

Graphic Representation of Hawai`i State NWHI Bottomfish Data: Impacts of the NWHI Reserve on the Bottomfish Fishery

Source: Data provided by Hawai`i Department of Land and Natural Resources, 10/29/01 letter to Margaret Davidson:

Table 1: Federal NWHI Bottomfish Commercial Catch & Landings affected by area closures per Executive Orders 13178/13196 (Worst Case Scenario) selected areas by Mau and Hoomalu Zone 1996 - 2000

Table 2: Summary of all federal NWHI bottomfish catch and landings, Necker Island, Mau Zone, 1996-2000.

Table 3: Federal NWHI Bottomfish commercial catch and landings: Example of single quadrant information within a 20 sq. n. mile grid fishing area, 1996-2000

Copies of original DLNR tables provided below. Graphed by
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TABLE 1: FEDERAL NWHI BOTTOMFISH COMMERCIAL CATCH AND LANDINGS AFFECTED BY AREA CLOSURES PER EXECUTIVE ORDERS 13178/13196 (WORSE CASE SCENARIO) SELECTED AREAS BY MAU AND HOOMALU ZONE, 1996-2000

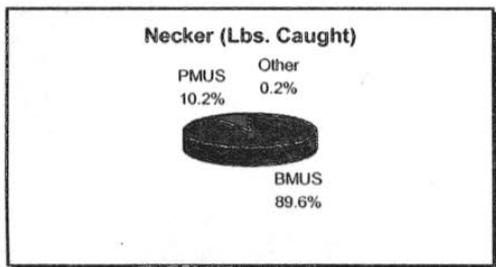
Selected NWHI areas	Bottomfish Management & Other Species				Pelagic Management Species			
	Lbs. Caught	% All NWHI Areas	% Reported Area	Value	Lbs. Caught	% All NWHI Areas	% Reported Area	Value
Mau Zone								
Niihau	114,344	6.9		\$331,033		6.5		
Impacted area (16123A)	73,761	4.4	64.5	\$216,574		4.2	65.4	
Necker	236,712	14.2		\$657,562		12.9		
Impacted areas (16423B - 16423F)	207,663	12.5	87.7	\$564,197		11.0	85.8	
Hoomalu Zone								
French Frigate area closures *	159,119	9.6		\$500,675	14,879	0.9		\$30,456
Other Hoomalu Zone Closures	102,347	6.2		\$285,002		5.6		
Impacted areas	46,827	2.8	45.8	\$130,547		2.6	45.8	
Impacted Area Totals	487,370	29.3		\$1,411,993	14,879	0.9		\$30,456
All NWHI Areas	1,663,633			\$5,112,127	1,663,633			\$5,112,127

* Includes French Frigate Shoals, French Frigate Shoals Pinnacle, 66 Bank, Brooks Bank, etc.

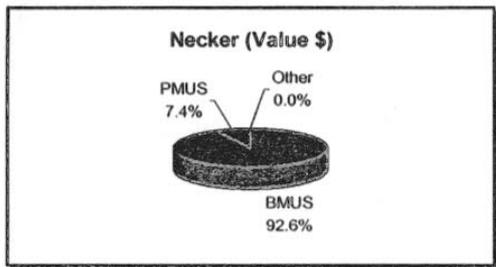
**TABLE 2: SUMMARY OF ALL FEDERAL NWHI BOTTOMFISH CATCH AND LANDINGS
NECKER ISLAND, MAU ZONE, 1996 - 2000**

Area: **Necker**
Zone: **Mau**
No. trips: 75

Species	Catch	
	Lbs. Caught	No. Released
BMUS	236,178	1,993
PMUS	26,758	646
Other	534	34
Total	263,470	2,673

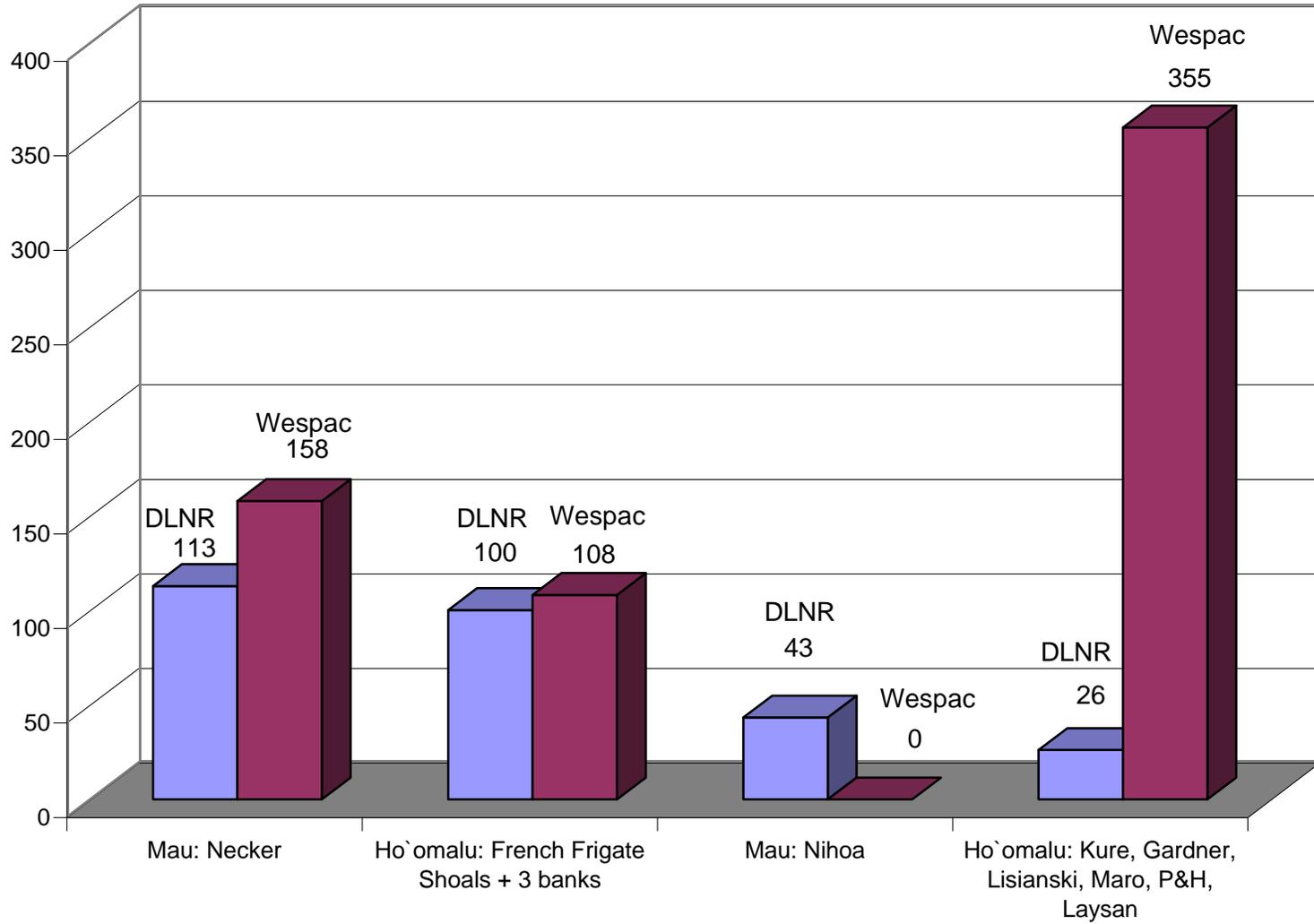


Species	Landings	
	Lbs. Sold	Value
BMUS	224,800	\$657,344
PMUS	21,915	\$52,574
Other	210	\$218
Total	246,925	\$710,135



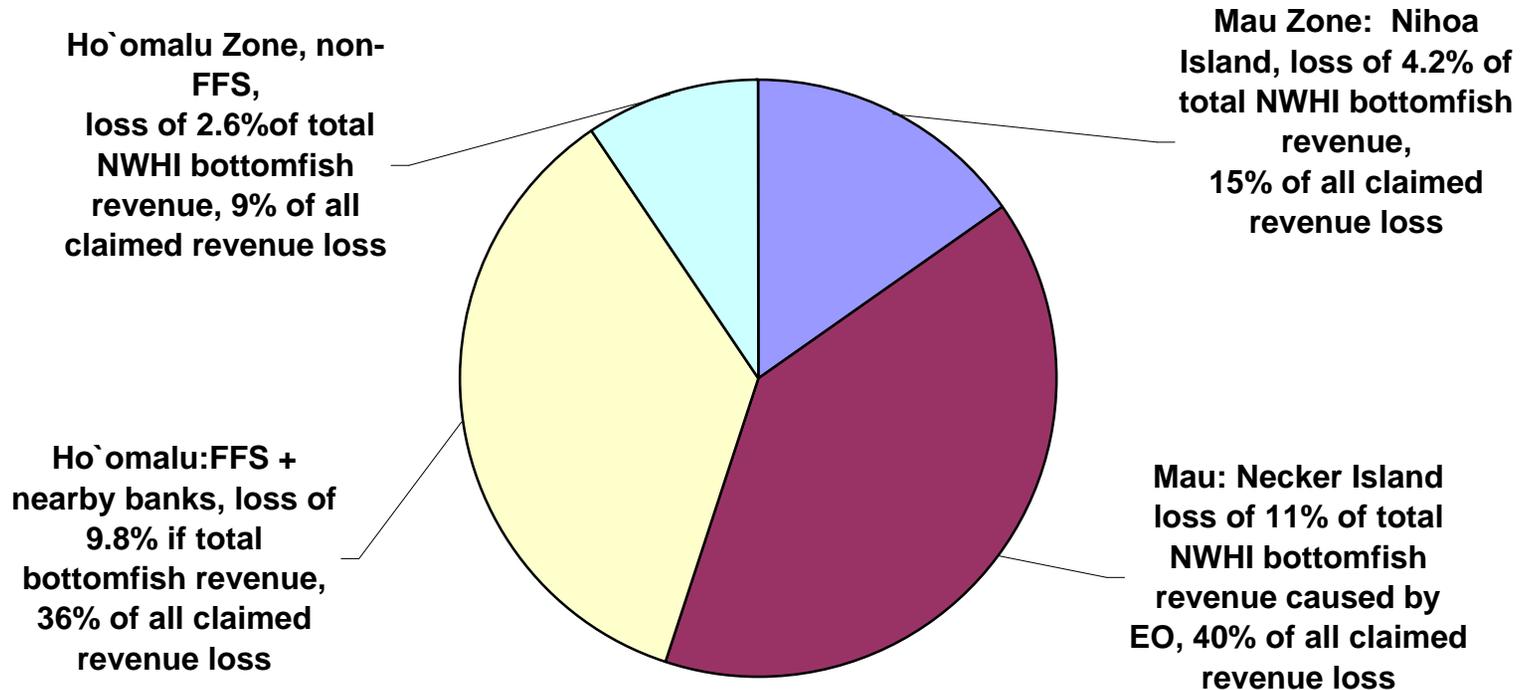
Species	Catch		Depth (fathoms)					
	Lbs. Caught	No. Released	Beginning			Ending		
			Min	Max	Ave	Min	Max	Ave
BMUS:								
Uku	106,159	28	13	130	43.79	15	150	77.13
Butaguchi Ulua	47,323	43	15	150	56.64	22	180	92.25
Opakapaka	36,241	0	16	150	56.58	22	180	92.21
Hapuupuu	18,659	0	16	150	60.15	20	180	97.02
Onaga	15,559	0	16	150	77.89	90	150	127.20
Ehu	3,714	0	15	130	59.97	30	150	104.41
Papa Ulua	2,953	0	15	130	43.83	15	150	77.49
Gindai	1,588	0	16	130	58.30	50	150	101.29
Kalekale	1,582	0	15	130	53.76	35	150	100.15
White Ulua	916	19	20	80	46.67	70	140	96.67
Gunkan Ulua	616	0	20	60	46.79	40	130	84.69
Kahala	395	1,892	13	100	42.41	15	150	85.66
Omilu	253	10	15	50	32.07	15	105	58.75
Hogo	90	0	30	130	68.46	85	150	114.06
Lehi	78	0	60	60	60.00	80	90	85.00
Yellow-tail Kali	26	0	25	60	45.00	80	110	91.43
Ulua-misc.	12	0	50	50	50.00	70	70	70.00
Wahanui	5	0	15	16	15.50	70	105	87.50
Taape	2	1	17	30	23.50	105	130	117.50
PMUS:								
Ono	15,093	1	13	30	19.53	30	90	59.41
Ahi Yellowfin	4,781	18	17	400	54.57	40	600	99.64
Kawakawa	3,283	41	13	60	27.52	15	130	62.69
Mahimahi	2,512	5	13	400	42.96	30	600	83.40
Mano Shark-misc.	635	581	15	100	37.01	15	180	69.28
Ahi Bigeye	193	0	0	0	0.00	0	0	0.00
Striped Marlin	134	0	0	0	0.00	0	0	0.00
Thresher Shark	60	0	45	45	45.00	90	90	90.00
Monchong	44	0	30	100	65.00	130	140	135.00
Aku	23	0	0	0	0.00	0	0	0.00
OTHER:								
Kagami Ulua	146	0	18	18	18.00	30	30	30.00
Kamanu	114	3	13	70	42.00	30	100	75.00
Kaku	71	2	15	17	16.00	30	60	45.00
Weke Ula	62	0	20	80	44.38	50	140	81.25
Opelu	53	0	0	0	0.00	0	0	0.00
Miscellaneous	25	10	13	60	38.30	30	150	118.00
Aweoweo	23	0	60	60	60.00	140	140	140.00
Aawa	21	0	15	80	42.40	60	150	102.00
Kawelea	8	0	17	17	17.00	150	150	150.00
Mu	6	0	0	0	0.00	35	35	35.00
Nohu	5	0	0	0	0.00	130	130	130.00
Dobe Ulua	3	0	0	0	0.00	30	30	30.00
Opelu Mama	2	0	60	60	60.00	130	130	130.00
Hauliuli	1	12	16	40	28.00	70	70	70.00
Ahaaha	0	1	13	13	13.00	30	30	30.00
Tiger Shark	0	6	16	60	36.20	20	80	66.00

Figure 1: Comparison of Wespac and DLNR Claims re Losses to Bottomfish Fishery Revenue as a Result of NWHI Reserve, dollars (1000s)



**Figure 2. DLNR claims about impact of NWHI Reserve on bottomfish revenue:
"Worst case scenario" as result of EOs.
Source: DLNR data, 10/29/01.**

**Total annual "loss" claimed by DLNR: \$282,399 or 27.6% of total NWHI
bottomfish revenue, divided as below:**



Hawai'i Department of Land and Natural Resources Revenue Loss Claims

Annual Average, 1996 -2000

Source: DLNR: "Analysis of NWHI CRE Reserve Impacts to the Bottomfish Fishery," October 29,2001

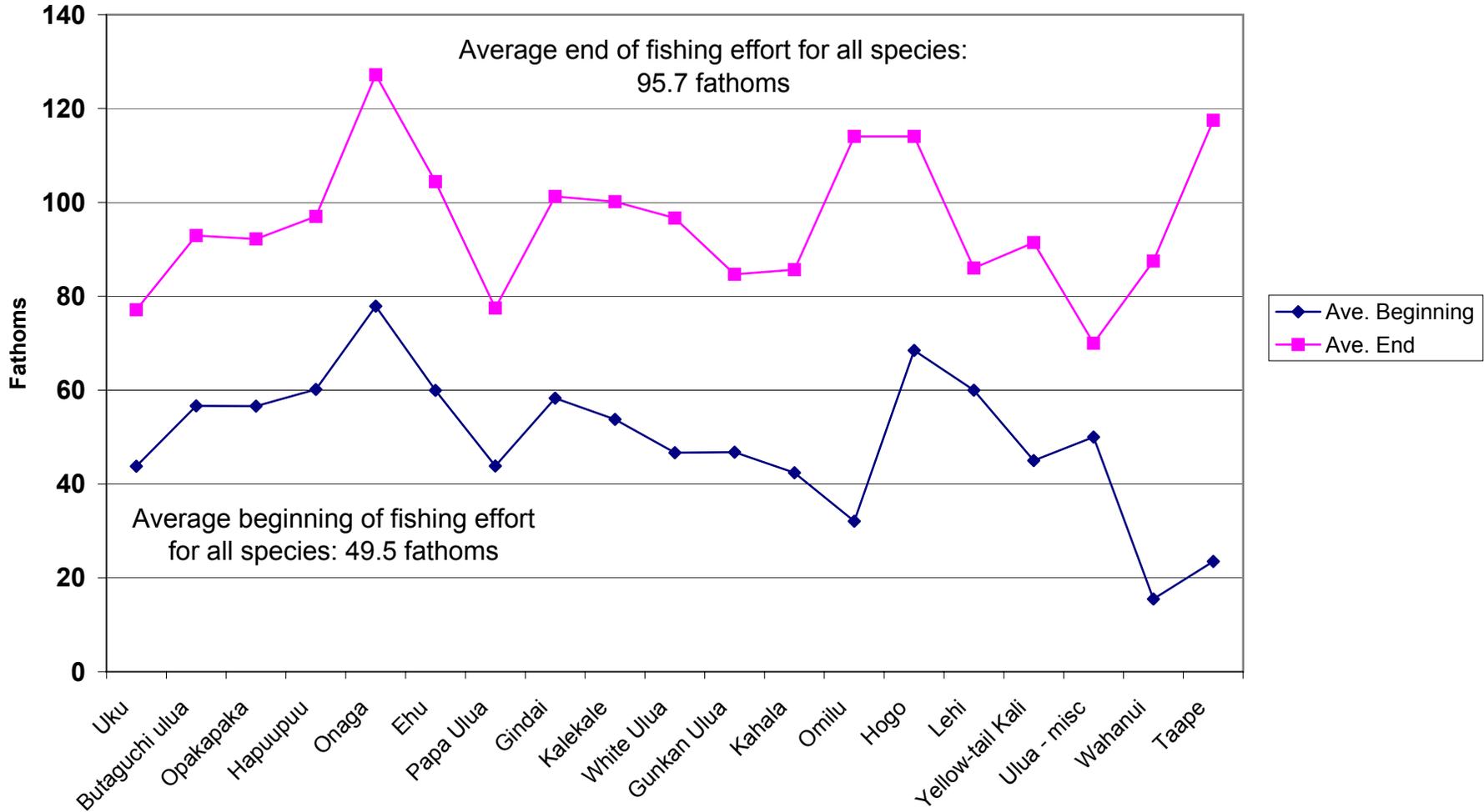
	Annual Value of Catch, \$	Revenue Loss	% Loss Total NWHI Revenue	
Nihoa Island	66,207	43,315	4.2%	Wespac: no claims of revenue loss due to EO at Nihoa
Twin Banks				
Necker Island	131,512	112,839	11.0%	DLNR Counts EO impact as completely closing Necker, despite fact that 1) Refuge already restricts fishing out to 20 fms. 2) EO restricts fishing only out to 25 fathoms. 3) DLNR 10/01 data shows average reported Necker bottomfish effort begins at 50 fm and ends at 96 fm., well outside restricted areas. 4) Reserve Council has only proposed closures based on bottomfishers' 25 fm charts, never proposed closure of entire blocks
TOTAL MAU Loss claims		156,154		

French Frigate Shoals				DLNR counts EO impact entirely responsible for
66 Fathom Bank				FFS closure. Yet DLNR & CREFMP propose
Brooks Bank				50 fm closures at FFS, regardless of EO.
St. Rogatien				DLNR should subtract impact of DLNR, CREFMP
* Total: FFS + 3 banks	31,824	100,135	9.8%	closure estimates from this number for worst-case
				scenario.

Gardner Pinnacles	DLNR: "[A]verage and beginning depths fished are outside of the closure areas" p4			
Raita Bank				
Maro Reef	DLNR: "data not available to calculate impact", "beginning depths fished at 20", closure to 25 p4			
Laysan Island	DLNR: "impossible to calculate the impact based on the data", beginning depths fished at 40 fm,			
N. Hampton		Laysan closure to 50 fm.		
Pioneer Bank				
Lisianski	DLNR provided no information re Lisianski, unclear if it was counted in calculations			
Pearl & Hermes	DLNR: most [94.6%] 100 fm waters = State waters, not closed, yet DLNR still counts			
Salmon Bank		entire P&H as "loss"		
Ladd				
Nero				
Kure	DLNR claims easy to assess Kure impacts, yet doesn't quantify loss. Where is data?			
	Wespac claims large loss at Kure, yet only 17.6% of Kure's 100 fm waters are Federal			
*Total non-FFS Ho'omalua	57,000	26,109	2.6%	Given DLNR data, unclear where these totals are from
TOTAL Ho'omalua loss claims		126,244		

TOTAL NWHI revenue loss claimed	282,399	27.6%
Total Annual Revenue NWHI	1,022,425	

Figure 3: Average depths at which bottomfishing begins and ends at Necker by species.
Note: Wildlife Refuge out to 20 fm, NWHI Reserve out to 25 fm.
Source: DLNR "Summary of All Federal NWHI Bottomfish Catch, Landings, Necker Island, 1996-2000" 10/29/01



**Figure 4: Range of average Necker bottomfish effort: 49.5 fm to 95.7 fm. Note: Wildlife Refuge protection to 20 fm, Reserve protection to 25 fathoms.
Source: DLNR "Summary of All Federal NWHI Bottomfish Catch and Landings, Necker Island, 1996-2000."**

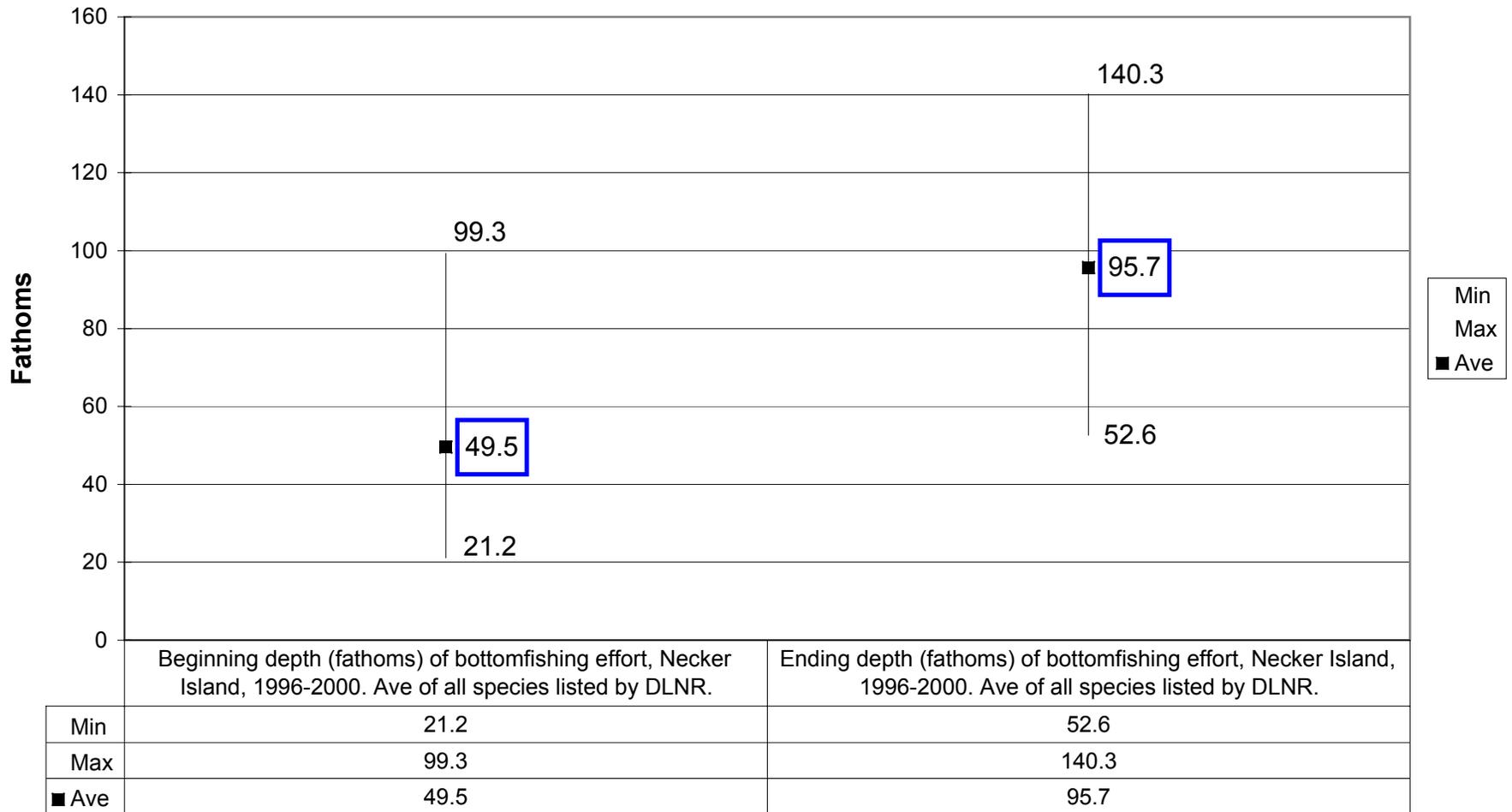


Figure 5: Bottomfish Catch at Necker Island, 1996-2000.

Source: HI DLNR data, 10/29/01

Top 10 species by weight make up 99.4% of total catch and are labelled below.

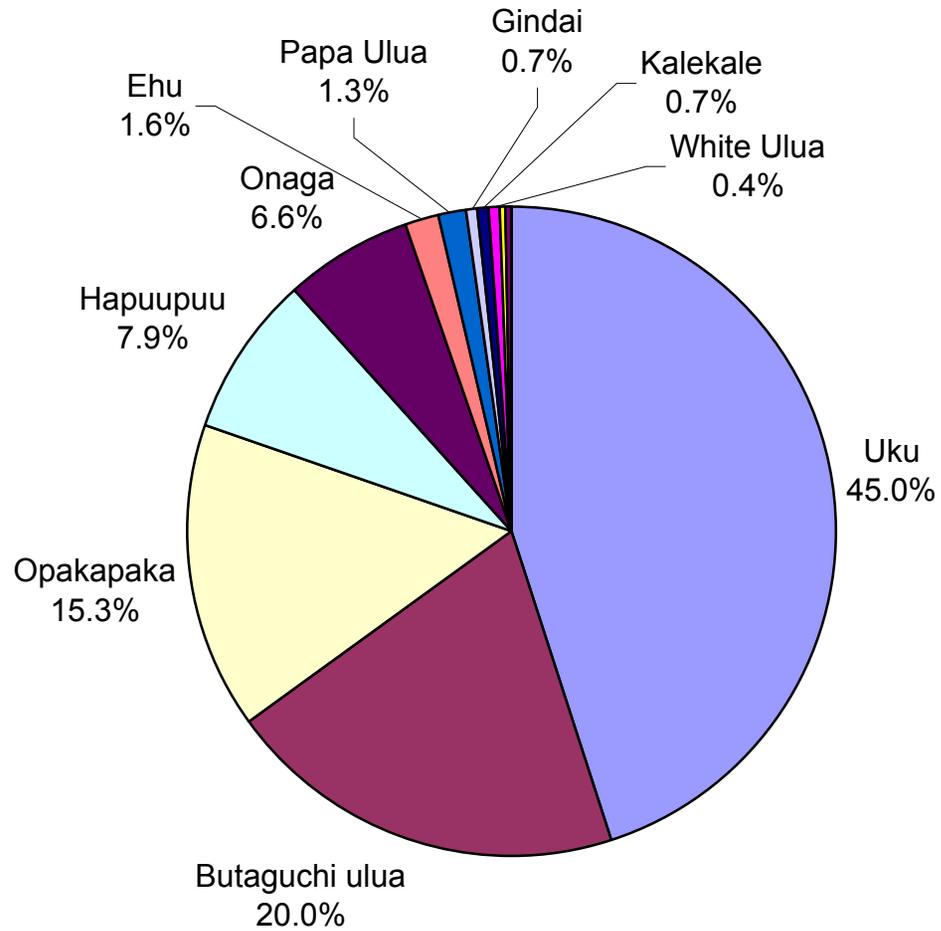


Figure 6: Average depths at which Necker bottomfishing begins & ends for top 10 species by weight, equivalent to 99.4% of total catch.

Data Source: DLNR, "Summary of All Federal NWHI Bottomfish Catch, Landings, Necker Island, 1996-2000".

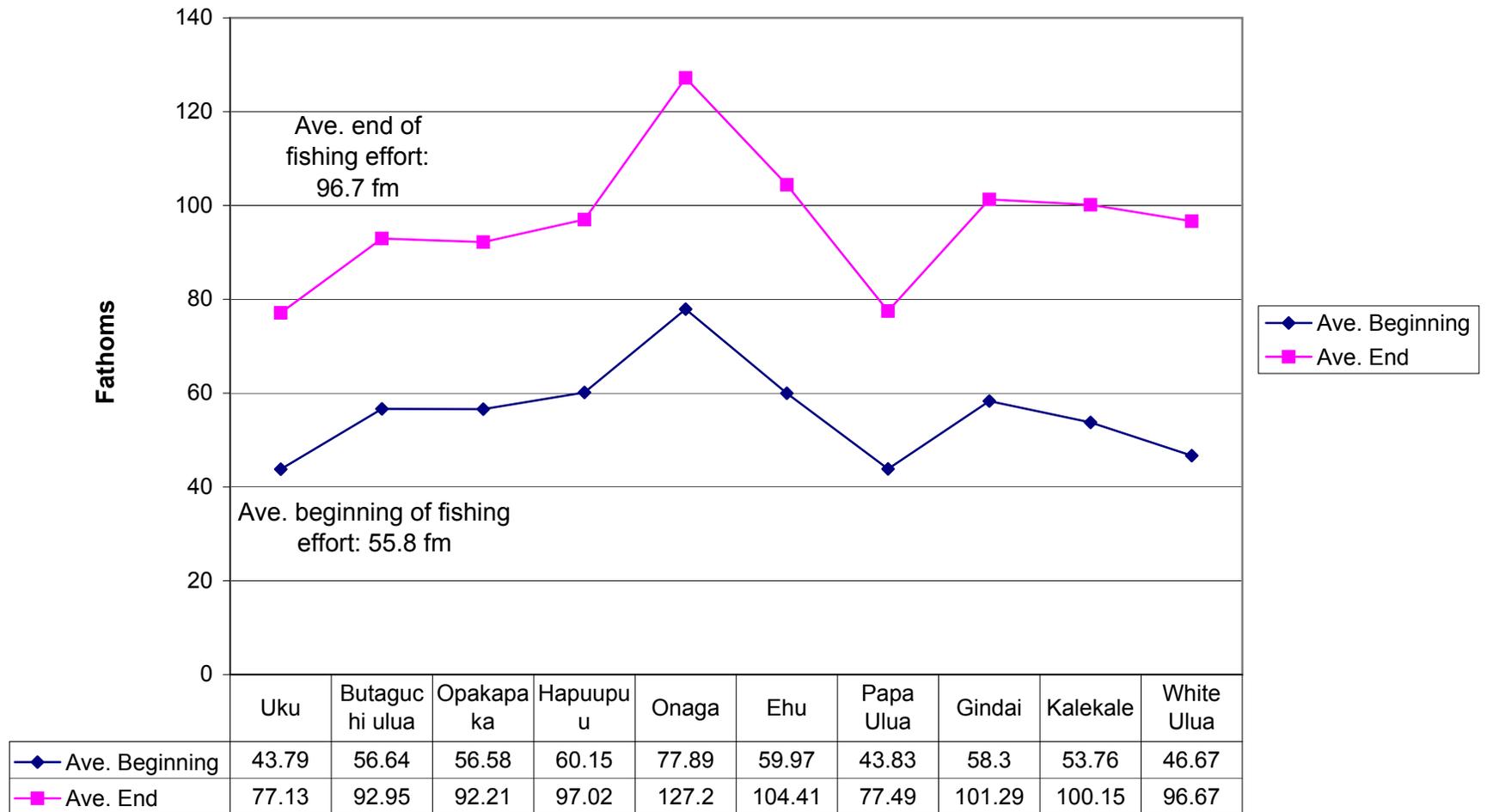


Figure 7: Range of Necker bottomfish effort for top 10 species: 55.7 fm to 96.7 fm. Note: Wildlife Refuge protection to 20 fm, Reserve protection to 25 fm. Source: DLNR "Summary of All Federal NWHI Bottomfish Catch & Landings, Necker Island, 1996-2000."

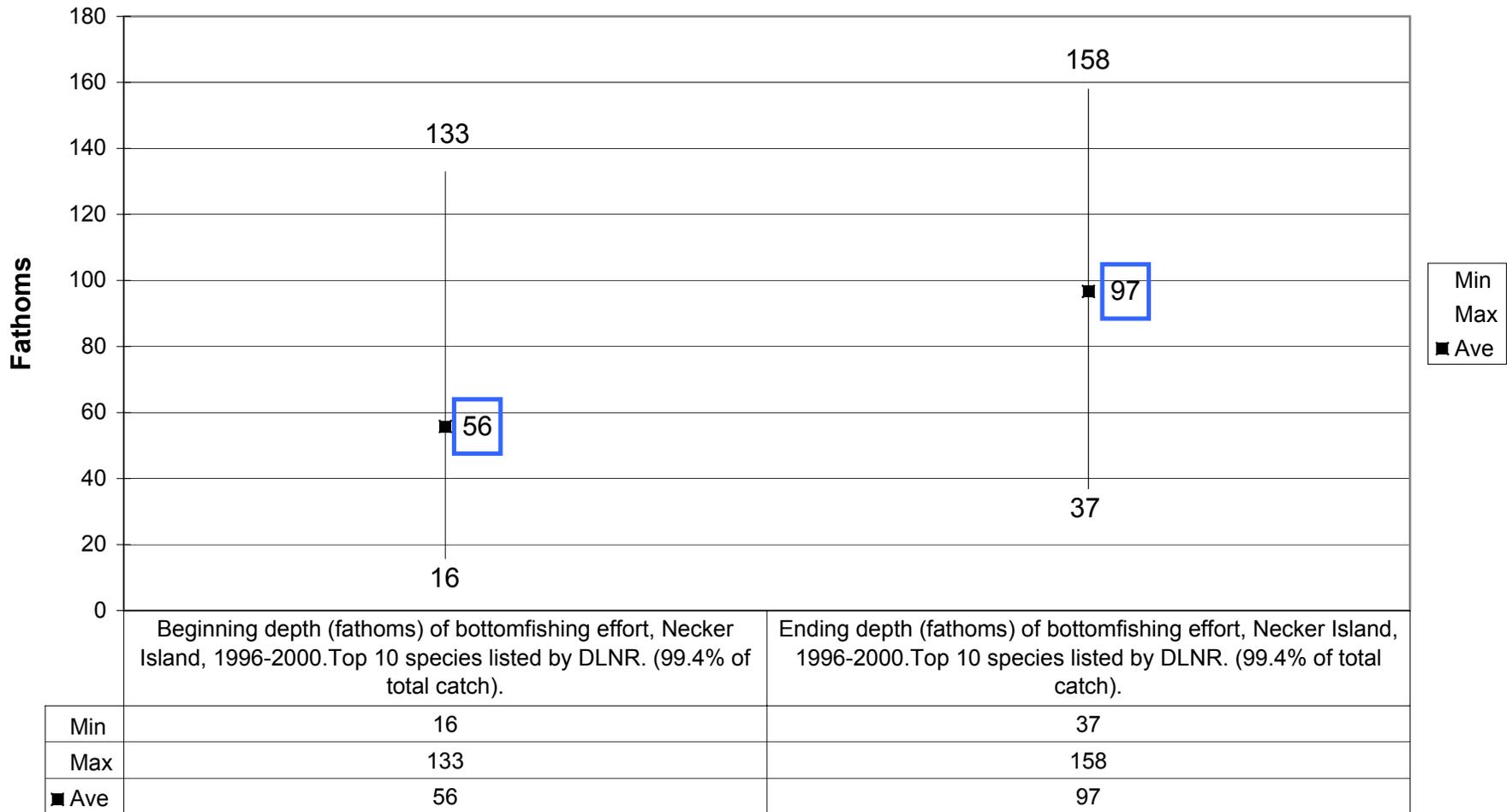


Figure 8: Comparison between average depths at which bottomfishing begins at Necker Island: (for top 5 species, top 10 species, all species) and Refuge protected area depths, Reserve protected area depths.
Data source: HI DLNR 10/29/01

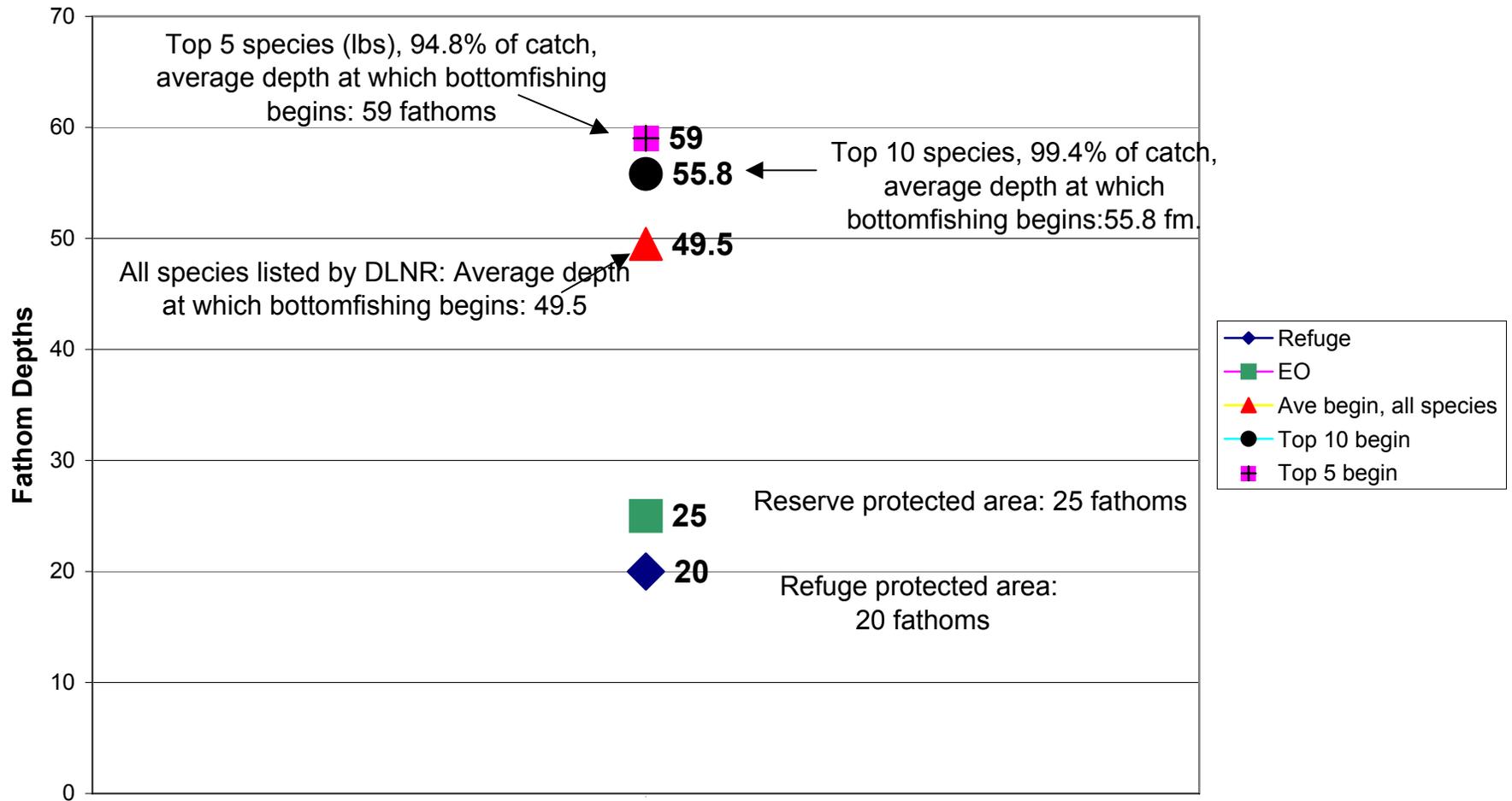


Figure 9: Necker: minimum, maximum, average depths (fathoms) at which fishing effort begins. Data source: DLNR: "Summary of All Federal NWHI Bottomfish Catch, Landings, Necker, 1996-2000", Note: Wildlife Refuge out to 20 fm NWHI Reserve to 25 fm

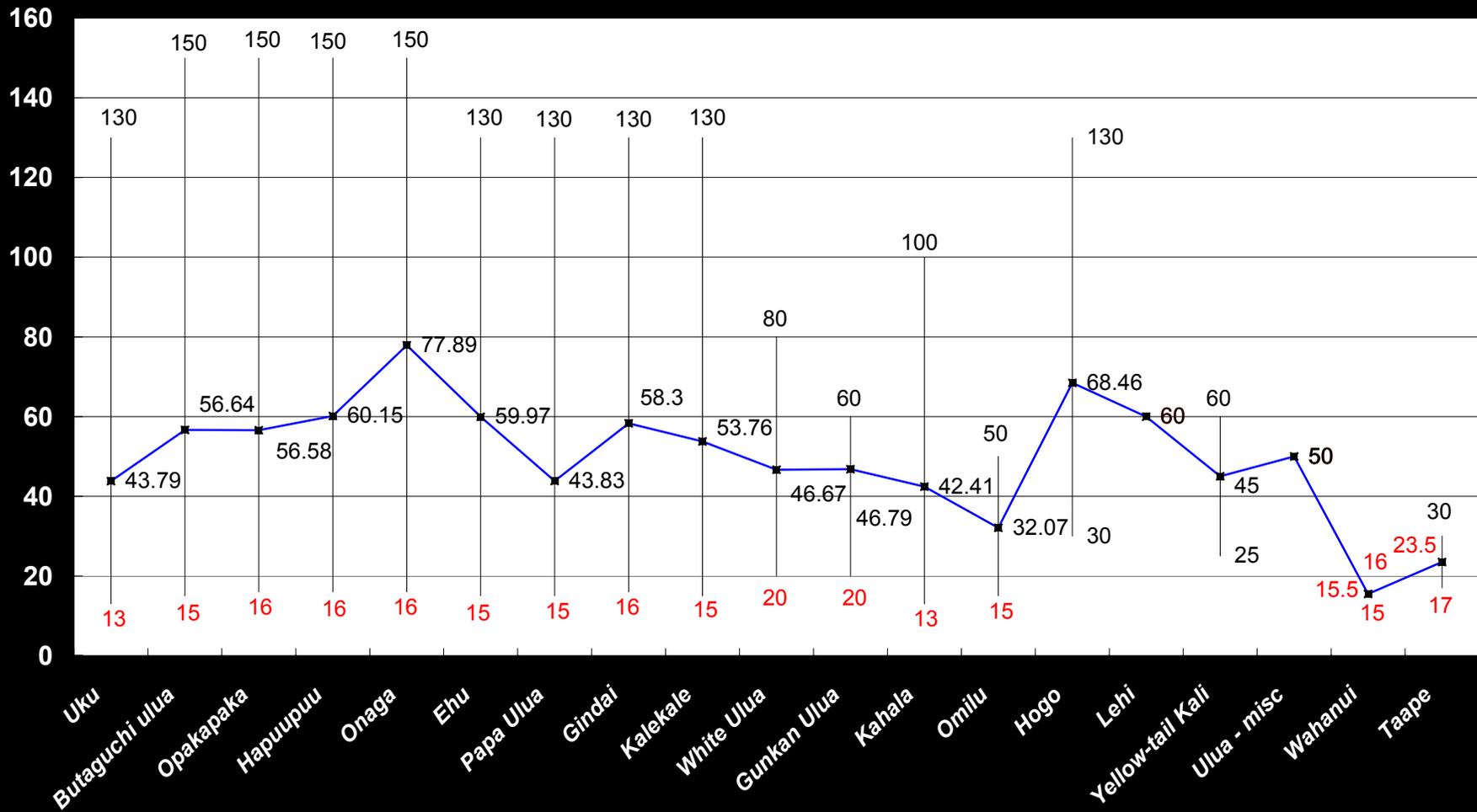


Figure 10: Necker: Minimum, maximum, and average depths at which reported fishing effort ends. Data Source: DLNR Table:"Summary of All Federal NWHI Bottomfish Catch, Landings, Necker Island, 1996-2000," Wildlife Refuge to 20 fm, NWHI Reserve to 25 fm.

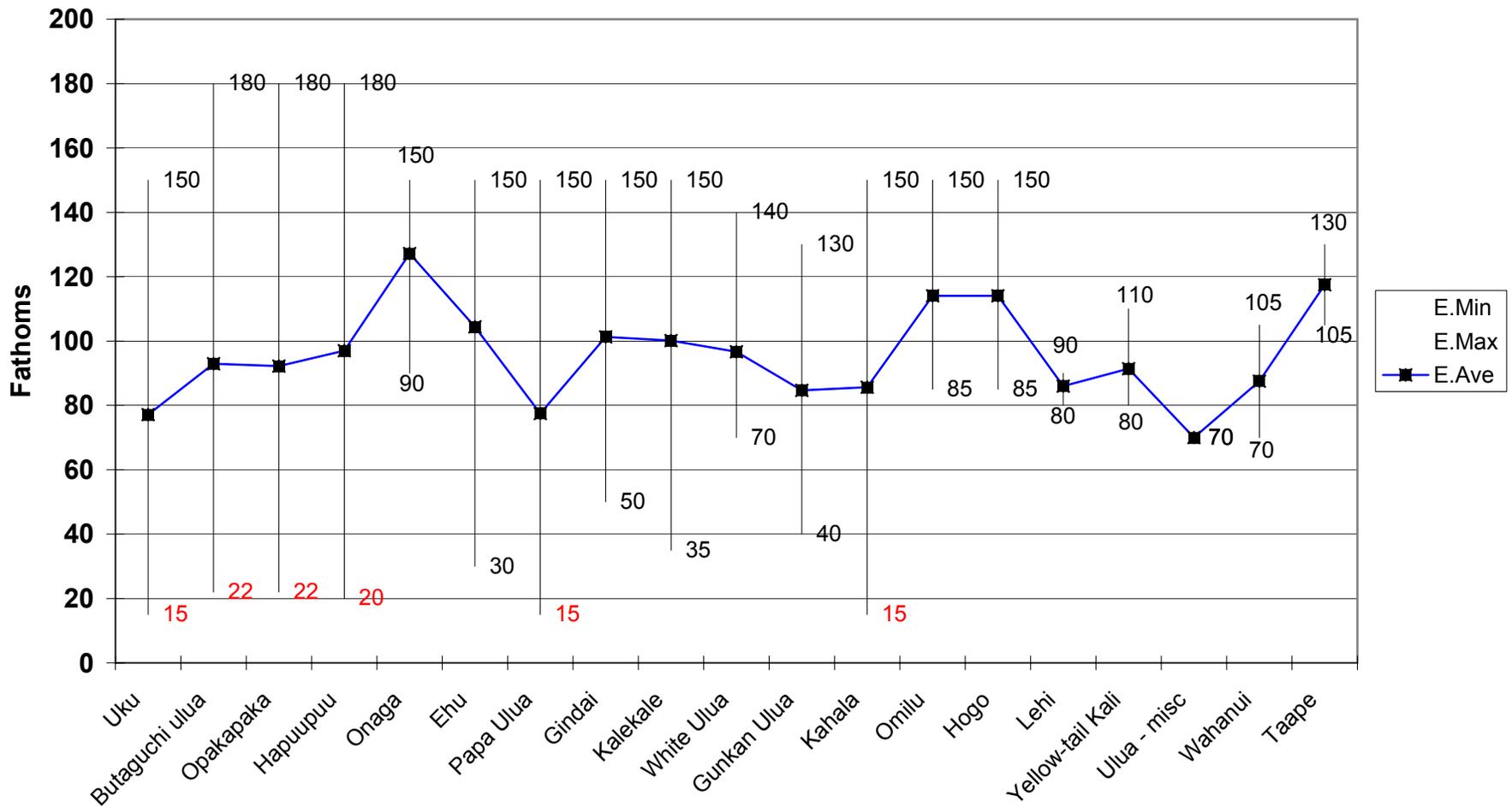


Fig 11. Hawai'i bottomfish market revenue distribution

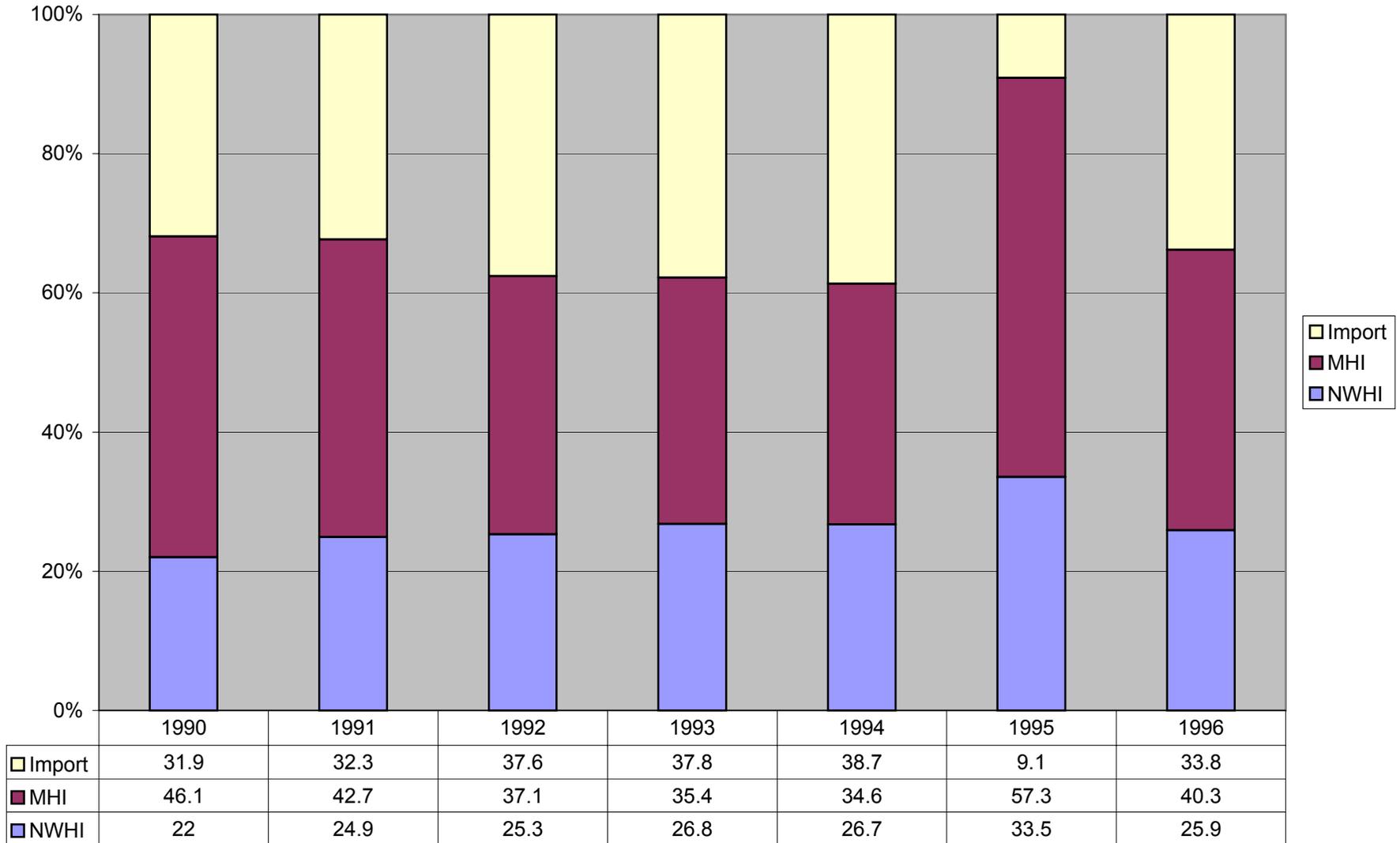


Figure 12: Necker quadrant 16423B: species caught 1996-2000, lbs. sold (1000s), price per pound (dollars). Source: DLNR Federal NWHI Bottomfish Commercial Catch & Landings, 1996 - 2000. 10/29/01

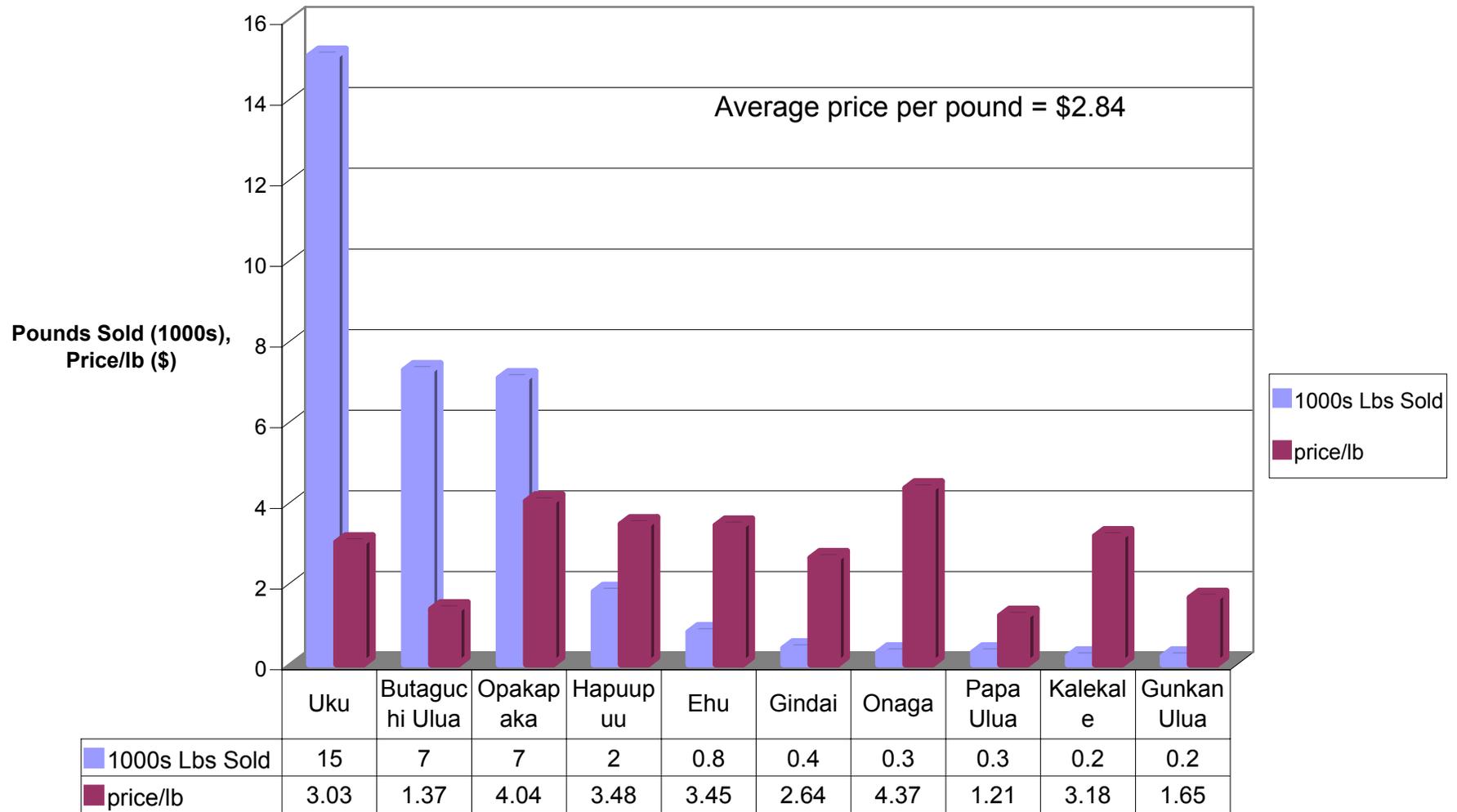


Figure 13: Necker Island, Quadrant 16423B, Average depths at which bottomfishing effort begins and ends per species, 1996-2000. Source: DLNR 10.29/01, Table 3. Note: Wildlife Refuge Protection out to 20 fm, Reserve protection to 25 fm.

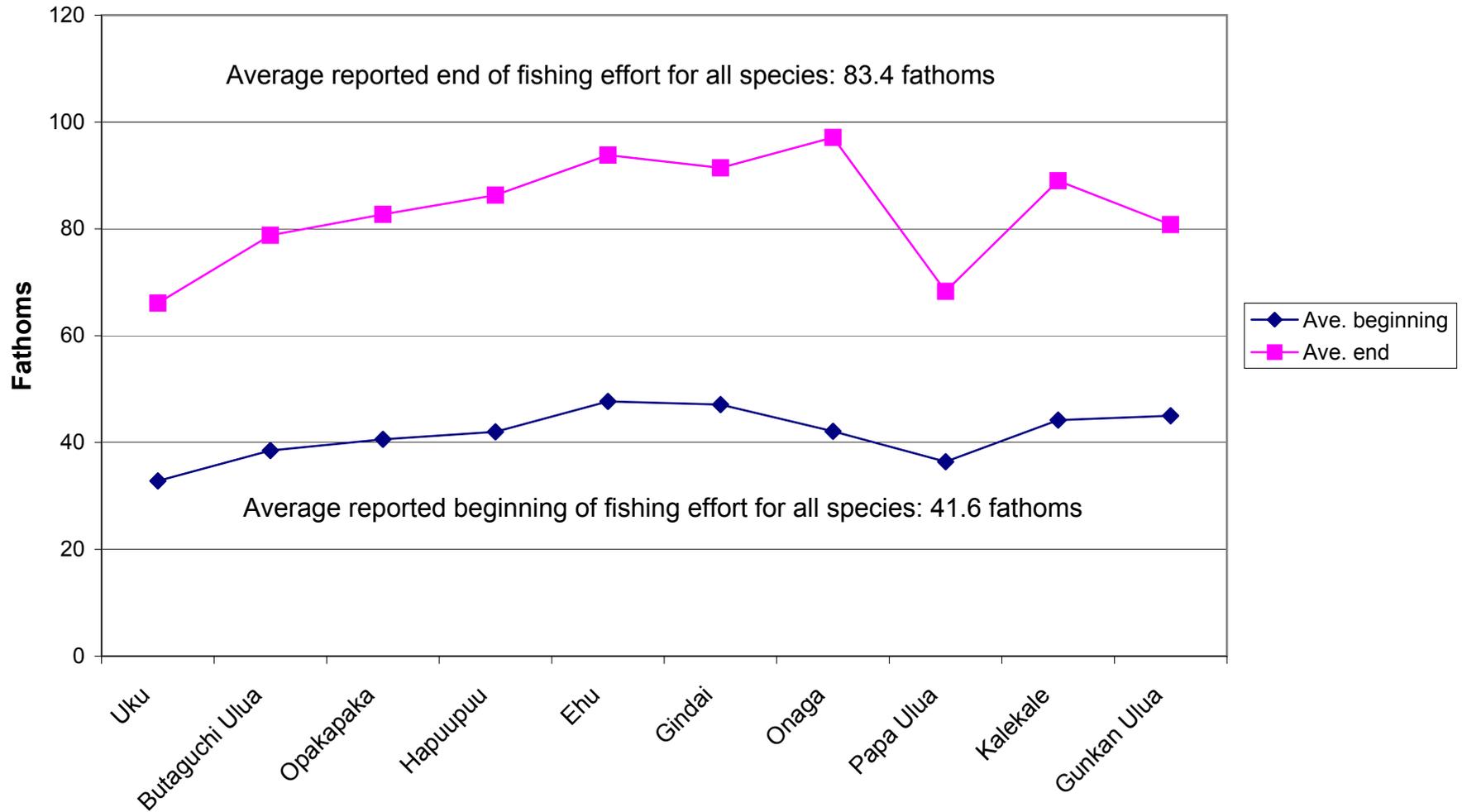


Figure 14: Necker Island, Quadrant 16423B: Average, minimum, maximum depths (fathoms) at which bottomfishing effort begins, per species, 1996-2000.

Source: DLNR 10/29/01 Table 3. Note: Wildlife Refuge protection out to 20 fm, Reserve protection to 25 fm.

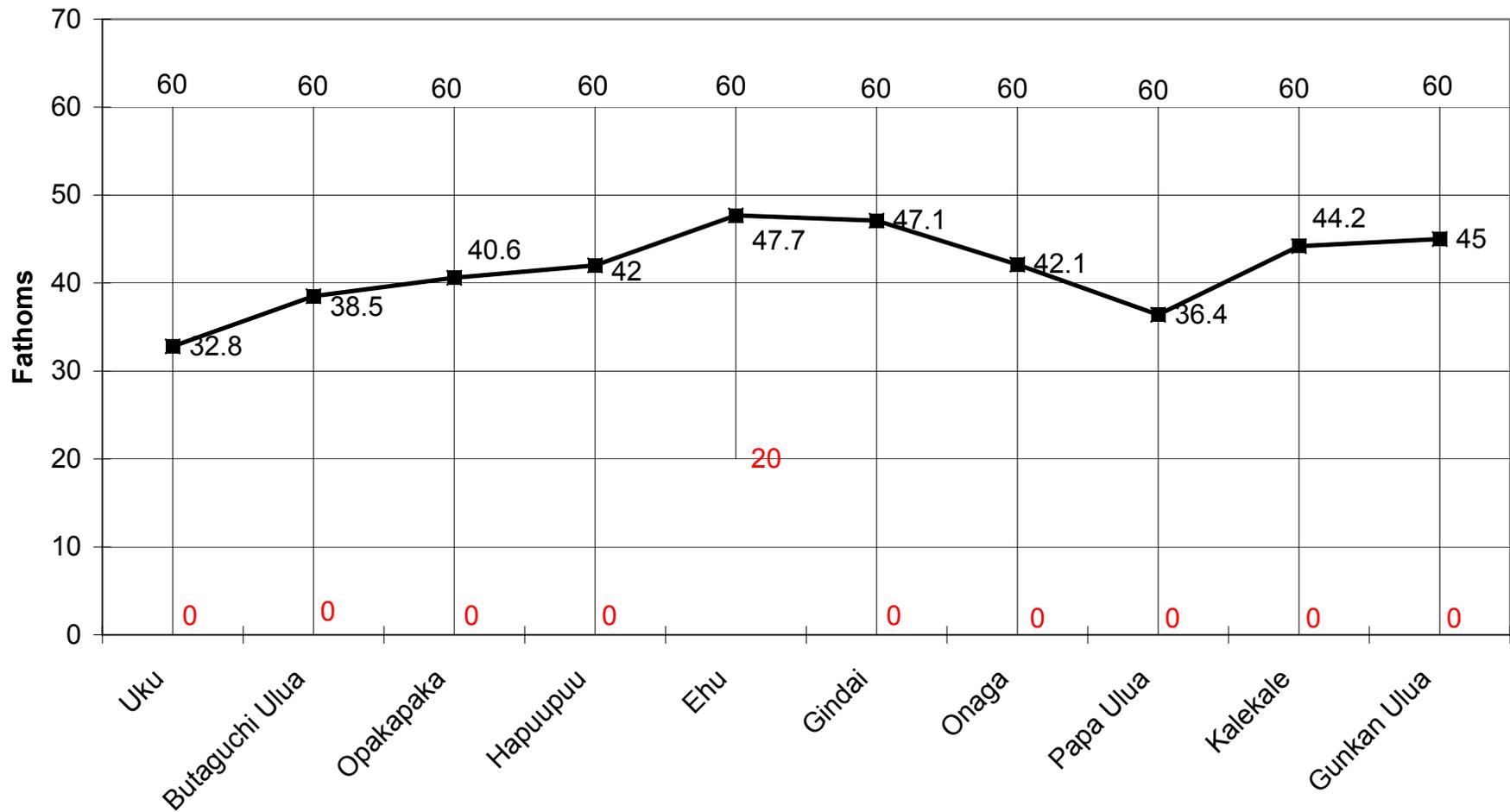
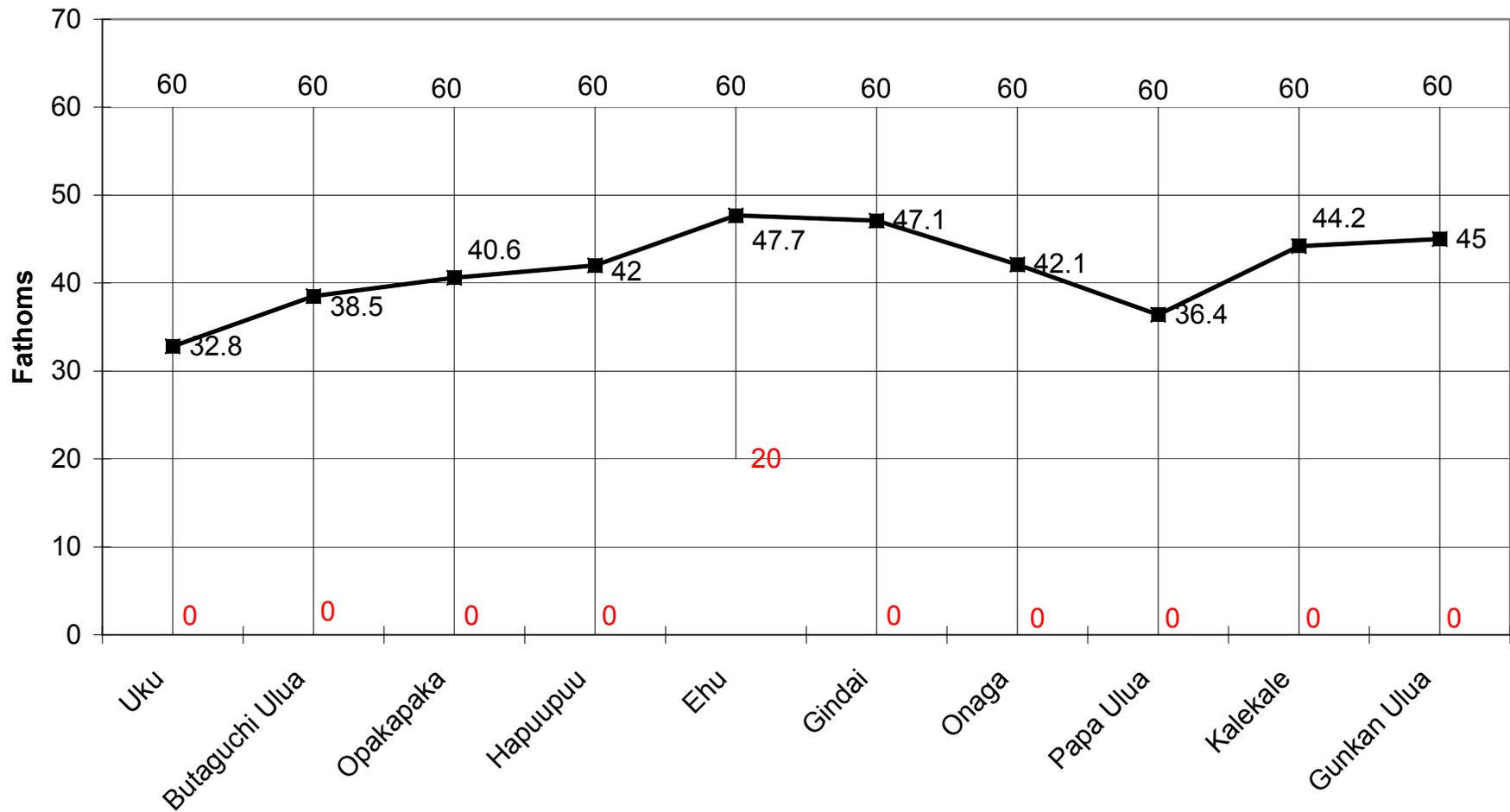
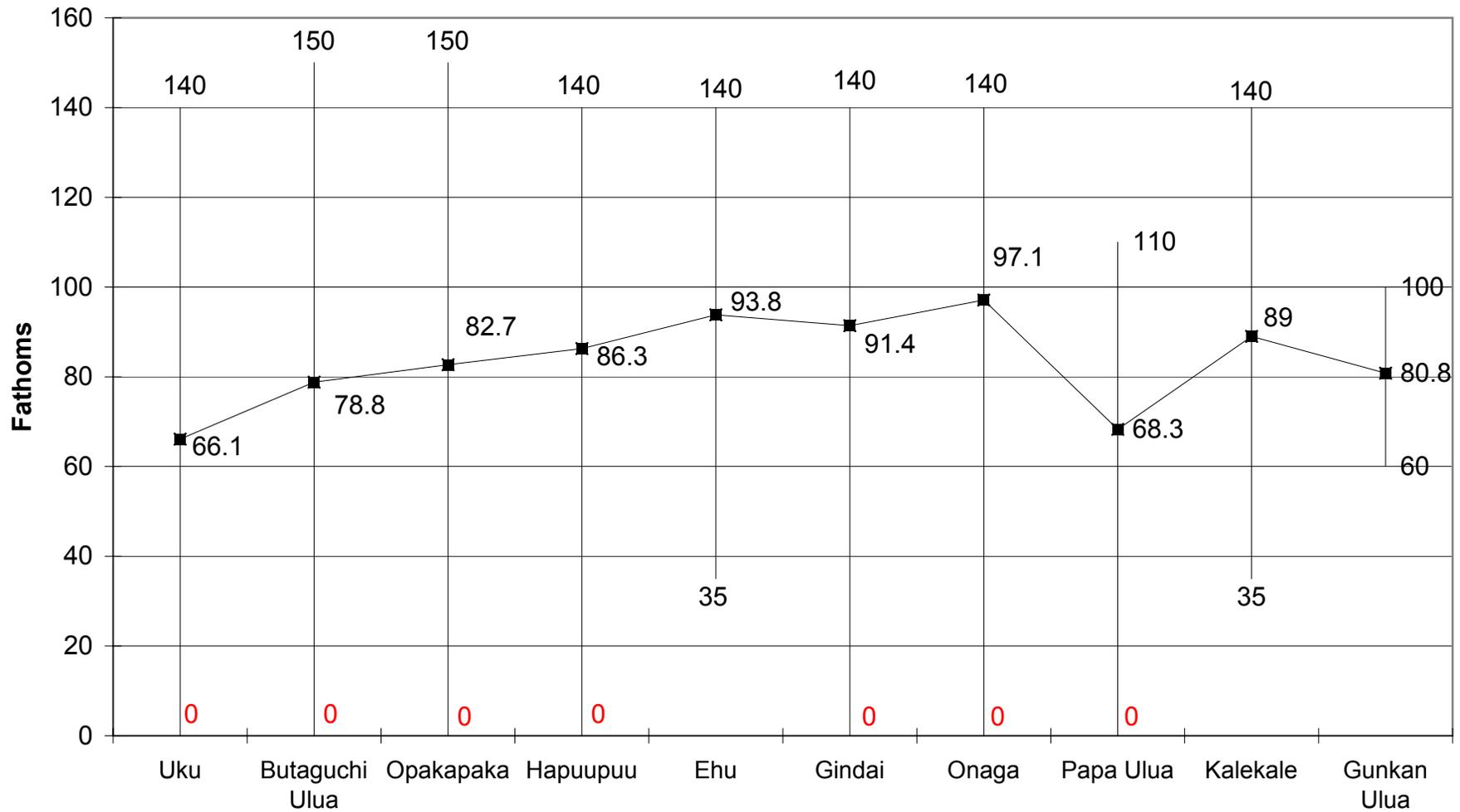


Figure 14: Necker Island, Quadrant 16423B: Average, minimum, maximum depths (fathoms) at which bottomfishing effort begins, per species, 1996-2000.

Source: DLNR 10/29/01 Table 3. Note: Wildlife Refuge protection out to 20 fm, Reserve protection to 25 fm.



**Figure 15: Necker Island, Quadrant 16423B: Average, minimum, maximum depths (fathoms) at which bottomfishing effort ends, per species, 1996-2000. Source:DLNR, 10/29/01, Table 3.
 Note:Wildlife Refuge protection out to **20 fm**, Reserve protection to **25 fm****



DLNR Data indicate:

(1) NWHI bottomfish & pelagic fishers, on average, fish outside of Reserve and Refuge boundaries.

(2) EOs have minimal impact on overall NWHI bottomfish and pelagic fishery revenue.

DLNR estimates:

Ho`omalulu Zone average annual loss:

\$54,000 - \$126,000

Mau Zone average annual loss:

\$67,000 - \$156,300.

Note: the higher numbers represent DLNR “worst case” scenario.

(3) Enforcement implications: routine reporting of fathom depths

“Worst Case” Analysis

* A great deal of attention has been focused on the production of “Worst Case” analyses by DLNR and Wespac. Wespac’s “Worst Case” estimate is 60% loss to bottomfish fishery; DLNR’s is 30% loss.

* DLNR 10/29/01 “Worst Case” and “Best Case” analyses present a false dichotomy.

* “Worst Case” scenario unrealistic, based on huge area closures not recommended by Reserve Council, not under consideration.
(See maps.)

* Analysis of actual DLNR data indicates that “worst case” loss projections of both DLNR and Wespac represent significant exaggerations of EO impact on bottomfish fishery.

Recent Westpac Statements on NWHI Reserve: Wespac Letter to Linda Lingle, Sept. 14, 2001



“Independent analysis conducted by the Council and NMFS has suggested that the language of the EO places as much as 60% of the bottomfish grounds off limits to fishermen.”

Since “there are no records to document the level of recreational fishing activity in the NWHI ... the recreational fishery should also be capped at zero.”

“Representation of the Reserve as an initiative by fishermen, cultural practitioners, and ordinary citizens to protect both jobs and the environment is ‘shibai’.”

76% of DLNR “Worst Case” loss claims



* 40% of “Worst Case” losses claimed by DLNR are at Necker where DLNR data indicate average fishing effort for all species begins at 49.5 fathoms, well outside Reserve’s 25 fathom protected areas.

*36% of claimed “Worst Case” losses occur at French Frigate Shoals where DLNR states “Closure of the area is justified” and describes 50 fm closures planned by WPRFMC and State.

DLNR “Worst Case” Analysis, continued



* 15% of claimed “Worst Case” losses occur at Nihoa Island.

DLNR: “[A]rea closure at Nihoa Island appears to be relatively small, and therefore not likely to significantly affect the fishery.” Note: Wespac claims no losses at Nihoa.

* The remaining 9% of claimed “Worst Case” losses are not described in any detail except as “other Ho`omalulu Zone closures.”

Economics, continued....



*DLNR analysis present data regarding the economic value of the Reserve to the \$700-\$800 million ocean recreation industry in the Main Hawaiian Islands, a significant part of which involves the viewing of migratory NWHI sea turtles by scuba divers and snorkelers.

The type of calculation missing from DLNR analysis -- an example from the Maldiv Islands:

* Annual value of a single shark to diving industry in Maldiv Islands:
\$33,500

* Annual value of a single shark to a fisherman: \$32

More on DLNR Analysis...



The only data presented in detail by DLNR are from Necker Island, where average fishing effort begins well outside Reserve and Refuge depths.

The data indicate, however, that there is some activity inside protected Refuge and Reserve waters. DLNR does not provide standard error of the mean data which would indicate the distribution of fishing effort by depth around the average points. Without this information it is difficult to tell much about the distribution of fishing effort, other than where the average effort occurs.

DLNR: Impact of EO Minimal in Ho`omalua Zone

DLNR: "Worst Case" to "Best Case" range of annual EO impact on Ho`omalua Zone bottomfish and pelagic fisheries: \$54,000 - \$126,000/year loss

* \$11,100 - \$26,000 annual loss at Kure, Gardner Pinnacles, Lisianski, Maro Reef, Pearl and Hermes, and Laysan combined.

* French Frigate Shoals. DLNR: "Closure of the area is justified." DLNR & Wespac already plan 50 fm closure here vs EO 100 fm closure.

DLNR FFS estimates of \$43,000 - \$100,000 annual loss do not take into account impact of already planned 50 fm closures not due to EO.

DLNR: Impact of EO Minimal in Mau Zone

* Necker Island. DLNR claims losses may range from \$48,400 to \$113,000 per year.

These estimates, however, appear exaggerated because:

(1) DLNR data demonstrates that average depth at which bottomfishing begins at Necker is 49.5 fathoms.

(2) EO closure at Necker is 25 fathoms

(3) Pre-existing Wildlife Refuge protection extends to 20 fathoms.

(4) “Worst Case” scenario assumes huge closed areas not recommended by Reserve Council, not under consideration

(5) Unclear what assumptions DLNR used to generate lower figure of \$48,400 loss.

DLNR: EO Impact on Mau Zone #2



* Nihoa Island: DLNR claims losses may range from \$18,500 to \$43,315

*DLNR states:”the area closure at Nihoa Island appears to be relatively small, and therefore not likely to significantly affect the fishery.” Note that Wespac claims no losses at Nihoa.