



# Sanctuary Preservation Areas and Ecological Reserves: Economic User Value



**Background.** Results presented here are part of the Recreation and Tourism component of the Socioeconomic Research and Monitoring Program for the Florida Keys National Marine Sanctuary (FKNMS). The Socioeconomic Research and Monitoring Program was designed in a workshop held in Islamorada, Florida in January 1998, which was attended by 50 social scientists and community stakeholders. Baseline measurements for Recreation and Tourism were obtained in a 1995-96 study entitled "Linking the Economy and Environment of the Florida Keys/ Florida Bay." However, in our baseline year of 1995-96, the Sanctuary Preservation Areas (SPAs) and Ecological Reserves (ERs) or "no take zones" were not yet in existence. The information presented here was obtained from a multi-agency partnership project entitled "Socioeconomic Study of Reefs in Southeast Florida, 2000-2001."

We were able to add several modules of questions to the 2000-01 surveys about use of the SPAs and ERs. From the broader survey, we were also able to produce comparative socioeconomic profiles of SPA & ER Users versus Non Users, comparative importance and satisfaction scores, and estimates of economic user value. Twenty-two of the SPAs and ERs (18 of which are open to nonconsumptive recreation activities) went into effect on July 1, 1997. The Tortugas Ecological Reserve went into effect on July 1, 2001. The Socioeconomic Study of Reefs in Southeast Florida was for the time period of June 2000 through May 2001. Therefore, the Tortugas Ecological Reserve was not part of the 2000-01 survey results.

## Economic User Value

Economic user values (consumer's surplus – value over and above what users pay for reef use) were estimated for each visitor and resident in the 2000-01 samples (See Johns et al, 2003) and compared between SPA & ER Users and Non Users.

**Visitors.** Visitor SPA & ER users had significantly higher economic user values for artificial reefs, natural reefs, and for all reefs (natural and artificial reefs) than Non-SPA & ER using visitors, when measured on a per party per trip basis. However, because visitor SPA & ER users had significantly larger party sizes than non SPA & ER users, there was no difference in economic user values when normalized on a per person-trip or per person-day basis.

Using a weighted average of user value per person-day for snorkeling and scuba diving from Johns et al (2003) for natural reef use and multiplying by the number of person-days of diving by visitors in the SPAs & ERs yields an estimated total annual user value of diving in the SPAs & ERs of about \$11.5 million. Following the same

**Sanctuary Preservation Areas** are marine zones that focus on the protection of shallow, heavily used reefs where conflicts occur between user groups, and where concentrated visitor activity leads to resource degradation. These areas are designed to enhance the reproductive capabilities of renewable resources, protect areas critical for sustaining and protecting important marine species, and reduce user conflicts in high-use areas. This is accomplished through the prohibition of consumptive activities within these areas. SPAs are chosen based on the status of important habitat, the ability of a particular area to sustain and protect the habitat, the level of visitor use, and the degree of conflict between consumptive and nonconsumptive users. The actual size and location of these zones have been determined by examination of user patterns, aerial photography, and ground-truthing of specific habitats.

**Ecological Reserves** are designed to encompass large, contiguous diverse habitats. They are intended to provide natural spawning, nursery, and permanent residence areas for the replenishment and genetic protection of marine life and to protect and preserve all habitats and species particularly those not protected by fishery management regulations. These reserves are intended to protect areas that represent the full range of diversity of resources and habitats found throughout the Sanctuary. The intent is to meet these objectives by limiting consumptive activities, while continuing to allow activities that are compatible with resource protection. This will provide the opportunity for these areas to evolve in a natural state, with a minimum of human influence. These zones will protect a limited number of areas that provide important habitat for sustaining natural resources such as fish and invertebrates.

Source: National Marine Sanctuary Program

procedure for glass-bottom boat rides yields an annual user value of \$1.3 million. So visitors have a total annual user value of about \$12.8 million for SPAs & ERs (Table 1).

Table 1. SPA & ER Use Value: 2000-01

Type of User	User Value Per Person-day (\$)	Annual Person-days of Use	Annual Use Value (Millions \$)
<b>Visitors</b>			
Diving <sup>1</sup>	\$19.46	590,700	\$11.495
Glass-bottom boat rides	\$22.53	58,500	\$1.318
<b>Total</b>	<b>\$19.74</b>	<b>649,200</b>	<b>\$12.813</b>
<b>Residents</b>			
Diving <sup>1</sup>	\$9.25	593,400	\$5.489
<b>Visitors &amp; Residents</b>			
Diving <sup>1</sup>	\$14.34	1,184,100	\$16.984
Glass-bottom boat rides	\$22.53	58,500	\$1.318
<b>Total</b>	<b>\$14.73</b>	<b>1,242,600</b>	<b>\$18.302</b>

1. Diving includes snorkeling and scuba diving.

**Residents.** There were no statistically significant differences between resident SPA & ER users and Non-SPA & ER using residents.

Using a weighted average of user value per person-day for snorkeling and scuba diving from Johns et al (2003) for natural reef use and multiplying by the number of person-days of diving by residents in the SPAs & ERs yields an estimated total annual user value of diving in the SPAs & ERs of about \$5.5 million (Table 1).

**Visitors and Residents.** For all diving use by both visitors and residents, the SPAs and ERs generate almost \$17 million annually in economic user value and another \$1.3 million for glass-bottom boat rides. SPAs and ERs have a total annual user value of \$18.3 million (Table 1). Capitalizing this \$18.3 million in annual user value using a discount rate of three (3) percent and assuming this annual flow of value continues into perpetuity (indefinite future), we can derive an estimate of the asset value of the SPAs and ERs. Asset value represents what someone would be willing to pay today for the right to own the SPAs and ERs if they could charge a price for their use. The asset value is estimated to be \$610 million (\$18.3 million divided by 0.03).



The Christmas Tree Worm in  
The Elbow SPA  
Photo: James Guttuso

**Both annual user value and the asset value are likely under estimates of economic user value** because the SPAs & ERs are probably not used to full capacity and future use is likely to increase. Also, it is likely that user value per unit of use (per person-day) will also increase in the future as demand for their use increases relative to the world supply of coral reefs.

In addition, **total use value is an under estimate of total economic value** because it is highly likely that some people have non use economic value or passive economic value for SPAs and ERs. Non use or passive economic values include people's willingness to pay some amount simply to know that the SPAs and ERs will be maintained in a certain condition, even though they never intend to use the SPAs & ERs (existence value) or people's willingness to pay to ensure the SPAs & ERs are maintained for future generations to enjoy (bequeath value). Another type of non use value not accounted for here is "option value" or the amount people would be willing to pay to ensure that SPAs and ERs would be maintained in a condition suitable for their use some time in the future, even though they currently have not had a chance to use them. This latter value is like that of an insurance policy on future use, where there is uncertainty both about future use and future supply of the resource.

#### **For Further Information:**

For the full report containing the Comparison of Socioeconomic and Ecological Monitoring Results go to our web site:  
<http://marineeconomics.noaa.gov/SocmonFK/rectour.html>

For the 2001 Science Report containing details of the Ecological Monitoring Results go to:  
[http://www.fknms.nos.noaa.gov/research\\_monitoring/welcome.html](http://www.fknms.nos.noaa.gov/research_monitoring/welcome.html)

For the full report on the Socioeconomic Study on Reefs in Southeast Florida, 2000-2001 go to:  
<http://marineeconomics.noaa.gov/Reefs/02-01.pdf>

For fact sheets addressing the following topics:  
-Comparative Socioeconomic Profiles of SPA & ER Users and Non Users  
-SPA and ER Use  
-Comparative Importance-Satisfaction Ratings of SPA & ER Users and Non Users  
-Monroe County Reef Using Residents' Opinions on "No Take" Zones  
-Linking Ecological Monitoring with Socioeconomic Monitoring Results Go to  
<http://marineeconomics.noaa.gov/SocmonFK/rectour.html>

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