

The “Science” of Catch and Release angling – how can it help us improve our sport?



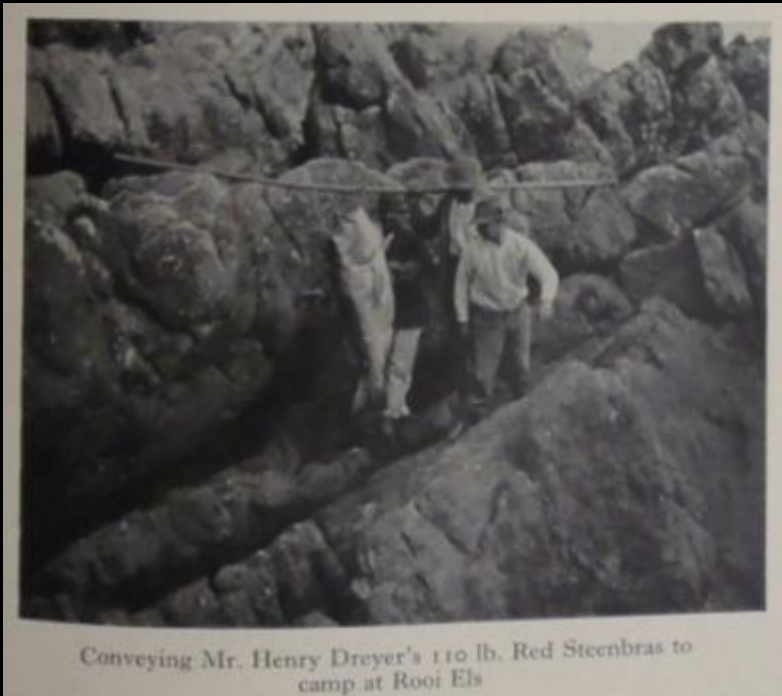
Warren Potts
Senior Lecturer
Department of Ichthyology and Fisheries Science
Rhodes University
Tel. +27 (0) 46 603 8415
Cell +27 (0) 79 615 5113
Fax. +27 (0) 46 622 4827
w.potts@ru.ac.za

Contents:



- Why should we practice C&R angling?
- What factors influence survival?
- How can we improve things in the RASSPL?

Why do we practice catch and release angling?



Conveying Mr. Henry Dreyer's 110 lb. Red Steenbras to camp at Rooi Els

Has anyone ever caught a red steenbras from the shore?



Mr. Henry Dreyer's catches at Witsands



Mr. Henry Dreyer's catches at Cape of Good Hope

Has anyone ever caught 44 galjoen in a morning?

So what happened to our fish?



- Lets take the galjoen as an example.....
- Based on what we know about the biology of this fish, the average age of those 42 individuals caught by Henry Dreyer was 15.
- So, in one mornings fishing one fishermen removed 660 years worth of fish growth from the sea.



Many people say that fish populations have declined because of commercial fisheries, but is that true?



There are 29 inshore hake trawlers fishing in SA
They fish on average for 180 days a year
They catch a total of 2390 t per year
(Powers et al 2004)

There are approximately 850 000 rock and surf
fishers in SA (Leibolt 2008)
If we each fish on average five times per year
and catch 1kg of fish per trip our total catch
would be 4250 t per year

COMMERCIAL FISHERS DON'T TARGET GALJOEN

Cooke and Cowx (2004) –Recreational anglers catch an
estimated 47.1 billion fish annually.

The difference between commercial and recreational fishers is.....



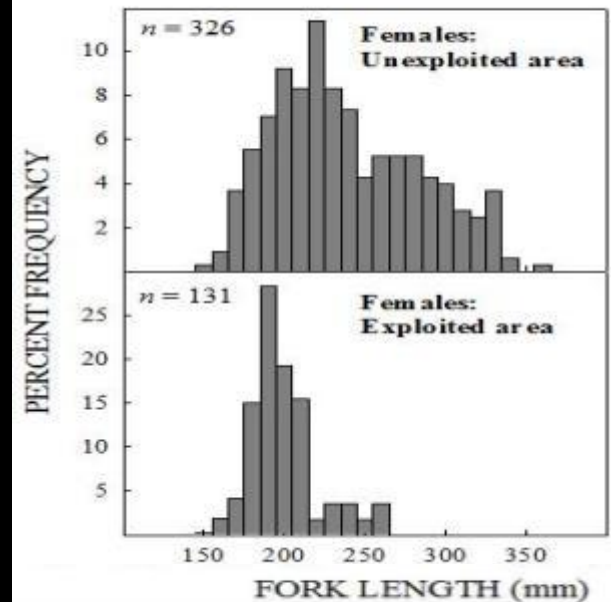
- Commercial fisher stop fishing when it is no longer economically profitable to do so (Arlinghaus et al 2007).
- Recreational anglers are not dependent on high catch rates.
- The old adage “Even the worst day of fishing is better than the best day at work” actually holds true.
- We often fish for the experience and while catching improves our satisfaction it is not the only important thing. (Arlinghaus and Mehner 2005, Arlinghaus, 2006)
- Unfortunately, this means that we place pressure on our fish stocks even if their numbers are very low. This does not happen in commercial fisheries.

WE DON'T STOP FISHING IF THE FISH POPULATIONS ARE IN TROUBLE

It doesn't matter if you are a recreational or a commercial fishermen, you still have the same type impact on the resource.

- Both reduce the mass of fish available to catch
- Larger fish are normally the first to be caught and killed
- Fish that grow the fastest are removed from the population and don't breed
- Both pollute the environment
- Both destroy habitat

(Cooke and Cowx, 2006).





- With declining catches and a commercial fishery that rarely targets our species, it is up to us to improve our fishery.
- So, what is the best way for us to continue enjoying our sport, getting good catches and protecting the fish for our children to catch?



is the obvious way to go. Common sense would suggest that C&R encourages the biological, economic, and social sustainability of recreational fishing, and much evidence shows that it does (Policansky, 2002).

Catch and release is only worth doing if the fish survives.



- Several studies suggest that survival varies depending on the species and on the type of fishery.
- A review of the studies by Munsiek (2004) suggested that survival ranged between 25% and 98% in various studies.
- The RASSPL goal should be to get survival well over 90%

Angling activity	Potential problem	Possible result	Extreme case
Fish hooked	Tissue damage	Injury ➤	Death
Fish fought	Exhaustion	Injury ➤	Death
		Stress ➤	Death
Fish handling	Air exposure	Hypoxia ➤	Death
	Scale removal	Disease ➤	Death
	Slime removal	Fungus ➤	Death
Hook removal	Tissue damage	Injury ➤	Death
Fish released	Tissue damage	Injury ➤	Death
	Predation	Injury ➤	Death



AVOID THIS SITUATION

- Injury
- Disease/fungus
- Sublethal stress
- Fitness impact
- Mortality

CUMULATIVE IMPACT



TARGET FOR CATCH AND RELEASE

- Recovery
- No fitness effects
- No disease
- Minimal injury
- Minimal sublethal stress
- Survival

Angling activity	Potential problem	Possible result
Fish hooked	Tissue damage	Injury Death

Where the fish is hooked is generally the most important factor influencing fish survival (Bartholomew and Bohnsack 2005)



Study on the survival of dusky kob (*Argyrosomus japonicus*)

- Very few kob died when they were mouth hooked
- 73% of kob died when they swallowed the hook and the angler removed it.
- Only 16% died when they swallowed it and the angler cut the line 5cm from the hook.
- Many of these fish got rid of the hooks within 5 days.

(BUTCHER et al 2007)

ANGLERS SHOULD CUT THE LINE (5CM AWAY FROM THE HOOK) WHEN FISH SWALLOW THE HOOK TO OPTIMISE THEIR SURVIVAL.

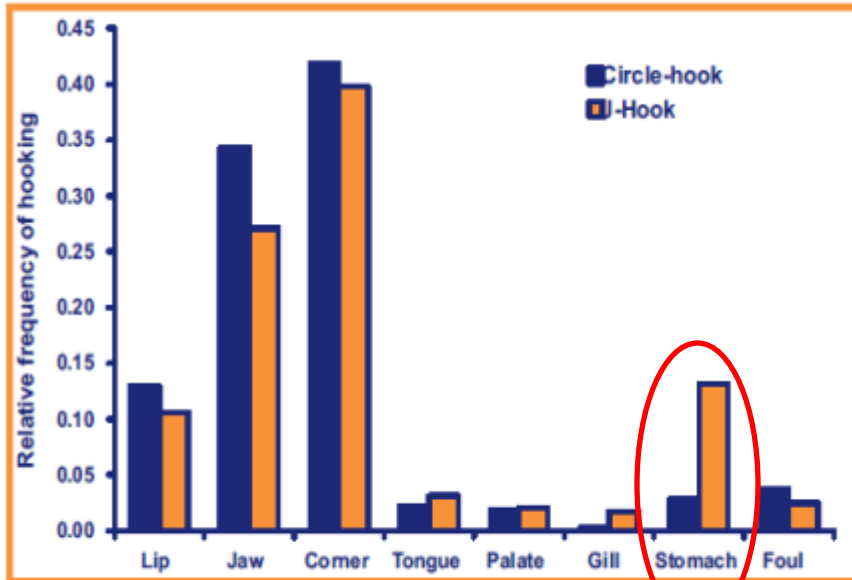
So, what factors influence the amount of tissue damage caused by hooks?

- Hook type
- Hook barbs
- Hook composition
- Hook size

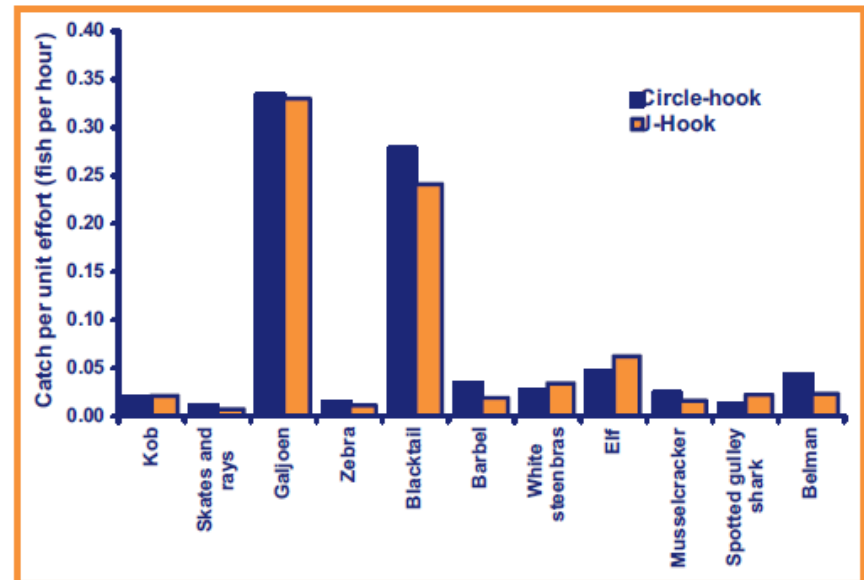


Hook types – Circle vs J hook?

Attwood 2007 – De Hoop marine protected area



A comparison of the frequency of hooking in each position between circle-hooks and J-hooks for all species caught from the shore.



A comparison of the catch rate of circle-hooks and J-hooks for common species taken from the shore. None of the differences were statistically significant, implying no difference in the catch efficiency of the designs.



The average number of sinkers lost per day by anglers fishing in the TNP tagging program dropped from 12 to 4 when they switched to circle hooks

Tying versus Snelling Fish Hooks

- Commercial fishers in NZ use a type of circle hook (Tainawa pattern, Jap Hook) and snell their hooks to the fishing line.
- Most recreational fishers tie a knot to the eye of the hook as shown in the diagram on the right.
- **Snelling improved** the observed catch rate on circle hooks **by a staggering 30%** while gut hooking of the catch was about the same



Single vs treble hooks?

Ayvazian et al. (2002)

- Shad (*Pomatomus saltatrix*)
- Treble hooks produce significantly higher mortality rate than single barbed and barbless hooks.



Barbed vs barbless

- Study on Bonefish (*Albula vulpes*) - Barbless hooks were expelled 3.9 times faster when located deep in the oral cavity compared to barbed hooks, but there was no difference in expulsion rates among barbed and barbless hooks in shallow-hooked fish (Stein et al 2012).
- The barb also increases the size of the wound and makes the fish more difficult to unhook.
- Unhooking time is significantly shorter when there is no barb (Schaeffer and Hoffman, 2002, Alos et al 2008).
- Unfortunately some studies found that fishermen using barbless J hooks caught significantly less fish than barbed hooks (Alos et al 2008), but other studies show that squashing the barb makes no difference to your catch rate (DuBois and Dubielzig 2004)



Hook chemical composition

Research into this aspect is still new.

However an Australian study (McGrath et al 2011) compared the hook ejection rates of fish that swallowed stainless steel and nickel-plated and red-lacquer carbon steel hooks in dusky kob (*Argyrosomus japonicus*)

Nickel-plated swallowed hooks corroded the fastest and were ejected quickly. Unfortunately, the nickel got into the fish's blood and killed them.



Hooks that corrode quicker are better for survival

Hooks with high nickel content are not good for fish survival

Hook size

More fish swallow the hook when you use small hook sizes (Alos et al 2008).

This will result in more fish dying.

Try to match your hook size to your target species

Minimum size in R&S should be a 2/0.



Angling activity	Potential problem	Possible result	Extreme case
Fish fought	Exhaustion	Injury ➤ Stress ➤	Death Death

- Length of fight
- Injury during fight or while landing fish



Length of fight

- The longer the fish is played the more physiological disturbance it experiences and the longer it will take to recover

- Fighting fish for long periods reduces their energy stores and creates lactic acid build-up in their muscles
- High water temperature is correlated with increased physiological disturbances and increased probability of post-release mortality (Muoneke 1992) .

FIGHT TIME IS A FINE LINE – YOU SHOULD TRY TO REDUCE THE FISH PLAYING TIME, BUT BRINGING A GREEN FISH ONTO THE SHORE IS ALSO NOT A GOOD IDEA. Fish that jump around frantically are more likely to get injured. I would recommend that your fish should be quite tired, but not exhausted.

Injury during fight or while landing fish

Fish are often injured as we drag them over rocks or over dry sand.

Before you start fishing ask yourself :
“Can I get the fish out here without dragging over something that will hurt it?”

How can I stop the fish from ending up in the dry sand?

If I hook a big cracker where could I land it safely?



Angling activity	Potential problem	Possible result	Extreme case
Fish handling	Air exposure	Hypoxia ➔	Death



AIR EXPOSURE is in my opinion one of the biggest problems in the RASSPL format

Rainbow trout – Fish were chase around in a tank for 30s to simulate the fight.
 Some fish were exposed to air for 30s – 38% died
 Others were exposed to air for 60s – 72% died (Ferguson and Tufts, 1992).

Rockbass - Fish that were in air for 30 s required 2 h for full cardiac recovery
 Fish that were in air for 180 required 4 h to fully recover (Cooke et al 2001).

Different fish species will vary in their sensitivity to air exposure. Eg Galjoen and Yellowbellies are quite tough. Most fish will be sensitive when the sea is warm.

However we should all try to reduce air exposure when handling fish that are to be released.

How to reduce air exposure in the RASSPL competitions?



1. Be organised!!!!
2. Keep a bucket with fresh seawater near you on the beach. If you are wading out on rocks, Carry the empty bucket (soft pvc) out with you.
3. Fill the bucket before you land the fish, place the fish/or its head into the bucket and walk carefully to your bag.
4. Have the measuring sling laid out and ready. Wet it immediately with water from the bucket and use a cloth to remove all of the dry sand.
5. Keep the fish in the bucket while you unhook it (have pliers handy, jut in case) and get your camera ready (it should be easily accessible).
6. Place your measure card on the sling, take the fish out of the bucket, use wet hands or a wet cloth to move it for its measurement and take a quick photo and put the fish back in the bucket.
7. Get you friend ready to take a photo.
8. Remove the fish from the bucket, take a quick photo, place it back into the bucket and carry the fish in the bucket to the sea for its release.

If you do this well, it will get you fishing again sooner

Angling activity	Potential problem	Possible result	Extreme case
	Scale removal	Disease ➔	Death
	Slime removal	Fungus ➔	Death



This often happens when you drag the fish up into the dry sand or if you touch it with dry hands.

It will lead to disease and fungus and could lead to death



Angling activity	Potential problem	Possible result	Extreme case
Fish released	Tissue damage Predation	Injury ➔ Injury ➔	Death Death



Holding fish (for photos)



The end