Avoidance: Management and Fishing Techniques to Minimize Capture of Unwanted Fish

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Ventafish Fish Venting Tool

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I used Relative Risk to assess the effects of venting, because it allowed me to combine results from experimental and tagging studies

$$\text{Relative Risk} = \frac{\text{Probability of Survival or Recapture in Vented Fish}}{\text{Probability of Survival or Recapture in Unvented Fish}}$$

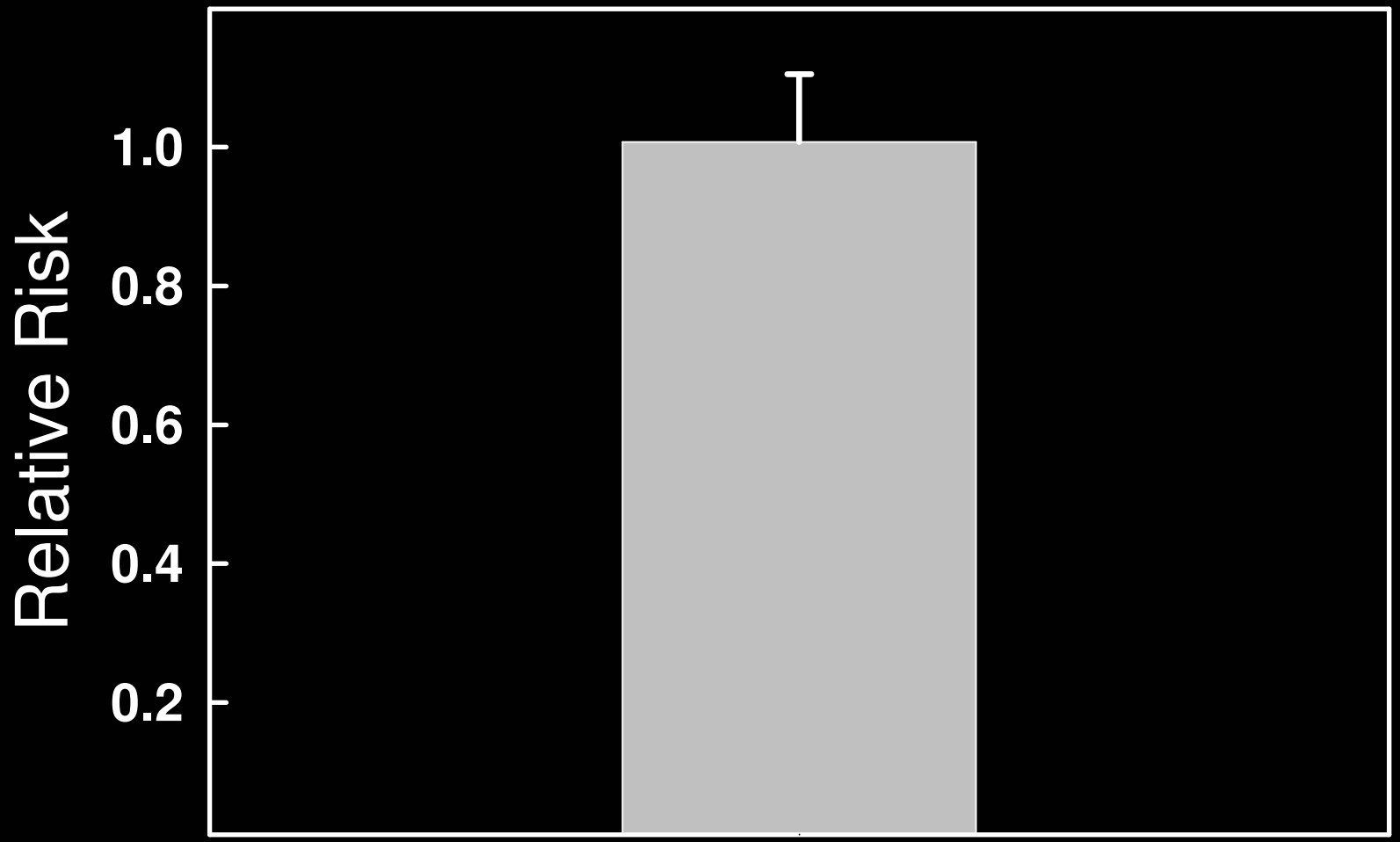
Seventeen studies provided 39 sample estimates, for 22 species, of the effects of venting

Venting had no effect ($P > 0.05$) in 32 of 39 samples

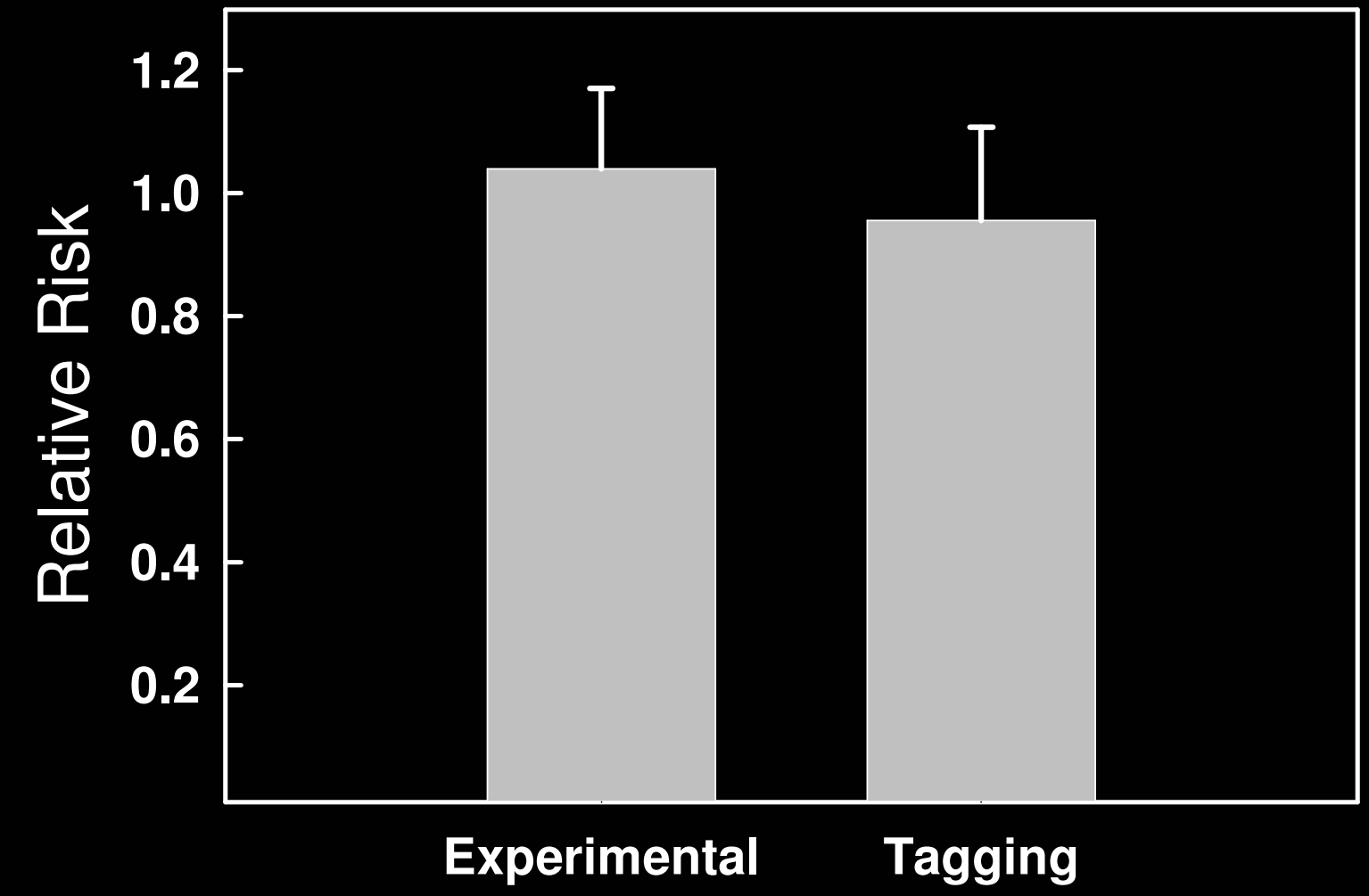
- Negative effect in two samples
- Positive effect in five samples

Among ten species for which multiple estimates were available (including three of the above species), none showed a significant overall response to venting

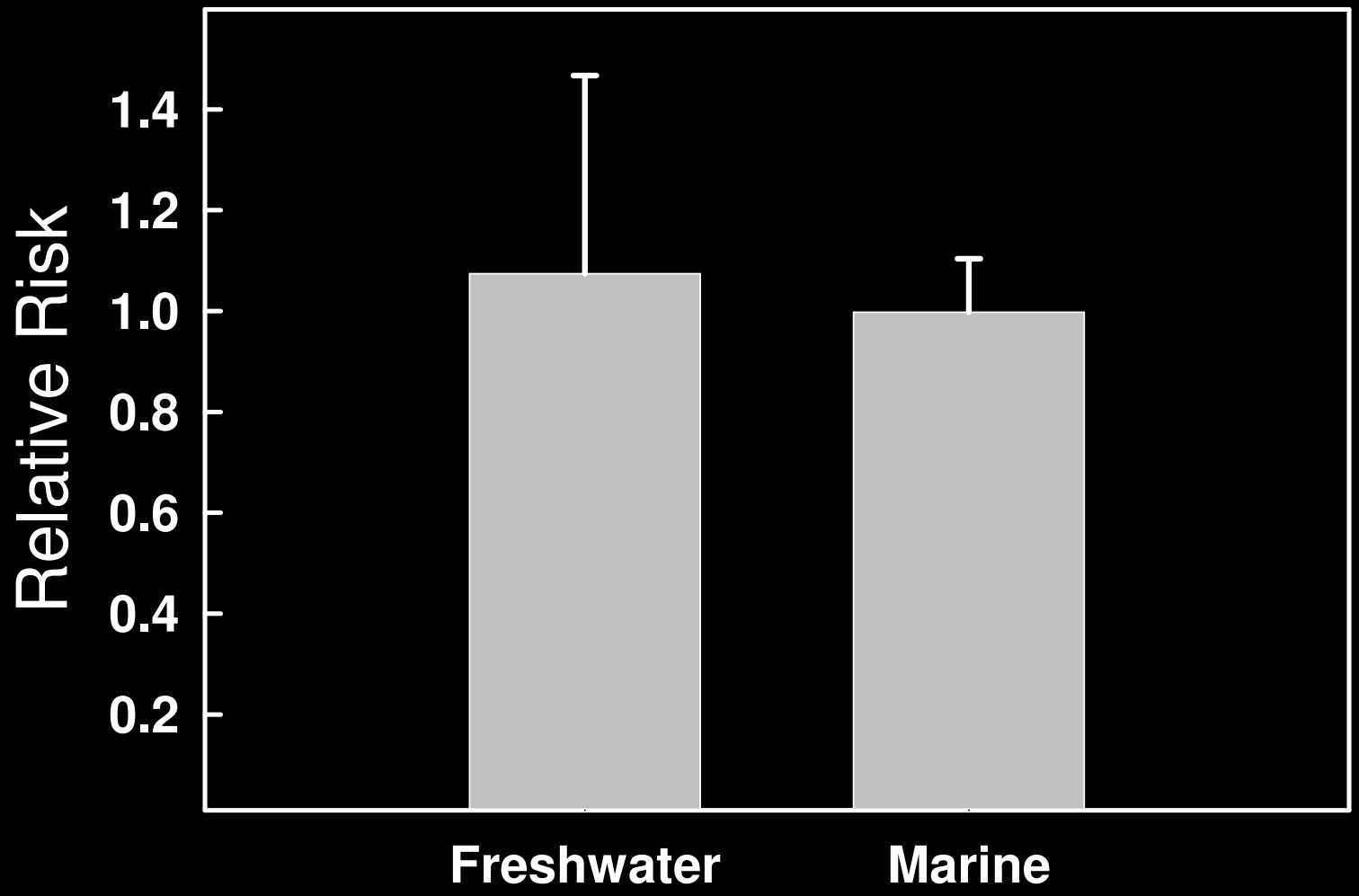
Across all study species, there was no evidence that venting affected survival



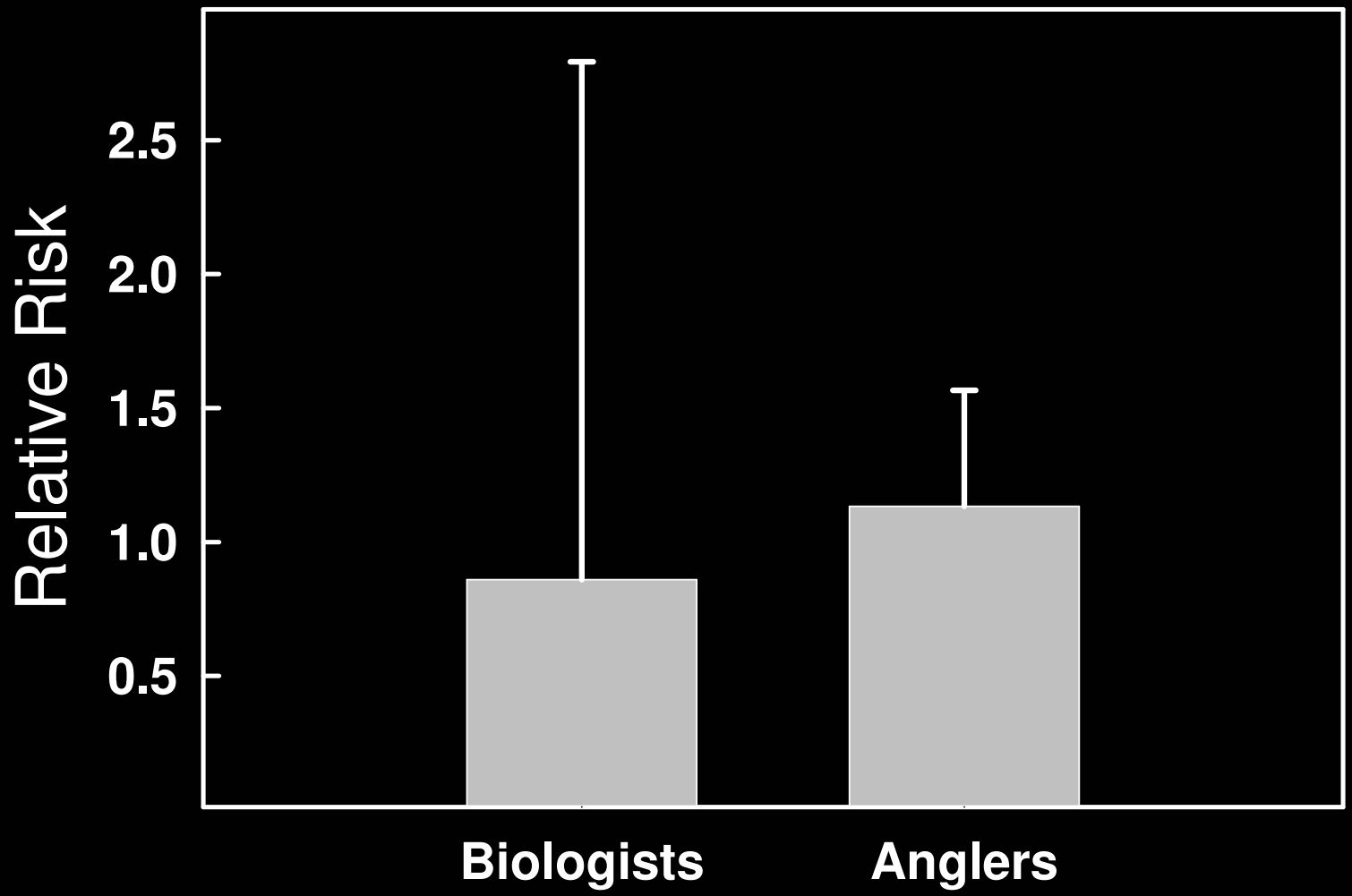
There was no difference in results of experimental and tagging studies (P = 0.7584)



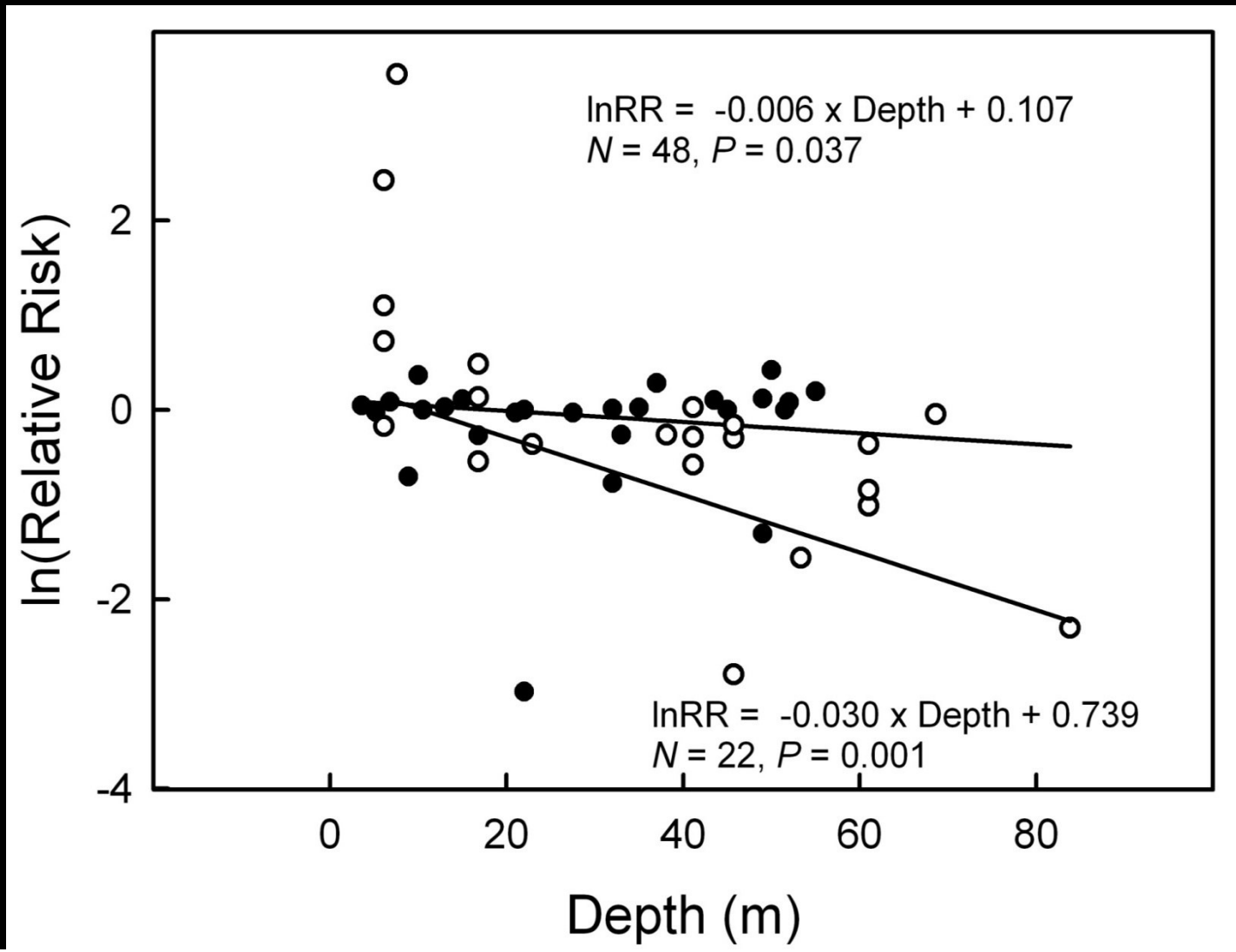
There was no difference between freshwater and marine species (*P* = 0.2821)



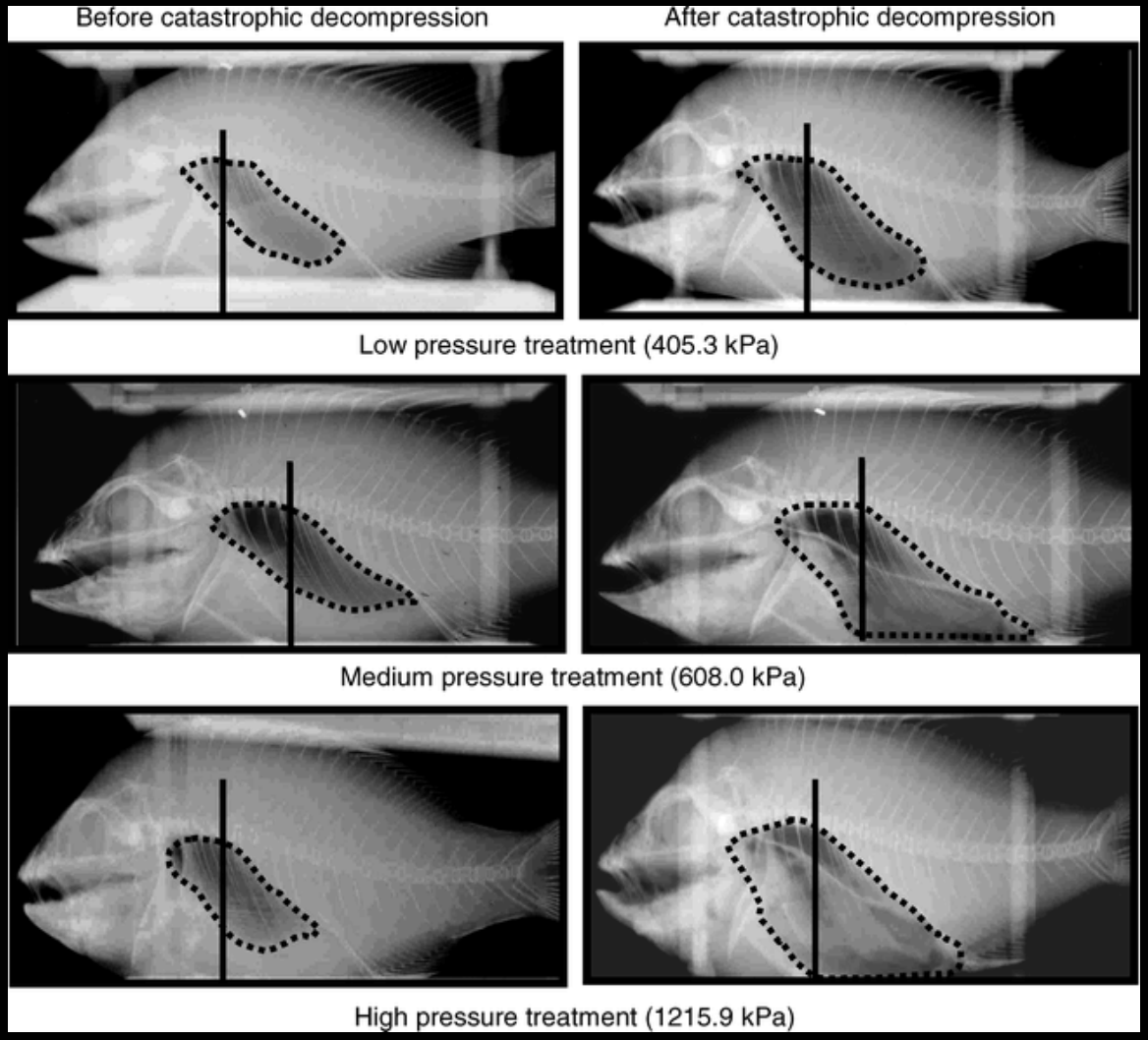
There was no difference in survival of fish vented by biologists and anglers (P = 0.4903)



Surely, there must be a relationship between the effects of venting and capture depth



Barotrauma may result in expansion and displacement injuries that are potentially fatal

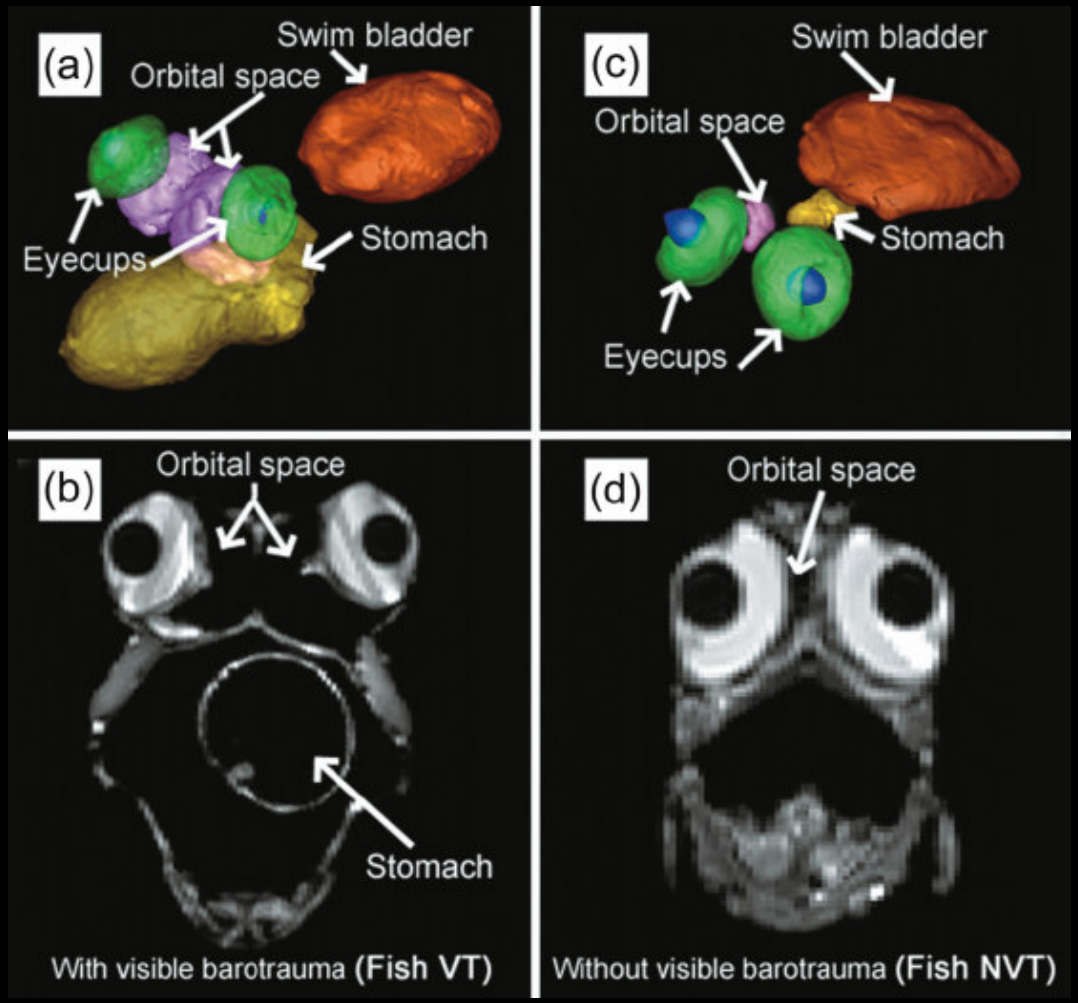


Source: Rummer and Bennett (2005)

Barotrauma may result in hemorrhage and hematomas

Source: Phelan (2008)

Barotrauma may result in permanent damage to the eyes and optic nerve



Source: Rogers et al. (2008)

Alternatives to venting

Release Capsules

Source: Brown et al. (2008)

Drop Weights

Can Barotrauma affects be reduced by rapid assent?

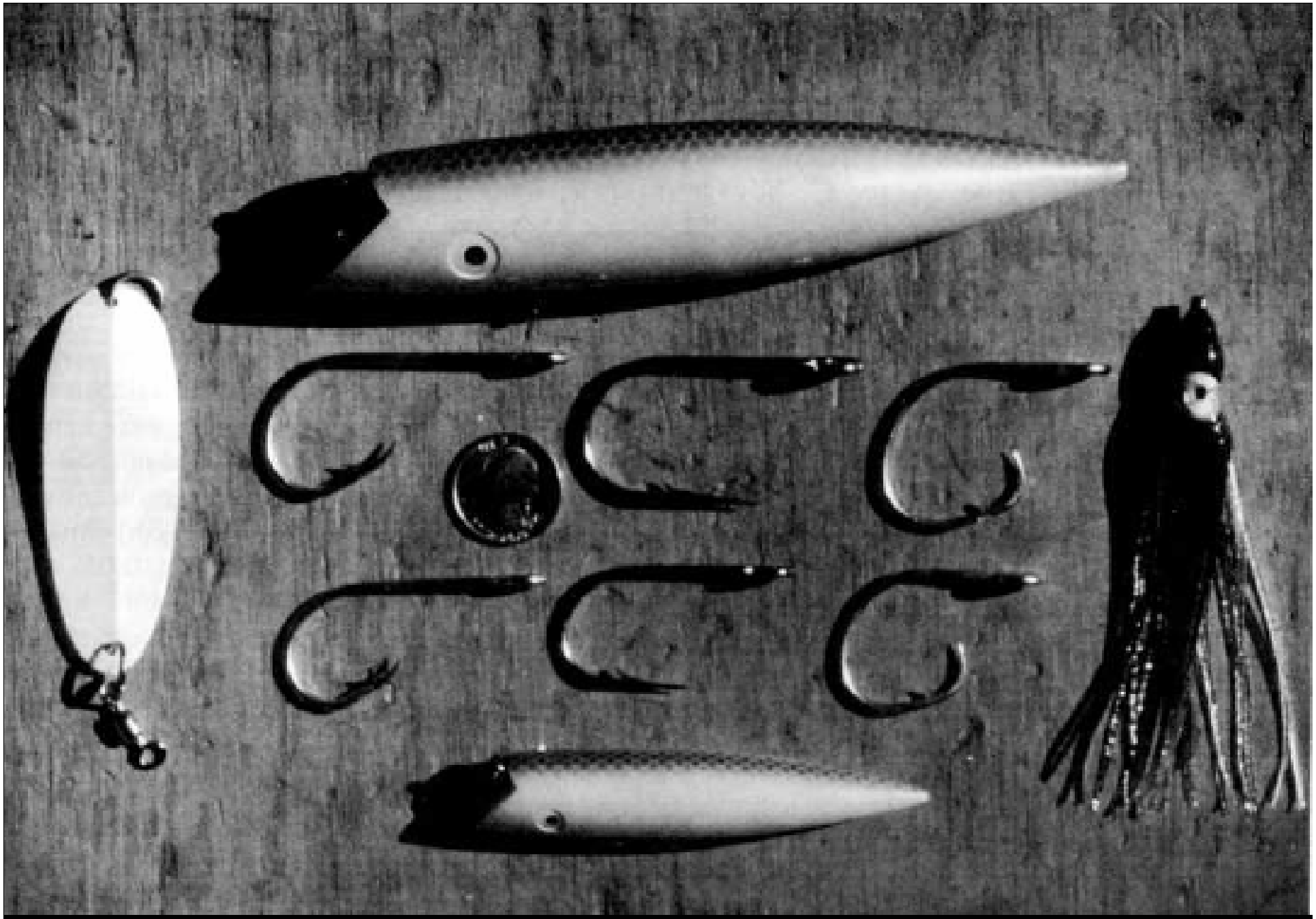
Venting, and other methods of relieving barotrauma, may be ineffective in many cases because fish sustain serious injuries that simply do not resolve spontaneously upon recompression

The New Hampshire Fish and Game Department recommendation for largemouth bass

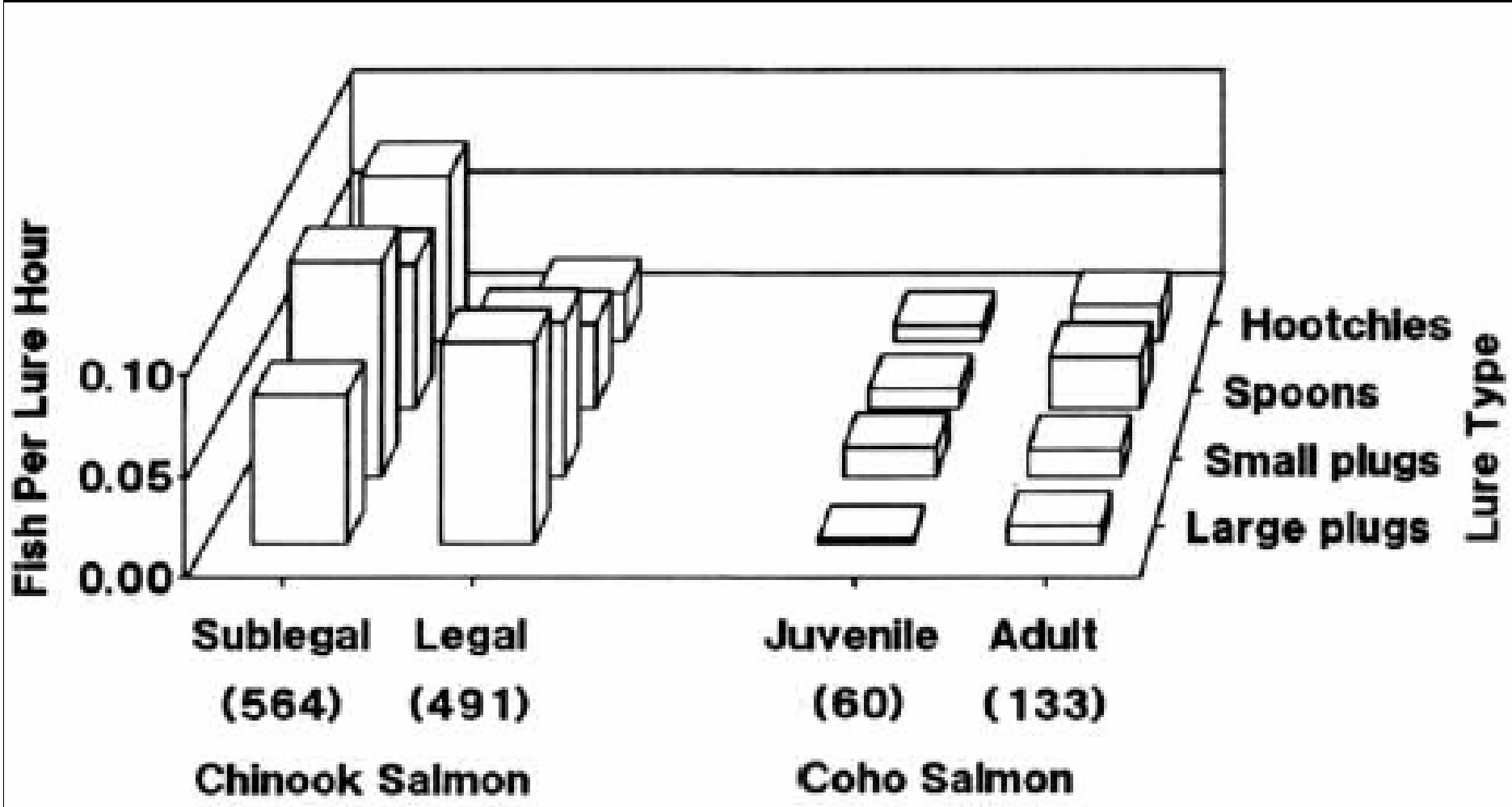
In order to avoid bass mortality due to rapid depressurization, the best practice is to not fish for bass in deep water.

Fish vary in their sensitivity to barotrauma

"Goin' after the big one, Al?"



Source: Orsi et al. (1993)



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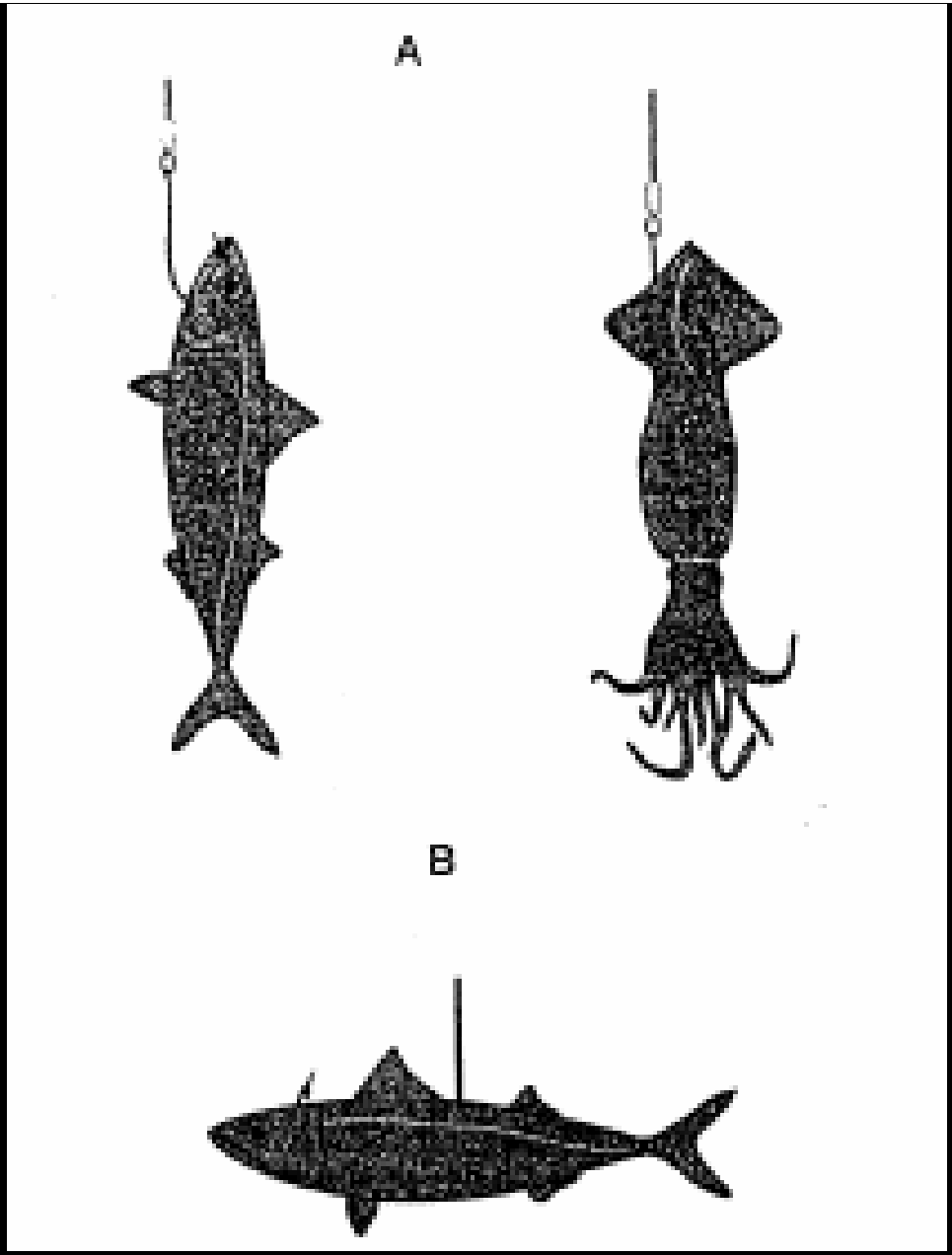

Source: Broadhurst and Hazin (2001)

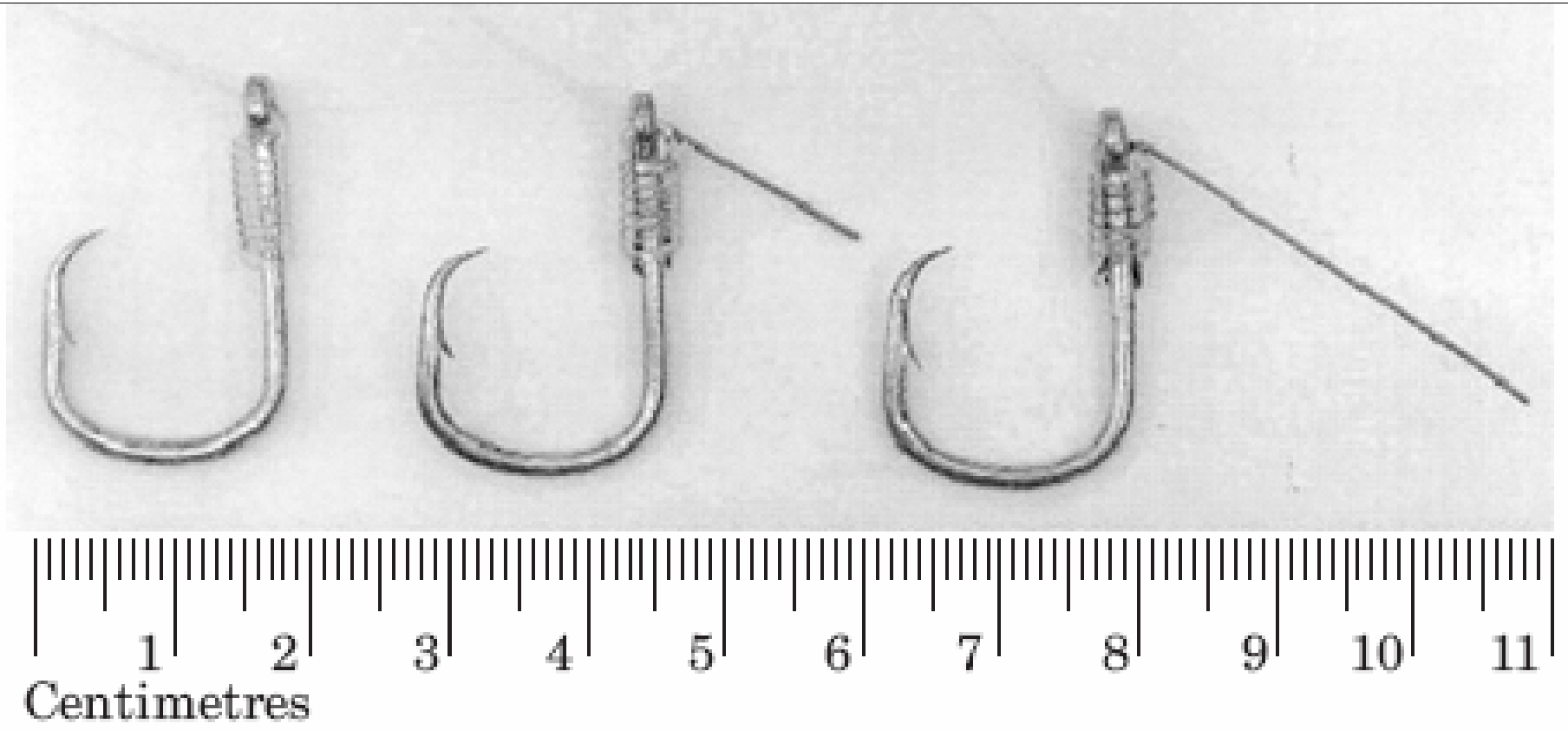

Figure 1. Photograph of the three hooks fished in this study. From left to right: a normal 16R pattern hook, hook fitted with a 20-mm appendage, hook fitted with a 40-mm appendage.

Source: Willis and Millar (2001)

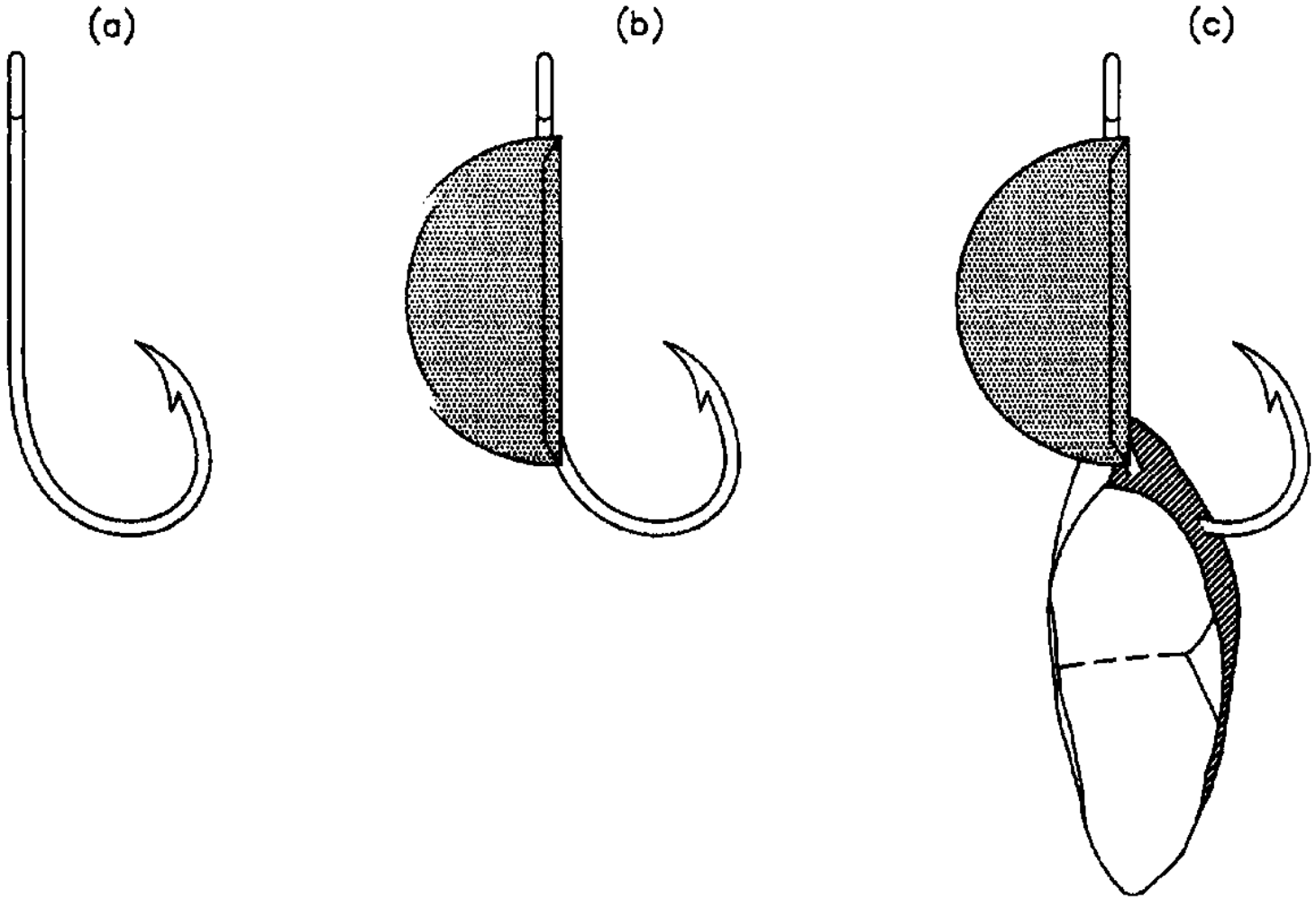

Fig. 1. The two types of hook tested: (a standard hook and (b, c) hook with plastic body attached to the shank. (c) Hook with plastic body baited withmackerel bait.

Source: Løkkeborg and Bjordal (1995)

Løkkeborg and Bjordal (1992): Species and Size Selectivity in Longline Fishing

"… fishing strategy with respect to fish distribution and bait type are the most important factors affecting the species selectivity of longlining, whereas bait size is the most important parameter that affects size selectivity…"

Regulations

Closed seasons/ closed areas: to limit catch, but also to reduce angler-fish encounters at key times

Size and bag limits

No catch and release

Incentive-based regulations

Løkkeborg and Bjordal (1992): Species and Size Selectivity in Longline Fishing

"Studies that measure the total selection effect by combining the effects of different gear characteristics including … bait type, bait size, hook design…, may reveal a significant potential for further improvement in longline selectivity… "

Future Studies

Better Design- to many studies are ad hoc

- Boyle's Law
- Controls
- Facilities, equipment, and daring

Multi-investigator research