Chapter 7 – Diversity: measurement and valuation

QUESTIONS ASKED

- What do ecologists call diversity?
- How can we measure changes in diversity in locally impacted areas?
- How can we valuate those changes by simple means?

BACKGROUND INFORMATION

- Compendium: Santos (2015b)
- Wikipedia: Biodiversity, Species diversity
- YouTube: CSIRO, What is biodiversity and why is it important?
- YouTube: CCVEnvBio, Biodiversity: Richness, Evenness, and Importance

COVERAGE

- Indices of species diversity: richness, heterogeneity, evenness
- Measurement of species diversity change in impacted aquatic ecosystem
- Valuation of two states of an aquatic ecosystem using a contingent valuation method

INSPIRATION AND SOFTWARE

The concept of species diversity has had the largest and longest tradition in ecology. Krebs's book on experimental ecology is the definitive reference on sampling and data analysis of distribution and abundance, and easy reading. One of the methods used by bio-economists to value biodiversity and ecosystem services, the willingness to pay, is introduced.
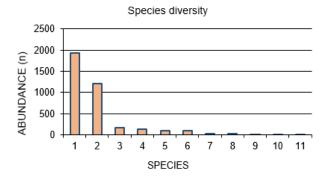
- Ch7 Conservation and valuation of diversity Belize JdS.xlsx

SNAPSHOTS

Species diversity

$$J' = \frac{H'}{H'\max}$$

J'-evenness measure
H'-Shannon-Wiener fi
H'max- maximum valu

$$H'_{max} = \log_2 S$$

S-number of species

WELCOME TO S.PEDRO, BELIZE.
Ambergris Caye

Anoldent (2007)

Data adapted from several case studies, including Williams &

Edwards (2012)

Valuation and economic value of reserve implementation
Divers (tourists) seems to rank reserve quality, and willingness to pay, according to the following characteristics:

Williams & Polunin 2000

Rank (max 5.0)	
4.3	Variety of fishes
4.2	Fish abundance
4.1	Variety of corals
4.0	Presence of large animals (sharks, manta-rays, turtles, dolphins, whales)
3.9	Unusual fishes (e.g. groupers, moray-eels)
3.7	Coral cover
3.6	Big fishes
3.5	Reef structure
3.5	Unusual corals

Diliff (2006)

Nassau grouper