



Comparing efficiency and angler preference for five different descending devices in the Central California recreational rockfish fishery

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BACKGROUND

There are over 65 species of rockfish, *Sebastes* spp., off the coast of California which make up a popular recreational fishery. In 2002, Canary, Cowcod, Yelloweye, and Brownspotted Rockfish were federally designated as overfished species with continued zero-retention under the 2015 California recreational groundfish regulations. Additionally, in 2015 only three Bocaccio and five Black Rockfish could be retained as part of a 10 fish daily bag limit.

Conservation concern: Post-release mortality for many species of rockfish is high due to excessive buoyancy and other internal injuries associated with barotrauma (Hannah et al. 2008). Barotrauma occurs when rockfish are reeled up from capture depth and the gasses in the physoclistous swim bladder expand with the change in pressure. These fish are often unable to swim back down on their own before being preyed upon by birds, other marine mammals, or succumbing to complications at the surface such as internal injury or thermal shock (Jarvis and Lowe 2008).



Solution: Tagging studies show high long-term survival for rockfish released at depth of capture (Hyde and Wegner unpubl. data). Multiple types of descending devices are available and designed to release rockfish back at depth. Use of these devices is voluntary in the California recreational rockfish fishery, and increasing their presence in the fishing community could greatly reduce the post-release mortality rate of regulated species.

OBJECTIVES

This study is one of several outreach projects along the U.S. West Coast attempting to increase descending device use in the recreational fishing community. Our objectives were to:

- 1) Work with the Central California fishing community to increase the use and awareness of descending devices.
- 2) Assess species composition, catch rates, and prevalence of barotrauma in rockfish caught.
- 3) Compare the efficiency of five descending devices and evaluate angler preference in order to inform future outreach aimed at increasing use.



Figure 1. Five descending devices included in study. Photo credit: Nick Wegner SWFSC La Jolla

METHODS

Catch-and-release Charters

- 7 charters May through August 2015, 5-10 volunteer anglers each trip, anglers fished with hook-and-line gear and released all fish at depth with a descending device

Data Collected

- *Catch rates:* Standardized timed fishing
- *Fish data:* Species, fork length, and external signs of barotrauma
- *Descending device efficiency:* Recorded time to load, total release time, number of times fish fell off device before being returned to the water, and any instances where the fish failed to be released from the device and returned to the surface still attached

Angler Preference Survey

- Anglers ranked each device according to easiest to use, most successful at releasing fish and most recommended for both private and party boats.
- Anglers were asked which device they would choose if one was provided for free (price not a factor) versus purchased at full price.

RESULTS

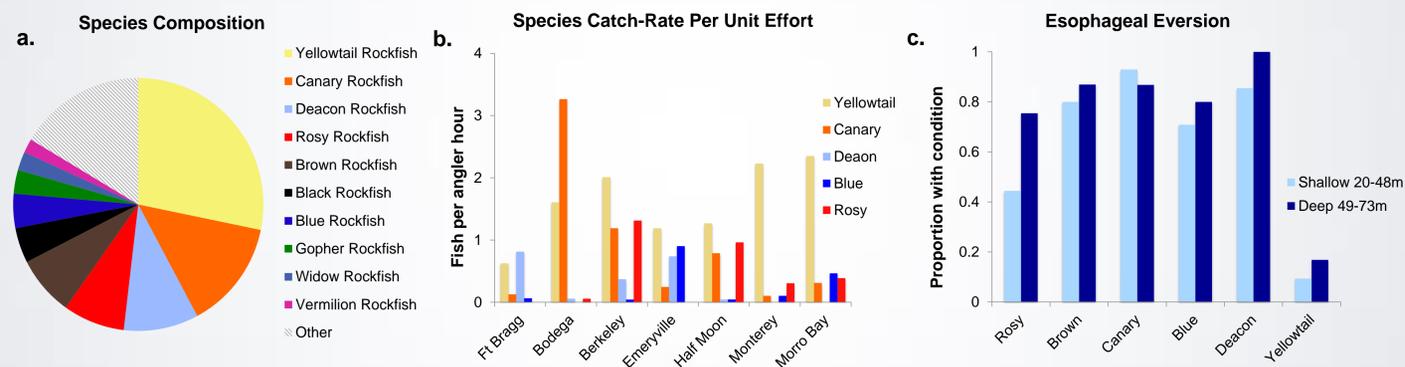


Figure 4. a) Species composition of total fish caught. b) Species CPUE on each charter. c) Proportion of fish with esophageal eversion (external sign of barotrauma) by depth in six commonly caught rockfish.

	SeaQualizer	Roklees	Shelton	Blacktip	Milkcrate
Retail Price	\$49.95	\$29.95	\$6.00	\$49.99	\$64.99

Question	SeaQualizer	Roklees	Shelton	Blacktip	Milkcrate	Average Rank
Most Successful	1.3	2.6	3.1	3.2	3.4	
Easiest to Use	1.6	2.1	3.1	3.1	3.5	
Recommend for Party Boat	1.5	2.4	3.2	3.1	3.2	
Recommend for Private Boat	1.7	2.4	2.5	3.2	3.8	
Currently own/use	21.7	6.7	21.7	5	6.7	
Preference if device is provided for free	71.7	20	10	3.3	1.7	
Preference if purchasing a device	36.7	26.7	30	15	1.7	

Table 1. Charter survey angler responses. Adapted from survey created by Hyde and Wegner. Means and percentages were calculated from a sample size of 60 surveys. Participants were asked to rank each device on a scale of 1 to 5 with 1 being the most preferred and 5 being the least. Anglers were permitted to assign multiple devices the same number.

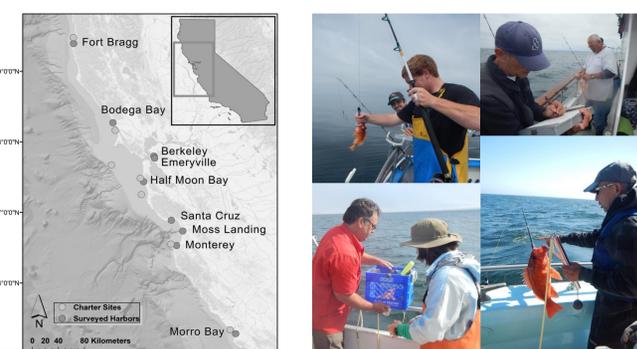


Figure 2. Location of charters and dockside outreach program in Central California. Figure 3. Anglers descending fish on catch-and-release charters.

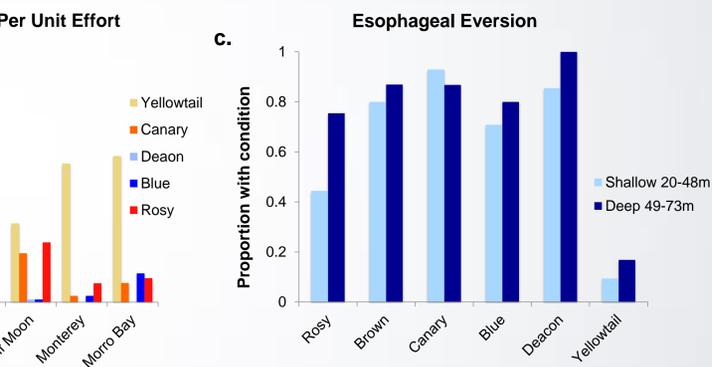


Figure 5. The proportion of instances fish fell off or out of each device before entering the water or fish failed to release from each device at depth and came back up to the surface still attached.

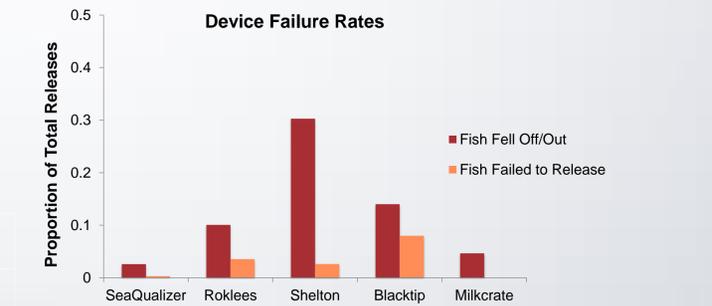


Figure 6. Mean time it took anglers to load fish onto each device and mean total release time for each device with 95% confidence intervals. There was no significant difference in total release times among the devices (ANOVA, P=0.072). The Shelton Fish Descender took significantly more time to load fish compared to the Blacktip (Post-hoc Tukey, P=0.014) and the SeaQualizer (Post-hoc Tukey, P=0.002).

CONCLUSIONS

Impacts to the Resource

- Canary Rockfish were the second most frequently caught fish in our study (Fig. 4a) and encountered at every charter site (Fig. 4b). This indicated that it is highly likely anglers are encountering fish required to be released under current regulations.
- Esophageal eversion is correlated with the inability for rockfish to re-submerge on their own (Hannah et al. 2008). The high proportion of Canary Rockfish with this barotrauma condition demonstrated the need for descending devices to release fish at-depth in order to decrease post-release mortality (Fig. 4c).
- The majority of our top six rockfish caught (except Yellowtail Rockfish) had esophageal eversion (Fig. 4c). Depth was only a significant factor for Rosy Rockfish which experienced less barotrauma when caught in shallower waters.

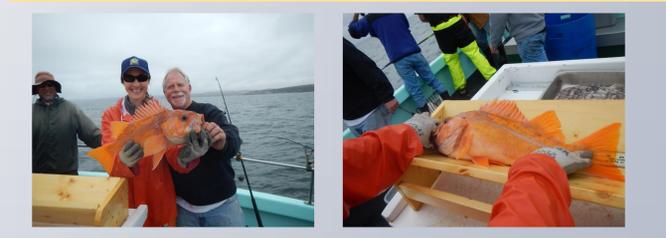


Figure 7. Canary Rockfish being descended on a SeaQualizer.

Device Efficiency and Angler Preference

- Anglers' top choice for a device was the pressure-activated lip-gripper (the SeaQualizer) whether or not price was a factor. It was considered both easiest to use as well as most successful at releasing fish (Table 1). This reflected our findings that it was the most consistently efficient device across all measures and had relatively low proportions of failure compared to the other devices (Fig. 5).
- The simple inverted hook style device (Shelton Fish Descender) was the second preferred device if purchased. This device was the least expensive and most portable, but had a sharp learning curve. It took the most time to load fish onto the device (Fig. 6) and had the highest failure rate of fish falling off or out of the device (Fig. 5).

These findings will be used to inform future outreach efforts promoting best-practice release techniques in the recreational rockfish fishery in order to reduce post-release mortality of overfished, regulated species.



For underwater release videos from our project and more information....

Please visit barotrauma.ucsc.edu (or scan this QR code with your smartphone)

REFERENCES

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