Overview for estimating targeting effects

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Identifying targeting / fishing strategies

- Fishing strategies / metiers
  1. Longline vs trawl
  2. Longline for oilfish vs albacore
  3. Longline for bigeye/yellowfin vs yellowfin/bigeye vs bigeye/swordfish
- Gear-based or data-based indicators
  - HBF, number of hooks, location, season, vessel
  - Lightsticks, set time, bait type
- Species composition

Three approaches using species comp data

1. Identify targeting first, then fit CPUE model
   - Cluster analysis methods (He et al 1997), PCA-based (Winker 2017).
2. Fit CPUE model first, then identify targeting from residuals
   - Gaussian mixture method (Okamura 2018), Hybrid method (Lennert and Maunder).
3. Estimate targeting and other covariates simultaneously
   - VAST (Thorson et al 2017)
   - Iterative hybrid method (Lennert-Cody et al).

Set by set or aggregated?

- Species composition in an individual set has a random component
  - p_s ~ expectation + error
  - Probability of allocating a set to the wrong fishing strategy is high
  - As relative abundances of species change, so does the probability of misallocation
  - As a consequence, clustering can remove/dilute the abundance signal
- Vessels maintain fishing strategies over time
  - Aggregating sets before clustering reduces the rate of misallocation
  - Further study needed
    - Appropriate aggregation
    - Modelling e.g. assigning a state rather than simple aggregation