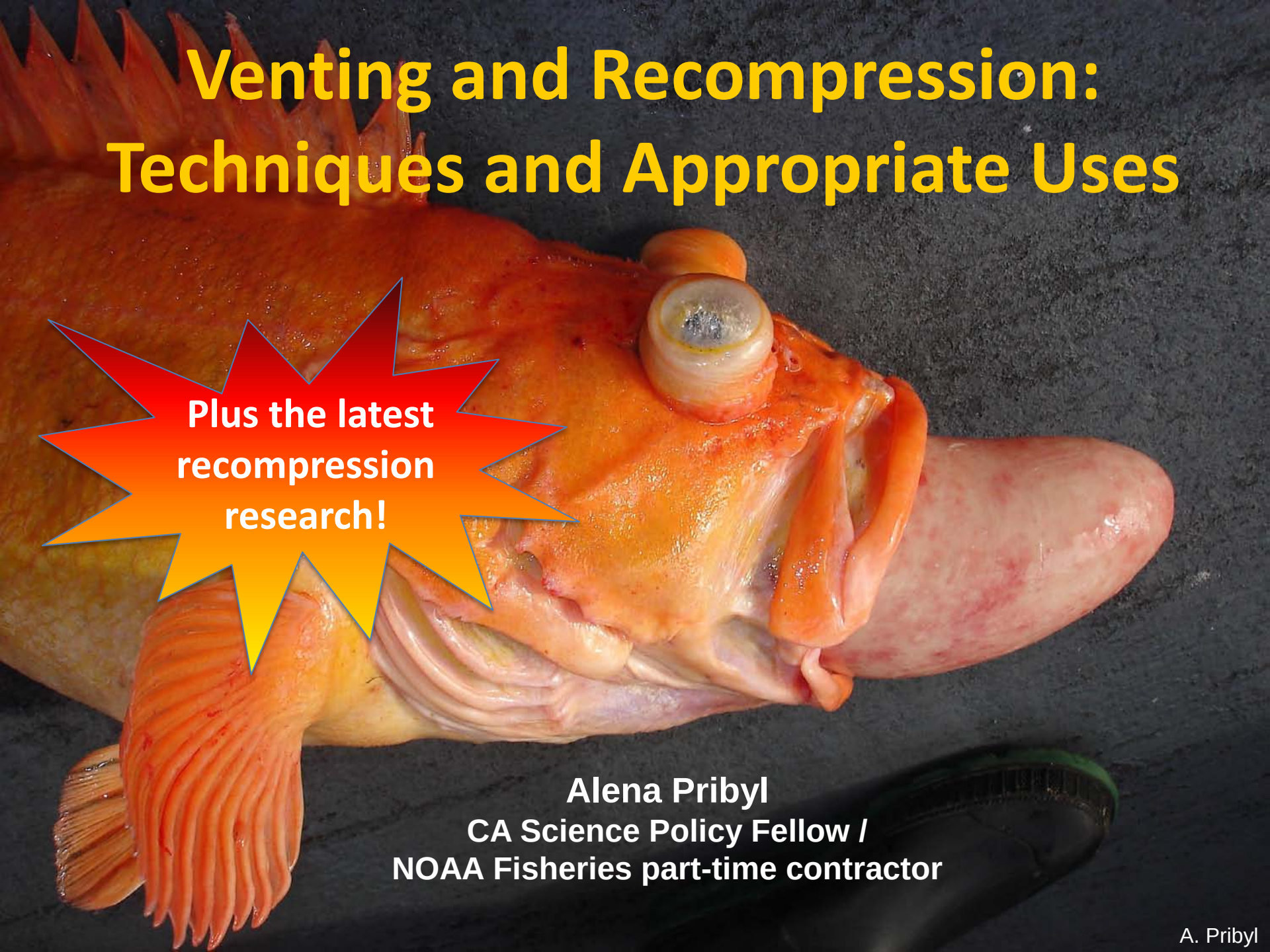
Venting and Recompression: Techniques and Appropriate Uses

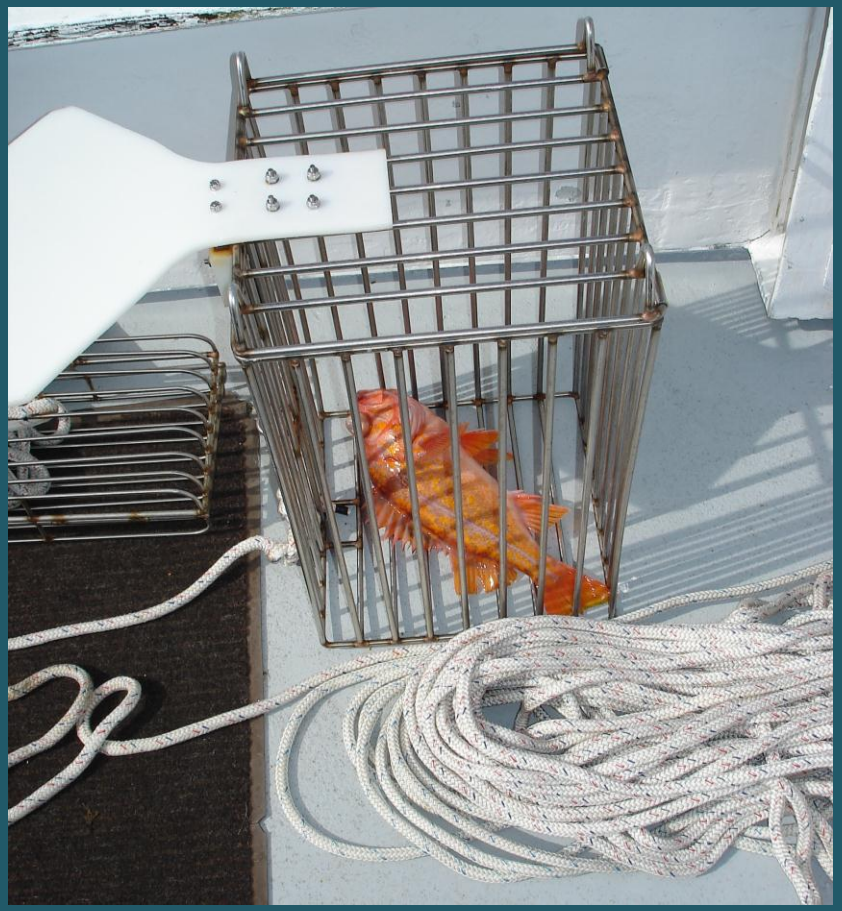


Alena Pribyl
CA Science Policy Fellow /
NOAA Fisheries part-time contractor

A. Pribyl

Two Primary Release Techniques

Venting



Recompression with weights/cages

Venting Techniques

- Hold fish gently, but firmly on side
- Insert venting tool at 45˚ angle, 1”-2” behind base of pectoral fin
- Only insert tool deep enough to release gases

Marine species where venting appears to work

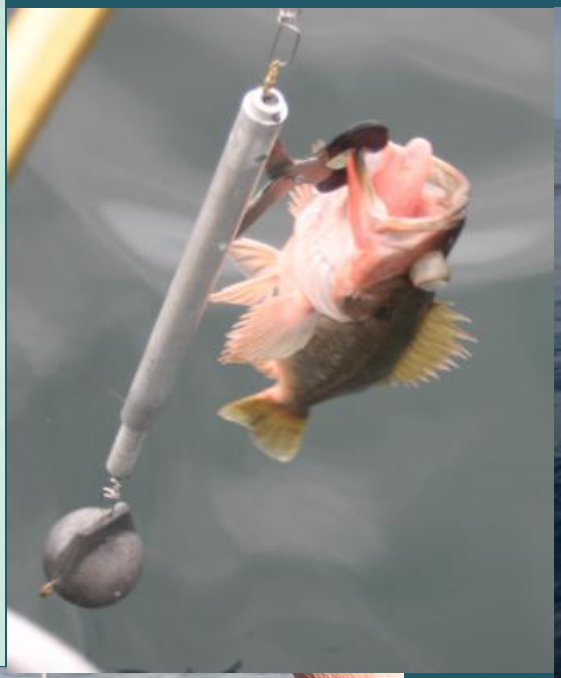
- Black sea bass, *Centropristis striata* (Collins et al. 1999)
- Gag, *Mycteroperca microlepis* (< 40 ft) (Burns et al. 2002)
- Mangrove snapper, *Lutjanus griseus* (< 100 ft) (Burns et al. 2002)
- Saddletail snapper, *Lutjanus malabaricus* (Sumpton et al. 2010, Brown et al. 2008)

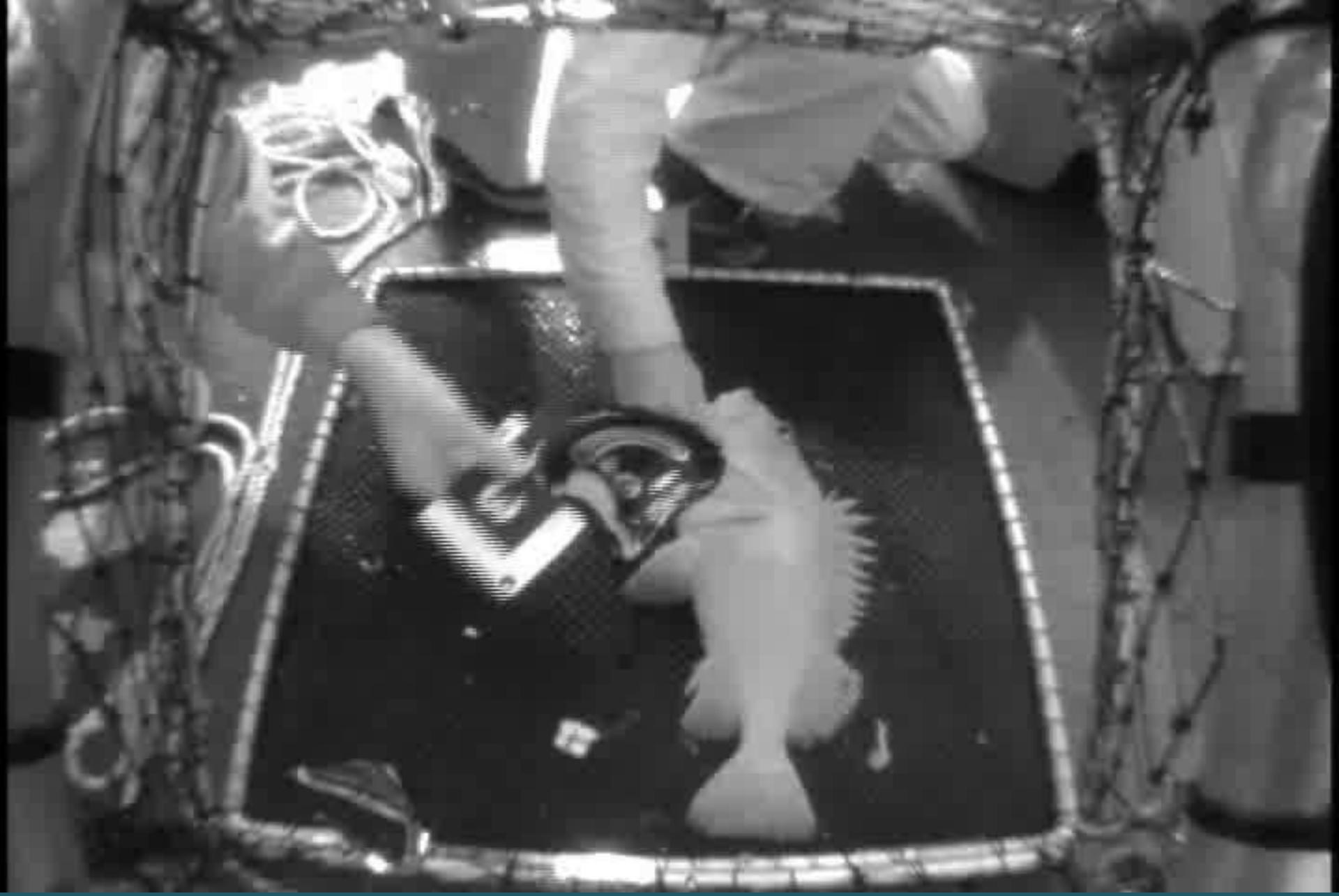
*Out of 18 marine species

Where Venting could be Beneficial

- Limited species where it is shown to work
- When a fish is unable to submerge and no other option is available to overcome buoyancy
- Non-catch and release purposes
  - aquariums, laboratory use, aquaculture, live fish markets, etc.

Recompression





Video courtesy of the Oregon Dept. of Fish and Wildlife, Newport

Marine species where recompression appears to work

- Many from *Sebastes spp*: canary*, yelloweye*, quillback, copper, black, cowcod*, bocaccio*, flag, vermilion, rosy, rougheye (Hannah et al. 2012, Pribyl et al. 2012, Hochhalter et al. 2011, Rogers et al. 2011, Jarvis et al. 2008, Hannah and Matteson 2007, Smiley and Drawbridge 2007, Parker et al. 2006, P. Rankin pers. comm.)
- Red grouper, *Epinephelus morio* (<44 m) (Wilson and Burns 1996)
- Saddletail snapper, *Lutjanus malabaricus* (Sumpton et al. 2010)
- Australasian snapper, *Pagrus auratus* (<30 m) (Stewart 2008)

Benefits of Recompression Devices

1) Simple and easy to use
2) Devices can be made cheaply, or purchased
3) Fish can be released quickly
4) No risk of infection from unsterile needles
5) No risk of puncturing internal organs
6) Release cages can protect fish from predation

Factors Affecting Recompression Survival

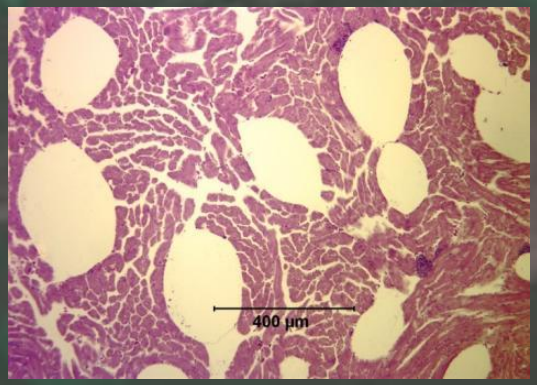
- Fish species (Hannah et al. 2012, Sumpton et al. 2010, Jarvis et al. 2008, Hannah and Matteson 2007)
- Time on deck (Jarvis et al. 2008, Burns et al. 2002)
- Temperature difference (Hannah et al. 2012, Diamond and Campbell 2009, Jarvis et al. 2008, Feathers and Knable 1983)
- Depth of capture (Hannah et al. 2012, Campbell et al. 2009, Stewart 2008, Hannah and Matteson 2007, St.John and Syers 2005, Wilson and Burns 1996)
- Wounding (Davis and Ottmar 2006)

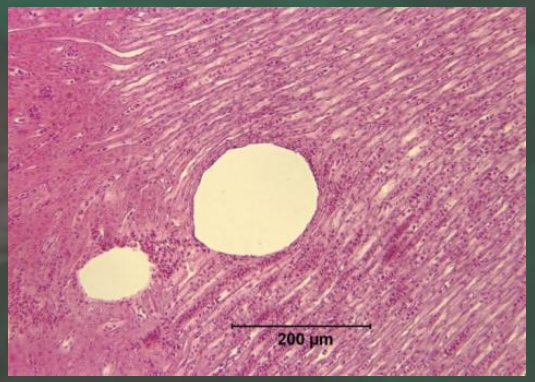
Fish Species

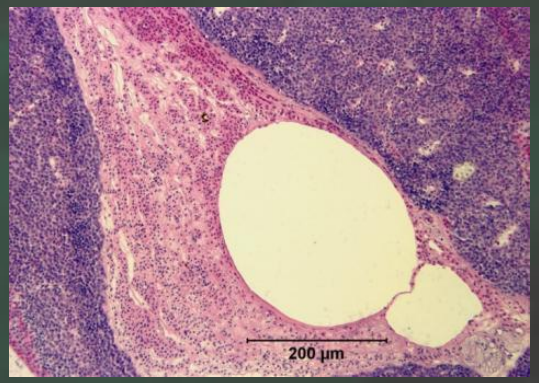
- Swimbladder morphology
  - Swimbladder thickness, elasticity
  - Size – volume of gas
  - Healing rate of swimbladder
- Life history: Pelagic or Benthic
  - Ruptured SwB will likely affect pelagic fish more than benthic fish
- Behavioral impairment
  - Fish species that recover quickly less likely to be subject to predation

Time on Deck

- Deck time >10 min results in high mortality (Jarvis et al. 2008)
  - Emboli can block blood flow, cause hemorrhaging, tissue injury



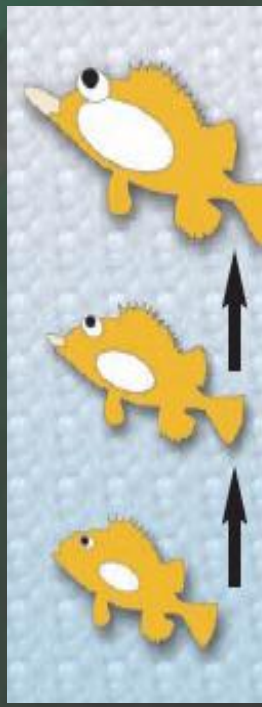




- Optimal deck time should be <5 min
  - The less time internal cavities are exposed to high gas pressure, the more likely internal injuries will not be permanent

Depth of Capture

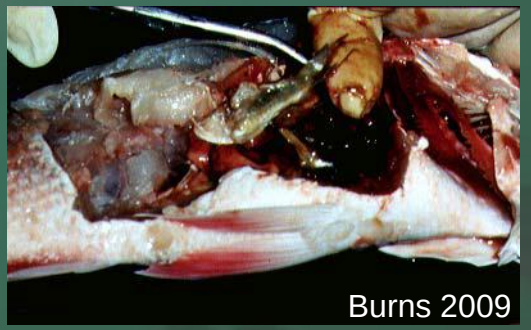
- Decreased recompression survival when captured from greater depths
  - Black rockfish, blue rockfish, red snapper, red grouper, dhufish, Australasian snapper
- High recompression survival when captured deep
  - Canary, yelloweye , rougheye , bocaccio, sunset, vermilion rockfish



Temperature Differential

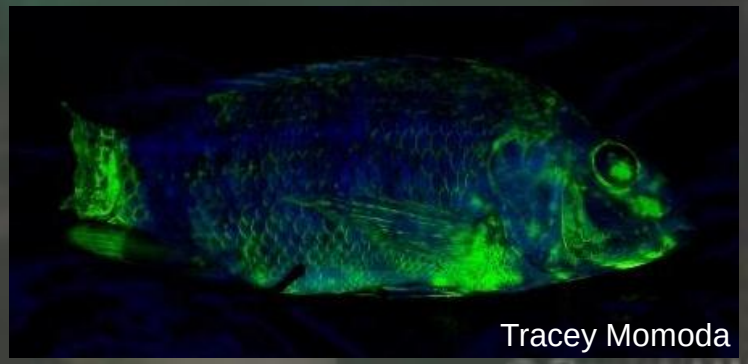
- Surface water temps may be outside of a fish's ability to acclimate , or thermal range
- Large thermal differentials can cause increased gas expansion, exacerbating barotrauma
- If large T diff, placing fish in cool water or in ice water during hook removal may help (P. Rankin, pers. comm.)

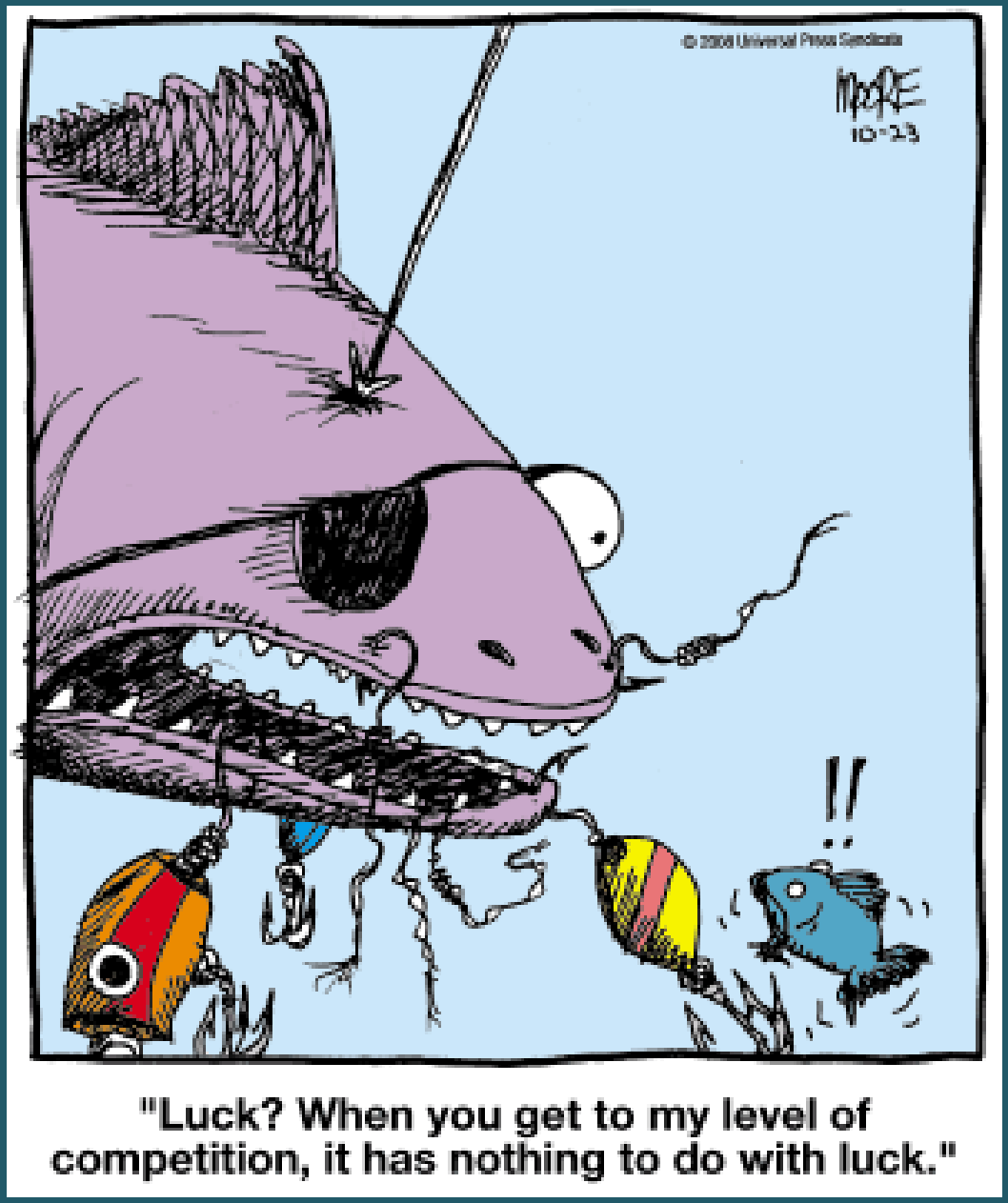
Wounding



- Can be caused by net abrasion, rubbing against other fish, rough handling, hook removal, dropping on deck, etc.

- Can disrupt slime coat, leaving fish susceptible to infection

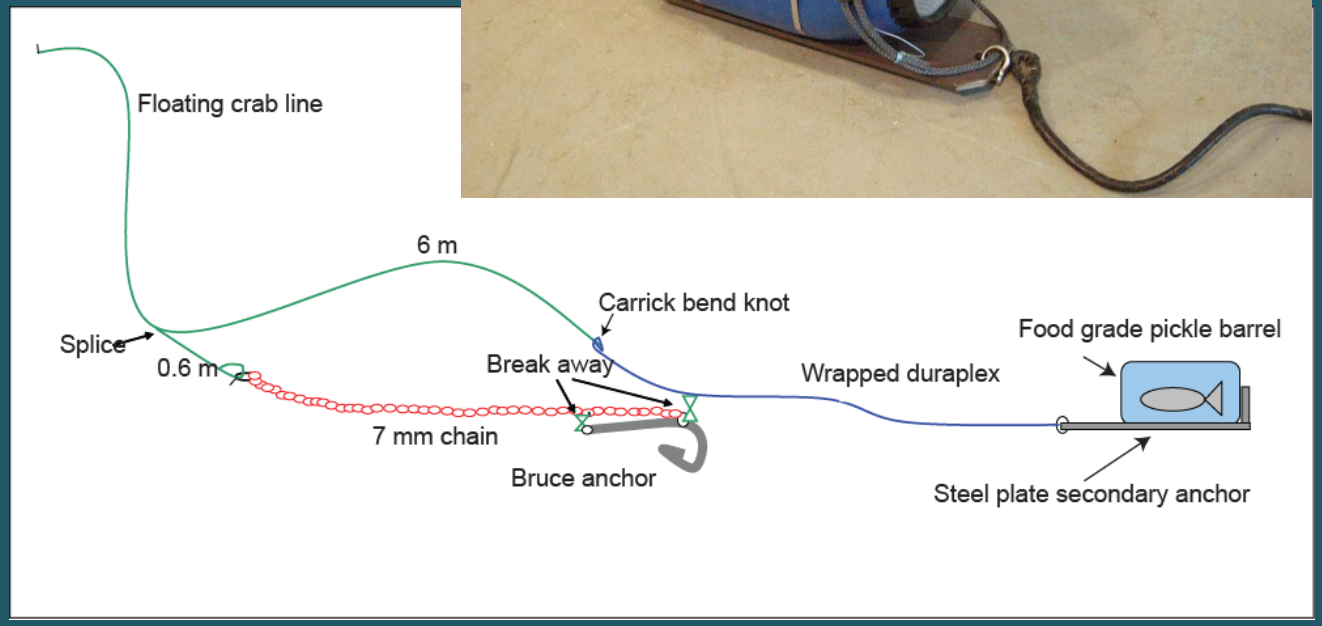




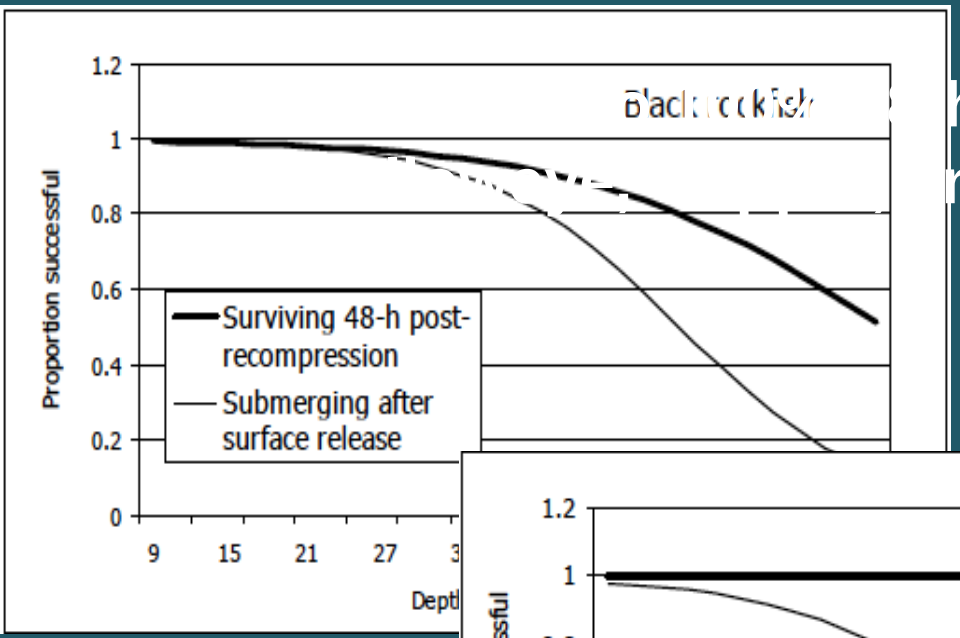
"Luck? When you get to my level of competition, it has nothing to do with luck."

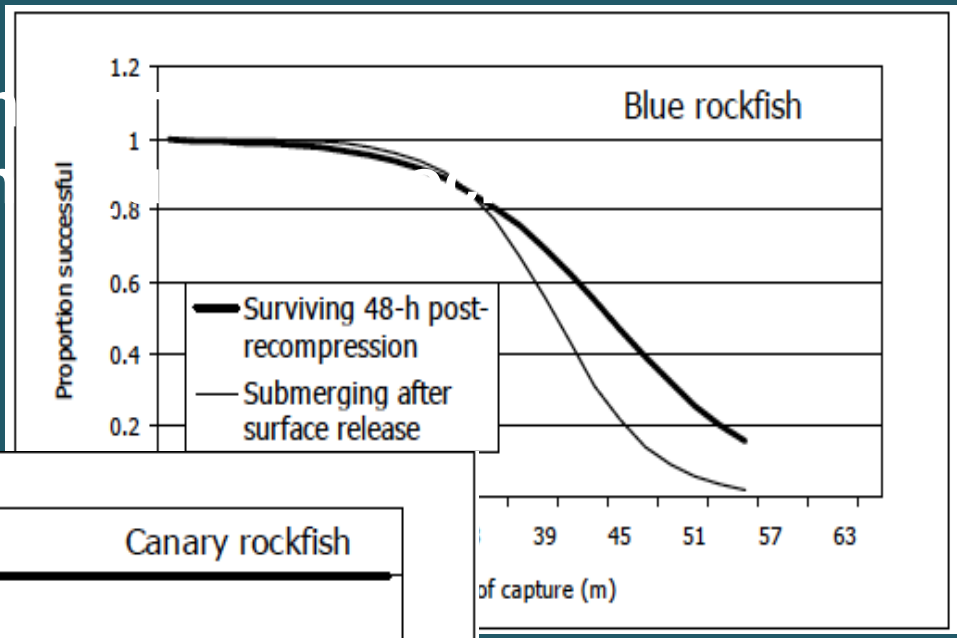
Use of a novel cage system to measure postrecompression survival of NE Pacific rockfish

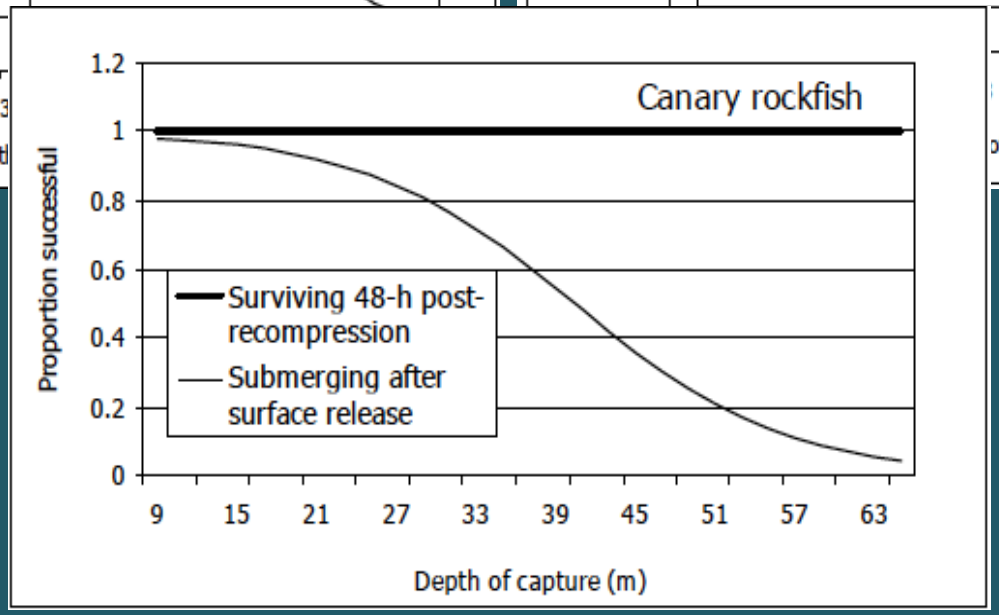
R.W. Hannah, P.S. Rankin, and M.T. Blume. 2012. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science* 4: 46-56



Submergence Data combined with 48-hr Survival Data







Graphs from Hannah et al. 2012

The effectiveness of deepwater release at improving the survival of discarded yelloweye rockfish

S.J. Hochhalter and D.J. Reed. 2011. *North American Journal of Fisheries Management* 31:852-860.

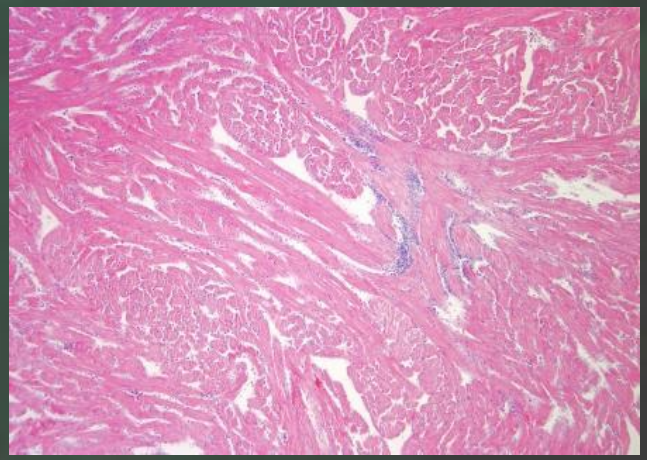
Recovery of visual performance in rosy rockfish following exopthalmia resulting from barotrauma

B.L. Rogers, C.G. Lowe, E. Fernandez-Juricic. 2011. *Fisheries Research 112: 1-7*

No vision impairment 4 days after recompression

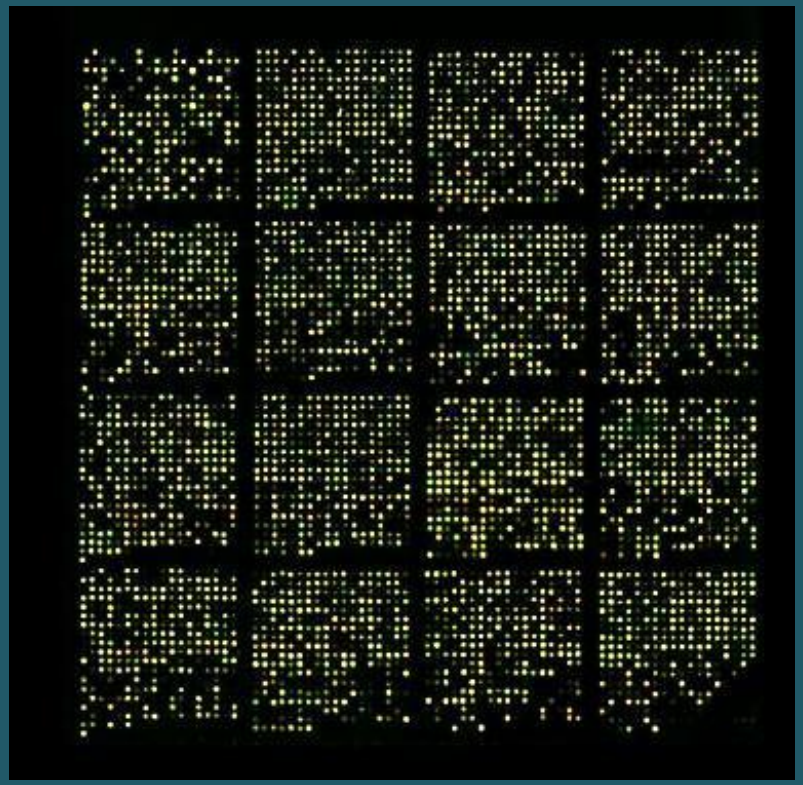
Recovery potential of black rockfish following recompression

Pribyl, A. L., C. B. Schreck, M. L. Kent, K. Kelley and S. J. Parker. 2012 . *Journal of Fish Diseases* 35 (4): 275-286.



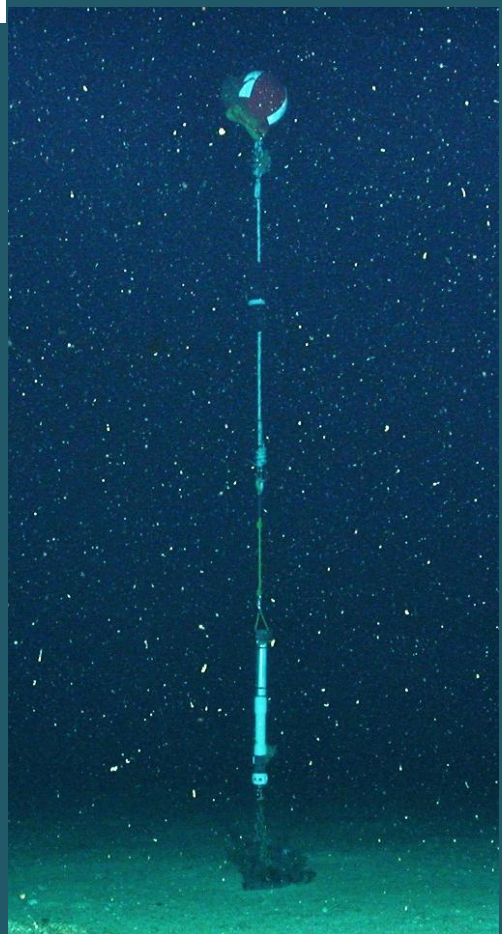
Identification of biomarkers indicative of barotrauma and recovery in Pacific rockfish.

Pribyl, A. L., C. B. Schreck, M. L., S. J. Parker and V. Weis. 2012. *Journal of Fish Biology,* doi:10.1111/j.1095-8649.2012.03322.x.

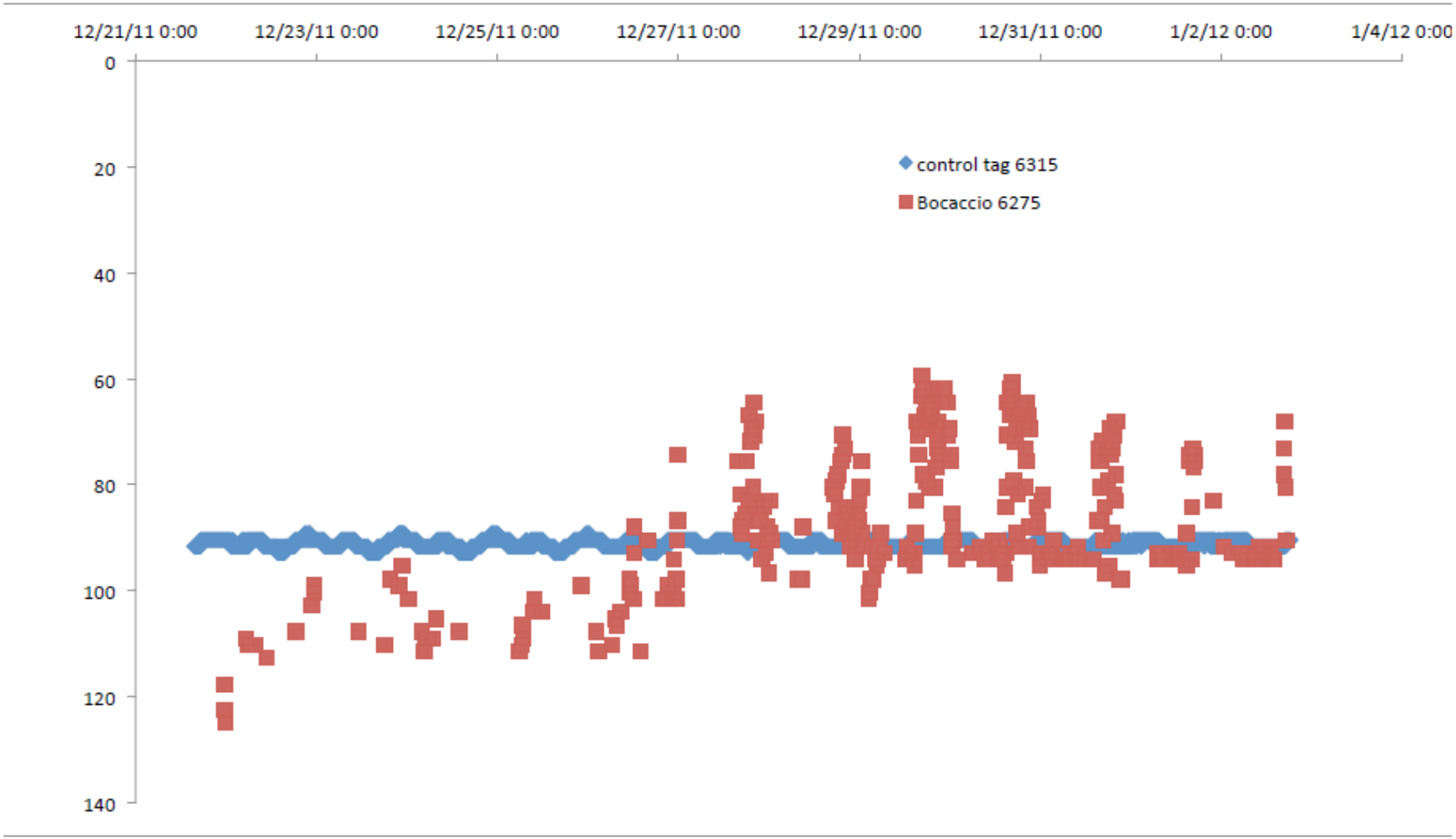


Ability of southern California shelf rockfish to survive barotrauma following in-situ recompression

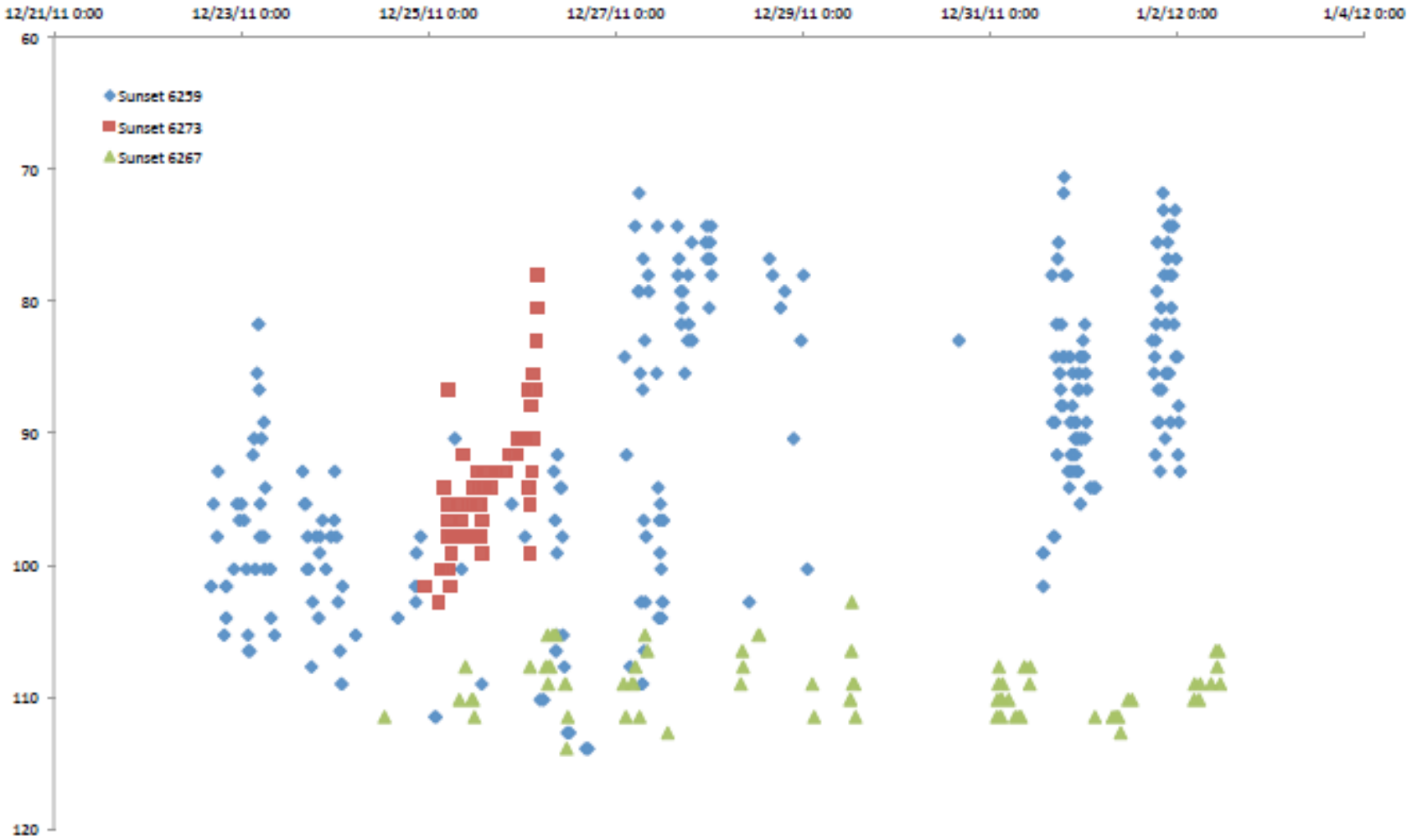
In-progress study at NOAA's SWFSC, La Jolla
John Hyde, Nick Wegner, Alena Pribyl



Preliminary Results from Bocaccio



Preliminary Results from Sunset Rockfish



Summary of recompression studies in *Sebastes spp.*

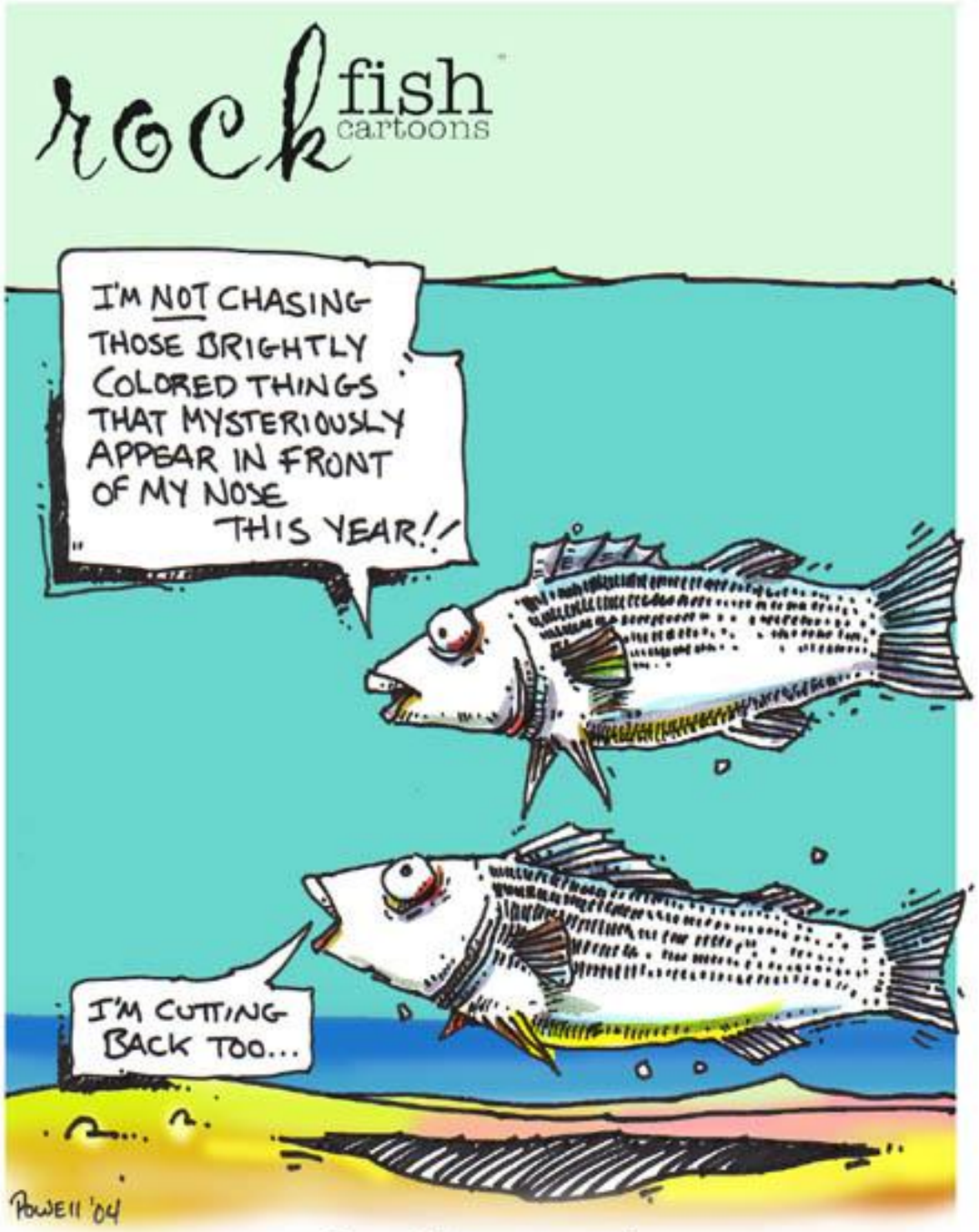
- High survival rates, esp. for species that cannot submerge on their own (Hannah et al. 2012, Hochhalter and Reed 2011, Jarvis et al. 2008)

- Physiological recovery possible (Pribyl et al. 2012, Rogers et al. 2011)
  - Primary concern: SwB healing rates, vision immediately after recompression

- Prelim data looks good for shelf species (> 140 m)

Conclusions

- One size does not fit all
- Consider species-specific recommendations
- Be cognizant how factors such as time on deck, DOC, and temp differential may affect survival
- Even if fish do not recover 100%, recompression offers chance at survival



FISH RESOLUTIONS