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Changes to Sampling and Estimation Designs, Including Descriptions of Completed and Ongoing MRIP Projects

Ron Salz and Rob Andrews

MRIP/MRFSS Calibration Workshop

March 27-29, 2012

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Overview

- Background
- MRIP Projects
  - Estimation Designs
  - Catch Survey Designs
  - Effort Survey Designs
  - For-Hire Data Collections
  - Other Projects

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Background

NRC 2006 Report : Key Recommendations

- Estimation procedure for onsite data does not use actual selection probabilities of the sampling design
  - Potential bias in catch estimates & variances;
- Onsite sampling process requires greater quality control, i.e., less latitude on the part of samplers;
- Onsite sampling frame should be redesigned;
- Onsite intercept methods don't cover anglers who have private access to fishing waters;

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Background

NRC 2006 Report : Key Recommendations

- Random–digit dialing telephone surveys for effort estimates are complicated by increasing use of cell phones;
- The existing RDD survey suffers in efficiency from the low proportion of fishing households among general population
  - Potential bias from its restriction to coastal counties only;
- An updated, complete angler registration list would greatly improve sampling efficiency in terms of time and cost;
- Dual-frame procedures should be used wherever possible to reduce sample bias;
- For-hire sector should be required to maintain logbooks.

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Background

- MRIP established in 2007
  - MSRA mandates
  - NRC Recommendations
- MRIP Operations Team
  - Develop research priorities
  - Design projects to address priorities
  - 60+ projects funded to date

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Estimation Designs

Re-Estimation Project

1. Evaluate MRFSS estimation design
   - Design-biased
2. Develop new estimation design
   - Weighted estimation
3. Re-estimation
   - 2004-Present - Complete
   - 1998-2003 - Late 2012
   - 1990-1997 - TBD
4. Explain changes
   - Overall no systematic differences

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Catch Survey Designs

MRFSS Access Point Angler Intercept Survey (APAIS)

- Stratified, multi-stage, cluster sampling design
- Emphasis on productivity: intercepts obtained per assignment
- Sampling protocols combined formal randomization with subjective decision-making
- Interviewer discretion makes sample selection probabilities difficult to determine
- Not all assignments issued: flexibles, reserves
- Not all assignments completed on assigned date: rescheduling

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Catch Survey Re-Design

Key Objectives

- Simplify determination of sample selection probabilities
- Eliminate need for model-based weighting methods
- Provide a means for a strictly design-based approach to unbiased estimation

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APAIS Redesign Recommendations

- More emphasis on site-days (PSU); less on angler intercepts
- Eliminate sampling at sites not pre-determined in the probability sampling design
- Cover completed fishing trips throughout the fishing day, not just during “peak” fishing times
- Eliminate opportunistic sampling in fishing modes other than the assigned mode
- Improve accuracy of completed angler fishing trip counts within each site-day assignment (interviewed plus missed)

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North Carolina Intercept Survey Pilot

- Project team: NMFS, states, consultants
- January – December 2010
- Side-by-side with MRFSS APAIS sampling
- Feasibility study
  - Only 6 interviewers most of year
  - Sample distributed evenly across modes and regions
  - At least 1 night time-interval assignment per mode/month

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North Carolina Intercept Survey Pilot

Design Changes

- Fixed 6-hour time intervals covering 24-hour sampling day
- Site clusters
- Probability-based approach for selection/order of sites visited
- Attempt to complete all drawn assignments
- Cancel assignments not completed – no re-scheduling
- Procedures to improve counts of “missed” angler trips

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North Carolina Intercept Survey Pilot

Design Changes (cont.)

- Include anglers under five years old
- Include trips returning to tournament sites
- Disallow “incomplete trips” in shore mode
- Remove cap on interviews per assignment
- New fish sub-sampling procedure
- Regional stratification: North, Central, South

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North Carolina Intercept Survey Pilot

Sampling results*

- Intercepts per assignment: MRFSS >> Pilot
- Sites visited per assignment: Pilot > MRFSS
- Pilot intercepts more evenly distributed throughout 24-hour period

* preliminary

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North Carolina Intercept Survey Pilot

Catch Estimate Comparison: Pilot vs. MRFSS*

- No systematic differences found for landings or releases
- For large majority of management species, annual catch estimates (all modes/waves combined) were not statistically different from one another
- A few large differences at mode/wave level due mainly to:
  - Large differences in un-weighted catch rates and/or
  - Large estimation weights
- MRFSS estimates more precise than pilot
  - Need to evaluate how much due to sample size/distribution versus design/estimation changes

* preliminary

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Effort Survey Designs

- Coastal Household Telephone Survey
- License Frame Telephone Surveys
- Dual-Frame Telephone Surveys
- Dual-Frame Mail Surveys

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Coastal Household Telephone Survey

- Under-coverage
  - Random Digit Dial (RDD), no cell phones, standard exclusions
  - Coastal counties only
- Inefficiency
- Declining response rates
  - For Atlantic and Gulf coast states, decline from 31% to 18% between 2003 and 2009
- Measurement
  - Anglers can't/won't provide details for all trips (70% of trips imputed)

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License-Frame Telephone Surveys

- Angler License Directory Telephone Survey (ALDS)
  - Sample directly from state license databases
  - Improved efficiency
  - “Bad telephone numbers” for 25% of cases
  - Incomplete frames
- Dual frame telephone survey
  - CHTS + ALDS
  - Improves coverage over either frame alone
- However…..
  - All the warts of CHTS and ALDS
  - Problems in determining overlap between frames (respondent reported licensure)

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Dual-Frame Mail Surveys

- Address-based sampling (ABS) + license-frame sampling
- Overlap determined by address matching
- Tested in 2009 (NC) and 2010 (NC + LA)
- Addresses many concerns with CHTS
  - Nearly 100% coverage
  - Gains in efficiency over CHTS
  - Significantly higher unit response rates (45-65%)
  - Much simpler questionnaire
- Still some challenges with matching sample frames
- Questions about timeliness

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Mail v Phone Comparisons/Conclusions

- Mail estimates generally > phone estimates
  - Trip rates similar
  - More individuals report fishing in mail (especially shore)
  - Hypothesis: differences due to measurement errors
- Mail estimates less susceptible to bias across all types of survey error
  - Greater coverage
  - Higher response rates
  - More time to contemplate survey request
- Preliminary estimates with early mail returns
- Frame matching errors in dual-frame design result in slight overestimate of effort

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2012 Pilot Study

- Dual-frame, mixed-mode survey
  - ABS + License frame
  - Telephone + mail data collection
- South Atlantic states (NC, SC, GA, FL)
- Wave 1 – Wave 6
- Direct phone vs. mail comparisons
  - Response rates
  - Timeliness
  - Measurement error
  - Cost
- Continued CHTS vs. dual-frame comparisons
- Will still be susceptible to bias from frame matching errors

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2012-2013 Pilot Study

- Single-phase, stratified design
  - ABS “over” sample
  - Match sample to license databases
  - Sample matched and unmatched address at different rates
- 4 States (FL, NC, NY, MA)
- Wave 5, 2012 – Wave 6, 2013
- Less complicated than traditional dual-frame design
- Frame matching errors won’t cause bias
- Retains efficiency of license sampling
- Continued comparisons to CHTS

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For-Hire Data Collections

- Currently utilize sampling approach (FHS)
- NRC Review recommended mandatory logbook reporting
- MRIP review of for-hire methods (Best Practices)
  - Complete sample frames
  - Mandatory logbooks
  - Weekly, online reporting
  - Dockside sampling component (validation and NR adjustment)

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For-Hire Data Collection Projects

South Atlantic Regional Headboat Survey

- Electronic reporting
  - Feasibility study in 2009-2010 (PC-based application)
  - Expansion to entire fleet in 2012 (online reporting)
  - Monthly reporting
  - Long-term cost savings
  - Gains in timeliness of data availability
  - Built-in QC
- Probability-based designs for dockside component - biological sampling (2010-Present)
- Probability-based designs for dockside and at-sea validation (2012)

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For-Hire Data Collection Projects

Gulf of Mexico Electronic Reporting Pilot Study

- September 2010-August 2011
- Subset of Federally permitted charter boats in FL and TX
- Mandatory weekly reporting
- Dockside validation of catch and effort
- Expect final report in April 2012

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Other Projects

- Private Access Fishing
  - Panel design
  - October 2011 – September 2012
  - North Carolina and Florida
  - Panelists recruited from license and address-frames
  - Bi-weekly or monthly phone or web reporting to collect catch and effort data
  - Compare catch characteristics between private- and public-access trips

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Other Projects

- Stratification Projects
  - FL – stratify sampling into 5 regions
  - MD – stratify inland waters into Ches. Bay and Coastal Bays
- Video Discards
  - Test feasibility of video technology to monitor discards

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