Standardizing AFSC bottom trawl surveys

Survey overview
Protocol compliance
Areas for further improvement

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Chartered stern trawlers
Protocol 1: Warp Measurement

2 independently calibrated systems
- Warps measured and marked
- Geometric counters in real time

Maximum offset = 7 m

Problems:
- Rough weather
- Grease
Protocol 2: Autotrawl

30-day window for Calibration, maintenance of autotrawl systems
Testing, certification by authorized mechanic
Sea trials required
Protocol 4: Trawl construction & repair

AFSC Net loft (7 full-time employees)

Purchase and maintain trawl doors
Purchase net materials

Construct:
- Trawls
- Headropes
- Footropes
- Body
- Codends
- Rigging
Net plans

POLY-NOREASTERN (Race)

Total mesh counts
Twine sizes: top and sides 4mm
      bottom and intermediate 5mm

Side panel

Bottom

Top

5/8" Long link chain thru this wing bobbin

3/8" Chain droppers - 10" long - 5 links & 1 ring
      secured to fishing line using 5/16" shackles

14" Laminated rubber wing bobbins

3/4" 6x19 Domestic wire rope

3/4" Barrel clamp and steel washer
      behind wing bobbins

Eyes connected using 3/4" hammer locks

4" Rubber disk solid between bobbins

Note: Overall length of roller gear - 76'6"
       length to include 3/4" hammer locks
       used to connect three sections of roller
gear together.

1. 19'6"
2. 40' center
3. 19'6"
   79'6"

Web: Chaffing strip along inside of Bottom wings and Busom. Cut 8 meshes wide.
      5 mm Double Bar mesh, going 3 meshes on each side (leaving 2 open meshes).
      Secure 3 mesh of gore on inside (Bar Cut) of Bottom wings, and securing
      other gore to footrope (Bolsh).

Date: 3/93
Certification checklist
Training and repairs
Protocol 3: Operational procedures

- Defining responsibility
- Warp measurement and scope table
- Deployment & retrieval of gear
- Tow speed
- Tow duration
- Tow location (search time, alternate sites)
- Tow direction
- Tow distance measurement
- Tow acceptance criteria
Monitoring trawl performance

- Wingspread
- Net height
- Depth
- Bottom contact
Training:
The need for minimizing the human effect

Sources of bias

Chief Scientist effect
  • Interpretation of ambiguous terms in tow acceptance language
    – “small tears unlikely to significantly affect catch rates”
  • Time management
    – Tidal currents
    – Decisions late in the day
  • Catch subsampling
    – Splitting of catch
    – Selecting samples for size and age composition
Captain effect

• Where to tow
  – Experience
  – Likelihood for gear damage
  – Influence of fish sign

• Attentiveness
  – Towing speed
  – Following depth contours
The end
Criteria for Determining A Valid Tow When an Object is Caught in Net

Object is defined as a crab pot, fishing gear, large rocks, etc.

Start here

No damage to survey gear

Yes

Exact time of object entered survey trawl can be determined

No

Gear damage resulted in significant loss of catch or improper fishing configuration

Yes

Tow invalid, assign negative performance code. Re-tow station

No

On Bottom time is >=20 minutes from start of tow until object entered net

Yes

Multiply On Bottom time above by 0.10 = Acceptable Time Limit (ATL). Did haulback occur <= ATL minutes after object entered net?

No

Tow is valid, assign positive performance code

Yes

No damage to survey gear

Yes

Gun damage resulted in significant loss of catch or improper fishing configuration

No

Tow invalid, assign negative performance code. Re-tow station

Yes

Tow is valid, assign positive performance code
Vessel speed in moderate current

![Speed Profile - Vessel 134 Cruise 200501 Haul 36](image1)

![Speed Profile - Vessel 134 Cruise 200501 Haul 28](image2)
The end
Why do we use charter vessels?

Only one NOAA research vessel: used for acoustic & fish larvae surveys

Scope of operations too big for one vessel
5 vessels: 60-75 days each
2 boats in Bering Sea
3 boats in G. of Alaska