Cooke, S.J., and C.D. Suski. "Are Circle Hooks an Effective Tool for Conserving Marine and Freshwater Recreational Catch-and-release Fisheries?" *Aquatic Conservation: Marine and Freshwater Ecosystems* **14 (2004): 299-326.**

http://fishlab.nres.illinois.edu/Reprints/Aquat%20Cons%20Mar%20FW%20Eco%202004.pdf

- Meta-analysis of 43 circle hook studies (25 species, 65% marine) from scientific journals, gray literature (studies not published in peer-reviewed journals), and outdoor media (magazines, etc.) through 2003.
- Meta-analysis consistently found different performance between circle hooks and J-hooks.
- In general, circle hooks reduce hooking mortality by 50% when compared to J-hooks.
    - This effect is from the tendency of circle hooks to hook in the jaw, resulting in shallower hook depth. Gut/deep hooking was rare with circle hooks, reducing damage.
- Frequently, studies focused on immediate mortality, rather than long-term mortality.
- The type of hook used plays a major role in mortality from direct hooking injuries.
- Gut and esophagus hooking increase the risk of bleeding and damage to vital organs, which leads to increased mortality.
- Circle hooks resulted in lower mortality than other hook types.
- Overall, discard mortality rates were consistently lower than J-hooks.
    - Limited instances where circle hooks did not have lower mortality than J-hooks (see below).
- Circle hooks caught in the jaw more often than J-hooks.
    - Eye damage can be associated with circle hooks, and is linked to hook size in relation to fish size.
- J-hooks caught in the gut more frequently than circle hooks.
- Circle hooks, in general, are more difficult to remove than J-hooks.
    - Some studies found circle hooks were easier to remove.
    - General studies (not with circle hooks) found increased hook removal time leads to longer air exposure times and increased physiological disturbance.
- Circle hooks function most effectively when angler does not ‘set’ the hook.
    - A circle hook is most likely to perform as designed when fish have sufficient time to ingest the entire hook in the mouth and then the angler applies gentle pressure to the line.
    - No empirical studies have evaluated circle hook efficiency with different angling techniques.
- Variation in mouth shape, feeding mode, and behavior affect circle hook performance.
- Overall, circle hooks had lower capture efficiency (catch) than J-hooks.
    - Some instances where circle hooks had higher catch efficiency than J-hooks.
    - Substantial variation in hooking, landing, and capture efficiency between studies.
- Data regarding different impacts between in-line circle hooks and offset circle hooks was inconclusive.

- No evidence to support differential size selectivity between circle hooks and J-hooks. Circle hooks don't necessarily reduce bycatch of undersized fish in comparison to J-hooks.
- "Based upon our synthesis, we strongly support management strategies that incorporate the use of circle hooks when species-specific data or compelling evidence from other species with similar mouth morphology suggest that circle hooks result in less injury and mortality than other hook designs."

Burns, Karen M, and John T Froeschke. "Survival of Red Grouper (*Epinephalus Morio*) and Red Snapper (*Lutjanus Campechanus*) Caught on J-Hooks and Circle Hooks in the Florida Recreational and Recreational-for-Hire Fisheries." *Bulletin of Marine Science*, **2012, 633-46.**

- Jaw morphology and feeding behavior may predict release survival.
- Many factors affect post-release mortality, but hook trauma is a primary cause (cites a large body of literature).
- Damage from J-hooks was responsible 20.0% of the mortality of red grouper (suction feeders) and 49.1% of the mortality for red snapper (biters).
- Tag and recapture found that red grouper survival was higher with circle hooks than J-hooks, but the opposite was true for red snapper.
- Because red grouper are suction feeders, hooks are in the mouth longer before swallowing, which provides more time for an angler to set a J-hook in the mouth or jaw.

  n.b. Cod are mainly suction feeders, but also can seize and bite prey.

Sauls, Beverly, and Oscar Ayala. "Circle Hook Requirements in the Gulf of Mexico: Application in Recreational Fisheries and Effectiveness for Conservation of Reef Fishes." *Bulletin of Marine Science*, **2012, 667-79.**

- For species that are susceptible to high levels of effort and strict harvest restrictions, reductions in release mortality rates may equate to meaningful conservation benefits (citing Coggins, et al 2007). (p. 674)

  Coggins, Lewis G, Matthew J Catalano, Micheal S Allen, William E Pine, and Carl J Walters. "Effects of Cryptic Mortality and the Hidden Costs of Using Length Limits in Fishery Management." *Fish and Fisheries*, 2007, 196-210.

- In 2008 Amendment 27 implemented circle hook requirement for recreational anglers in the Gulf of Mexico based on comprehensive meta-analysis by Cooke and Suski (2004; summarize above).
- Study found circle hooks more often hook the lip and result in fewer potentially lethal injuries for 7 out of 10 species.
- Circle hooks reduced potentially lethal injuries 30 to 93 percent (across all species).
- No clear evidence circle hooks result in reduced bycatch of undersized fish than J-hooks in this study.