

## Addendum to Appendix B: Shoreline to Shelf Edge Benthic Maps of Tutuila, American Samoa

### Thematic Accuracy Assessment

Thematic accuracy of the portion of the benthic maps derived from sonar (described in Appendix B) was assessed using video data collected on the insular shelf of Tutuila. The results of an accuracy assessment for the shallow-water portion of the maps are available in NOAA NCCOS 2005. Video data were collected by DMWR using a Seaviewer drop camera system in support of a fisheries assessment project. These data were collected independently of map production. Videos were acquired within randomly selected 500 m grid cells around Tutuila. Only video files that provided a good view of the sea floor, had GPS tracking or could be linked back to grid cell coordinates, and consisted of one unambiguous video clip (several consisted of multiple clips from different locations apparently spliced together) were used in this assessment. Of the videos provided, 77 met acceptable quality control standards. Videos were evaluated in the context of the MMU and features in the sonar imagery from which maps were derived and then scored according to the major and detailed structure categories of the classification scheme. Video observations were compared to map attributes at drop camera sites and used to produce error matrices. Overall accuracy ( $P_o$ ) and Tau ( $T_o$ ) were calculated. Matrices consisting of omission (user's accuracy) and commission (producer's accuracy) errors by category for both the major (Table 1) and detailed map classifications (Table 2) are provided. For a complete discussion of error matrix terms and interpretation see NOAA NCCOS (2005) or Congalton and Green (1999).

Table 1. Accuracy of major structure classifications. Cell entries denote the number of sites correctly and incorrectly classified within each category.

	Accuracy Assessment (i)		$n_j$	User's Accuracy (%)
	Hard	Soft		
Hard	9	2	11	82%
Soft	0	66	66	100%
$n_i$	9	68	$n=77$	
Producer's Accuracy (%)	100%	97%	$P_o =$	97.4%
			$T_o =$	$0.948 \pm 0.07$

Both hard and soft bottom categories were mapped with a highly acceptable level of thematic accuracy, although sample size was small for hard bottom. Over 97% (75 of the 77) of sites surveyed in the accuracy assessment were mapped correctly at the level of major structure in the classification scheme.

Table 2. Accuracy of detailed structure classifications. Cell entries denote the number of sites correctly and incorrectly classified within each category.

		Accuracy Assessment (i)																
		Aggregate Reef	Aggregate Patch Reef	Individual Patch Reef	Spur and Groove	Pavement	Pav w/ Sand Channels	Rock Outcrop	Boulder	Reef Rubble	Algal Plain	Sand w/ SCR	Sand	Mud	Land	n <sub>i</sub>	User's Accuracy (%)	
	Aggregate Reef	1									1					2	50.0%	
	Aggregate Patch Reef		7								1					8	87.5%	
	Individual Patch Reef			1												1	100.0%	
	Spur and Groove															0	n/a	
Map data (j)	Pavement															0	n/a	
	Pav w/ Sand Channels															0	n/a	
	Rock Outcrop															0	n/a	
	Boulder															0	n/a	
	Reef Rubble															0	n/a	
	Algal Plain										49		2			51	96.1%	
	Sand w/ SCR															0	n/a	
Sand												13	1		14	92.9%		
Mud													1		1	100.0%		
Land														0	0	n/a		
	n <sub>i</sub>	1	7	1	0	0	0	0	0	0	51	0	15	2	0	n=77		
	Producer's Accuracy (%)	100.0%	100.0%	100.0%	n/a	n/a	n/a	n/a	n/a	n/a	96.1%	n/a	86.7%	50.0%	n/a	P <sub>o</sub> =	93.5%	
																T <sub>e</sub> =	0.93 ± 0.06	

Over 93% (72 of the 77) of sites surveyed in the accuracy assessment were mapped correctly at the level of detailed structure in the classification scheme. Only algal plain and sand had a sufficient number of accuracy assessment sites to consider results at the level of individual categories. Due to limited sample sizes for most categories (in many cases zero samples), accuracy was not corrected for bias resulting from the proportion of map area occupied by the various categories. While these results are very positive and comparable to the high accuracies achieved in other NCCOS mapping projects, a more thorough assessment of the coral reef categories based on additional surveys is advisable.

Literature Cited:

Congalton RG, and K Green. 1999. Assessing the accuracy of remotely sensed data: Principles and Practices. CRC/Lewis Press, Boca Raton, FL 137 pp.

NOAA NCCOS. 2005. Shallow-water benthic habitats of American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands (CD ROM). NOAA Technical Memorandum NOS-NCCOS 8, Biogeography Team. Silver Spring, MD

Acknowledgements:

The authors wish to thank Ray Tulafono, Domingo Ochavillo, Marlowe Sabater, Eric Simonsen, Ekueta Schuster and TeeJay Letalie of the Department of Marine and Wildlife Resources in American Samoa for collecting and generously making the accuracy assessment dataset available for this "extra" application. This accuracy assessment would not have been possible without this opportunistic dataset and partnership.