Angler Heterogeneity and Species-Specific Demand for Recreational Fishing in the Southeast U.S.

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Sector Allocation

Table 45. Dolphin harvest (pounds) on the Atlantic Coast from 1994-1999 (Data Source: NMFS, 2000 and Goodyear, 1999).

	Recreational	Commercial	Total	Recreational	Commercial
1994	9,500,580	1,252,553	10,753,133	88%	12%
1995	13,092,212	2,231,787	15,323,999	85%	15%
1996	8,002,144	1,216,682	9,218,826	87%	13%
1997	10,640,713	1,594,920	12,235,633	87%	13%
1998	7,693,144	826,640	8,519,784	90%	10%
1999	10,127,970	1,050,090	11,178,060	91%	9%
2000	12,574,950	970,781	13,545,731	93%	7%
Avg. 94-97	10,308,912	1,573,986	11,882,898	87%	13%
Avg. 97-99	9,487,276	1,157,217	10,644,492	89%	11%
Avg. 97-2000	10,259,194	1,110,608	11,369,802	90%	10%

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Plan leaves snapper anglers empty handed

BY JIM WAYMER • FLORIDA TODAY • NOVEMBER 5, 2009

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Red snapper fight like mad. And if they're made off limits, so will fishermen such as Billy Golding.

"Who wants to go fishing and throw back everything they catch?" said Golding, captain of the Miss Cape Canaveral, a 100-passenger "party" boat at Port Canaveral.

Under a ban on fishing for red snapper, Miss Cape Canaveral and other such boats would have to rely on top-water fish, such as kingfish, dolphin and cobia, which can be tougher to catch and less tasty.

Federal regulators want the total yearly red snapper kill cut by up to 88 percent to end overfishing -- a limit of 79,000 pounds by next year. And that's only the fish killed inadvertently as "bycatch."

The South Atlantic Fisheries Management Council proposes year-round closures from Florida to South Carolina of sport and commercial fishing for red snapper and other bottom fish, including many other popular grouper and snapper. The council would ban fishing for the other species as a way to prevent
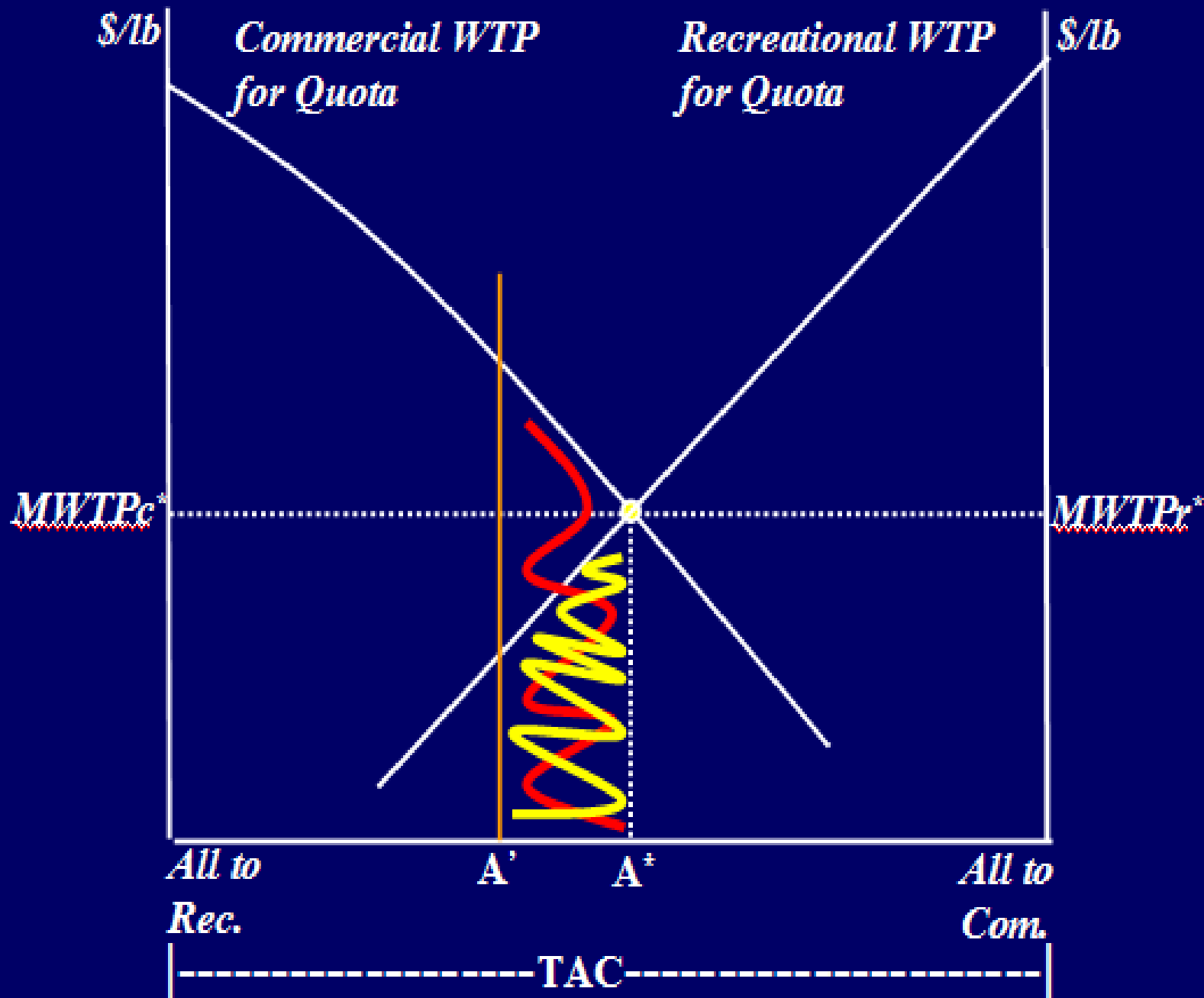
Purchase this Photo

Travis Wright of Orlando shows a red snapper he caught from the Miss Cape Canaveral of Port Canaveral. If snapper fishing is banned, the boat would rely on less popular species. (Craig Rubadoux, FLORIDA TODAY)

WHAT'S NEXT

A public hearing for the ban on fishing for red snapper will be from 3 to 7 p.m. Wednesday at the Radisson Resort at the Port, 8701 Astronaut Blvd., Cape Canaveral.

Possible red snapper ban

The South Atlantic Fishery Management Council is considering a year-round ban of red snapper and grouper within a portion of its jurisdictional boundaries, to prevent red snapper from being caught and killed as "bycatch." The proposal would close 8,100 to 26,000 square miles of water. Another proposal would close waters from 240 feet deep seaward for deepwater snapper and grouper.
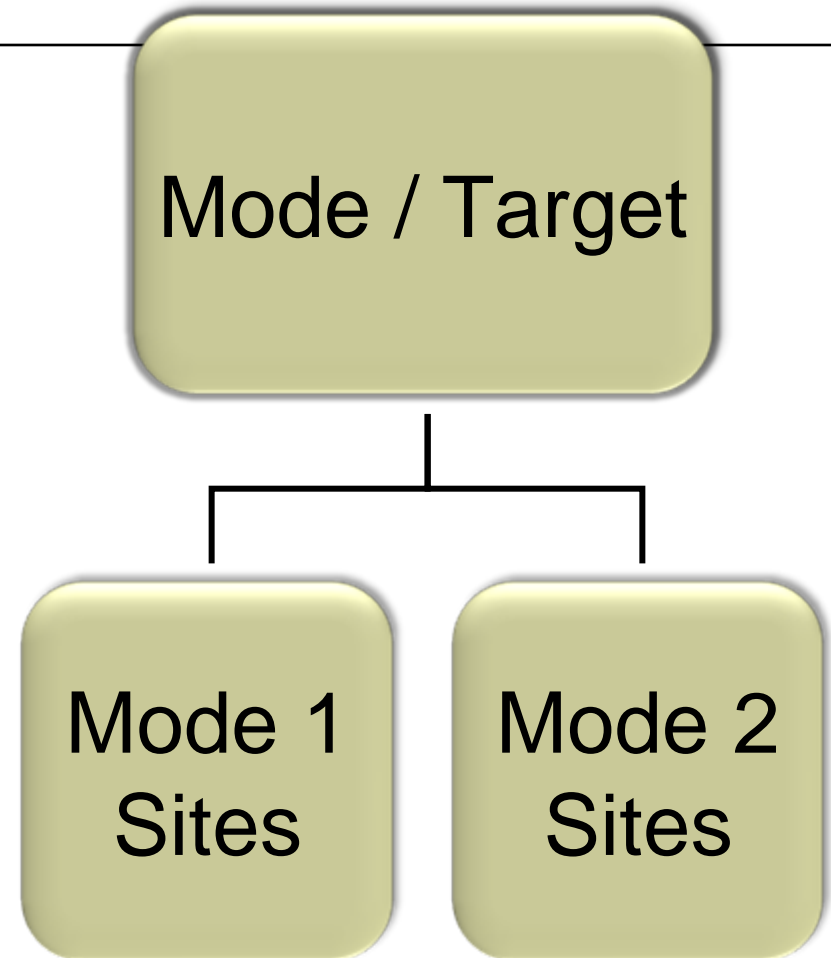
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NMFS SE Nested Logit Model

- 3 Modes
- 4 Aggregate targets species
- 70 County level sites
- 1000+ alternatives
- Sequential estimation

Mode / Target

Sites

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This project

- Single species
- Preference heterogeneity
- 70+ alternatives
- Full information maximum likelihood estimation

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          ┌─────────────────┐
          │  Mode / Target  │
          └─────────────────┘
                  │
        ┌─────────┴─────────┐
  ┌──────────┐        ┌──────────┐
  │  Mode 1  │        │  Mode 2  │
  │  Sites   │        │  Sites   │
  └──────────┘        └──────────┘
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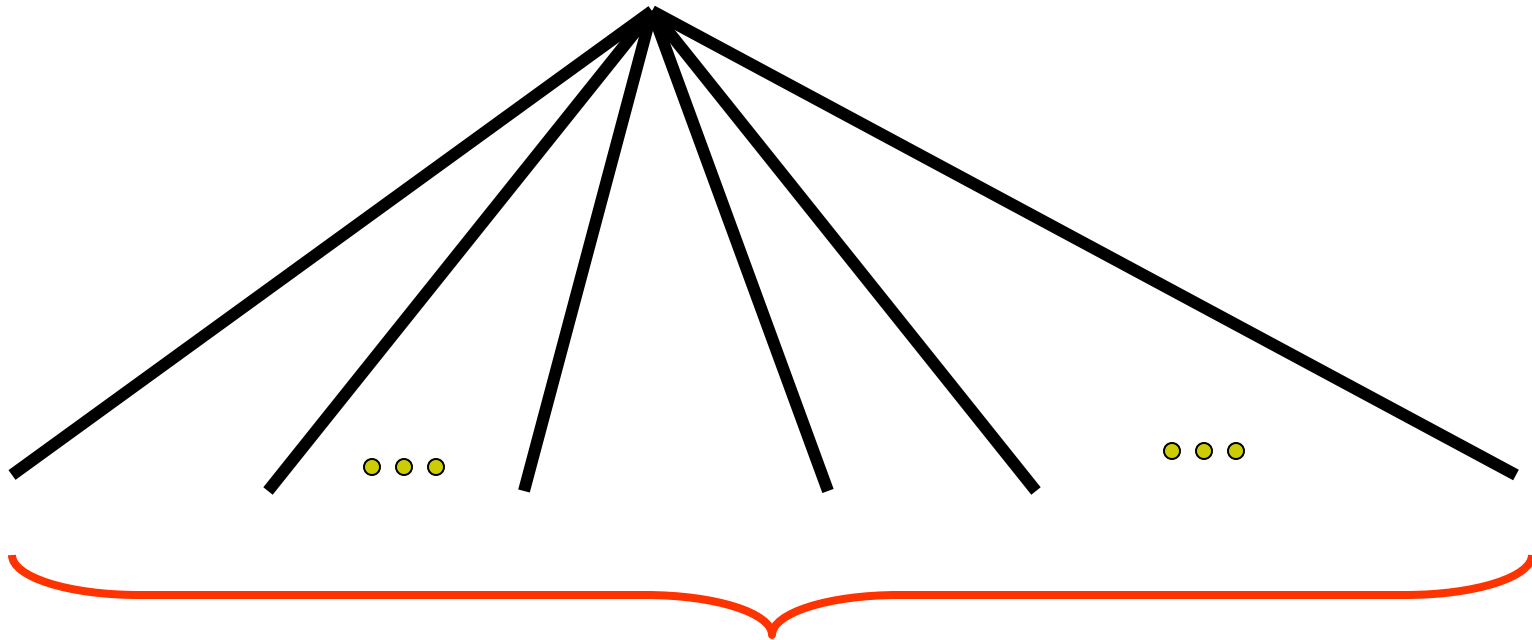
Random Utility Model

$$(1) \quad u_i = v_i(y - c_i, q_i) + \varepsilon_i$$

$$(2) \quad \pi_i = \Pr(v_i + \varepsilon_i > v_s + \varepsilon_s \quad \forall \, s \neq i)$$
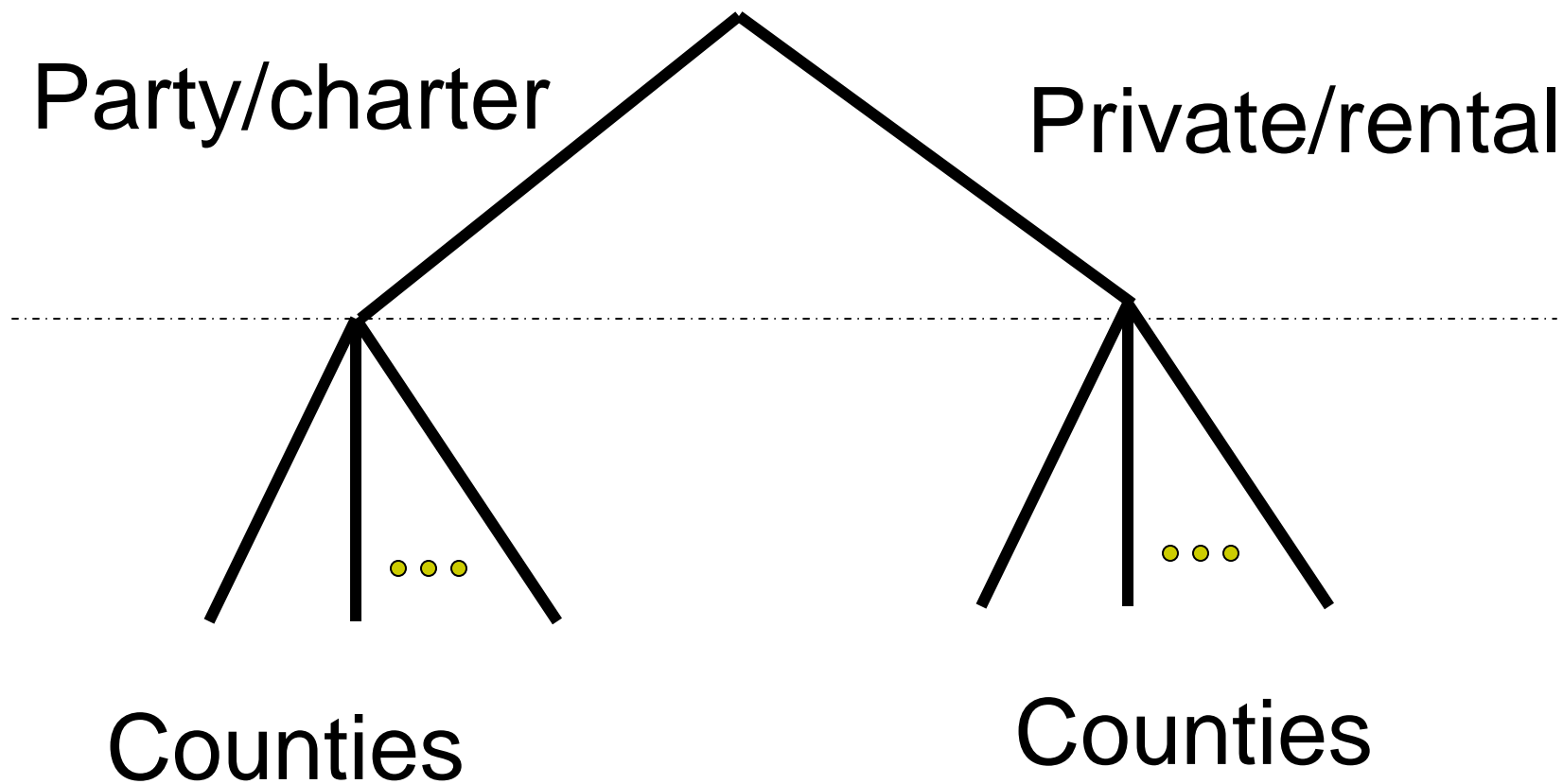
Conditional Logit
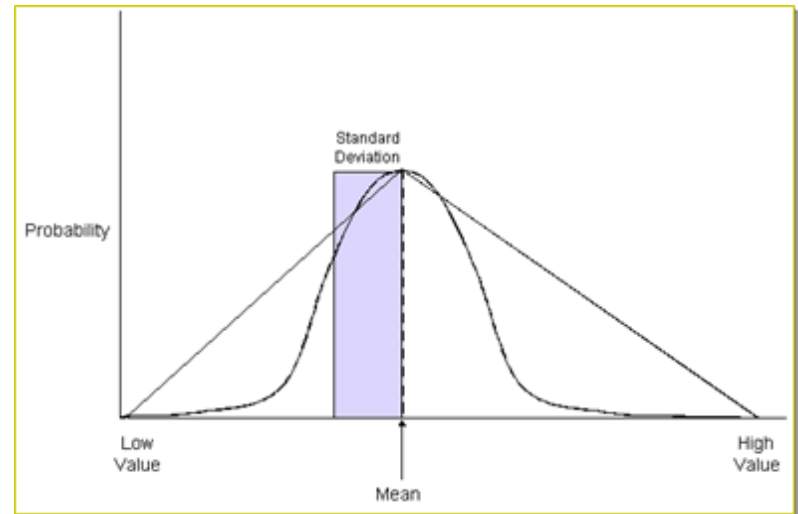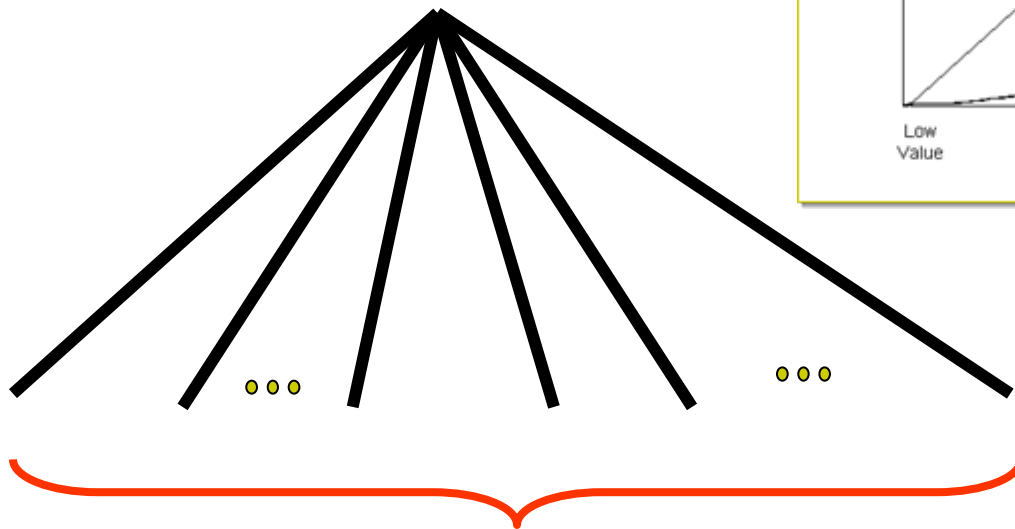

Party/charter boat, Private/rental boat County sites

Nested Logit

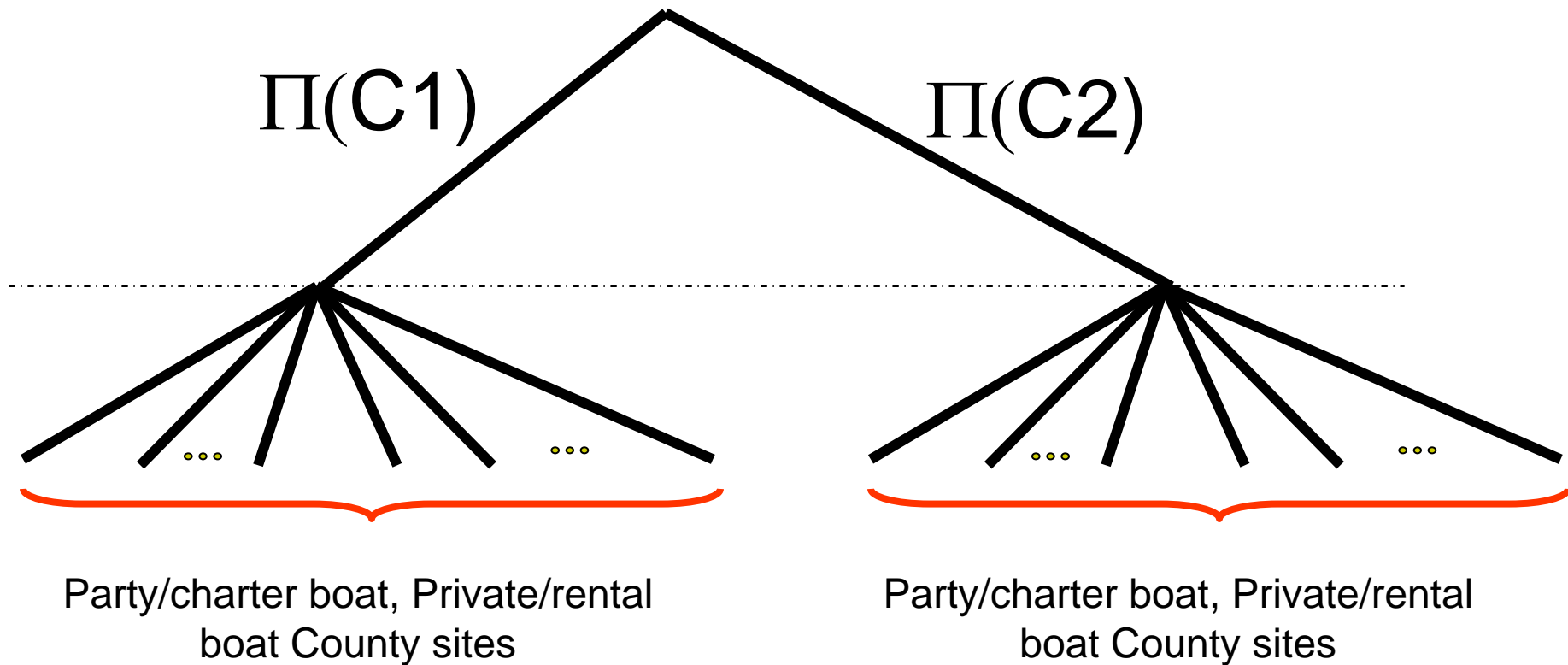Party/charter   Private/rental

Counties   Counties

Mixed Logit

Party/charter boat, Private/rental boat County sites

Finite Mixture Logit
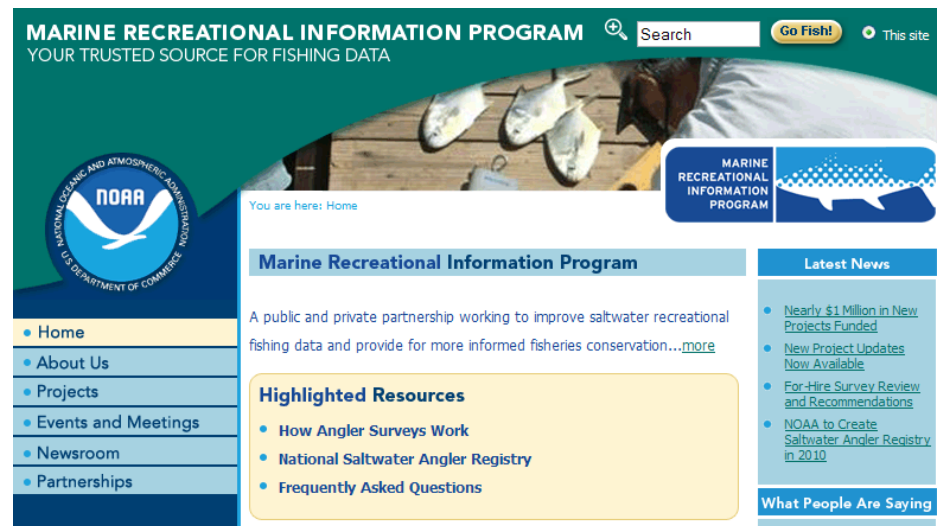
$\Pi(C1)$

$\Pi(C2)$

Party/charter boat, Private/rental boat County sites

Party/charter boat, Private/rental boat County sites

Data: MRFSS 2000 Add-on

- ☐ LA to NC
  - ▪ n = 70,781
- ☐ Southeast 2000 (Limited Valuation Round)
  - ▪ n = 42,079
- ☐ Hook and line trips only (99%), day trips only (67%), delete missing values on key variables
  - ▪ n = 18,709

Species

- Targets a species
  - n=11,257
- 425 unique species caught by recreational anglers sampled by the MRFSS
- 15 species account for 82% of the targeting activity and 38% of the (type 1) catch

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Four sets of demand models

- Gulf of Mexico Reef Fish (n = 1086)
  - "Snappers"
  - Shallow water groupers
  - Red snapper
- Florida Atlantic Big Game: Dolphin, big game (n = 823)
- Inshore small game: Red drum, spotted seatrout, small game (n=4353)
- Offshore small game: King mackerel, spanish mackerel, small game (n = 1531)

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Red Snapper Model

Target species (groups)

Snappers (n=122)

gray snapper	48.13%
sheepshead	23.75%
white grunt	11.88%
black sea bass	3.75%
crevalle jack	3.75%
amberjack genus	1.88%
gray triggerfish	1.88%
snapper family	1.25%
yellowtail snapper	1.25%
Etc	< 1%

Groupers (n=725)

unidentified grouper	73.38%
gag	17.38%
red grouper	6.07%
grouper genus Mycteroperca	2.9%
black grouper	0.28%

Red Snapper (n=239)

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Mode-Species Choice Frequencies

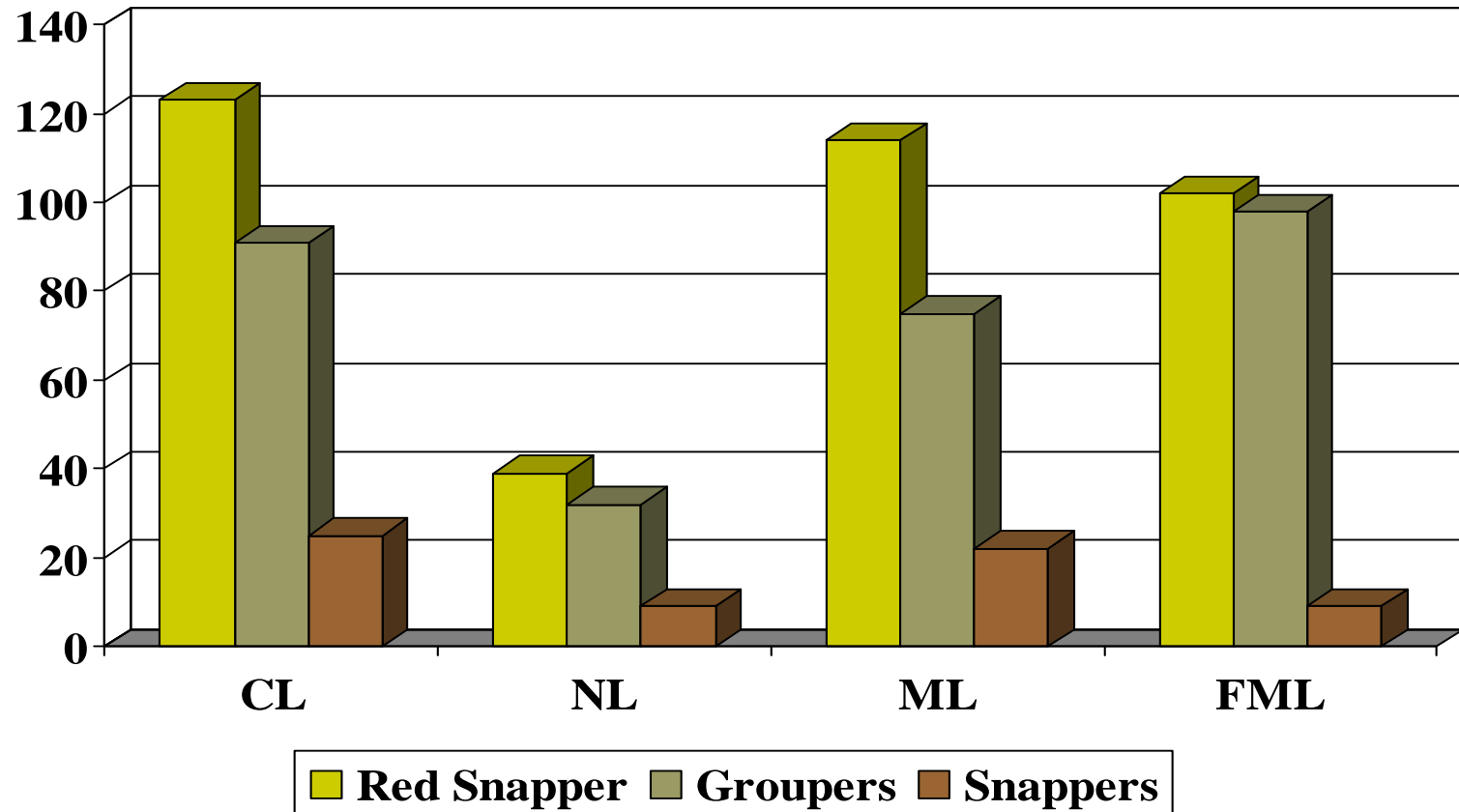| Mode	Target	Frequency
Party/charter	Snappers	14
Party/charter	Groupers	150
Party/charter	Red snapper	84
Private/rental	Snappers	108
Private/rental	Groupers	575
Private/rental	Red snapper	155

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Variables

- 71 Species/Mode/Site choices
- Travel cost
  - [party/charter] TC = charter fee + driving costs + time costs
  - [private/rental] TC = driving costs + time costs
- Quality
  - 5-year historic (type 1) targeted catch rate
- Number of MRFSS interview sites in the county

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Snapper-Grouper Results

	CL	NL	ML	FMM1	FMM2
TC	-0.04	-0.10	-0.04	-0.02	-0.34
SD(TC)			-0.01		
Snapper	0.89	0.83	0.88	0.22	0.95
Grouper	3.27	3.11	3.02	2.25	13.90
Red Snapper	4.43	3.82	4.59	2.71	3.71

Snapper-Grouper WTP

Mixed Logit: Distribution of WTP

Table 4-8. Willingness-to-Pay for one additional fish caught and kept: Snapper-Grouper

Mixed Logit (Travel Cost Parameter Randomly Distributed)

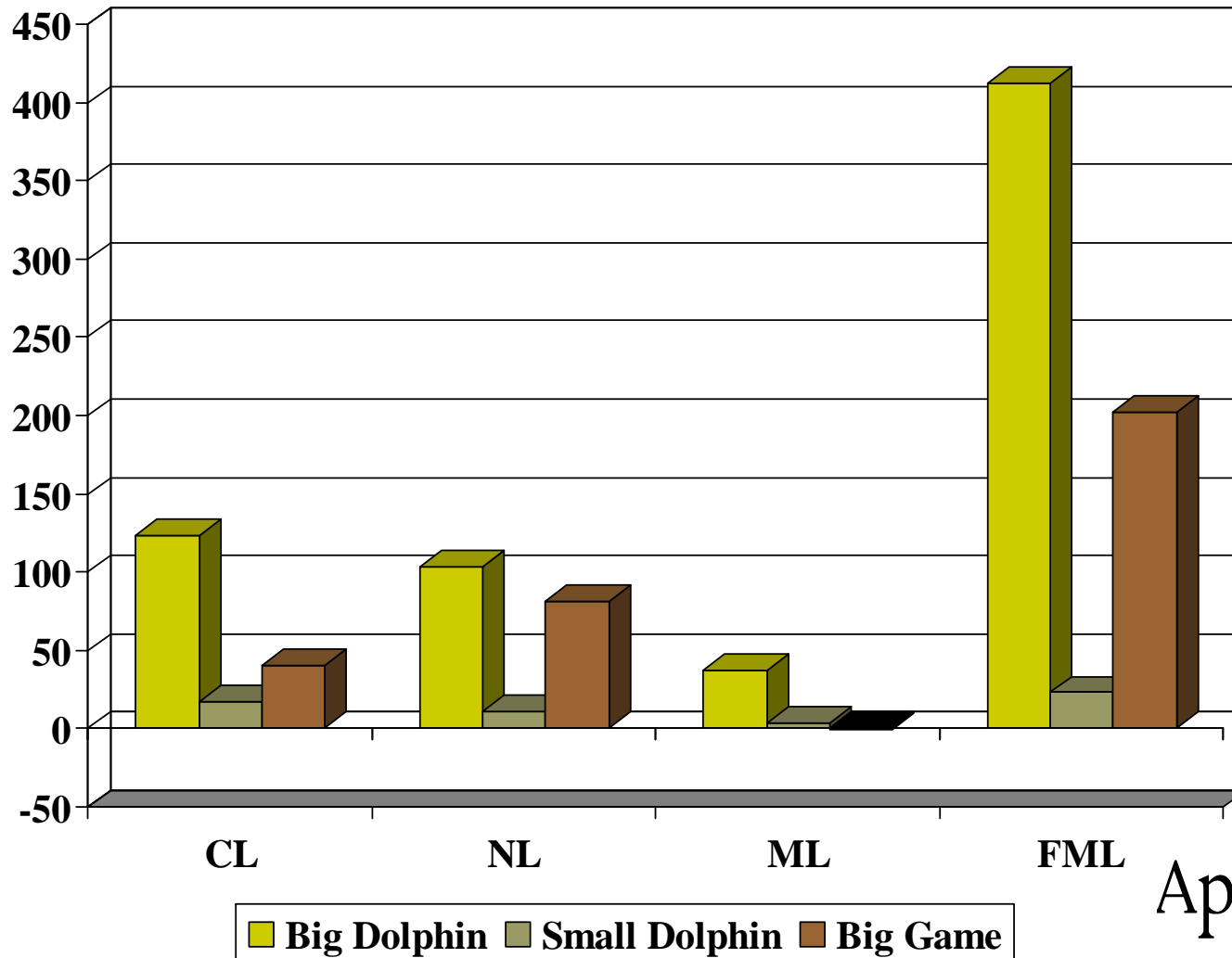|	Normal			Uniform		
	5th Percentile	Mean	95th Percentile	5th Percentile	Mean	95th Percentile
	5th	50th	95th	5th	50th	95th
Snapper	$14.61	$21.96	$43.37	$5.79	$10.82	$74.51
		(15, 29)			(7, 15)	
Grouper	$50.05	$74.95	$148.58	$14.68	$27.36	$188.94
		(66, 85)			(22, 33)	
Red Snapper	$76.20	$114.28	$226.23	$32.13	$56.51	$413.46
		(103, 127)			(50, 64)	

(95% Krinsky-Robb Confidence Intervals)

FM Logit: Tier WTP

Table 5-12. Tier-Specific Willingness-to-Pay for one additional fish caught and kept: Snapper-Grouper

	Tier 1	Tier 2
Grouper	136.15	40.65
Snapper	13.55	2.79
Red Snapper	164.14	10.85
Probability	0.5996	0.4004

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Dolphin Model Willingness-to-pay

Conclusions

- MRFSS supports only a few single species

- Models with preference heterogeneity statistically outperform baseline models

- WTP differences for 3 of 4 species models

- Future research: MRFSS add-ons 1997, 2006

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