

# **Case Study for Black Coral From Hawaii**

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# Introduction

**Phylum Cnidaria Order Antipatharia (Hexacoral)**

**>15 species in Hawaii (Taxonomic problems)**

**Fishery started in 1958 for the jewelry trade**

**3 species targeted by fishery – 1 dominant target**

**20 – 110 m depth range for targeted species**

**One of few black coral fisheries in Pacific**



***Antipathes dichotoma***  
25 m





*Antipathes dichotoma*  
95 m





***Antipathes grandis***  
**65 m**





***Antipathes grandis***

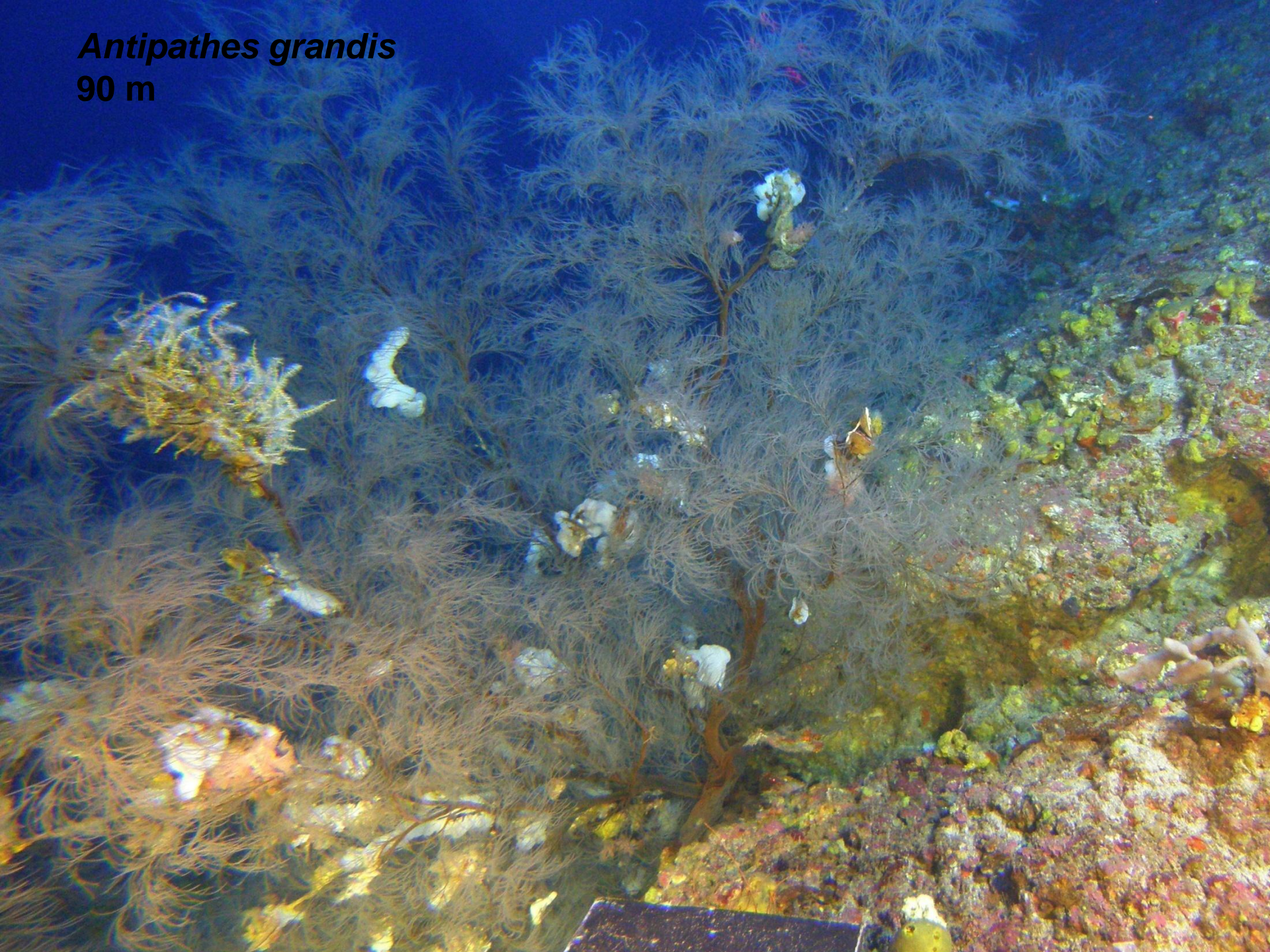
**85 m**





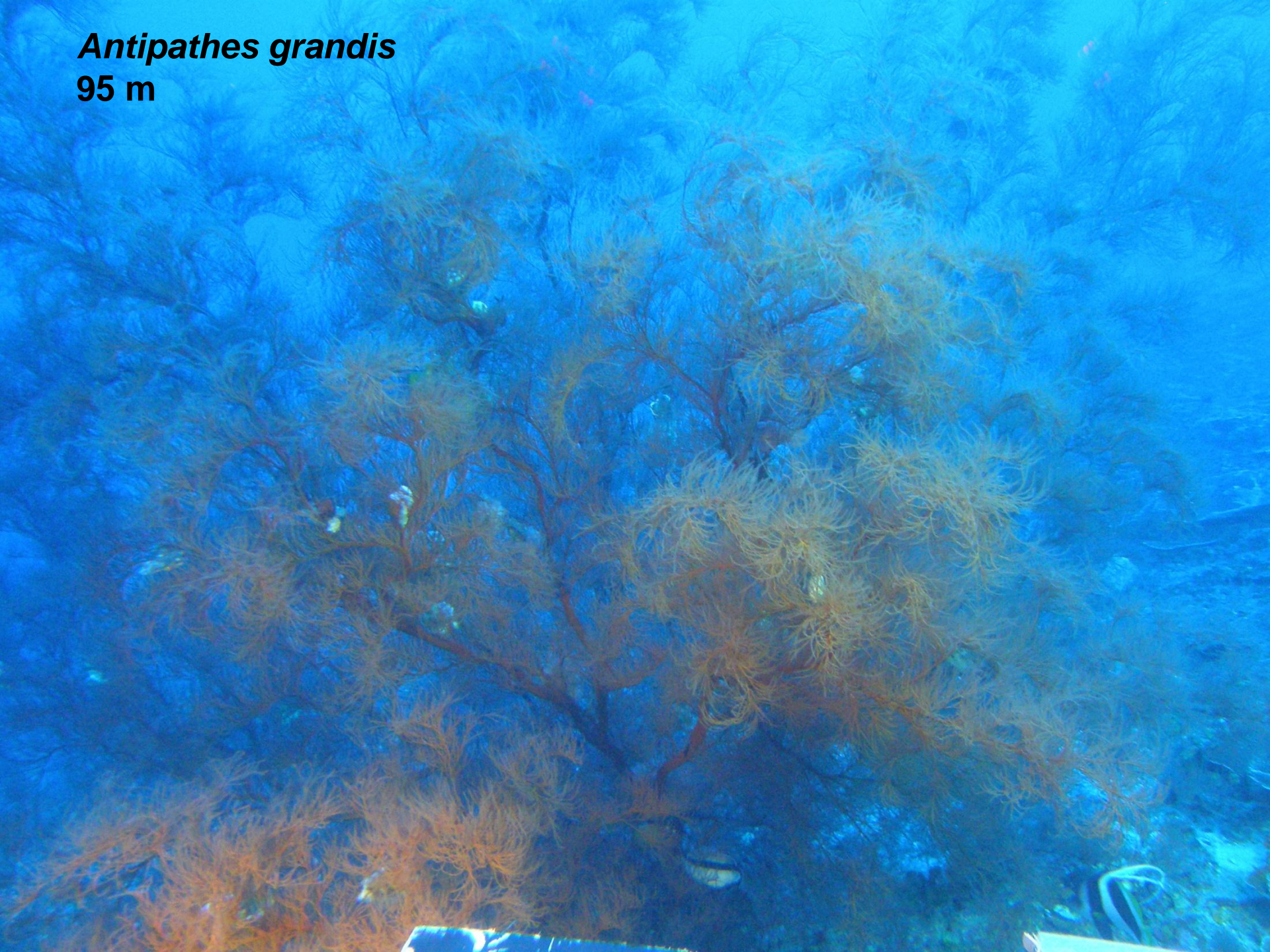
*Antipathes grandis*

90 m





***Antipathes grandis***  
**95 m**





*Myriopathes ulex*  
25 m





***Cirrhipathes anguina***

***Stichopathes* sp.**

**65 m**







**Grigg**





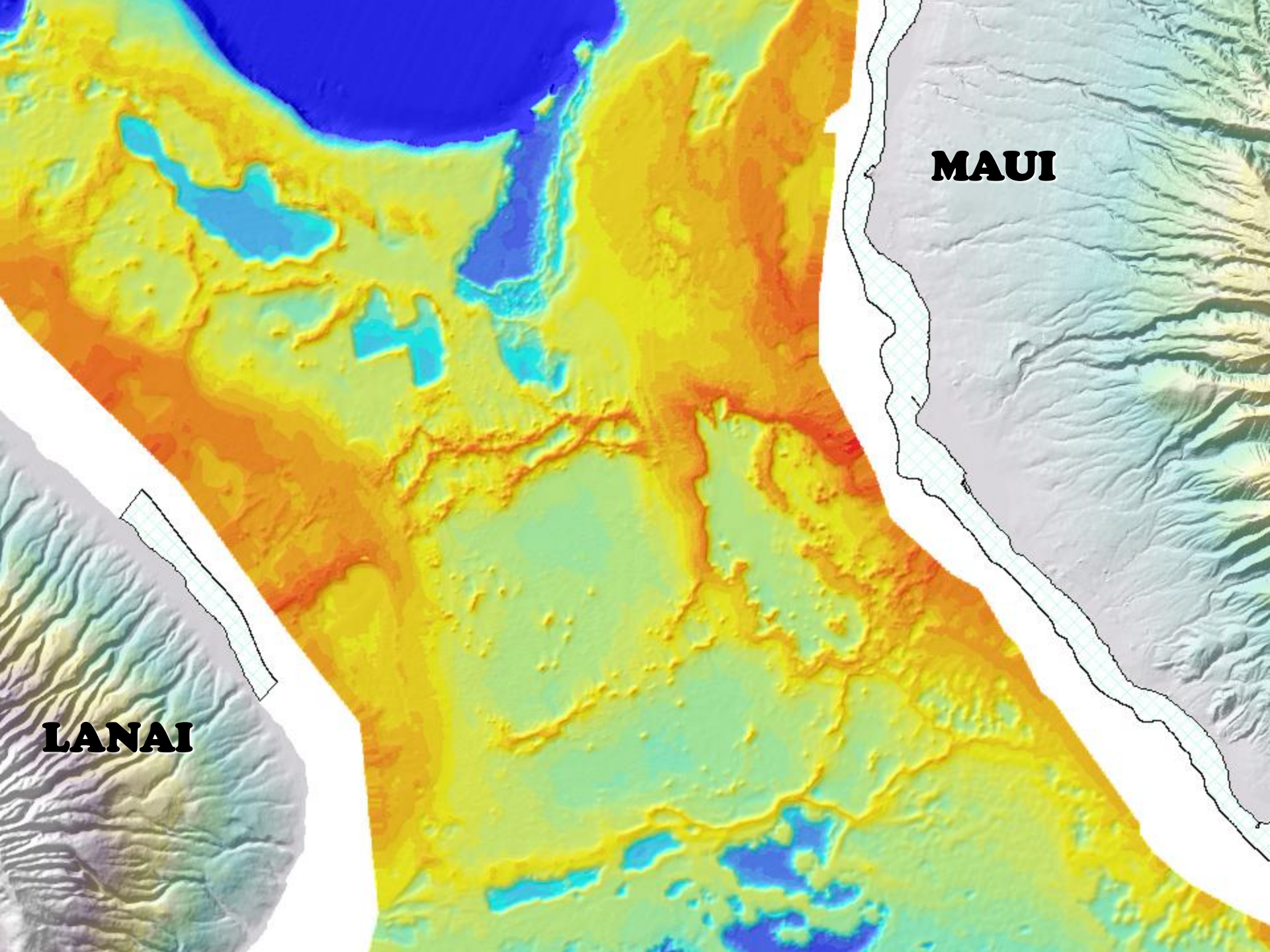




0"  
1"







**MAUI**

**LANAI**



# Key numbers to remember:

**Maturity estimated to be  
10.5 to 12 years = 67-77 cm height**

**Yearly growth = 6.42 cm/year**

**36" height =  $\frac{3}{4}$ " Base Diameter**

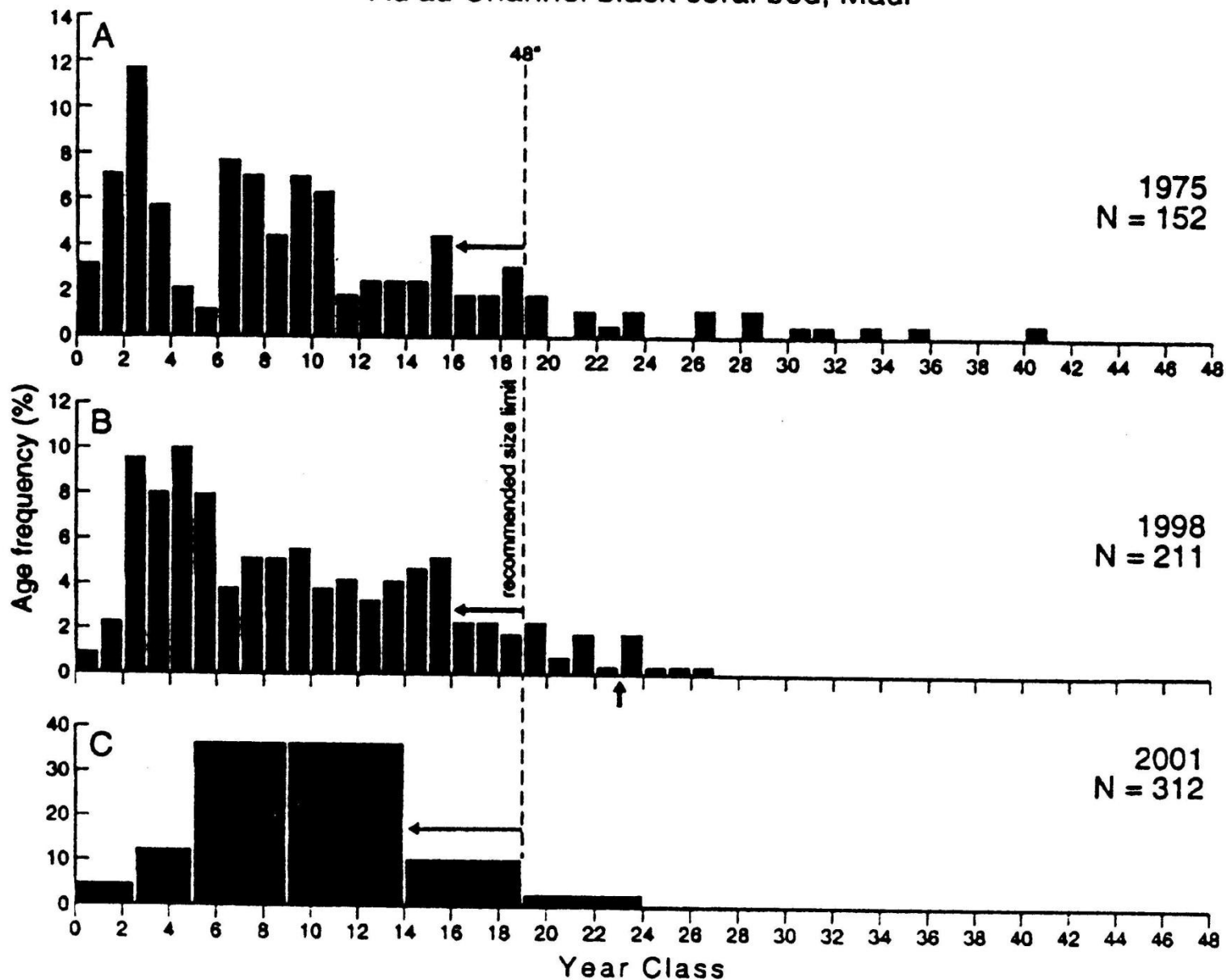
**90 cm = 1.9 cm = 14 years**

**48" height = 1" Base Diameter**

**120 cm = 2.5 cm = 19 years**



# Au'au Channel black coral bed, Maui

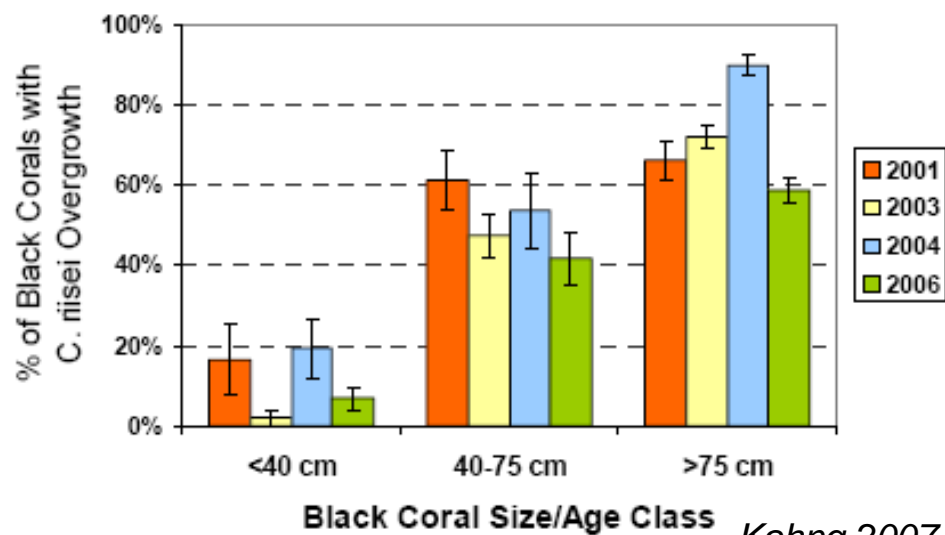


Grigg 2004

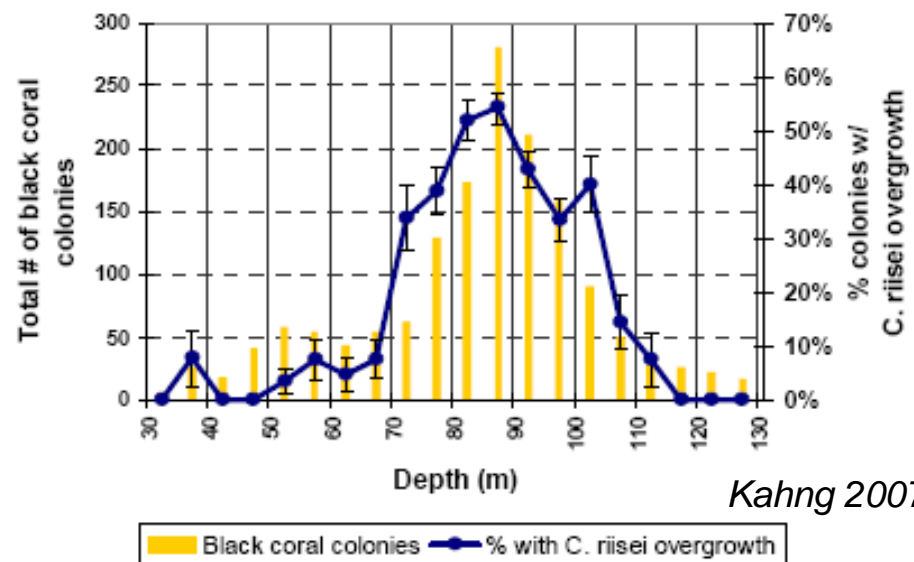




2001-2006 Keyhole Pinnacle Area

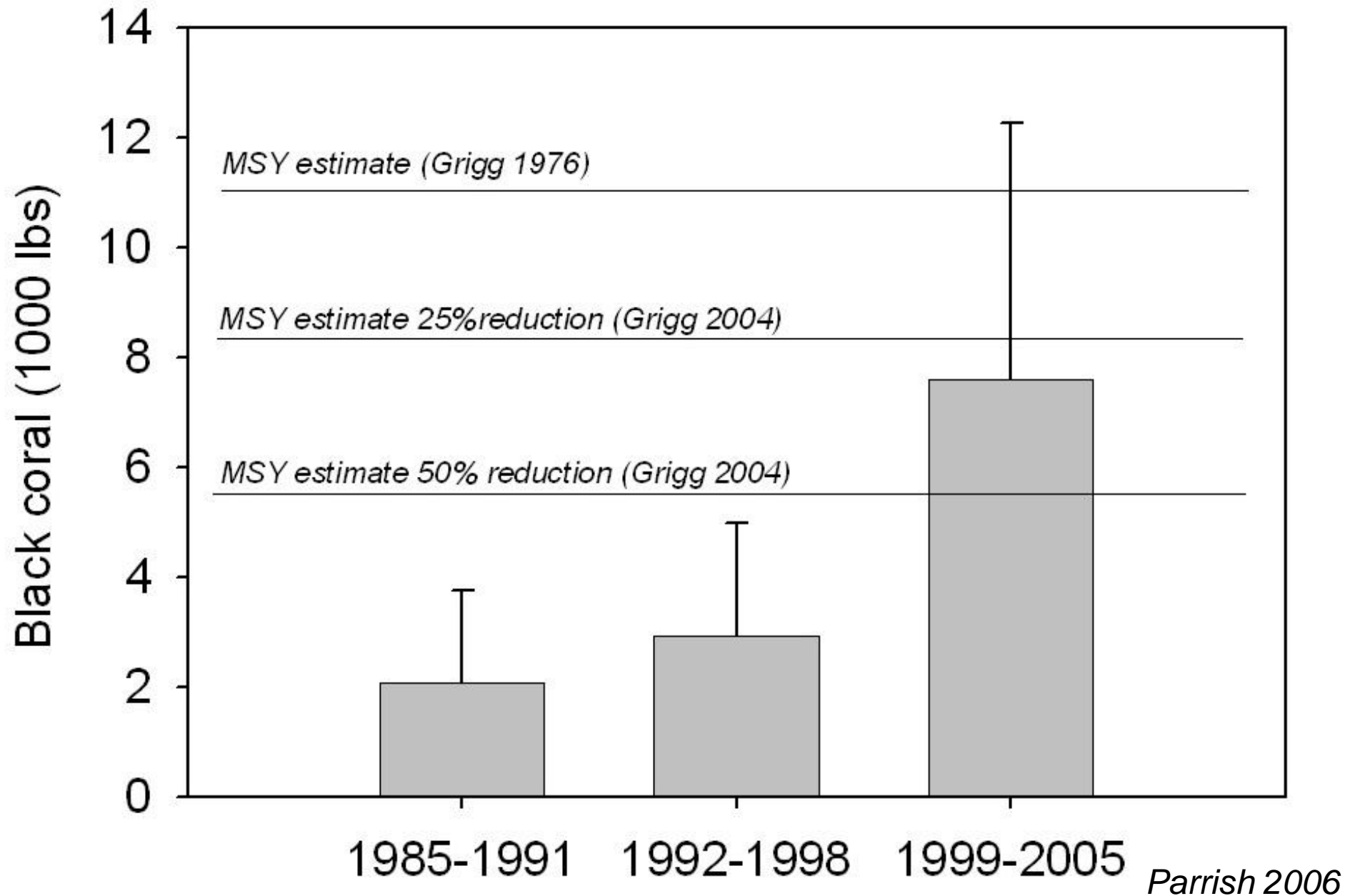


2001, 2004, 2006 Au'au Channel





# Mean annual black coral landings (w/sd)





# Threats to Resource

**Carijoa invasion below 70 m**

**Harvesting pressure above 70 m**

**Potential drop in recruitment**



# Data Collection Method:

## **Grigg 1975 and 1998**

**Divers using single tank with air**  
**Measure colonies with 1.2 meter rod**  
**Bottom time ranged 10 to 13 minutes**



## **Grigg 2001**

**Submersible with 2 observers**  
**Use laser to measure colonies**



## **DAR 2004**

**Divers using mixed gas SCUBA**  
**Measure colonies with 1.2 meter rod**  
**Bottom time ranged 25 to 30 minutes**





# Assumptions of Age Frequency Analysis

**Constant survival/mortality**

**Constant recruitment for all age groups**

**Sample is representative of whole population**

**Regression Analysis:**

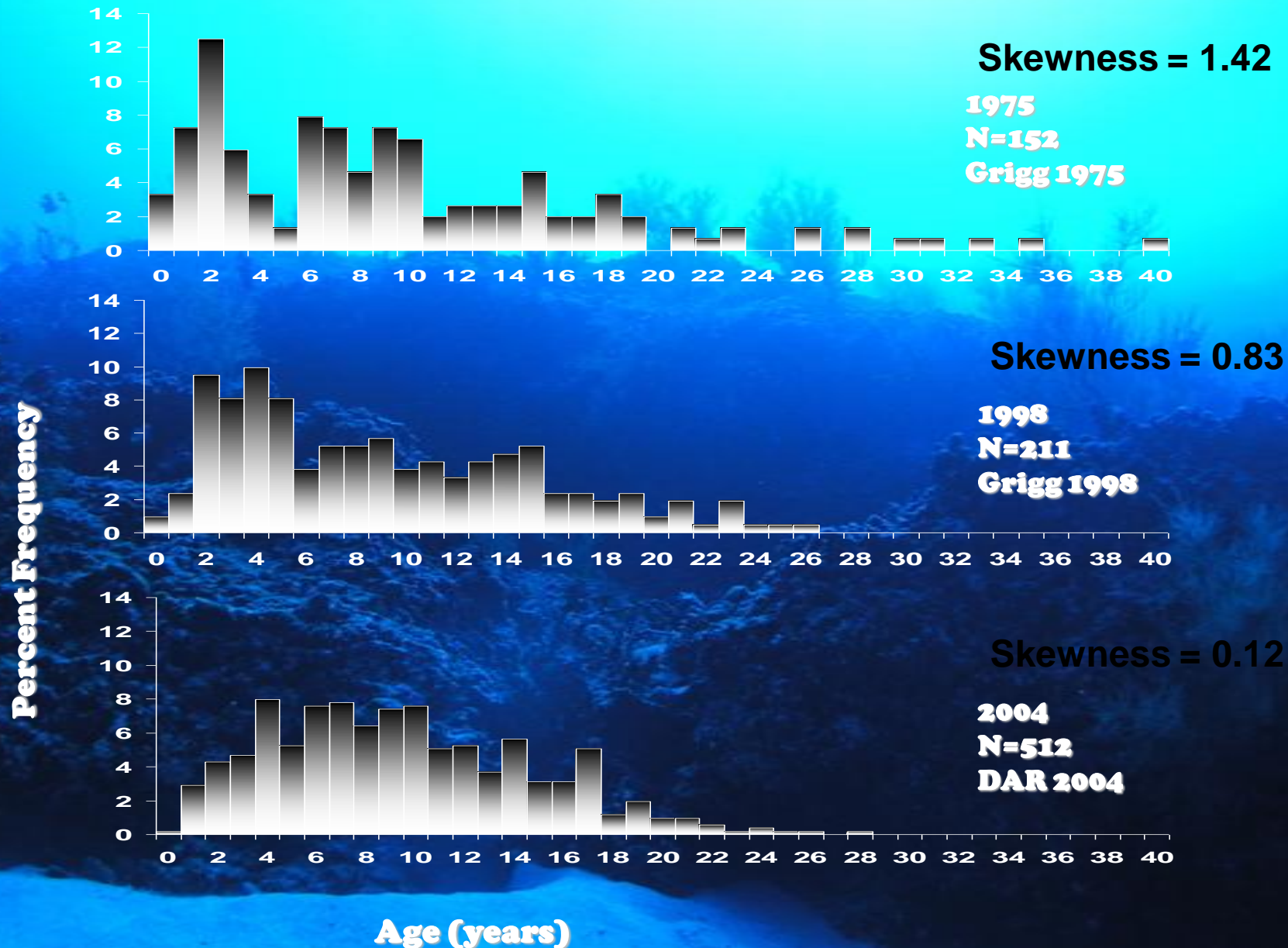
**Ages 0 and 1 were dropped**

**If an age class is missing individuals, that age class was averaged across 2 years**

**Regressions were carried out only across age classes for which there was reasonably continuous data (i.e. no more than 2 years without any individuals)**

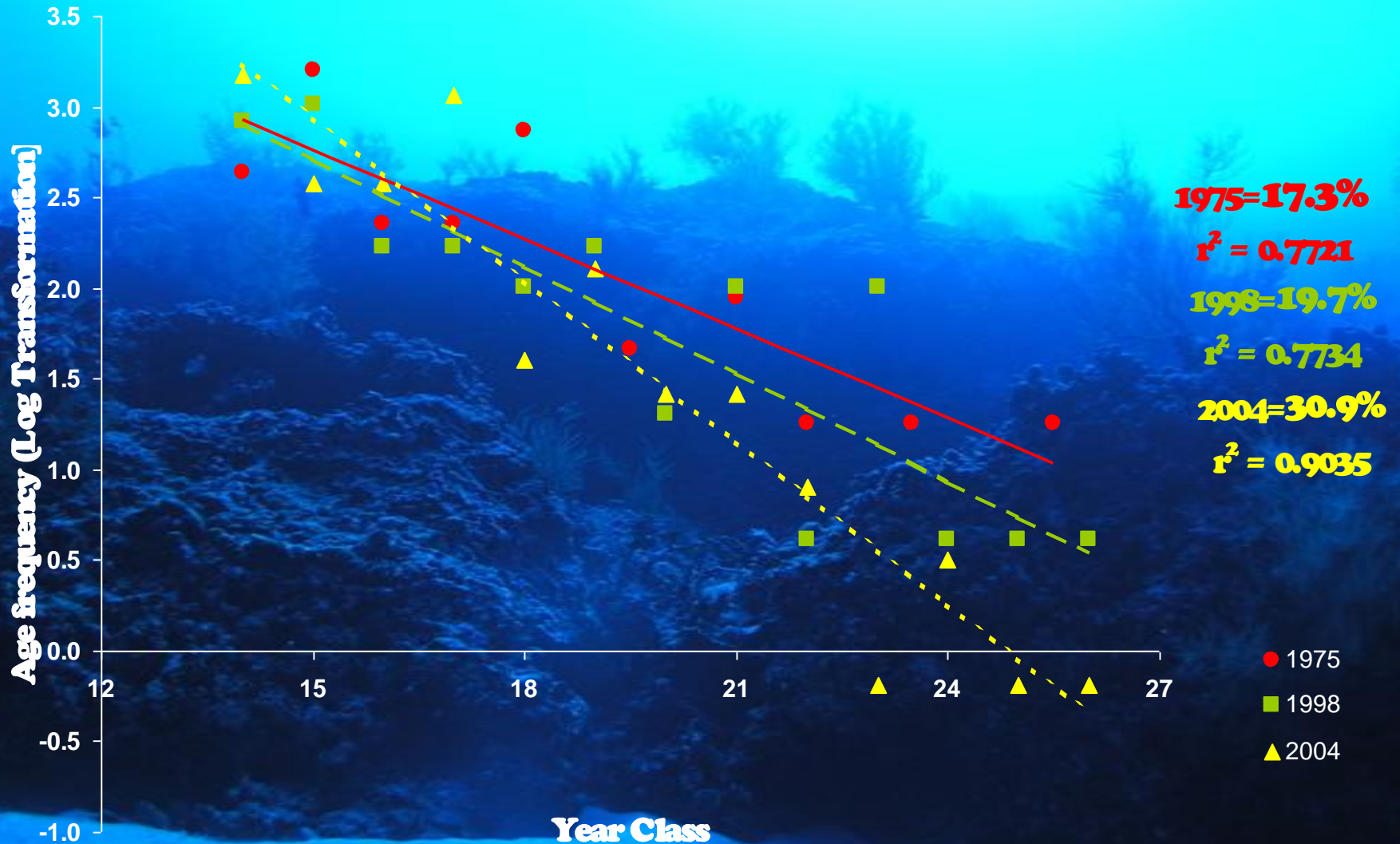


# Age Frequency Distribution



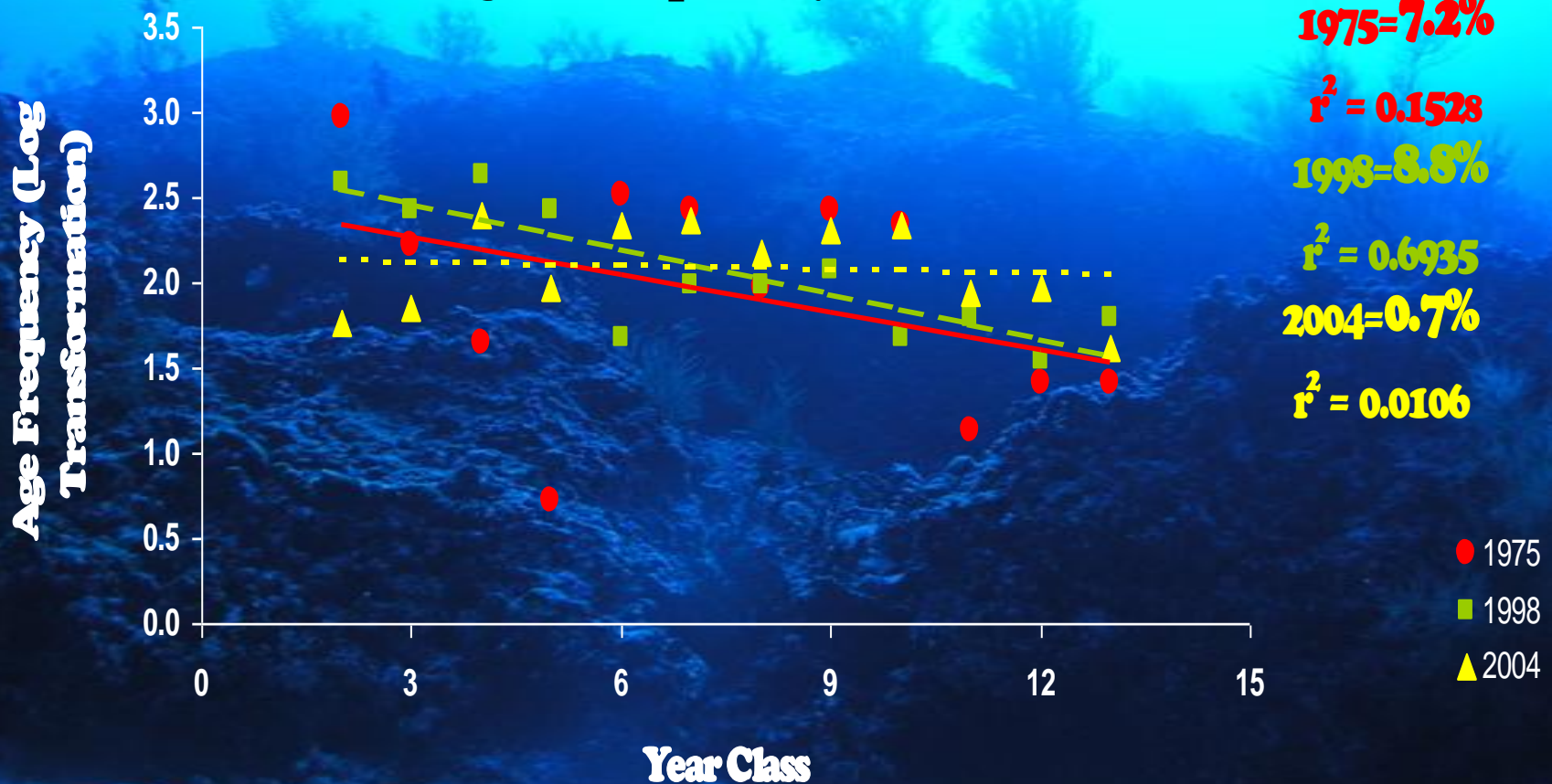


# Regression of Post-Harvest Age Frequency Distribution



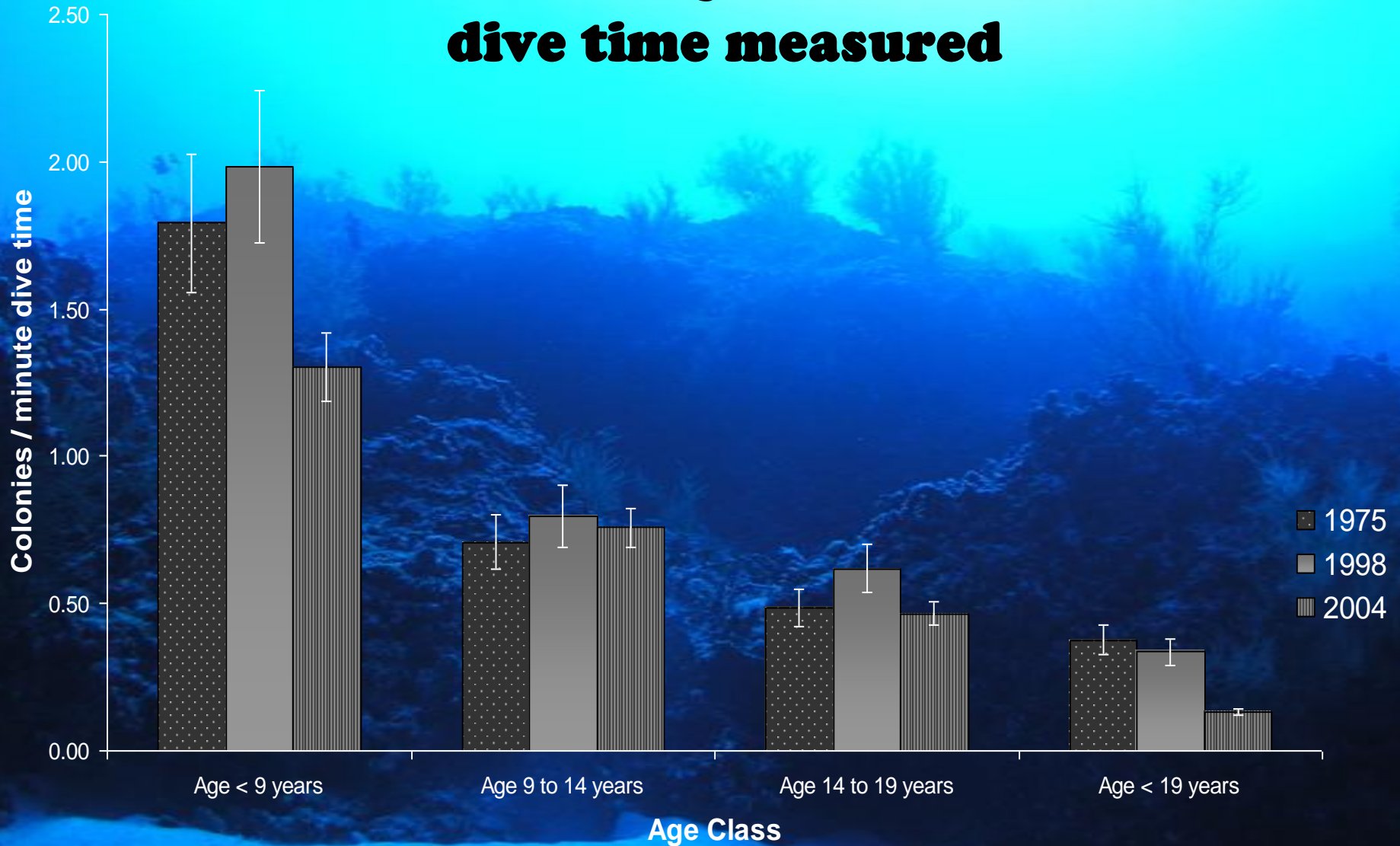


# Regression of Pre-Harvest Age Frequency Distribution





# Colonies per minute dive time measured





# Current Regulations:

**State of Hawaii – Minimum size of  $\frac{3}{4}$ " base diameter  
(in process of increasing to 1" base diameter)**

**Commercial Marine Fishing License**

**Planning on adding Total Allowable Catch  
(TAC) and closed areas**

**Federal – Minimum size of 1" base diameter or 48"  
height**

**Harvest Quota of 5000 kg/ 2 years**

**Pacific Precious Coral Permit**



# U.S. Fish and Wildlife Service

## International Affairs Program

- **Scientific Authority**
- **Management Authority**
- **International Conservation**



# Black Coral NDF

## **Black coral exports in the U.S.**

- **Industry is small (3 or fewer operators)**
- **Exports limited to specimens from Hawaii**



# Black Coral NDF

**DSA uses the following**

- **Licensing & reporting requirements**
- **Minimum size limit**
- **Maximum sustainable yield**
- **Industry information**
- **Practical harvest limitations**



# Black Coral NDF

## **Industry Information - Applicants report**

- **Weight of unworked black coral purchased (new applicant - on hand; established applicant - since last permit)**
- **Amount of unworked stockpiled coral**
- **Number of weight of processed specimens**



# Black Coral NDF

## **Practical Harvest Limits**

- **SCUBA depth is limited**
- **Areas beyond SCUBA depth serves as de facto refugia**



# Black Coral NDF

- **Information confidence**
- **Min. size and MSY based on peer-reviewed science**
- **Research is ongoing**
- **Industry self-reporting difficult to verify receipts to specimens**
- **Concept of deep water refugia reasonable although never confirmed**
- **Voluntary size limits after 2005 not verifiable**



# Black Coral NDF

## **Main Problems/Recommendations**

- **Consult with experts to obtain latest info and correctly interpret it**
- **Stay abreast of management and regulatory changes**
- **Application form - specific to coral/seahorses**
- **Understand the trade - trade data and products in trade**



# Black Coral NDF

## Recommendations

- **DSA uses templates for findings (see sample)**
- **different ones for plants and animals**
- **New NDF for each export**
- **Permit conditions**
- **Keep electronic copy**
- **Legal acquisition - DMA**