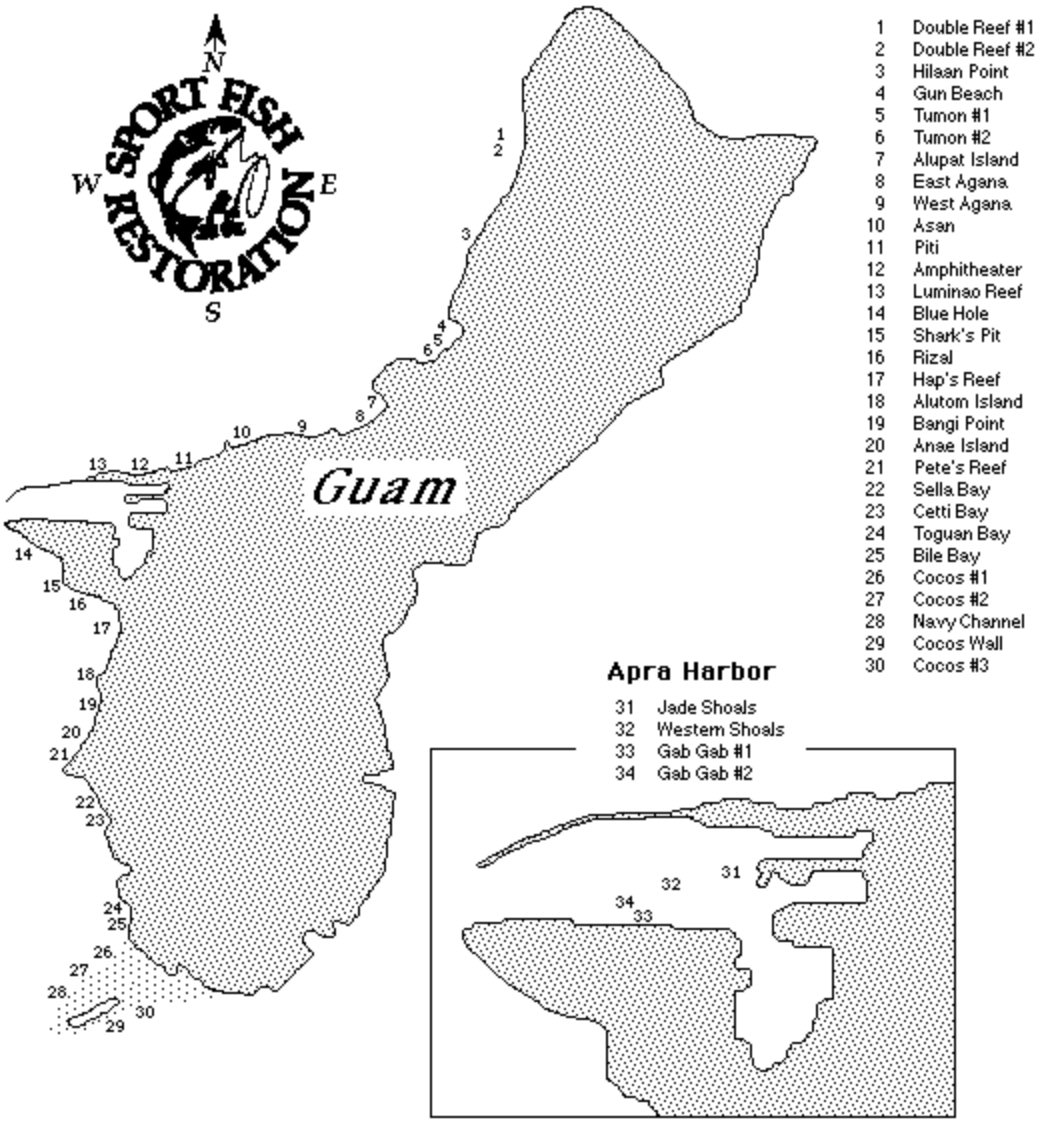

Figure 3. Shallow Water Mooring Sites

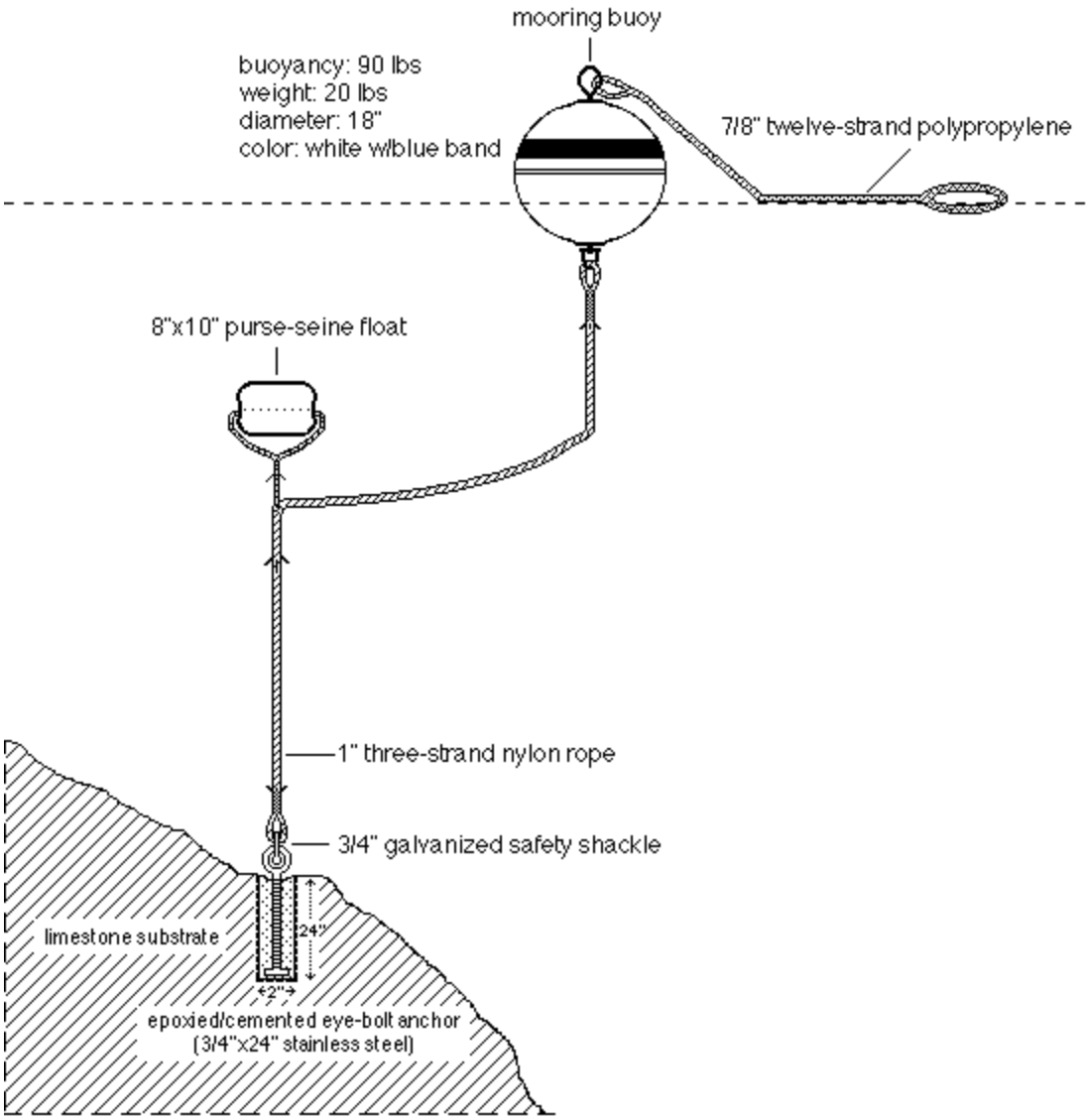

Figure 4. Shallow Water Mooring Design