Linking the Economy and Environment of Florida Keys/Florida Bay

Executive Summary - Visitor Nonmarket Economic User Values

The Monroe County Tourist Development Council (TDC), The Nature Conservancy, Florida Keys Initiative (TNC), and the National Oceanic and Atmospheric Administration (NOAA) have jointly funded a project with the objectives to 1) estimate the market and nonmarket economic values of recreation/tourism uses of the marine resources of the Florida Keys/Florida Bay ecosystem; 2) provide a practical demonstration of how market and nonmarket economic values of an ecosystem can be considered an integral component of the economy of a region when formulating sustainable development objectives and policies; and 3) foster cooperative management processes.

Contained here is an overview/summary of the findings and conclusions as reported in "Nonmarket Economic User Values of the Florida Keys/Key West", by Vernon R. (Bob) Leeworthy of NOAA's Strategic Environmental Assessments Division and J.M. (Mike) Bowker of the U.S. Forest Service's Outdoor Recreation and Wilderness Assessment Group. Other available reports and summaries along with project contacts are presented at the end of the summary below.

Environmental Quality and the Economy

The report presents a simple conceptual model that illustrates the link between the economy and the environment. Environmental and natural resource economic theory is used to show how sustainable use is related to environmental quality, and environmental quality's relationship to market and nonmarket economic values.

- Sustainable development in the Florida Keys/Key West is dependent on maintaining or increasing the natural capital stock of the area. The natural capital stock is represented by the quality of the environment and abundance & diversity of the natural resources of the area.

- In the long-run, market and nonmarket economic values will decline if environmental quality declines.

- Market economic values (sales/output, income, employment, tax revenues) are not good l*eading indicators* of the long term health of the natural resource dependent portion of the economy because market economic values can increase in the short-run if natural capital is sacrificed.

- Theoretically, nonmarket economic values (consumer's surplus, see definition on page 2) are a better *leading indicator* of the long term health of the natural resource dependent portion of the economy, but suffer the same problem, in that, nonmarket values can continue to increase in the short-run if natural capital is sacrificed.

- Levels of sustainable use are a function of technologies, individual behaviors and institutions.

- Economic opportunities can be expanded by investments in technologies, changes in individual behaviors, and changes in institutions that alter the relationship between environmental quality and use.

- Environmental indicators can be better *leading indicators* of the long term health of the natural resource dependent economy.

Travel Cost Demand Model Results

Travel cost demand models were estimated for both the summer and winter seasons. The models relate the number of annual trips (visits) to the Florida Keys/Key West to travel costs (price) and other socioeconomic factors such as age, household income, race/ethnicity, years experience visiting the Keys, forgone earnings to make the trip, length of stay, and whether the visitor visited other sites. Travel cost demand models allow for the estimation of how visitors would respond to price increases and their nonmarket economic user values per person-trip.

Key Definitions

- **Price elasticities.** For estimated travel cost models, price elasticities provide a prediction of the percentage change in the number of trips (visits) for a given percentage change in price, holding all other factors constant. Elastic demands mean a more than proportional reduction in the number of trips for a given change in price, while inelastic demands mean a less than proportional reduction in the number of trips for a given change in price.
- **Consumer's Surplus or Nonmarket Economic User Value.** Is the value a consumer receives from a good or service over and above what they have to pay to consume the good or service.
- **Asset Value of the Resources.** The asset value of the resources of an area represents the price one would be willing to pay for the resources today based on the flow of annual user values that the resources could generate into the indefinite future.

Visitor Responses to Prices. Price elasticities provide a prediction of the percentage change in the number of trips (visits) for a given percentage change in price, holding all other factors constant. As with most project findings, there were significant differences between summer and winter season visitors. Significant differences were also identified for Hispanic visitors during the summer season and day trip visitors during the winter season. The details of these findings are summarized below.

- Price elasticities for visitors to the Florida Keys/Key West vary with the level of prices and become more "elastic" as the level of prices rise. In other words, a higher percentage response in trips for a given percentage change in prices.
- Generally, visitor demands are price "inelastic" meaning a less than proportional change in trips (visits) for a given change in price. This means that price increases will result in increases in total revenue.
- Generally, winter season visitors are more responsive to prices than summer season visitors.
- During the summer season, Hispanic visitors had more elastic demands than all other visitors. At overall sample mean levels of travel cost, Hispanic's price elasticity was -1.15 versus -0.30 for all other visitors. This would mean that for a 10 percent increase in price, Hispanics would reduce their number of trips (visits) by 11.5 percent, while other visitors would reduce their visits only 3.0 percent. However, Hispanic visitors generally come from South Florida and have, on average, lower costs. At the Hispanic group mean level of travel costs, Hispanic visitor's price elasticity was equal to -0.30. And, at the all other visitors group mean level of travel cost, the price elasticity for all other visitors was -0.34.
- During the winter season, no difference in price elasticities were found for Hispanic visitors. However, they were a smaller proportion of winter season visitors.
- During the winter season, day trip visitors had more elastic demands than all other visitors. At overall sample mean levels of travel cost, day trip visitors price elasticity was -0.71 versus -0.44 for all other visitors. However, as with the Hispanic visitors during the summer, winter season day trip visitors primarily come from South Florida and have, on average, lower costs. At the day trip visitors group mean level of travel costs, day trip visitor's price elasticity was -0.30. And, at the all other visitors group mean level of travel costs, the price elasticity for all other visitors was -0.46.

Per Person-trip User Values. Separate travel cost demand models were estimated for summer and winter season visitors that participated in natural resource-based activities. The travel cost demand models were then used to derive estimates of the nonmarket economic user values on a per person-trip basis. The estimated models yielded not only different values by season but also significantly different values for Hispanic visitors during the summer season and day trip visitors from South Florida during the winter season. The estimated values are summarized below.

Summer Season (June - November, 1995)

- Hispanic visitors had a per person-trip user value of about $201 versus $790 for all other summer season visitors.
- The weighted average per person-trip user value for all summer season visitors was about $740.

Winter Season (December 1995 - May 1996)

- Hispanic visitors did not have significantly different per person-trip values during the winter season. However, Hispanic visitors were a much smaller proportion of winter season visitors.
- Day trip visitors from South Florida had a per person-trip user value of about $289 versus $594 for all other winter season visitors.
- The weighted average per person-trip user value for all winter season visitors was about $561.

Annual Weighted Average

- The average annual weighted per person-trip user value was about $654.

Person-trips, Person-days, and Activity Person-days

The analysis of nonmarket economic use value was limited to only those visitors that engaged in natural resource-based activities. Three measurements of use were estimated by season; 1) person-trips (visits), 2) person-days, and 3) activity person-days. Activity person-days can contain double-counting because a visitor can do multiple activities in a single day, so activity person-days could exceed person-days.

Summer Season. Visitors that participated in natural resource-based activities accounted for 81 percent of the total person-trips made by recreating visitors, 90 percent of the total person-days, and 96 percent of the total activity person-days.

Winter Season. Visitors that participated in natural resource-based activities accounted for 65 percent of the total person-trips made by recreating visitors, 82 percent of the total person-days, and 93 percent of the total activity person-days.

Annual. Visitors that participated in natural resource-based activities accounted for 72 percent of the total person-trips made by recreating visitors, 85 percent of the total person-days, and 95 percent of the total activity person-days.

Annual User Value

Estimates of the total number of person-trips by group were multiplied by the per person-trip user values to obtain estimates of the total annual use value by group and season.

Summer Season. Hispanic visitors had a total user value of about $16 million while all other visitors had a value of about $689 million for a total summer season value of about $705 million.

Winter Season. Day trip visitors had a total user value of about $28 million, while all other visitors had a value of about $471 million for a total winter season value of about $499 million.

Total Annual Value. All visitors that engaged in natural resource-based activities had a total annual user value of about $1.2 billion.

Activity-based Values

Visits to the Florida Keys are a complex mix of recreation activities and most often visitors do not think of any one activity as being either the main activity on the visit or the main reason for making the visit. However, for many purposes activity-based user values are desired. The authors generated estimates of user values by activity and season using the distribution of estimated person-days by activity and season. This method produces a first approximation for the estimated values by activity because the method assumes a constant per activity-day value for each activity i.e., that the value of a snorkeling day is the same as a scuba diving day or a fishing day. Using this method, the estimated value of snorkeling is different from scuba diving or fishing simply by the relative amount of days visitors spent doing each activity. The method also allows for differentiating the proportion of value assigned to non natural resource-based activities (e.g. swimming in outdoor pools, visiting historic areas, or visiting museums) and therefore provides a conservative estimate of the proportion of value assigned to the natural resources of the area.

- The constant per person-day values were about $97 for the summer season and about $77 for the winter season with an annual weighted average of about $87.
- Natural resource-based activities accounted for about 76 percent of the activity-days and total annual user value of $1.2 billion, or about $910million, while non natural resource-based activities accounted for about 24 percent of the $1.2 billion, or about $294 million.
- Beach activities accounted for about $233 million in annual user value, viewing nature and wildlife about $224 million, fishing about $171 million, snorkeling about $156 million, and scuba diving about $49 million.

Asset Value of the Resources

The natural resources of the Florida Keys/Key West are represented by the environment as a tourist destination and abundance & diversity of specific useable resources. The asset value of the resources of an area represents the price one would be willing to pay for the resources today based on the flow of annual user values that the resources could generate into the indefinite future. This value can be approximated using a couple of conservative assumptions. First, the annual values (net of inflation) remain constant in all future years. This means that combination of total person-trips and value per person-trip do not change in the future. Second, the interest rate that converts future dollars to current dollars (net of inflation) i.e. the "real discount rate", ranges between 3 and 5 percent. Based on the findings in this study the following asset values are estimated.

- The total asset value of all natural resource-based trips to the Florida Keys/Key West is $24.1 billion at a 5 percent interest rate and $40.2 billion at a 3 percent interest rate.
- Using only the natural resource-based activity component of value, the asset value of the resource is $18.2 billion at a 5 percent interest rate and $30.4 billion at a 3 percent interest rate.

Uses of Nonmarket Economic Values

Nonmarket use values have a long tradition of uses in benefit-cost analyses for public projects that either benefit or have adverse impacts on natural resources. They have also been used in natural resource damage assessment cases to recover damages related to groundings on coral reefs in the Florida Keys. The funds recovered are being used to restore the damaged reefs. The U.S. Department of Commerce, Bureau of Economic Analysis is also beginning to include nonmarket economic user values in National Income Accounting now generally referred to as "Green" Accounting.

- Natural Resource Damage Assessment
- Restoration of Natural Resources
- Public Investments in facilities and land acquisition
- Public Investments in environmental protection
- Investments in education and enforcement efforts
- Green Accounting

Putting the Cost of Water Quality Improvement and Protection into Perspective

The Monroe County Comprehensive Plan and Land Development Regulations (Florida Department of Community Affairs, 1996) includes estimates of the projected five-year costs of implementation of all aspects of the water quality protection plan. These costs, which seem quite high (upper estimate $500 million), are put into perspective by simply comparing these costs to one year's worth of nonmarket user values to visitors and the asset value of the resources the program is designed to protect.

- The total five-year costs pale in comparison to the estimated $1.2 billion in nonmarket economic user values to visitors for one year. This is true even if the comparison is restricted to the natural resource-based activity component of visitor's nonmarket values ($910 million).
- In addition, the five-year investment estimated for wastewater and stormwater protection is only about 2.7 percent of the conservatively estimated natural resource-based component of the asset value of the area's natural resources at a 5 percent discount rate and only 1.6 percent of the natural resource-based component of the asset value of the area's natural resources at a 3 percent discount rate.

The results summarized here and much greater detail can be found in the following report:

Nonmarket Economic User Values of the Florida Keys/Key West (40 pages)

The following reports are also available on the visitor portion of the study:

Linking the Economy and Environment of Florida Keys/Florida Bay: Executive Summary - Visitors Survey (5 pages)

Visitor Profiles: Florida Keys/Key West (159 pages)

Economic Contribution of Recreating Visitors to the Florida Keys/Key West (22 pages)

Importance and Satisfaction Ratings By Recreating Visitors to the Florida Keys/Key West (23 pages)

Technical Appendix: Sampling Methodologies and Estimation Methods Applied to the Florida Keys/ Key West Visitor Surveys (170 pages)

The following reports are also available on the residents of Monroe County:

Linking the Economy and Environment of Florida Keys/Florida Bay: Executive Summary - Resident Survey (4 pages)

A Socioeconomic Analysis of the Recreation Activities of Monroe County Residents In the Florida Keys/Key West (49 pages)

Technical Appendix: Sampling Methodologies and Estimation Methods Applied to the Survey of Residents of Monroe County

All the reports listed above are available on the World Wide Web at

http://www-orca.nos.noaa.gov/projects/econkeys/econkeys.html

All reports are in PDF file format and can be read and/or downloaded using Adobe Acrobat Reader at the Web site.

Printed copies can be ordered from the Web site or by contacting the following:

Dr. Vernon R. (Bob) Leeworthy, Project Leader
N/ORCA1, NOAA
1305 East West Hwy., 9th Floor
Silver Spring, MD 20910
telephone (301) 713-3000 ext. 138
fax (301) 713-4384
e-mail: bleeworthy@seamail.nos.noaa.gov

or

Linda MacMinn, Research Analyst
Monroe County Tourist Development Council
3406 North Roosevelt Blvd., Suite 201
Key West, FL 33040
telephone (305) 296-1552
fax (305) 296-0788
e-mail: lkmacminn@aol.com