

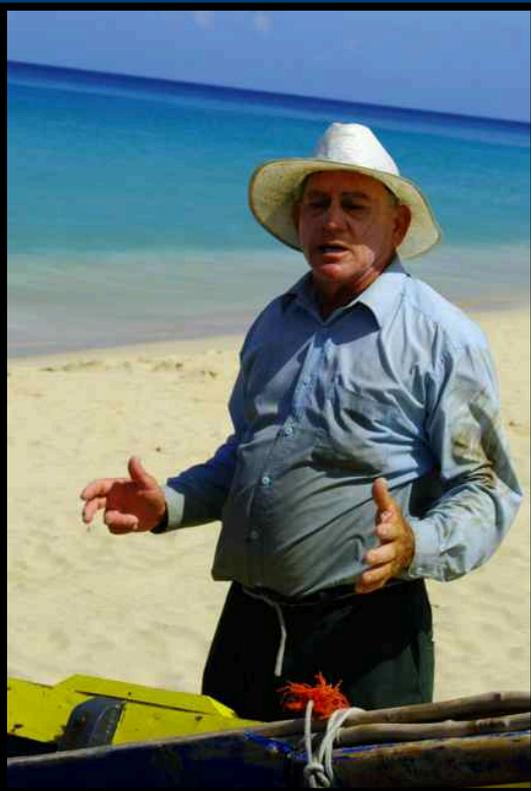
**These data are preliminary and are primarily intended to provide an overview of the fisheries of the US Caribbean. They should be treated as such. Do not cite without prior approval of the author. 10/13/11**



# U.S. Caribbean Fisheries: Description and Available Data

SEDAR 26  
October, 2011

NOAA



**NOAA  
FISHERIES  
SERVICE**

# Opening Comments

(more or less, a reminder for myself)

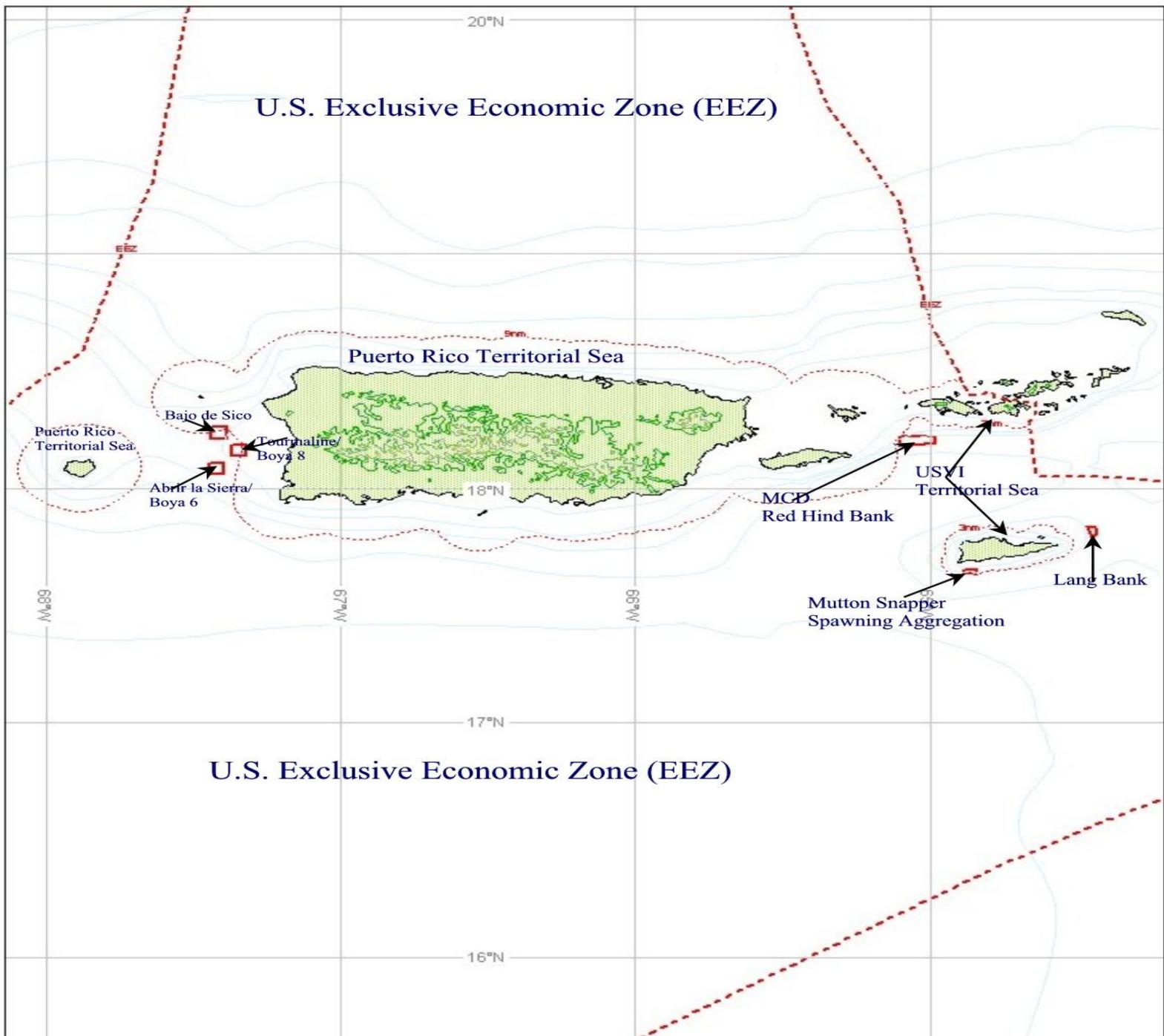


*Lutjanus vivanus*, silk snapper. Photo credit D. Bryan (2006)

*Etelis oculatus*, queen snapper. Photo credit J.G. Romine (2004).



*Sparisoma chrysopteron*, redbtail parrotfish  
Photo credit J.E. Randall (1997)

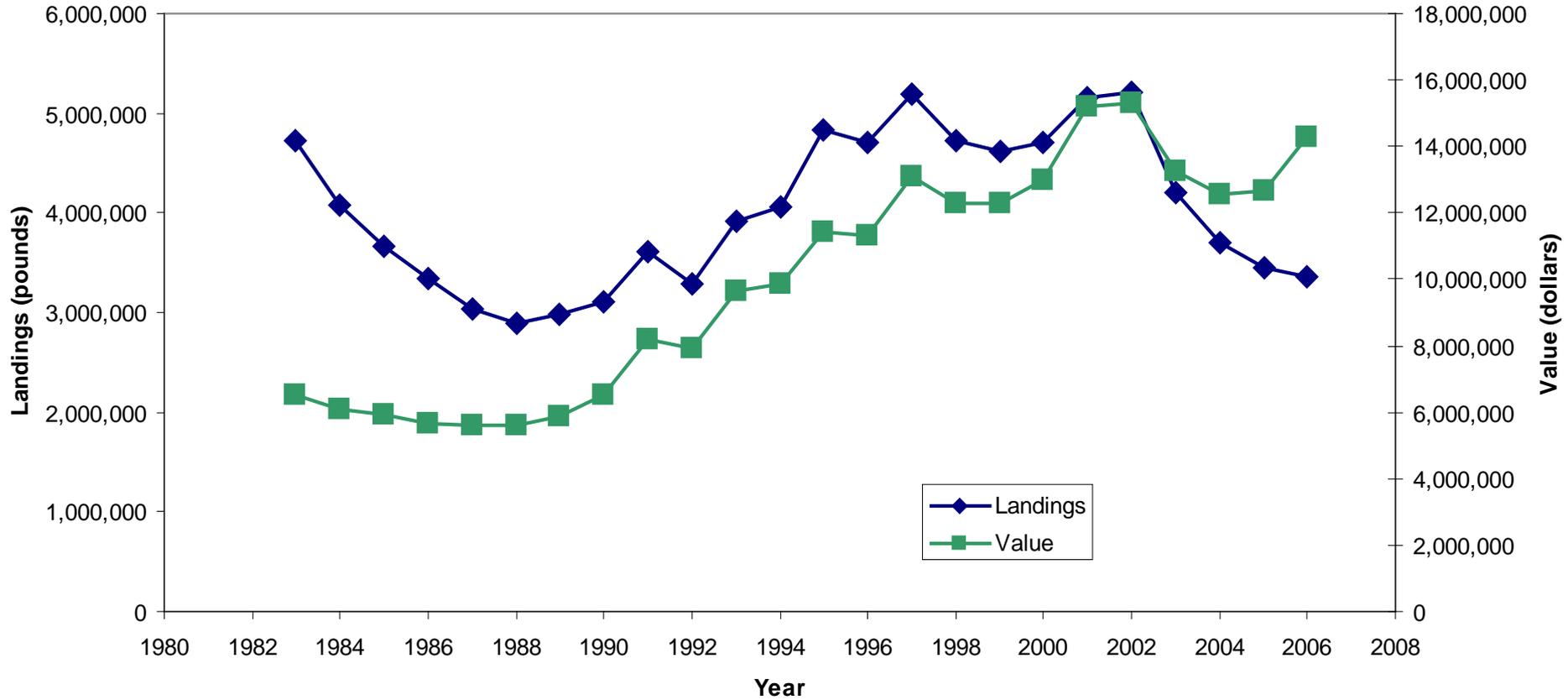


# Overview

- 1) Overall Landings and Value of Caribbean Fisheries
- 2) Recreational Data
- 3) Fishery Independent Data
- 4) Commercial Trip tickets—Landings
- 5) Commercial Trip Interview Program (TIP)—Length Frequency Data
- 6) Summary

# Reported Landings Only (Not expanded)

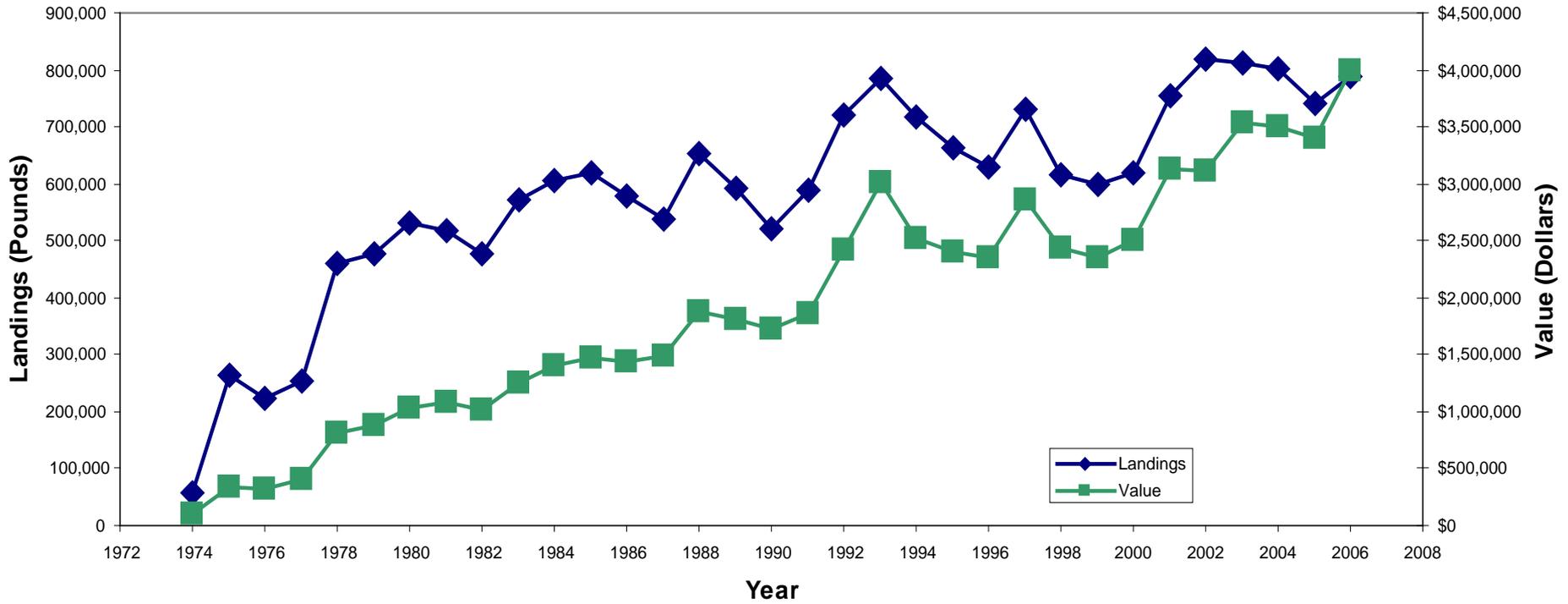
## U.S. Caribbean (all islands combined)-Landings and Value



**2006 - 3.3 million pounds worth \$14.3 million dollars**

# Reported Landings Only (Not expanded)

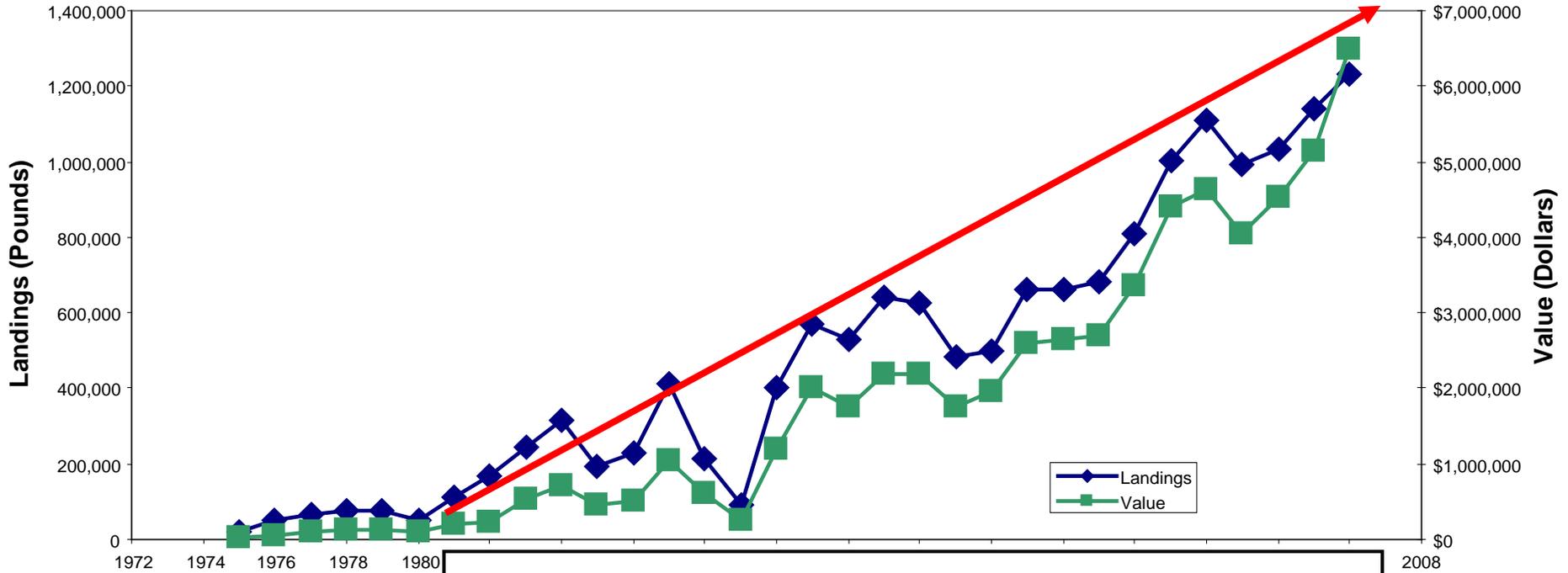
## St. Thomas/St. John



**2006 - 787,000 pounds worth \$4.0 million dollars**

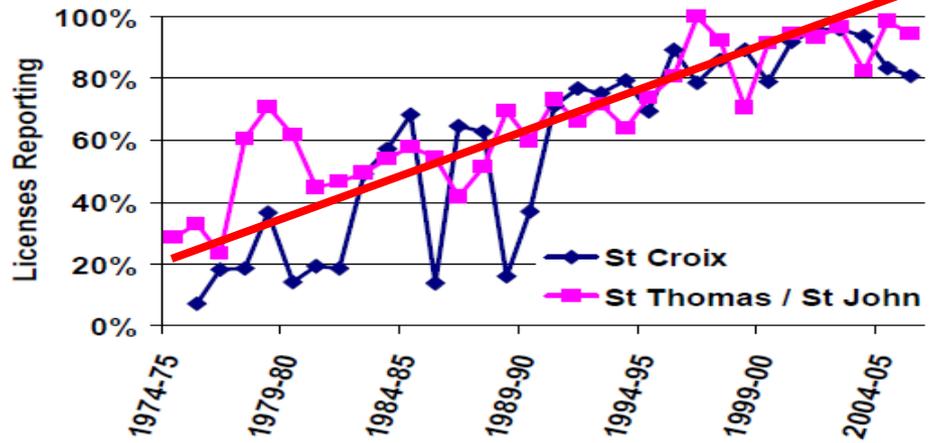
# Reported Landings Only (Not expanded)

## St. Croix



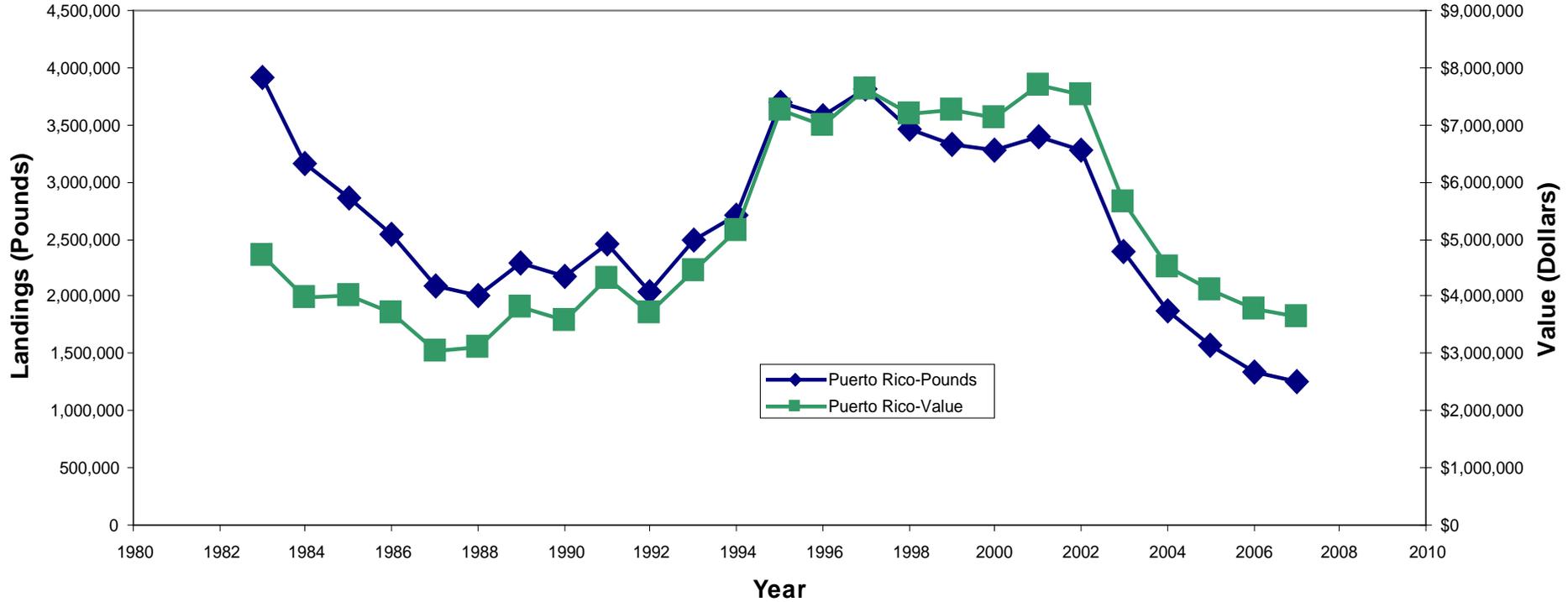
2006 - 1.2 m

ars



# Reported Landings Only (Not expanded)

## Puerto Rico



**2007 - 1.3 million pounds worth \$3.7 million dollars**

# Recreational Fisheries Data

- **MRFSS initiated in Puerto Rico in 2000**
  - In 2005: 470,00 shore mode trips; 380,000 private mode trips; <35,000 charter boat trips
  - No data collected on conch, whelk, or lobster
- **MRFSS is not conducted in the US Virgin Islands**
- **Occasional, short-term recreational surveys do occur, e.g. May-Sept. 2000 when 50,000 recreational conch fishers were estimated in Puerto Rico and the Virgin Islands**
- **There is no long-term, ongoing monitoring of recreational fishing in the US Caribbean other than MRFSS in Puerto Rico**

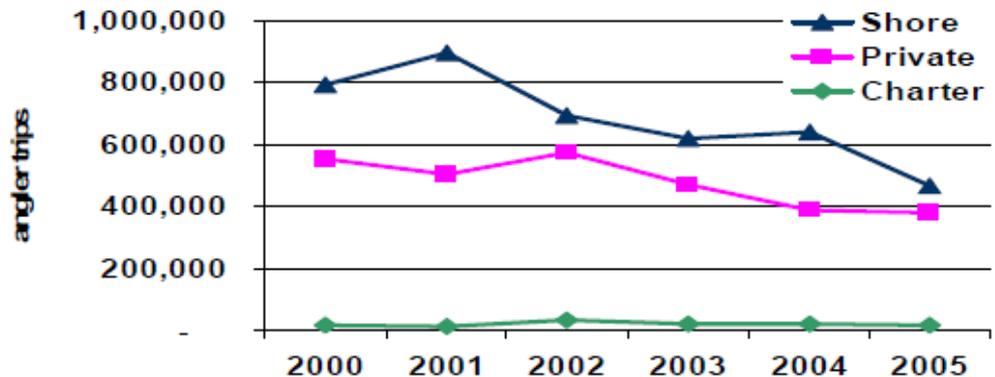


Figure 14. Estimated angler trips for Puerto Rico by mode from the Marine Recreational Fisheries Statistical Survey.

# Fisheries Independent Data

Data set	Years	Area	Methods	Target
Reef fish monitoring USVI Nat'I Park	1982-present	St. John, Buck Island St. Croix	Visual surveys, traps	Reef fish, conch, benthos
Reef fish surveys (PR DNER)	1988-present	Western PR, SE St. Thomas	Trap, hook and line	Reef fish
REEF and AGRRA surveys	1990-present	PR, USVI, BVI	Trained volunteers' observations	Reef fish
Seamap Reef Fish Sampling	1991-present	Western PR, St. Croix, St. Thomas	Trap, hook and line	Reef fish
Reef ecology, disease, and restoration	1997-present	Mona, Desecheo, La Parguera PR	Visual surveys, permanent & random sites	Corals, fish assemblages
Territorial Coral Reef Monitoring	2001-present	USVI, Vieques*, Desecheo*	Transects and roving diver	Reef fish, coral
Caribbean reef fish survey	2001-present	La Parguera PR, Buck Island St. Croix, St. John	Habitat-stratified visual surveys	Reef fish, benthos
Coral ecosystem studies	2001-present	La Parguera, Culebra, St. John	Visual surveys of permanent transects	Reef fish, benthos
PR deep reef surveys	2004-present?	Desecheo, Vieques, Bajo de Cico	Transects at 30-50m depths	Reef fish, coral?
Queen conch population/habitat use	2005-2007	St. John	Tag-recapture, sonic tracking	Queen conch
Shallow water surveys	2001-2003, 2005	St. John - 3 bays	Random visual transects, lift nets	Reef fish, conch, lobster
Trap impacts on reefs	2001-present	PR, USVI	Spp. comp of traps, diver surveys	Fish assemblages, benthos
AUV	?	Portions of deep shelf PR and USVI	Transects?	Benthos, but note other spp.

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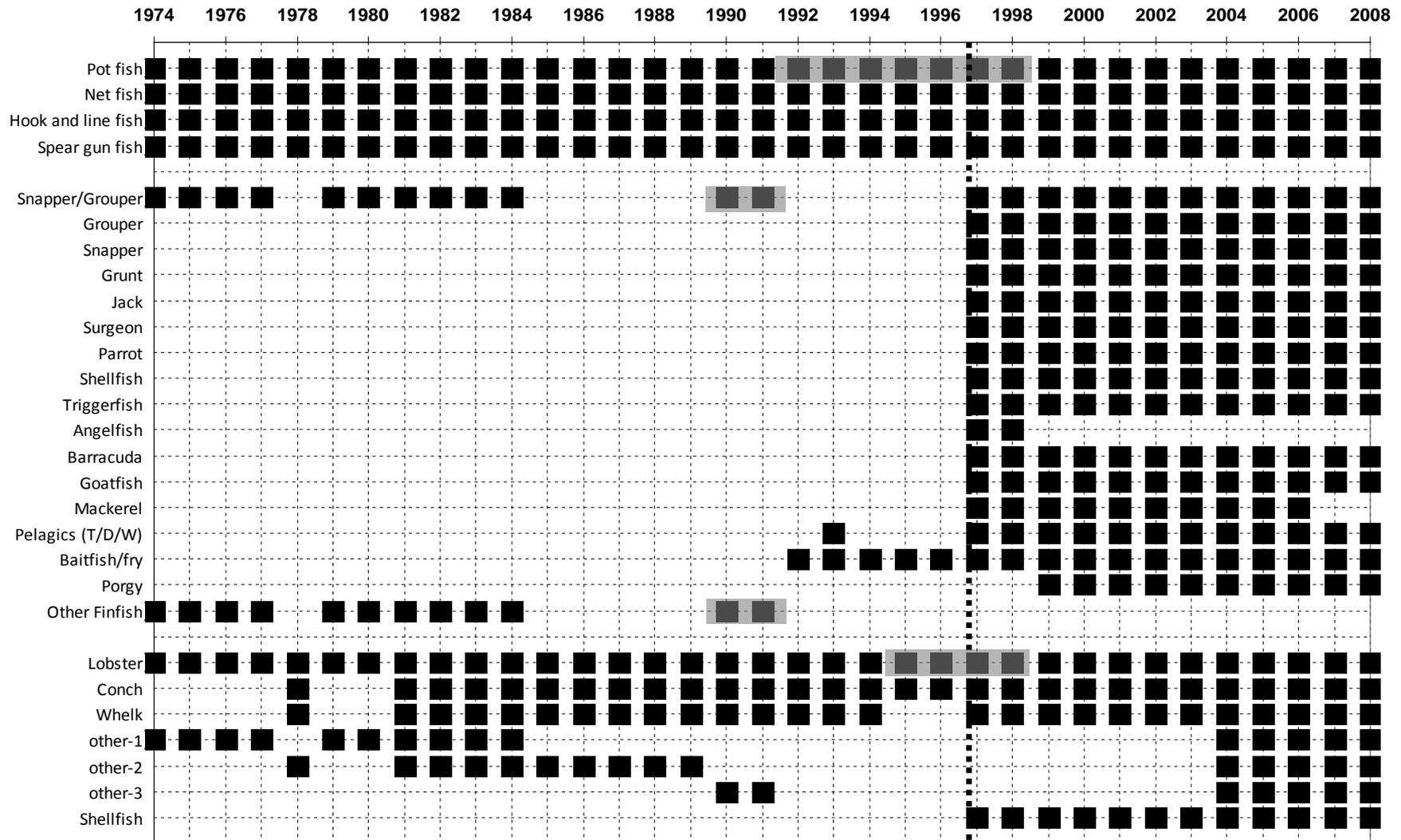
- **Concerns:**
  - **Short time series**
  - **Spatially limited – depth and region**
- **SEDAR's 4, 8, and 14 did not find a useful time series to conduct assessments**

# **Trip Tickets**

**Sales Records or Commercial Catch Records (CCR)**

**Self reported commercial landings and effort data**

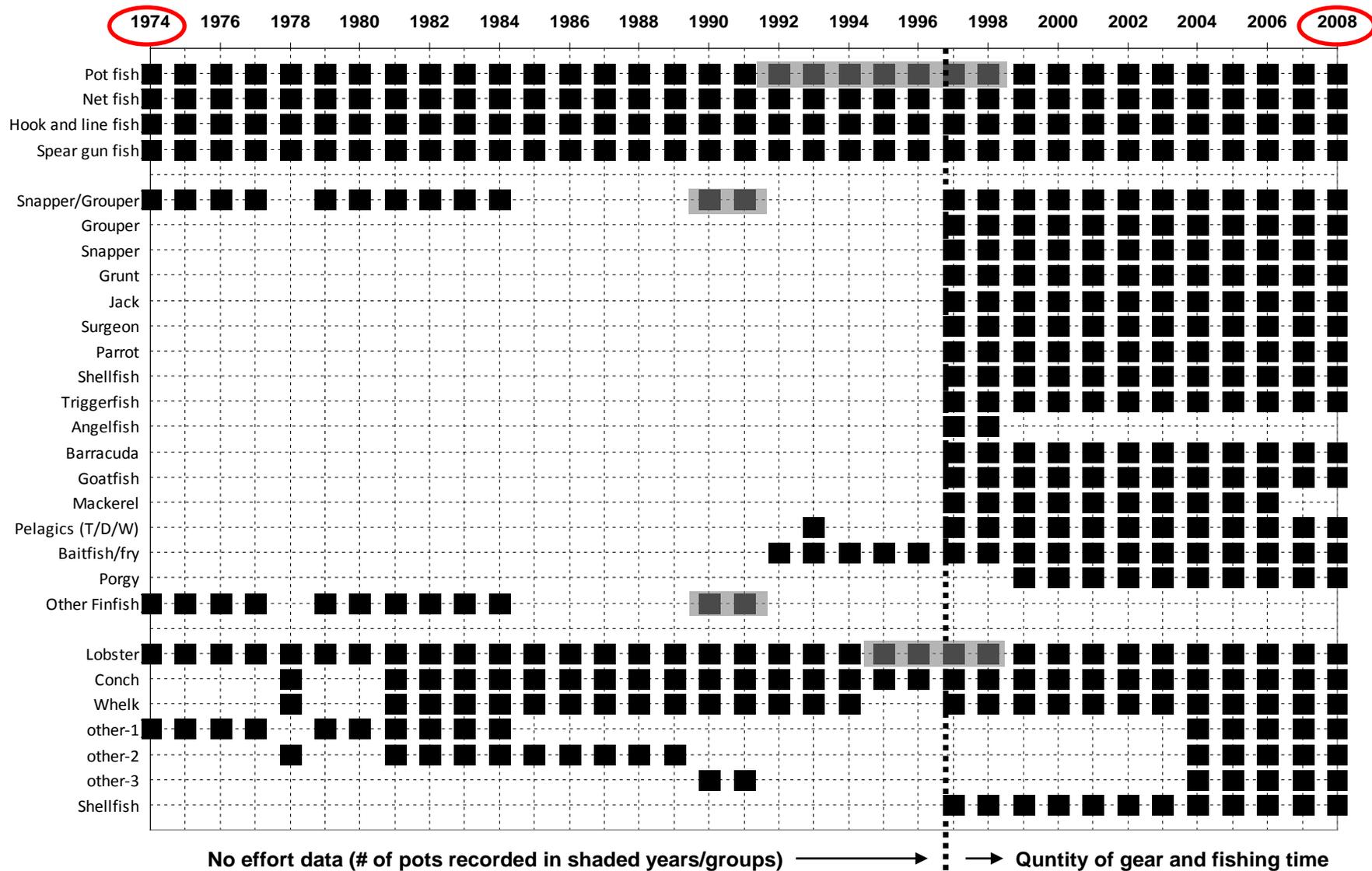
Available years of landings data and species groups that were used on the **St. Thomas/St. John** trip tickets.



No effort data (# of pots recorded in shaded years/groups) → → Quantity of gear and fishing time

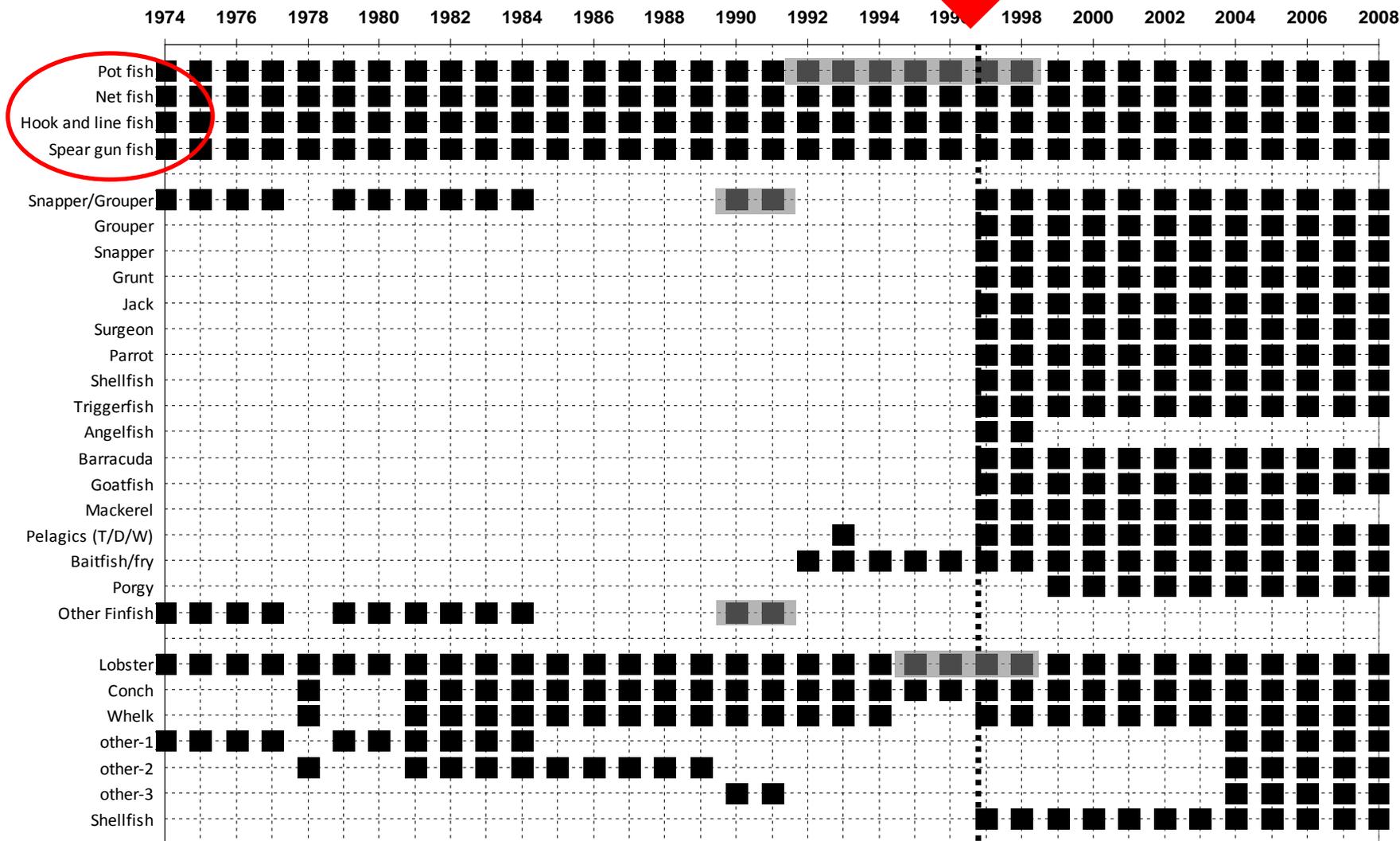
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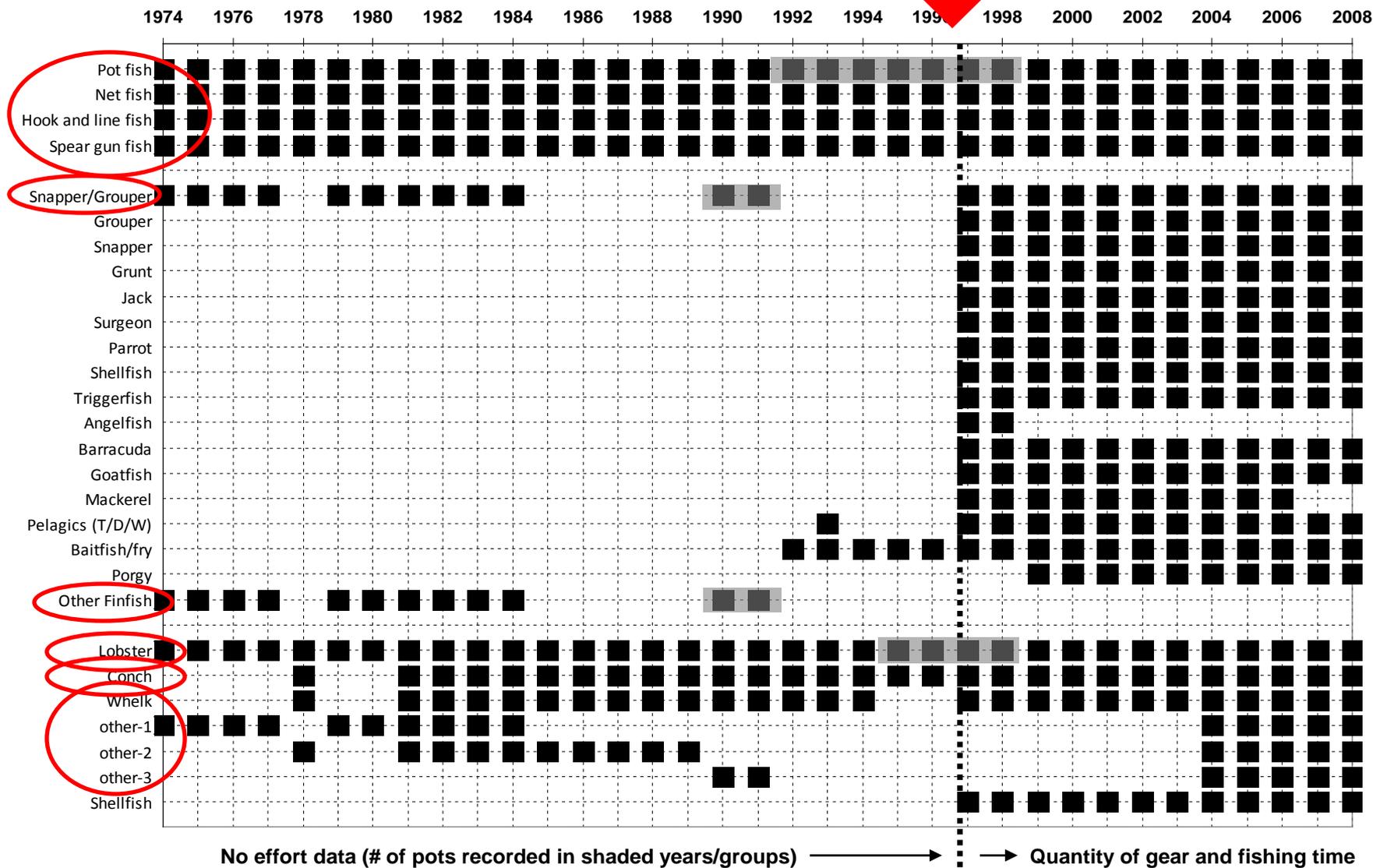
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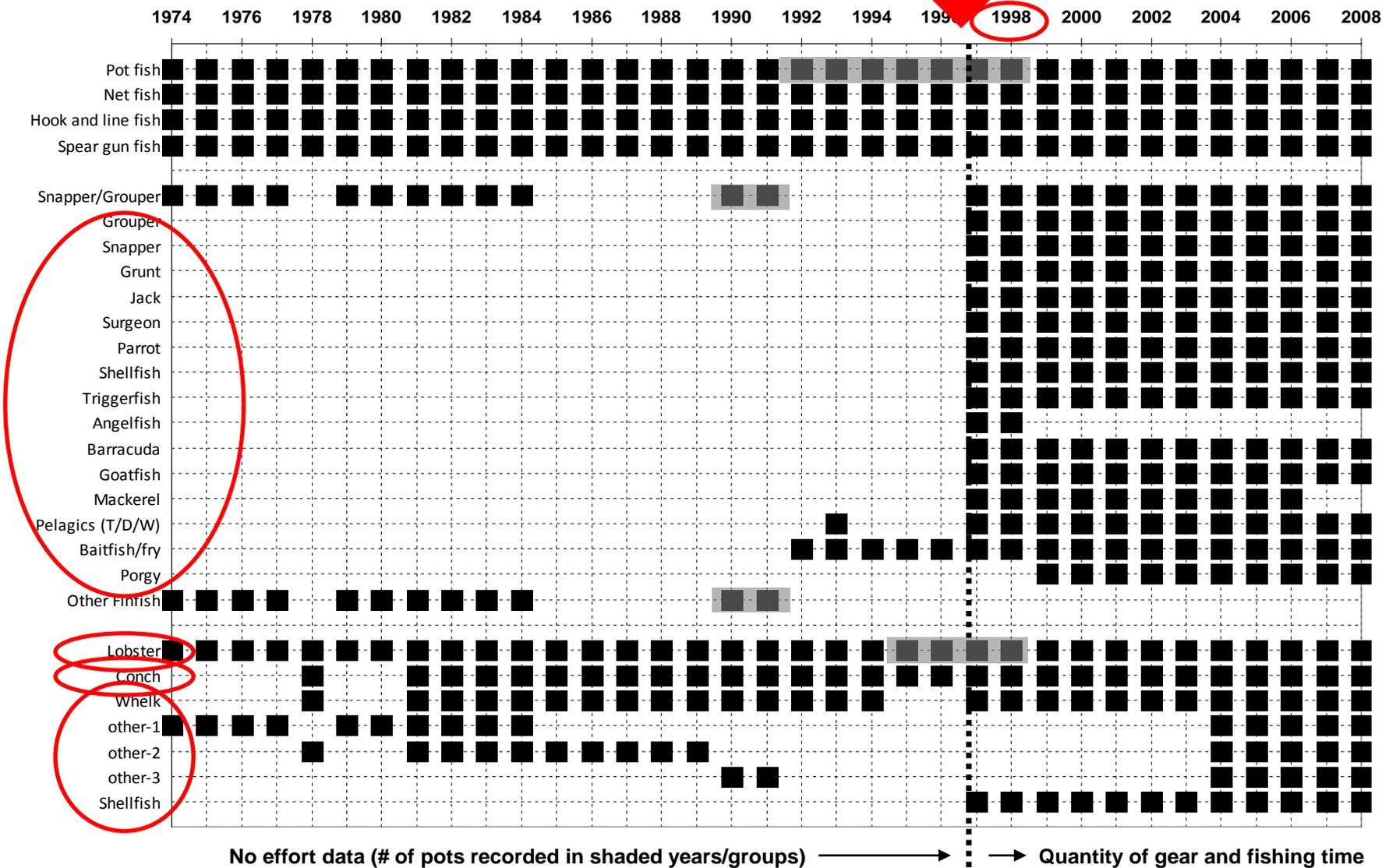
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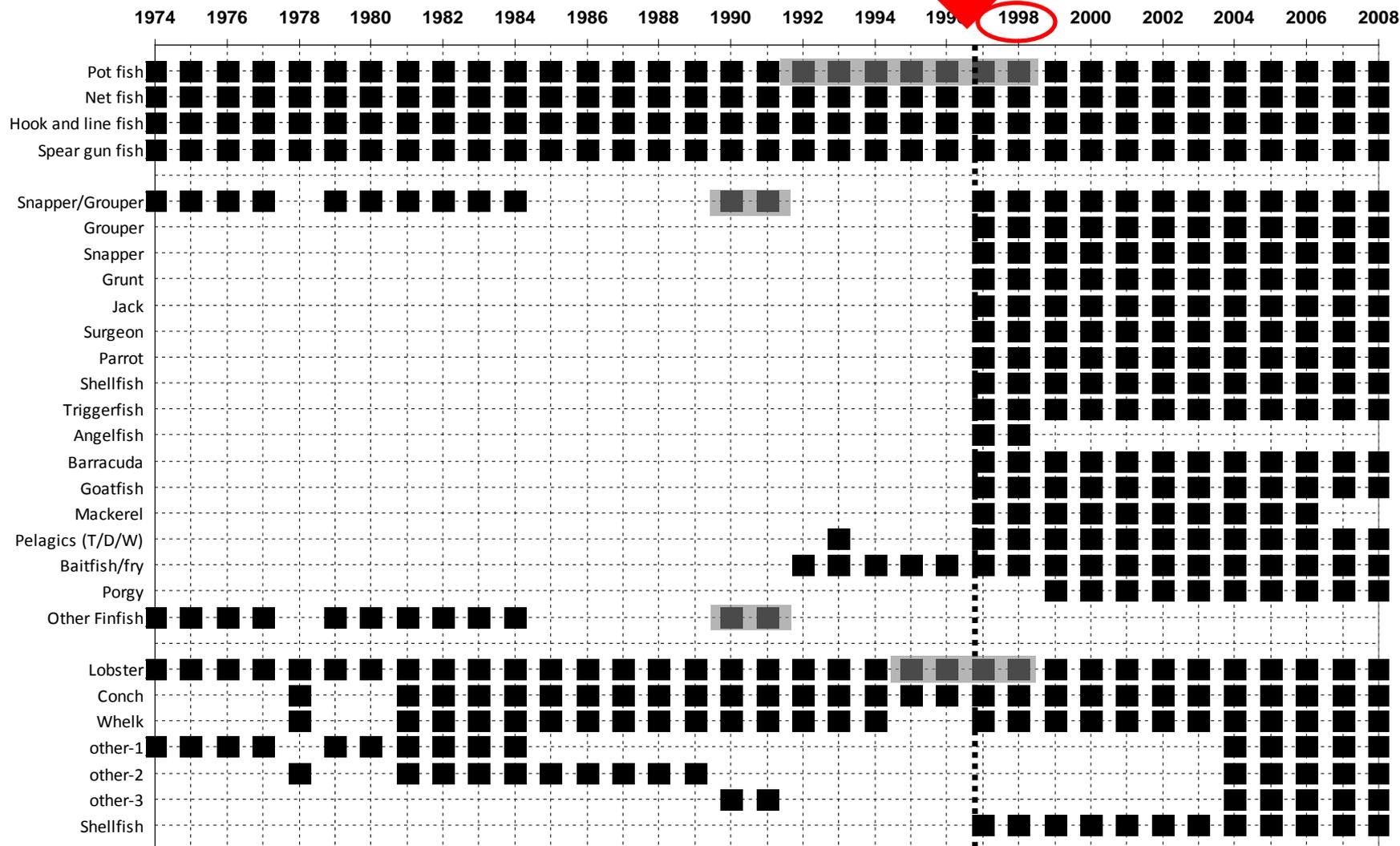
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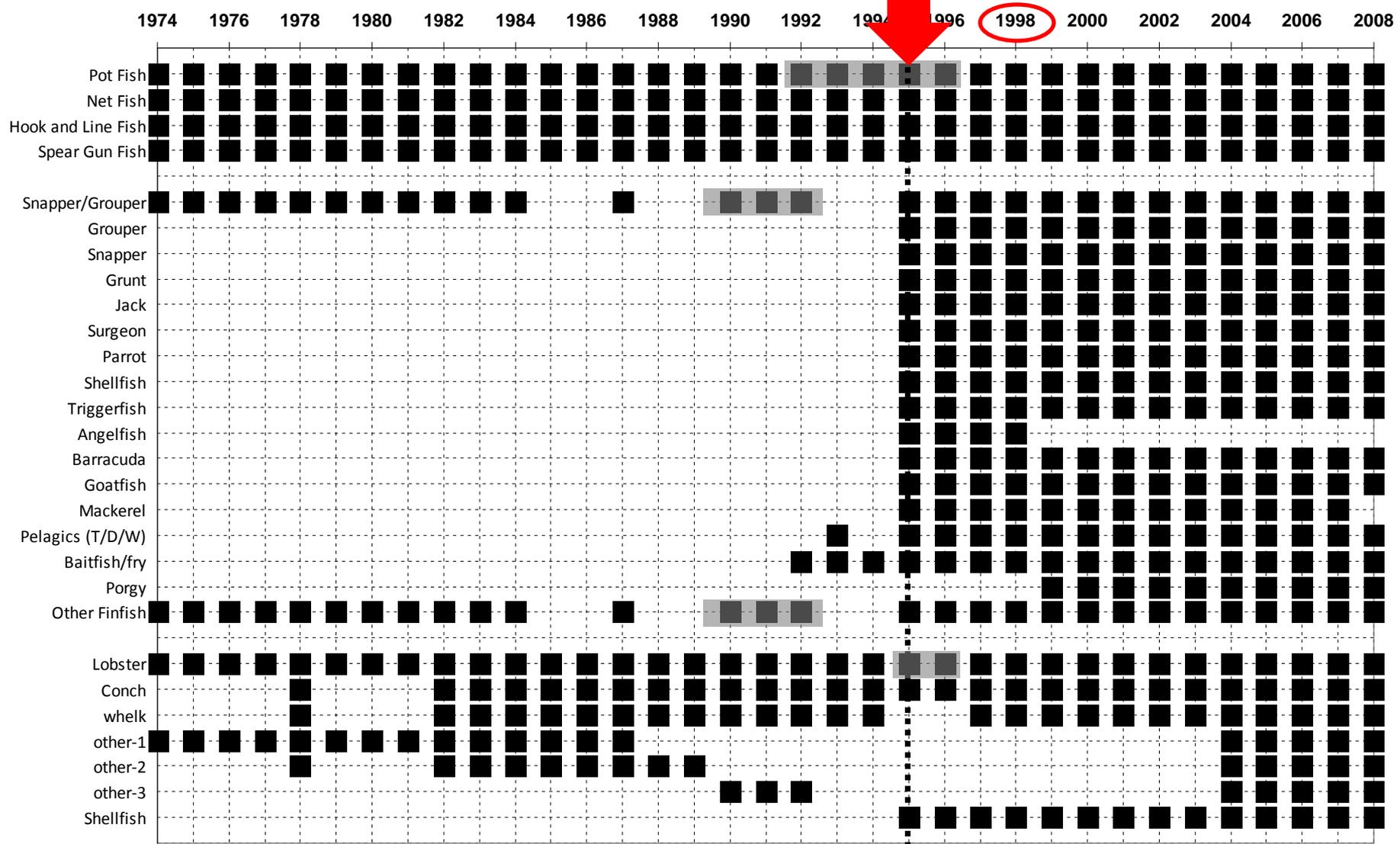
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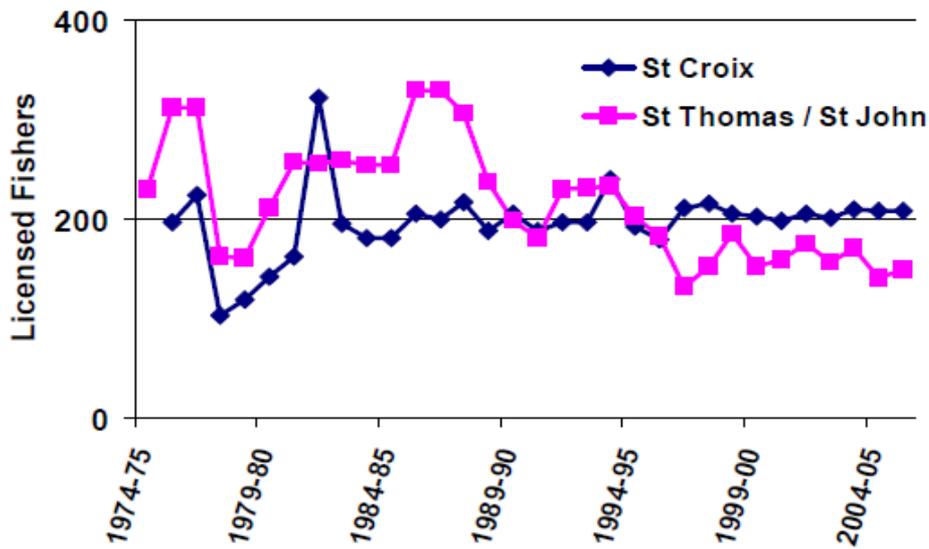
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# Available years of landings data and species groups that were used in the **St. Croix** trip tickets.



No effort data (# of pots recorded in shaded years/groups) → → Quantity of gear and fishing time

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USVI number of licensed fishers per year

Figure 1. Number of licensed fishers in the Virgin Islands since 1974.

USVI percent licensed fishers who reported at least once per year

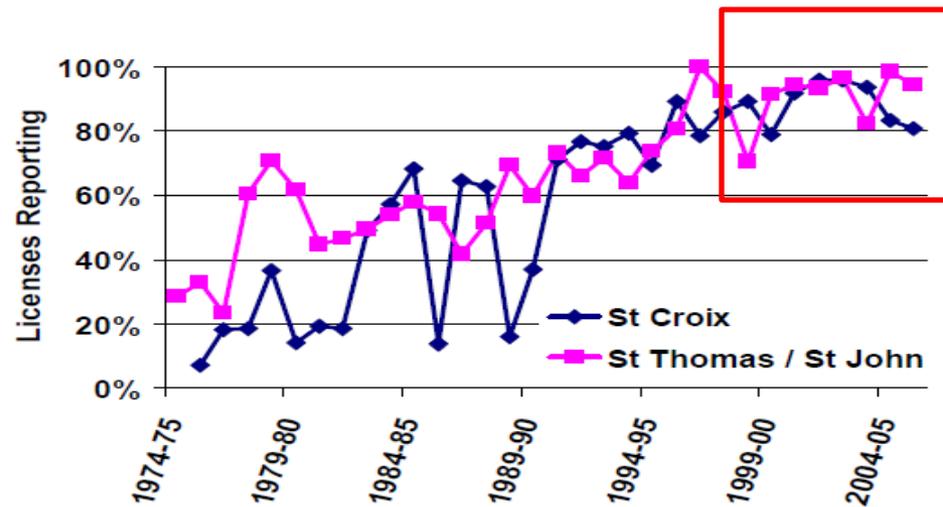
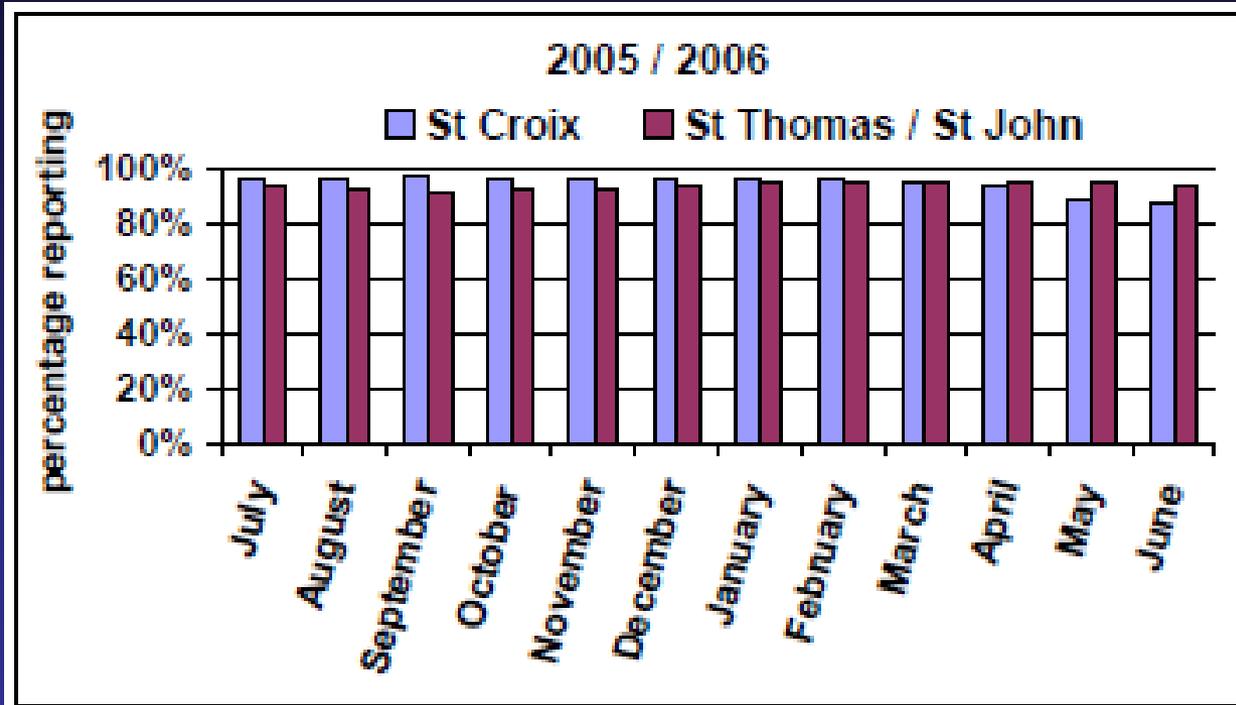
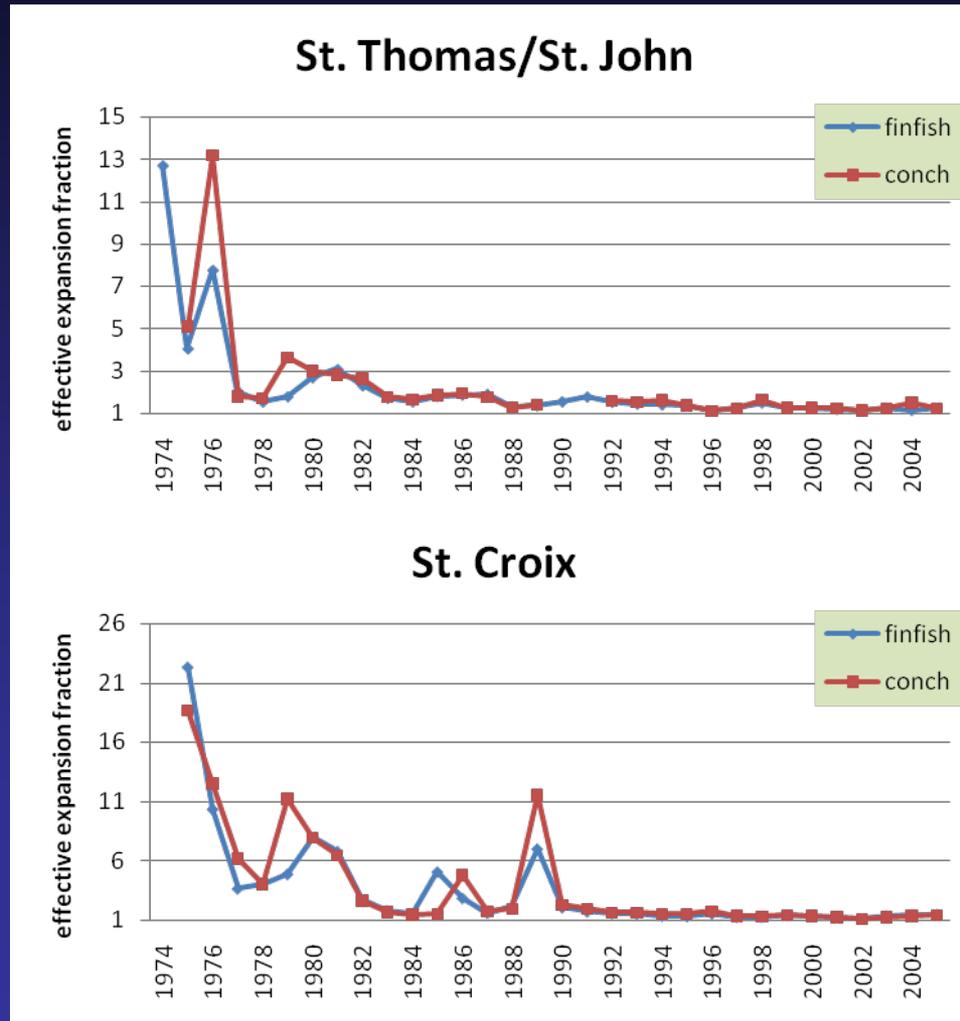


Figure 2. Percentage of Virgin Island license holders who reported landings.

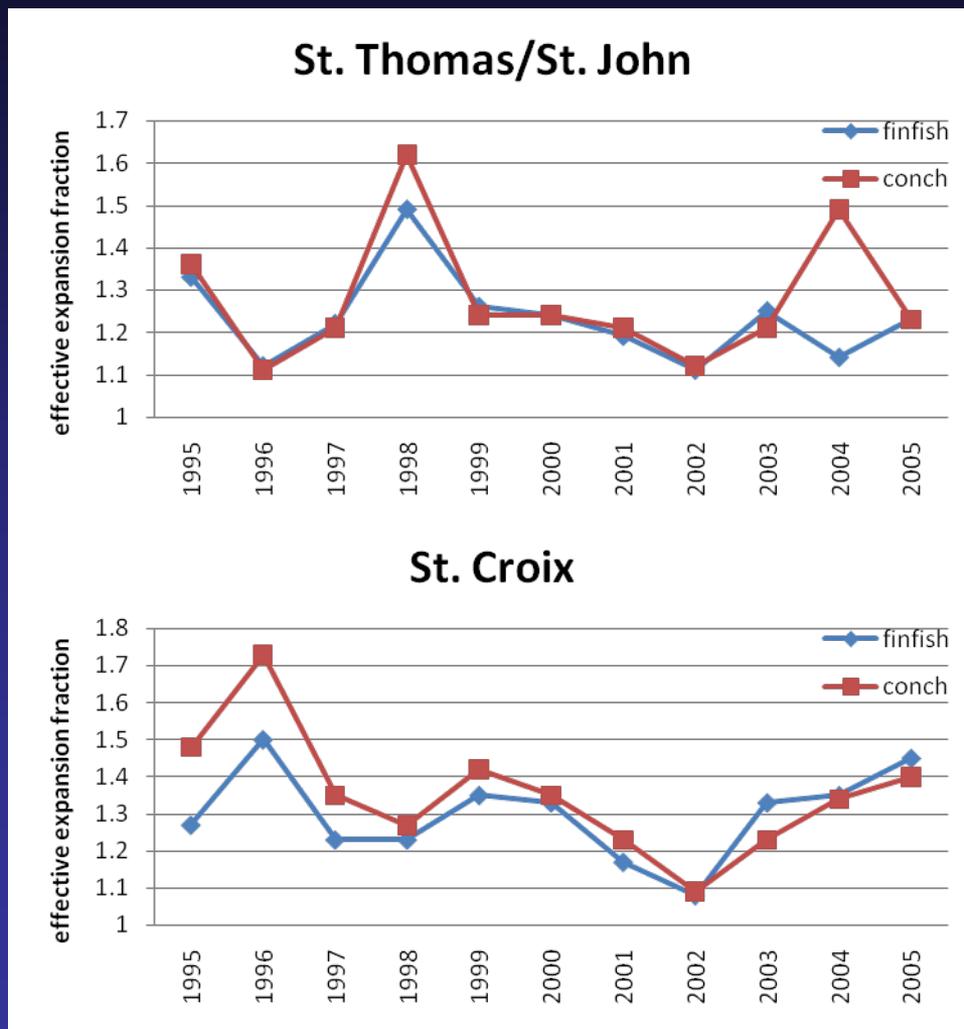
Percentage of Virgin Islands commercial license holders who reported landings or no fishing by month during the 2005-06 fishing year.



# Effective Expansion Fractions for USVI landings (calculated total landings/reported landings)



# Effective Expansion Fractions for USVI landings (calculated total landings/reported landings)



← ~71%  
Reported

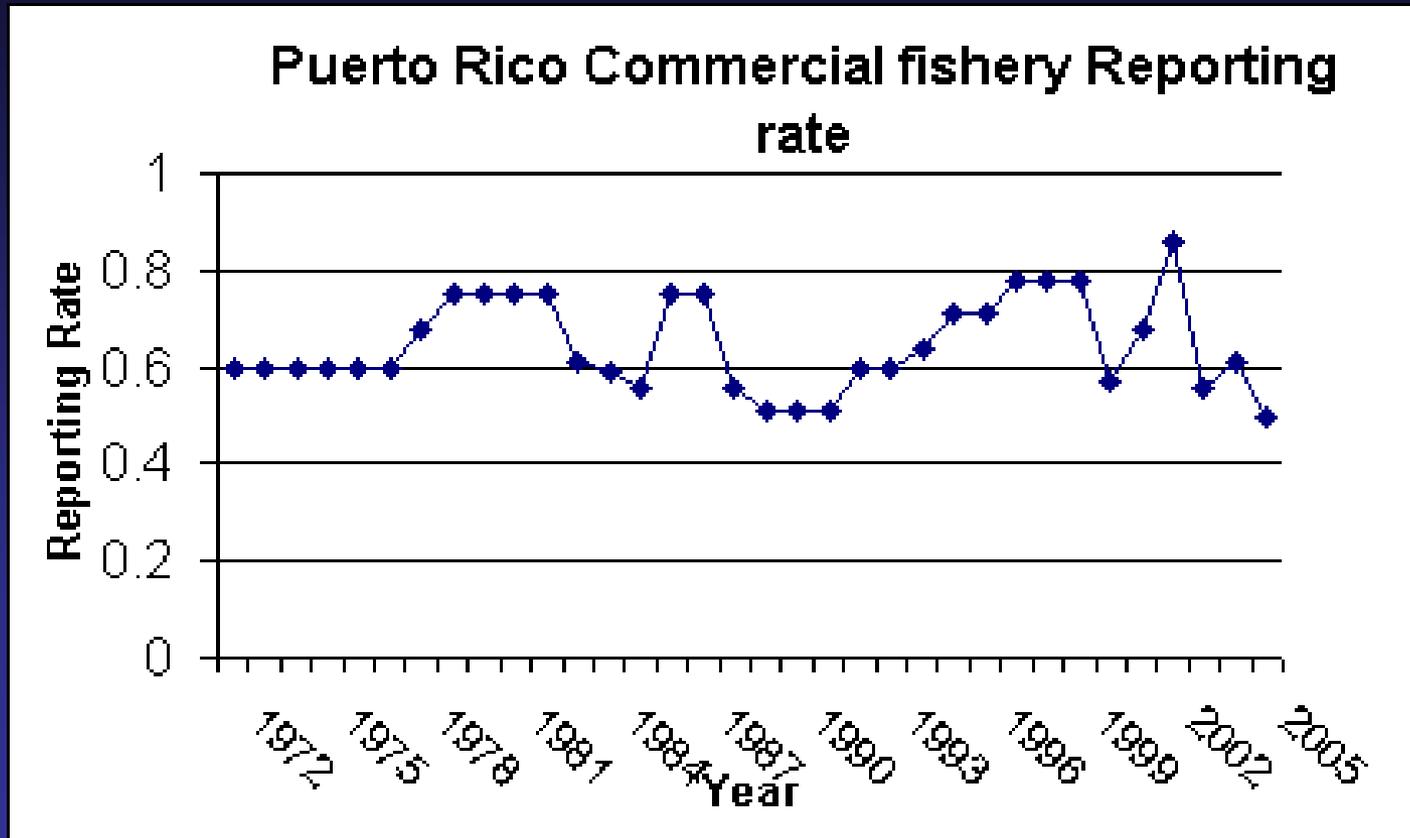
# USVI Landings Concerns

- Expansion factors can be calculated using license data and calculated reporting rate
- However, estimates of total removals difficult due to:
  - Unknown amount of unlicensed fishing
  - Unknown frequency and magnitude of misreporting (over and under reporting)
  - Unknown recreational landings
  - Unknown discard rates and mortality

# **Puerto Rico Sales Records**

- **Available Computerized Since 1983**
- **Identifies species specific landings on each sales record**
- **Not a unique 1 to 1 relation between sales records and trips (multiple trips on one ticket)**
- **Trends in Total Catch Landed affected by reporting rates**
- **Review- reporting rates of fisher sales records vary by year, area, gear**

# Puerto Rico Commercial Fishery Reporting Rates



# Puerto Rico Dominant Landings groups

- Eight Groups Account for 67 Percent of total reported landings
  - Snappers 27%
  - Tunas 9%
  - Conch 8%
  - Lobsters 8%
  - Grunts 6%
  - Parrotfishes 3%
  - Seabasses 3%
  - Dolphinfishes 3%

# Pros/Cons of Trip Ticket Data

- USVI
  1. Lower expansion factors
  2. No species specific records
  3. Some effort data exists
  4. TIP data can't be used to estimate species composition
- Puerto Rico
  1. Higher expansion factors
  2. Species specific records
  3. Questionable effort data hampers CPUE calculations for some species

# Trip Interview Program (TIP)

# **Trip Interview Program (TIP)**

- **Data collected by port samplers**
- **Provides length frequency of sampled catch**
- **In terms of characterizing catch (e.g. species composition, landings verification, or CPUE) there are two issues:**
  - 1) Very small fraction of the total landings are sampled. On the order of 1-2% in the USVI and 3-5% for PR.**
  - 2) Questions as to whether samples were complete catch samples (i.e. 100% of catch sampled for length).**

# Total Number of Measured fish in TIP Database

(by Gear)

<u>GEARCODE DESCRIPTION</u>	<u>GEARCODE</u>	<u>FREQ</u>	<u>GEAR CLASS1</u>
LINES HAND, OTHER	610	139226	HOOK AND LINE
POTS AND TRAPS, FISH	345	138689	TRAPS
TRAMMEL NETS	530	25715	TRAMMEL NETS
POTS AND TRAPS, CMB	300	15619	TRAP NETS
TROLL & HAND LINES CMB	600	10464	HOOK AND LINE
HAUL SEINES, LONG	30	10426	SEINE NETS
DIVING OUTFITS, OTHER	943	8405	DIVING BY HAND/SPEARFISHING
GILL NETS, GL 2 - 4 INCH	505	8217	GILL NETS
GILL NETS, OTHER	425	6316	GILL NETS
LINES LONG, REEF FISH	676	4635	LONG LINE
BUOY GEAR, VERTICAL	614	4243	HOOK AND LINE
REEL, ELECTRIC OR HYDRAULIC	613	3883	HOOK AND LINE
ROD AND REEL	611	2199	HOOK AND LINE
POTS AND TRAPS, SPINY LOBSTER	355	2019	TRAPS
LINES TROLL, OTHER	660	1689	HOOK AND LINE
SPEARS	760	1644	DIVING BY HAND/ SPEARFISHING
GILL NETS, GL 1 - 2 INCH	500	1461	GILL NETS
LINES LONG SET WITH HOOKS	675	931	LONG LINE
BY HAND, OTHER	955	533	DIVING BY HAND/SPEARFISHING
REEL, MANUAL	612	270	HOOK AND LINE
ENCIRCLINLING NETS (PURSE)	100	261	SEINE NETS
		235	TRAP NETS
LINES TROLL, TUNA	655	219	HOOK AND LINE
PUSH NET	725	153	OTHER NETS
HAUL SEINES, BEACH	20	139	SEINE NETS
		138	TRAPS
POTS AND TRAPS, BOX TRAP	380	118	TRAPS
CAST NETS	735	105	CAST NETS
ENTANGLING NETS (GILL) UNSPC	400	97	GILL NETS
HOOKS, SPONGE	925	72	OTHER GEAR
		60	HOOK AND LINE
GILL NETS, DRIFT LARGE PELAGIC	520	53	GILL NETS
POTS AND TRAPS, LOBSTER INSHOR	350	48	TRAPS
POTS AND TRAPS, CRAB, BLUE	330	38	TRAPS

# Total Number of Measured fish in TIP Database

(St. Thomas/St. John - by Gear)

GEARCODE_DESCRIPTION	GEARCODESP	_FREQ_	GEAR_CLASS1	Cum. %	% of Totals
POTS AND TRAPS, FISH	345	9141	TRAPS	58.86%	58.86%
LINES HAND, OTHER	610	2339	HOOK AND LINE	15.06%	73.92%
POTS AND TRAPS, CMB	300	944	TRAP NETS	6.08%	79.99%
TROLL & HAND LINES CMB	600	754	HOOK AND LINE	4.85%	84.85%
LINES TROLL, OTHER	660	599	HOOK AND LINE	3.86%	88.71%
POTS AND TRAPS, SPINY LOBSTER	355	369	TRAPS	2.38%	91.08%
LINES LONG, REEF FISH	676	333	LONG LINE	2.14%	93.23%
ENCIRCLINLING NETS (PURSE)	100	260	SEINE NETS	1.67%	94.90%
HAUL SEINES, LONG	30	189	SEINE NETS	1.22%	96.12%
PUSH NET	725	153	OTHER NETS	0.99%	97.10%
		138	TRAPS	0.89%	97.99%
POTS AND TRAPS, BOX TRAP	380	118	TRAPS	0.76%	98.75%
HOOKS, SPONGE	925	72	OTHER GEAR	0.46%	99.21%
ENTANGLING NETS (GILL) UNSPC	400	47	GILL NETS	0.30%	99.52%
LINES LONG SET WITH HOOKS	675	42	LONG LINE	0.27%	99.79%
GILL NETS, OTHER	425	19	GILL NETS	0.12%	99.91%
LINES LONG DRIFT WITH HOOKS	678	5	LONG LINE	0.03%	99.94%
SPEARS	760	4	DIVING BY HAND OR SPEARFISHING	0.03%	99.97%
HOOKS, OTHER	935	3	OTHER GEAR	0.02%	99.99%
		1	DIVING BY HAND OR SPEARFISHING	0.01%	99.99%
PURSE SEINES, OTHER	145	1	SEINE NETS	0.01%	100.00%

# Total Number of Measured fish in TIP Database

(St. Croix - by Gear)

GEARCODE DESCRIPTION	GEARCODESP	ST. CROIX		Cum. %	% of Total
		_FREQ_	GEAR_CLASS1		
POTS AND TRAPS, FISH	345	70713	TRAPS	57.8%	57.8%
LINES HAND, OTHER	610	12354	HOOK AND LINE	67.9%	10.1%
POTS AND TRAPS, CMB	300	12329	TRAP NETS	78.0%	10.1%
GILL NETS, GL 2 - 4 INCH	505	8210	GILL NETS	84.7%	6.7%
BUOY GEAR, VERTICAL	614	4218	HOOK AND LINE	88.1%	3.4%
REEL, ELECTRIC OR HYDRAULIC	613	3882	HOOK AND LINE	91.3%	3.2%
TRAMMEL NETS	530	2814	TRAMMEL NETS	93.6%	2.3%
DIVING OUTFITS, OTHER	943	2143	DIVING BY HAND OR SPEARFISHING	95.3%	1.8%
SPEARS	760	1555	DIVING BY HAND OR SPEARFISHING	96.6%	1.3%
GILL NETS, GL 1 - 2 INCH	500	1461	GILL NETS	97.8%	1.2%
ROD AND REEL	611	1043	HOOK AND LINE	98.7%	0.9%
LINES LONG, REEF FISH	676	566	LONG LINE	99.1%	0.5%
TROLL & HAND LINES CMB	600	526	HOOK AND LINE	99.5%	0.4%
GILL NETS, OTHER	425	257	GILL NETS	99.8%	0.2%
LINES TROLL, TUNA	655	218	HOOK AND LINE	99.9%	0.2%
ROD AND REEL, ELECTRIC (HAND)	616	30	HOOK AND LINE	100.0%	0.0%
FYKE AND HOOP NETS, FISH	310	25	TRAP NETS	100.0%	0.0%
POTS AND TRAPS, LOBSTER INSHOF	350	9	TRAPS	100.0%	0.0%
LINES TROLL, OTHER	660	8	HOOK AND LINE	100.0%	0.0%
LINES POWER TROLL OTHER	661	5	HOOK AND LINE	100.0%	0.0%
HAUL SEINES, LONG	30	2	SEINE NETS	100.0%	0.0%

Data through SEDAR Caribbean Data Evaluation Workshop 1/2009

# Total Number of Measured fish in TIP Database

## (Puerto Rico - by Gear)

Data through SEDAR Caribbean Data Evaluation Workshop 1/2009

GEARCODE_DESCRIPTION	PUERTO RICO		Cum. %	% of Total
	GEARCODESP	_FREQ_ GEAR_CLASS1		
LINES HAND, OTHER	610	124533 HOOK AND LINE	49.8%	49.8%
POTS AND TRAPS, FISH	345	58606 TRAPS	73.2%	23.4%
TRAMMEL NETS	530	22901 TRAMMEL NETS	82.3%	9.2%
HAUL SEINES, LONG	30	10235 SEINE NETS	86.4%	4.1%
TROLL & HAND LINES CMB	600	9076 HOOK AND LINE	90.0%	3.6%
DIVING OUTFITS, OTHER	943	6262 DIVING BY HAND OR SPEARFISHING	92.5%	2.5%
GILL NETS, OTHER	425	6040 GILL NETS	95.0%	2.4%
LINES LONG, REEF FISH	676	3736 LONG LINE	96.5%	1.5%
POTS AND TRAPS, CMB	300	2346 TRAP NETS	97.4%	0.9%
POTS AND TRAPS, SPINY LOBSTER	355	1650 TRAPS	98.0%	0.7%
ROD AND REEL	611	1156 HOOK AND LINE	98.5%	0.5%
LINES TROLL, OTHER	660	1082 HOOK AND LINE	98.9%	0.4%
LINES LONG SET WITH HOOKS	675	889 LONG LINE	99.3%	0.4%
BY HAND, OTHER	955	533 DIVING BY HAND OR SPEARFISHING	99.5%	0.2%
REEL, MANUAL	612	270 HOOK AND LINE	99.6%	0.1%
		235 TRAP NETS	99.7%	0.1%
HAUL SEINES, BEACH	20	139 SEINE NETS	99.8%	0.1%
CAST NETS	735	105 CAST NETS	99.8%	0.0%
SPEARS	760	85 DIVING BY HAND OR SPEARFISHING	99.8%	0.0%
		60 HOOK AND LINE	99.9%	0.0%
GILL NETS, DRIFT LARGE PELAGIC	520	53 GILL NETS	99.9%	0.0%
ENTANGLING NETS (GILL) UNSPC	400	50 GILL NETS	99.9%	0.0%
POTS AND TRAPS, LOBSTER INSHOR	350	39 TRAPS	99.9%	0.0%
POTS AND TRAPS, CRAB, BLUE	330	38 TRAPS	99.9%	0.0%
LINES TROLL, MACKEREL	665	37 HOOK AND LINE	100.0%	0.0%
SCOTTISH SEINE	240	35 TRAP NETS	100.0%	0.0%
BUOY GEAR, VERTICAL	614	25 HOOK AND LINE	100.0%	0.0%
POTS AND TRAPS, EEL	340	24 TRAPS	100.0%	0.0%
POTS AND TRAPS, PERWKLE OR CKL	365	16 TRAPS	100.0%	0.0%
GILL NETS, GL 2 - 4 INCH	505	7 GILL NETS	100.0%	0.0%
HOOKS, OTHER	935	4 OTHER GEAR	100.0%	0.0%
REEL, ELECTRIC OR HYDRAULIC	613	1 HOOK AND LINE	100.0%	0.0%
LINES TROLL, TUNA	655	1 HOOK AND LINE	100.0%	0.0%

# Number of measured fish summed across all years and gears for St. Thomas/St. John.

Data through SEDAR Caribbean Data Evaluation Workshop 1/2009

COMMON NAME	TOTAL NUMBER OF MEASURED FISH
CARIBBEAN SPINY LOBSTER	7863
QUEEN TRIGGERFISH	5197
YELLOWTAIL SNAPPER	4848
RED HIND	3535
BLUE TANG	2259
WHITE GRUNT	1819
CONEY	1306
REDTAIL PARROTFISH	1293
BLUE RUNNER	1134
DOCTORFISH	1073
BLACKFIN SNAPPER	1017
PORGIES, CALAMUS	1016
GRAY ANGELFISH	1010
BAR JACK	943
STOPLIGHT PARROTFISH	940
LANE SNAPPER	936
BLUESTRIPED GRUNT	708
SQUIRRELFISHES	696
OCEAN SURGEON	553
SQUIRRELFISH	514
HONEYCOMB COWFISH	511
YELLOWFIN GROUPER	476
SPINY LOBSTERS, PALINURIDAE	374
SILK SNAPPER	355
ALMACO JACK	341
TANGS, ACANTHURIDAE	341
FRENCH ANGELFISH	336
SCUPS OR PORGIES, SPARIDAE	334
VERMILION SNAPPER	330
MUTTON SNAPPER	326

# Number of measured fish summed across all years and gears for St. Croix.

Data through SEDAR Caribbean Data Evaluation Workshop 1/2009

COMMON NAME	TOTAL NUMBER MEASURED FISH
REDTAIL PARROTFISH	37265
BLUE TANG	32547
STOPLIGHT PARROTFISH	26374
WHITE GRUNT	21570
CARIBBEAN SPINY LOBSTER	17124
CONEY	11515
DOCTORFISH	10900
QUEEN TRIGGERFISH	8394
HONEYCOMB COWFISH	8366
REDBAND PARROTFISH	8042
RED HIND	7267
YELLOWTAIL SNAPPER	6363
FRENCH GRUNT	5338
OCEAN SURGEON	4815
YELLOW GOATFISH	4230
QUEEN SNAPPER	4167
BLACKFIN SNAPPER	3946
LONGSPINE SQUIRRELFISH	3639
PRINCESS PARROTFISH	3578
SILK SNAPPER	3045
CARDINAL SNAPPER	2809
REDFIN PARROTFISH	2520
SCHOOLMASTER	2054
PARROTFISHES, SCARIDAE	1981
CAESAR GRUNT	1967
ORANGESPOTTED FILEFISH	1768
SPINY LOBSTERS	1700
GOAT FISHES, MULLIDAE	1592
WENCHMAN	1587
BIGEYE SCAD	1569
BAR JACK	1370
SMOOTH TRUNKFISH	1133
BLUESTRIPED GRUNT	1018

# Puerto Rico TIP Length Samples

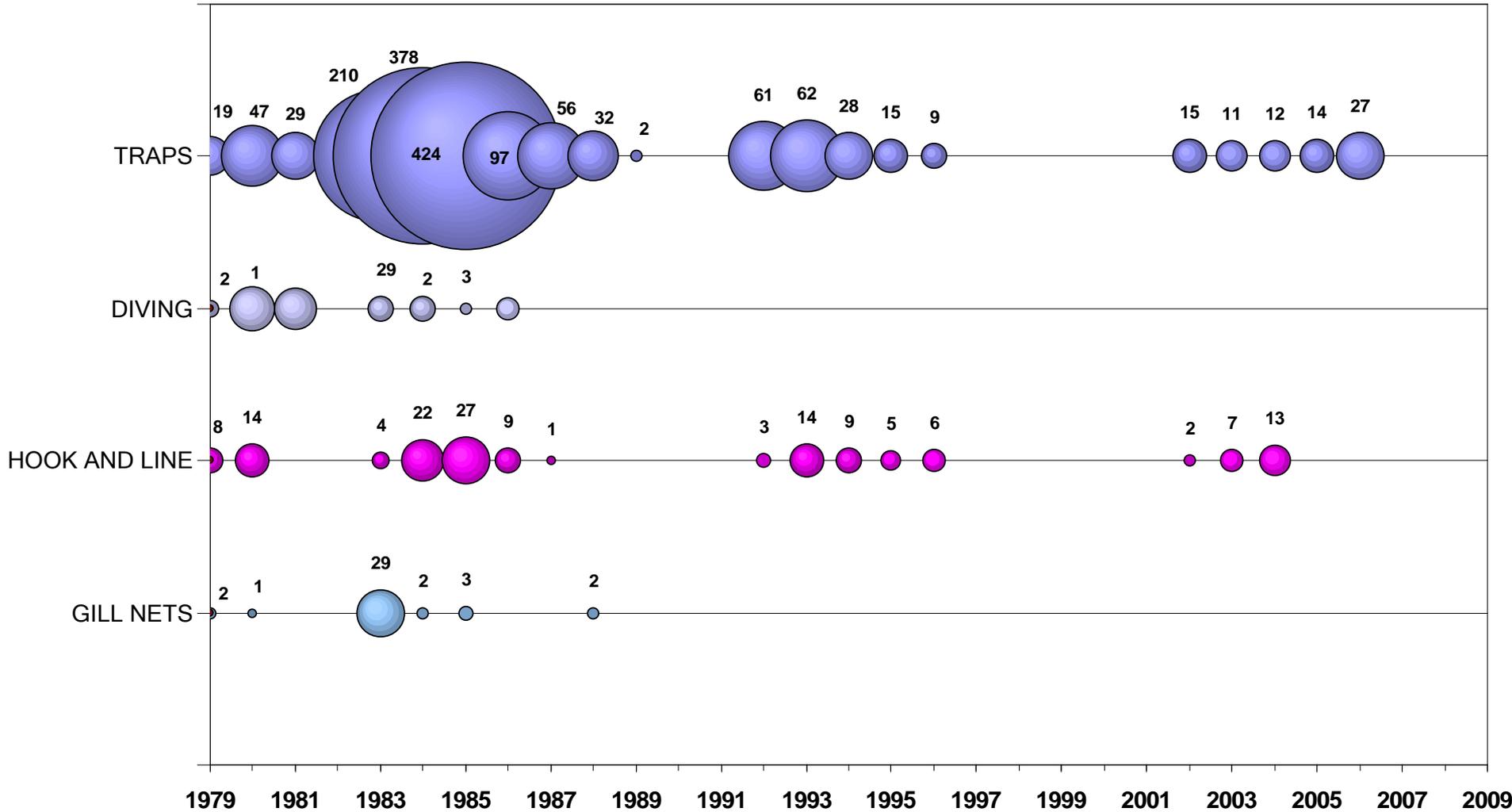
YELLOWTAIL SNAPPER	51140
WHITE GRUNT	48982
LANE SNAPPER	30020
CARIBBEAN SPINY LOBSTER	24738
RED HIND	21382
<b>SILK SNAPPER</b>	<b>21120</b>
CONEY	17245
STOPLIGHT PARROTFISH	14885
SPOTTED GOATFISH	13124
<b>REDTAIL PARROTFISH</b>	<b>12527</b>
PORGY	8993
VERMILION SNAPPER	8116
BLUESTRIPED GRUNT	7566
QUEEN TRIGGERFISH	6815
BAR JACK	6601
KING MACKEREL	5516
<b>QUEEN SNAPPER</b>	<b>4412</b>
CERO MACKEREL	4348
JOLTHEAD PORGY	4039
SCUPS OR PORGIES	3656
SCRAWLED COWFISH	3512
HOGFISH	3450
YELLOW GOATFISH	3226

Data through  
SEDAR Caribbean  
Data Evaluation  
Workshop 1/2009

# St. Thomas/St. John

## Total number of trip records by gear type

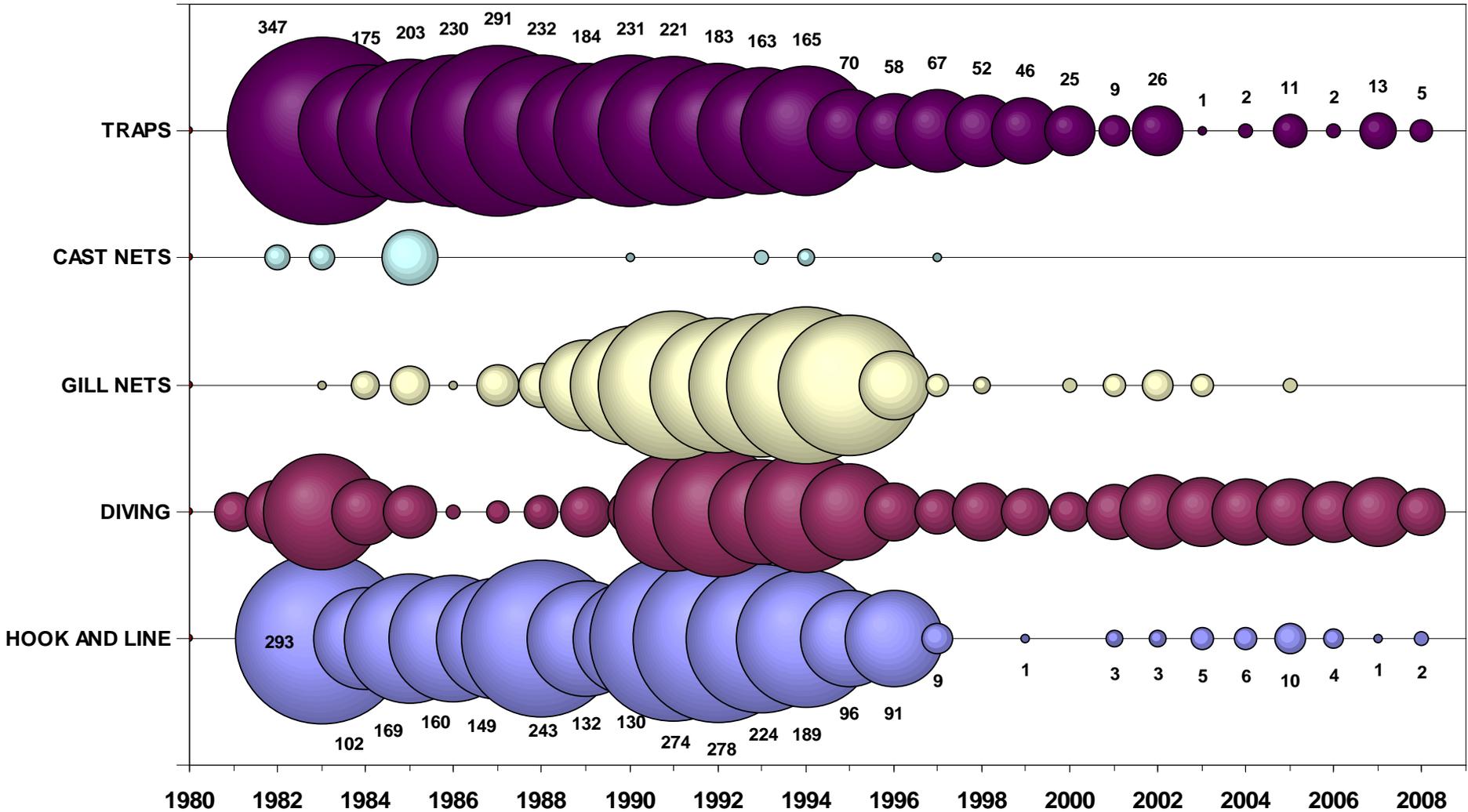
Total Number of trip records by primary gear types--St. Thomas/St. John



# St. Croix

## Total number of trip records by gear type

Total number of trip records by primary gear types--St. Croix



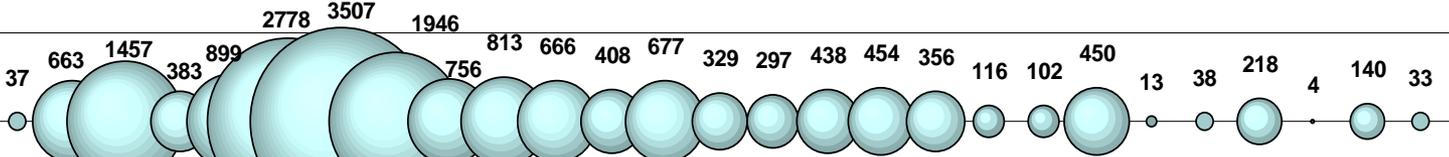
# USVI--Total number of measured fish

Total Number of Fish Measured by Gear Type

St. Croix Trap sample numbers (only) have been divided by 10 so 3507 represents 35074

## ST. CROIX

TRAPS (x 10)



HOOK AND LINE

GILL NETS

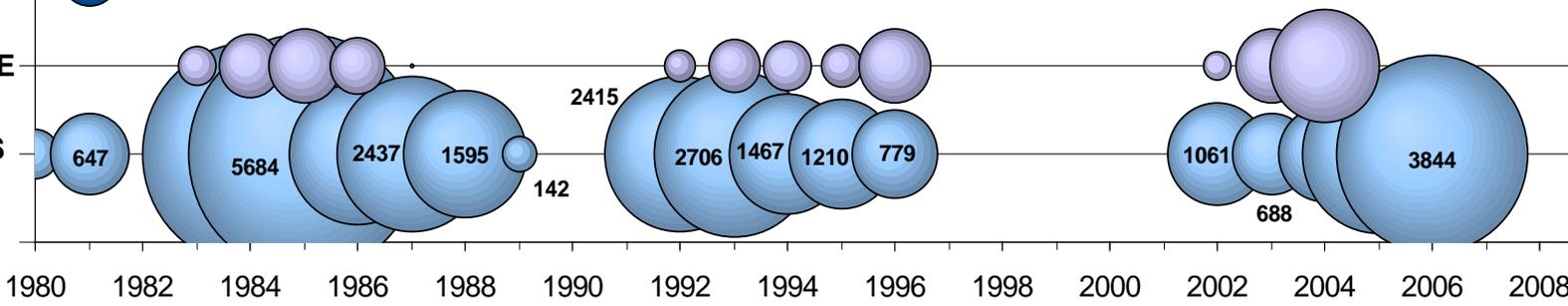
DIVING

## ST. THOMAS/ ST. JOHN

DIVING

HOOK AND LINE

TRAPS



# Top 10 Species measured in TIP data

## St. Thomas/St. John

Lobster  
Queen Triggerfish  
Yellowtail Snapper  
Red Hind  
Blue Tang  
White Grunt  
Coney  
**Redtail Parrotfish**  
Blue Runner  
Doctorfish

## St. Croix

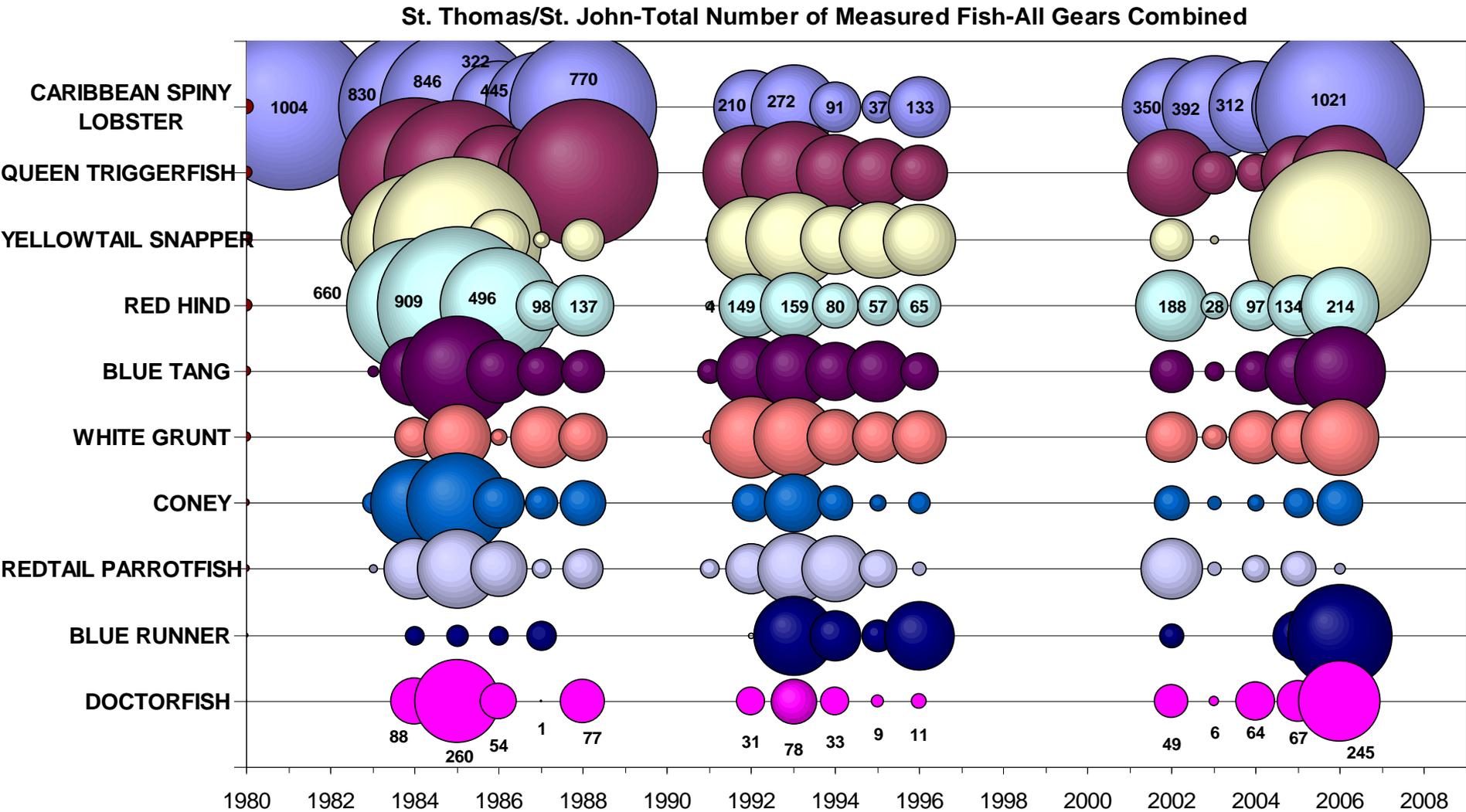
**Redtail Parrotfish**  
Blue Tang  
Stoplight Parrotfish  
White Grunt  
Lobster  
Coney  
Doctorfish  
Queen Triggerfish  
Honeycomb Cowfish  
Redband Parrotfish

## Puerto Rico

Yellowtail Snapper  
White Grunt  
Lane Snapper  
Lobster  
Red Hind  
**Silk Snapper**  
Coney  
Stoplight Parrotfish  
Spotted Goatfish  
**Redtail Parrotfish**

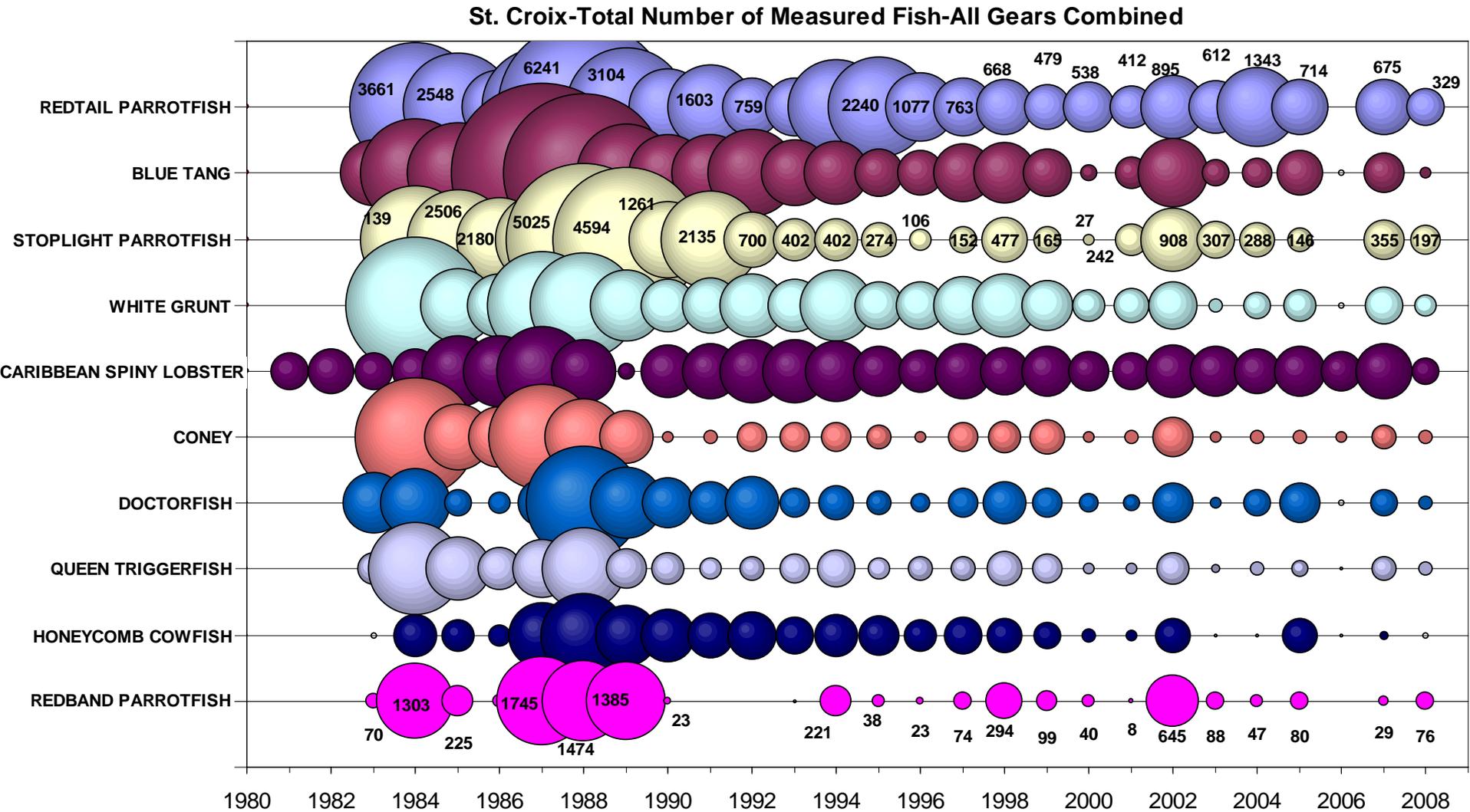
# St. Thomas/St. John --Top Ten Species

## Total number of measured fish--all gears combined



# St. Croix-Top Ten Species

## Total number of measured fish-all gears combined



# **Select Puerto Rico Sample Sizes Provided in Species-specific Presentations**

(spatial analysis/priority FMP units)

## Conclusions of Caribbean Data Evaluation Workshop (2009)

“In summary, the group suggests that, in the absence of adequate index data, the following is tried:

- If stock has adequate length and catch data
  - Estimate total mortality ( $Z$ )
  - Compute recent fishing mortality rate by subtracting out an assumed natural mortality rate ( $F = Z - M$ ).
  - Select a proxy for  $F_{MSY}$  such as the natural mortality rate or the fishing mortality rate associated with a given spawning potential ratio
  - Set  $OFL = F_{MSY}^* (\text{recent average catch}) / F$
- Note that the mean-length method also requires reliable estimates of the von Bertalanffy growth parameters and species-specific availability, which was not thoroughly evaluated at this meeting”

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- Note that the mean-length method also requires reliable estimates of the von Bertalanffy growth parameters and species-specific availability, which was not thoroughly evaluated at this meeting

## • Otherwise, if stock has adequate catch data, then use informed judgment

1) if consensus can be reached on a proxy for  $F_{MSY}$  and the level of depletion relative to unfished levels,  $d = (B_{\text{first}} - B_{\text{last}}) / B_0$ , then set  $OFL = (\text{average catch}) / (n + d / (0.4 * F_{MSY}))$

2) if consensus can be reached on a vulnerability scalar from a PSA analysis, then set  $OFL = (\text{average catch}) * \text{vulnerability scalar}$

3) if no consensus can be reached, adopt protocol of PFMC, i.e.,  $OFL = \text{average catch}$  and  $ABC = 0.5 * (\text{average catch})$ .”

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  - 2) if consensus can be reached on a vulnerability scalar from a PSA analysis, then set  $OFL = (\text{average catch}) * \text{vulnerability scalar}$
  - 3) if no consensus can be reached, adopt protocol of PFMC, i.e.,  $OFL = \text{average catch}$  and  $ABC = 0.5 * (\text{average catch})$ .
- Otherwise, if no reliable catch data exist, develop rationale for alternative management measures that do not conform to the framework established in the NS1 guidelines.”

## Conclusions of Caribbean Data Evaluation Workshop (see below definitions for next three slides)

- Summary rating of the quality of commercial, recreational and fishery independent data available for species listed in the Caribbean Fishery Management Council's fishery management plans.
- The labels 'BENCH' or 'OFL' indicate the data may be sufficient to warrant either a full SEDAR benchmark assessment or OFL advice, respectively (it is assumed a benchmark assessment would also render OFL advice).
- The numerical rating scale is: (5) reliable data for more than 10 years; (4) reliable data for recent years; (3) data for more than 10 years, but reliability, comprehensiveness or coverage is questionable; (2) data for recent years, but reliability, comprehensiveness or coverage is questionable; (1) scattered or occasional observations, reliability questioned; (0) data unavailable or unreliable.

# Conclusions of Caribbean Data Evaluation Workshop

St. Thomas/St. John FMP unit (species)	Commercial			Recreational	Fishery independent		Advice potential
	Catch	length	CPUE	length	index	length	
<b>Snapper Unit 1</b>							
Black snapper	0	0	0	1?	0	0	
Blackfin snapper	0	2	0	1?	0	0	
<b>Silk snapper</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>1?</b>	<b>0</b>	<b>0</b>	
Vermillion snapper	0	2	0	1?	0	0	
<b>Grouper Unit 4</b>							
Tiger grouper	0	1	0	1?	1	1	
Yellowfin grouper	0	2	0	1?	2	2	
Yellowedge grouper	0	0	0	1?	0	0	
Misty grouper	0	1	0	1?	0	0	
Red grouper	0	1	0	1?	0	0	
<b>Parrotfish</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1?</b>	<b>3</b>	<b>3</b>	<b>BENCH</b>
Queen Conch	3	0	0	1?	3	3	
Grouper	0	1	0	1?	3	3	
Goliath grouper	0	0	0	1?	0	0	
Spiny lobster	3	3	3	1?	1	1	OFL
<b>Snapper Unit 2</b>							
<b>Queen snapper</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>1?</b>	<b>1</b>	<b>1</b>	
Wenchman snapper	0	1	0	1?	1	1	

# Conclusions of Caribbean Data Evaluation Workshop

<b>St. Croix</b>	Commercial			Recreational	Fishery independent		Advice potential
FMP unit (species)	Catch	Length	CPUE	length	index	length	
<b>Snapper Unit 1</b>							
Black snapper	0	1	0	1?	0	0	
Blackfin snapper	0	3	0	1?	1	1	
<b>Silk snapper</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>1?</b>	<b>0</b>	<b>0</b>	
Vermillion snapper	0	2	0	1?	0	0	
<b>Grouper Unit 4</b>							
Tiger grouper	0	1	0	0	1	1	
Yellowfin grouper	0	1	0	0	2	2	
Yellowedge grouper	0	0	0	0	0	0	
Misty grouper	0	1	0	0	0	0	
Red grouper	0	0	0	0	0	0	
<b>Parrotfish</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1?</b>	<b>3</b>	<b>3</b>	<b>BENCH</b>
Queen Conch	3	0	0	1?	3	3	
Grouper	0	1	0	0	3	1	
Goliath grouper	0	0	0	0	0	0	
Spiny lobster	3	3	3	1?	1	1	OFL
<b>Snapper Unit 2</b>							
<b>Queen snapper</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>1?</b>	<b>1</b>	<b>1</b>	
Wenchman snapper	0	2	0	1?	0	0	

# Conclusions of Caribbean Data Evaluation Workshop

Puerto Rico FMP unit (species)	Commercial			Recreational	Fishery independent		Advice potential
	Catch	length	CPUE	length	index	length	
<b>Snapper Unit 1</b>							
Black snapper	3	1	0	2	0	0	
Blackfin snapper	3	2	1	2	1	1	
<b>Silk snapper</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>3</b>	<b>BENCH</b>
Vermillion snapper	3	3	1	2	1	1	OFL
<b>Grouper Unit 4</b>							
Tiger grouper	1	2	0	2	1	1	
Yellowfin grouper	3	1	1	2	2	2	
Yellowedge grouper	0	0	0	2	0	0	
Misty grouper	3	2	1	2	0	0	
Red grouper	0	1	0	2	0	0	
<b>Parrotfish</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>BENCH</b>
Queen Conch	3	0	0	2	3	3	OFL
Grouper	3	2	1	2	1	1	
Goliath grouper	0	1	0	2	0	0	
Spiny lobster	3	3	3	2	1	1	OFL
<b>Snapper Unit 2</b>							
<b>Queen snapper</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>BENCH</b>
W... ..	1	0	1	0	0	0	

# US Caribbean Commercial Data Improvement Project

# Background

- Developed out of need for improved data for stock assessment evaluations and management
- Initiated after SEDAR Data Evaluation Workshop (SEDAR Procedures III)
- May 2009 – May 2010

# Who

- Collaborative effort between:
  - Territory and Commonwealth scientists, managers (USVI, DPNR-DFW; Puerto Rico DNER)
  - Federal Scientists and Managers (SEFSC, SERO)
  - Councils (CFMC)
  - Fisher Groups (STFA, SCCA)
- Planning Efforts Supported by SEFSC and CFMC

# Primary Products

- Revised Catch Forms
  - Improved Species Composition
  - Improved effort statistics
- Increased spatial information relating to catch location
  - 2.5 minute x 2.5 minute catch grid maps

# Puerto Rico Revised Trip Ticket



Estado Libre Asociado de Puerto Rico  
 DEPARTAMENTO DE RECURSOS NATURALES Y AMBIENTALES  
**ACTIVIDADES DE PESQUERAS**  
 P.O. Box 100681  
 San Juan, P.R. 00981  
 Tel: (787-833-2410) Fax (787-833-2410)  
 Email: drna@gobierno.pr  
**FORMULARIO DE LICENCIAS DE PESQUERAS**  
**BOLETO POR VIAJE**

Fecha del desembarco

\_\_\_\_/\_\_\_\_/\_\_\_\_  
 Mes Día Año

Pesca:  Diurna   
 Nocturna

Reportado por:  Pescadería   
 Pescador

Número de Ticket (uso oficial)

\_\_\_\_\_

Municipio de desembarco \_\_\_\_\_

Centro de desembarco \_\_\_\_\_

Nombre del pescador \_\_\_\_\_

Número de licencia ( 1 ) \_\_\_\_\_

Nombre del pescador ( 2 ) \_\_\_\_\_

Número de licencia ( 2 ) \_\_\_\_\_

Nombre del pescador ( 3 ) \_\_\_\_\_

Número de licencia ( 3 ) \_\_\_\_\_

Número de teléfono \_\_\_\_\_

Profundidad donde ocurrió la mayor captura \_\_\_\_\_ (brasas).

Registro de embarcación \_\_\_\_\_

Área de captura \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ (puede ser más de un área).

Número Permiso si aplica: HMS \_\_\_\_\_

Carrucho \_\_\_\_\_

Langosta \_\_\_\_\_

Pesca capturada a una distancia de la costa:

Mayor \_\_\_\_\_ ( 9 millas )

Menor o igual a \_\_\_\_\_ ( 9 millas )

NÚMERO DÍAS TRANSCURRIDOS DESDE LA ANTERIOR VIAJE \_\_\_\_\_

UN AGENTE PESQUERO TOMÓ DATOS DE BIOESTADÍSTICAS DE ESTE DESEMBARCO: SÍ \_\_\_\_\_

¿ESTO FUE VIAJE "DE AQUILER"? SÍ \_\_\_\_\_

Si usa nasas o cajones, indique cuantos días estaban sumergidas \_\_\_\_\_

CLASE DE PESCADO	PE SO	PRE CIO POR LIB RA	AR TE	HORA S PES CANDO	CANT IDAD O TAMA ÑO DE ARTE	CLASE DE PESCADO	PE SO	PRE CIO POR LIBR A	AR TE	HORA S PES CANDO	CANT IDAD O TAMA ÑO DE ARTE
PELAGICO						PARGOS Y MEROS DE AGUAS PROFUNDAS					
(226) ATUN ALETA AMARILLA (Yellowfin)						(142) BESUGO (Vermilion Snapper)					
(229) BACORA (Skipjack tuna)						(143) CARTUCHO (Queen Snapper)					
(228) BONITO (Blackfin tuna)						(139) CHILLO (Silk Snapper)					
(230) VACA (Little tunny)						(144) MUNIAMA DE AFUERA (Cardinal Snapper)					
(720) PATUDO (Bigeye tuna)						(141) CHOPA NEGRA (Black Snapper)					
(227) ATUN BLANCO (Albacore)						(138) NEGRA O ALINEGRA (Blackfin Snapper)					
(225) ATUNES (Familia)						(760) MERO GUAJIL DEL HONDO (Yellowedge grouper)					



# St. Croix Revised Trip Ticket

## 2011 - 2012 USVI COMMERCIAL CATCH REPORT FORM - ST. CROIX

A SEPARATE FORM MUST BE COMPLETED FOR EACH TRIP OR MONTH OF NO FISHING

version Date: 07/11  
USE BLACK INK ONLY

LAST NAME : \_\_\_\_\_  
FIRST NAME : \_\_\_\_\_  
Vessel # : \_\_\_\_\_  
License # : \_\_\_\_\_ # of \_\_\_\_\_  
HMS Species \_\_\_\_\_  
Permit # : \_\_\_\_\_  
Did other Permit Holders Split Catch:  No  Yes  
Partner #1 \_\_\_\_\_ License # : \_\_\_\_\_ Name (last,first): \_\_\_\_\_  
Partner #2 \_\_\_\_\_ License # : \_\_\_\_\_ Name (last,first): \_\_\_\_\_

LANDED DATE: \_\_\_\_\_  
OR  
DID NOT FISH FOR MONTH OF: \_\_\_\_\_

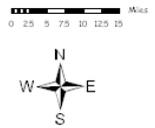
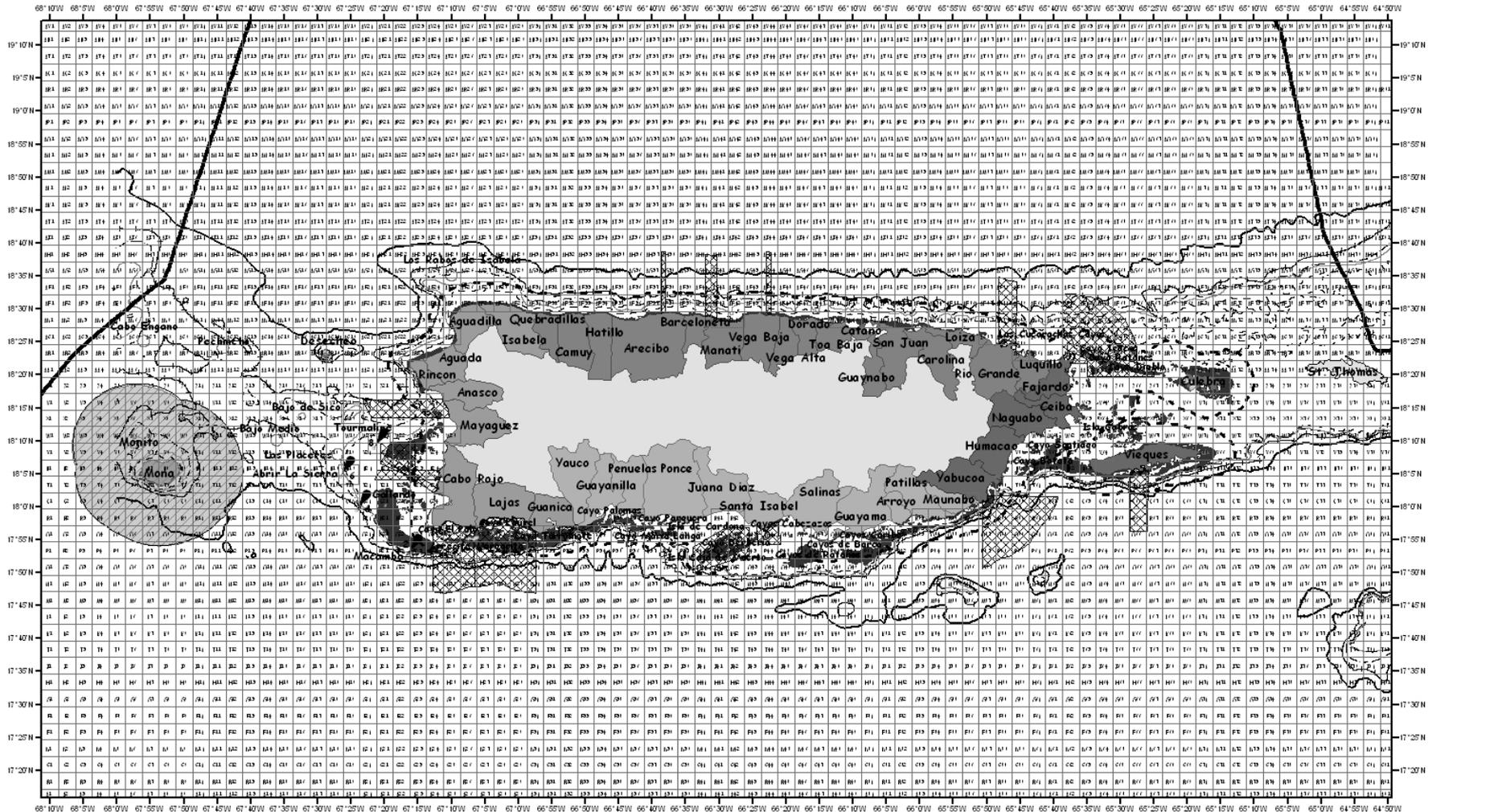
Trip Ticket # \_\_\_\_\_  
DFW USE ONLY  
Total Trip Pounds: \_\_\_\_\_  
Total # Traps in Water: \_\_\_\_\_  
Trip Landing Site: \_\_\_\_\_ (Town/Estate)  
Trip Port Sampled:  No  Yes  
Fishing Mainly at Night:  No  Yes  
Paying Customers Aboard:  No  Yes  
Fished 3 or more miles from Shore:  No  Yes

HOOK & LINE / ROD & REEL			LOBSTER TRAP			FISH TRAPS			NETS			SPEAR or BY HAND		
Hand <input type="radio"/> Powerband <input type="radio"/> Buoy <input type="radio"/>	# of Hauls _____	# of Traps _____	# of Hauls _____	# of Traps _____	Surface Gill <input type="radio"/> Seine <input type="radio"/> Cast <input type="radio"/>	Scuba <input type="radio"/> Free Diving <input type="radio"/>	FAD fished name _____	Days Soaked _____	Days Soaked _____	Length (yds) _____	Mesh (in) _____	# Divers _____	Hours Diving _____	Hours Diving _____
Hours Fished _____	Hours Soaked _____	Hours Soaked _____	Hours Fished _____	Hours Soaked _____	Feet _____	Area 1 Fished _____	Area 1 Fished _____	Area 1 Fished _____	Area 1 Fished _____	Area 1 Fished _____	Area 1 Fished _____	Area 1 Fished _____	Area 1 Fished _____	
Bottom Depth _____	Bottom Depth _____	Bottom Depth _____	Bottom Depth _____	Bottom Depth _____	Area 2 Fished _____	Area 2 Fished _____	Area 2 Fished _____	Area 2 Fished _____	Area 2 Fished _____	Area 2 Fished _____	Area 2 Fished _____	Area 2 Fished _____	Area 2 Fished _____	
Fathoms _____	Fathoms _____	Fathoms _____	Fathoms _____	Fathoms _____	Area 3 Fished _____	Area 3 Fished _____	Area 3 Fished _____	Area 3 Fished _____	Area 3 Fished _____	Area 3 Fished _____	Area 3 Fished _____	Area 3 Fished _____	Area 3 Fished _____	
Feet _____	Feet _____	Feet _____	Feet _____	Feet _____										

HOOK & LINE SPECIES	WHOLE POUNDS	GUTTED POUNDS	TRAP SPECIES	WHOLE POUNDS	GUTTED POUNDS	NET SPECIES	WHOLE POUNDS	GUTTED POUNDS	SPEAR OR BY HAND	WHOLE POUNDS	GUTTED POUNDS
<b>GROUPERS</b> Butterfish (Coney)			<b>LOBSTERS</b> Spiny Lobster			<b>BLUEFISH (PARROTFISHES)</b> Princess			<b>LOBSTERS &amp; MOLLUSKS</b> Spiny Lobster		
Cabilla (Red Hind)			<b>GROUPERS</b> Butterfish (Coney)			Queen			Conch		
Misty			Cabilla (Red Hind)			Redband			Whelk		
Tiger			<b>SNAPPERS</b> Blackfin			Red Belly (Stoplight)			<b>GROUPERS</b> Butterfish (Coney)		
Yellowfin			Dogtooth (Schoolmaster)			Redfin			Cabilla (Red Hind)		
<b>SNAPPERS</b> Blackfin			Lane			Redtail			Yellowfin		
Cardinal			Mahogany			<b>BAIT AND OTHERS</b> Ballyhoo			<b>SNAPPERS</b> Mangrove (Griny)		
Dogtooth (Schoolmaster)			Silk			Baywe Scad			Dogtooth (Schoolmaster)		
Lane			Vermillion			<b>JACKS</b> Barrjack			Yellowtail		
Queen			Virgin (Mutton)			<b>SURGONFISHES</b> Brown Doctor (Doctorfish)			Virgin (Mutton)		
Silk			Yellowtail			<b>GRUNTS</b> White			<b>GRUNTS</b> Bluestriped		
Vermillion			<b>GRUNTS</b> Bluestriped			Other Species			French		
Virgin (Mutton)			Ceasar			White In			Tomtate		
Wenchman			French						White		
Yellowtail			Tomtate			FISH RELEASED ALIVE			<b>PARROTFISHES</b> Princess		
<b>JACKS</b> Bar Jack			White			FISH RELEASED DEAD			Queen		
Blue Runner			<b>JACKS</b> Barrjack						Redband		
Horse Eye			Blue Runner						Red Belly (Stoplight)		
Margate			<b>SURGONFISHES</b> Blue Doctor (Blue Tang)						Redfin		
Loonfish			Brown Doctor (Doctorfish)			<b>TRAPS CONTINUED</b>					
<b>PELAGICS</b> Siganus Luna			Gizzard Doctor (Ocean Surgeon)			Trap Species Cont	WHOLE	GUTTED			
Blackfin Tuna			<b>TRIGGERFISHES</b> Ole Wile (Queen)			<b>SHELLBOX) FISHES</b> Sheepshead (Trunkfish)			<b>ANGELFISHES</b> French		
Cero Mackenel			Fiddfish			Spotted Trunkfish			Gray		
Dolphin (Mahi)			<b>BLUEFISH (PARROTFISHES)</b> Princess			Honeycomb Cowfish			Queen		
King Mackenel			Queen			Scrawled Cowfish			<b>TRIGGERFISHES</b> Ole Wile (Queen)		
Little Tunny (bonito)			Redband			<b>PORGIES</b> Jolthead			<b>SURGONFISHES</b> Blue Doctor (Blue Tang)		
Skipack Tuna			Red Belly (Stoplight)			<b>SQUIRRELISHES</b> Longspine			Gizzard Doctor (Ocean Surgeon)		
Swordfish			Redfin			<b>SHARKS</b> Nurse			<b>SQUIRRELISHES</b> Longspine		
Wahoo			<b>ANGELFISHES</b> French			<b>ELLS</b> Green Moray			Loonfish		
Yellowfin Tuna			Gray			Other Species (White In)			Other Species (White In)		
<b>Shark</b> Great Hammerhead			Queen								
Scalloped Hammerhead			Queen			FISH RELEASED ALIVE					
Tiger			Loonfish			FISH RELEASED DEAD					
Other Species (White In)			<b>GOATFISHES</b> Spotted			LOBSTER RELEASED ALIVE					
			Yellow			LOBSTER RELEASED DEAD					
FISH RELEASED ALIVE											
FISH RELEASED DEAD											

Submit these forms to the USVI - DFW offices at: (1) St. Thomas and St. John: 6291 Estate Nazareth, St. Thomas, VI 00802, Phone: (340) 775-6762, Fax: (340) 775-3972. (2) St. Croix 45 Mars Hill Complex, St. Croix, VI 00840, Phone: (340) 773-1062, Fax: (340) 772-3227

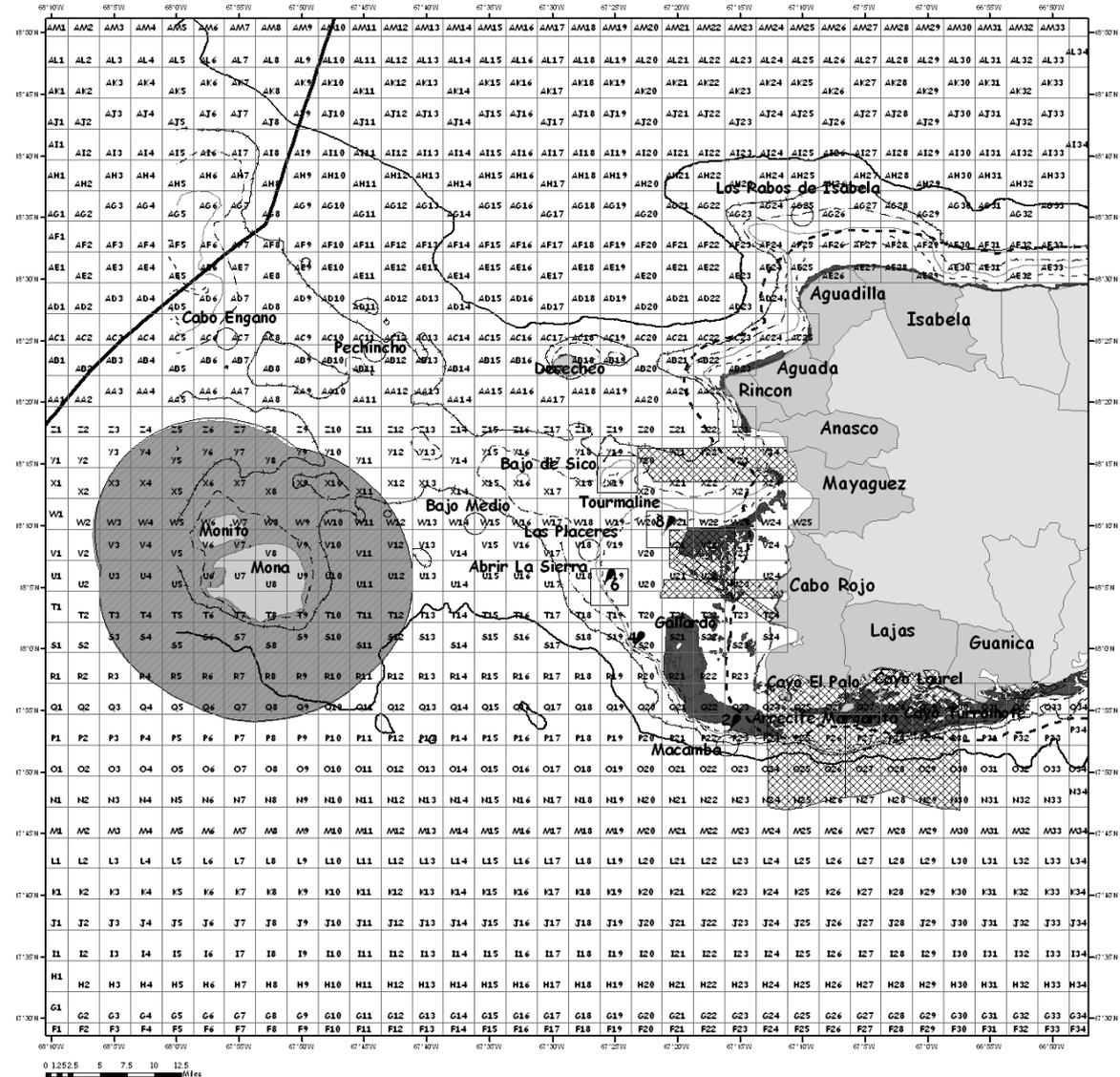
# Puerto Rico Biological Grid Map



**Legend**

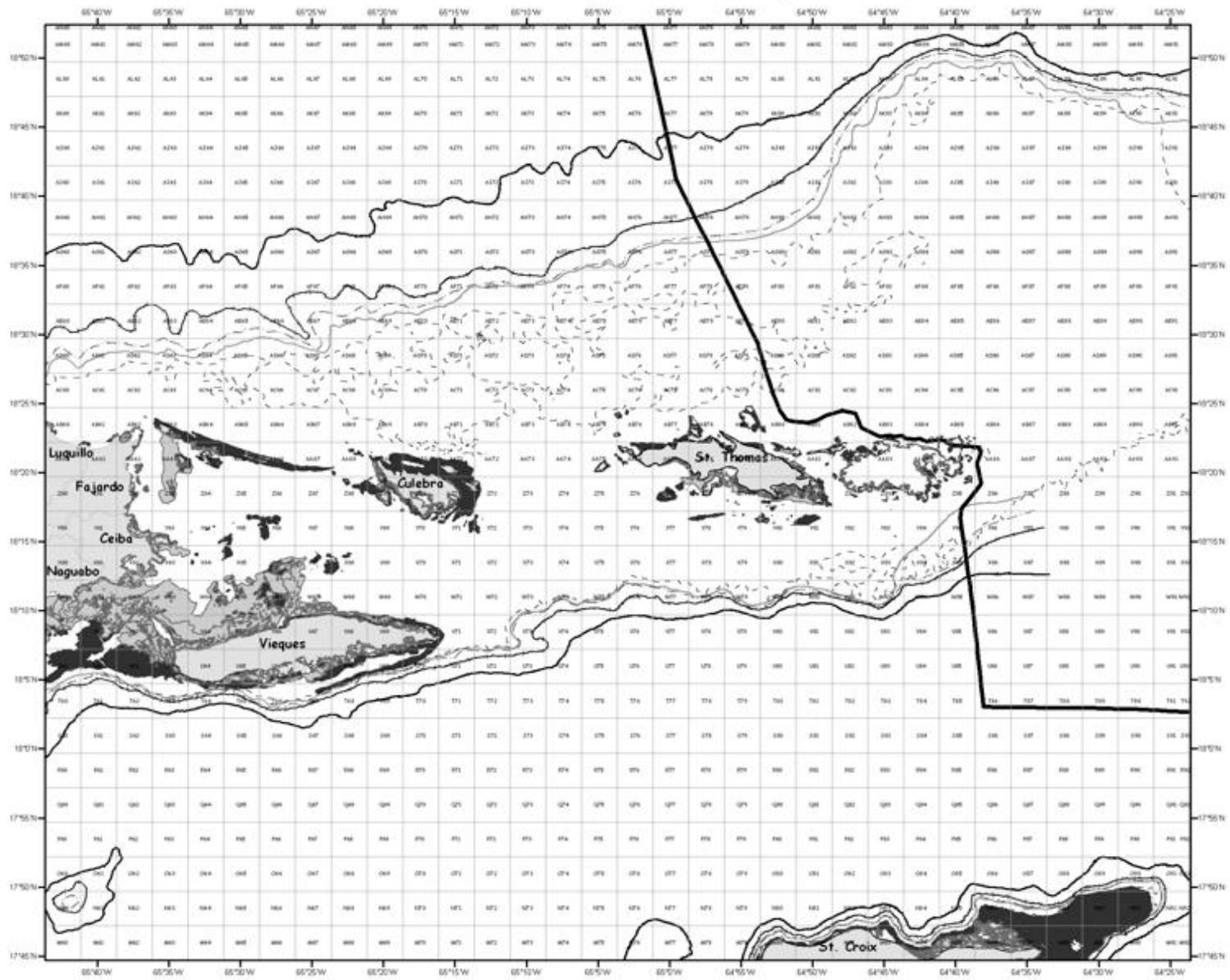
- Nautical Buys
- Isobath 100m
- Natural Resource Areas
- West Region
- Coastal Municipalities
- Exclusive Economic Zone
- Isobath 500m
- Marine Reserves
- North Region
- Puerto Rico
- 3nm Contour
- Isobath 1000m
- Reef
- East Region
- St. Thomas
- Isobath 30m
- 9nm TTS
- Fishing Zones
- South Region

# Puerto Rico Biological Grid Map- West



**Legend**

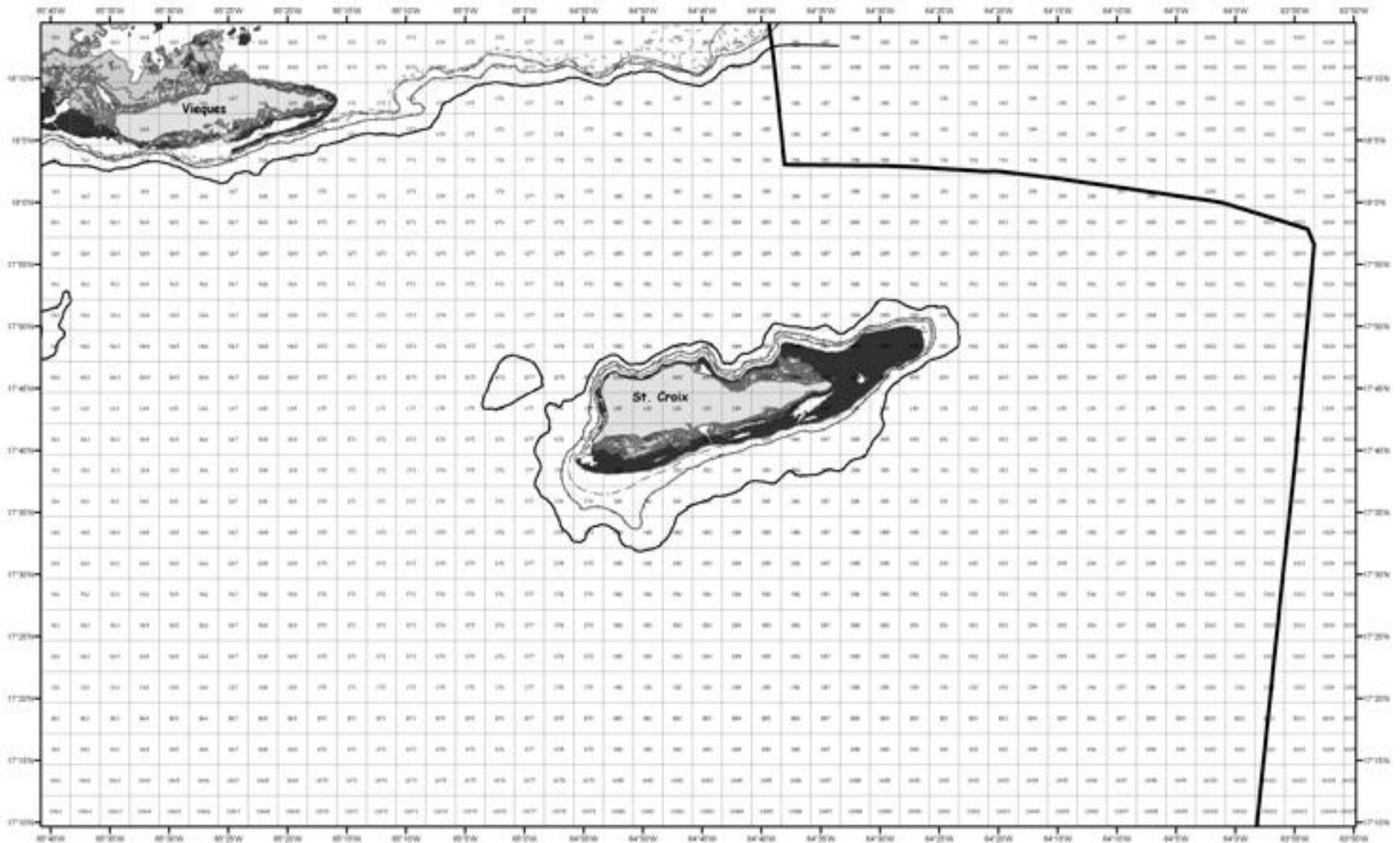

# St. Thomas Biological Grid Map



**Legend**

- - - Isobath 30m	<b>—</b> Exclusive Economic Zone	□ USVI
— Isobath 100m	■ Seagrass	□ Puerto Rico
— Isobath 500m	■ Reef	
— Isobath 1000m		

# St. Croix Biological Grid Map



**Legend**

- - - Isobath 30m	— Exclusive Economic Zone	□ St. Croix
— Isobath 100m	■ Seagrass	□ Puerto Rico
— Isobath 500m	■ Reef	
— Isobath 1000m		

# Future Direction

## Overall US Caribbean Data Collection Plan

- Catch validation Surveys
- Effort Estimation Surveys
  - Aerial surveys
  - Ramp Surveys
- Enhanced Catch Length Frequency sampling
- Life History Studies (age, maturity)
- Develop Caribbean Landings Data Entry System (ongoing, SEFSC effort)
- Implement biological grid maps (done)

Funding for validation, effort surveys being sought

# Research recommendations

- Welcome advice from panel/committee in prioritizing needed research
- Length-frequency data and the corresponding age-growth relationships will likely serve as the primary mechanism to inform assessments in the US Caribbean in the near future. A direct focus on increasing sampling intensity with a well designed program should be placed as a top priority.
- Reliable estimates of the von Bertalanffy growth parameters. Well designed age and growth studies should be instated to meet this research objective.

# Research recommendations

- Increase dockside sampling of recreational fishing trips in Puerto Rico to reduce the uncertainty in the catch estimates
- Extend / initiate MRIP's efforts in the US Virgin Islands to quantify the magnitude of recreational catches
- Better quantification of trip based catch and effort data
- Improved spatial catch/effort resolution
- Surveys should be designed that will allow validation of fisher reported catch, landings, and trip effort

# Research recommendations

- Surveys should be designed that allow characterization of multi-species trips to allow identification of trips that split fishing effort across different gears and species groups. These surveys should be coordinated with fisher groups to enhance support by the industry
- The ability to characterize trip specific CPUE data by life history stage is needed to aid in quantifying size or age specific abundance trends

# Annual Catch Limits

## 2010-2011 ACL Amendments

Reduction from recent average/median landings of:

Snappers 15%

Parrotfish 20%

Note: average landings being reduced to create limit

Concluding remarks

Stop