Raising trawl sweeps to protect seafloor animals: What configurations achieve effective clearance?

Cooperative Research – Alaska Fisheries Science Center, Conservation Engineering Project and Bering Sea bottom trawlers

Bering Sea Fishery Effect Distribution

EFH EIS Longterm Effect Index (1998-2002 fishery data)

Sand/Mud – Majority bottom trawl effects
Slope – Majority pelagic trawl effects
Major living structure animals of the eastern Bering Sea shelf

- Ascidian (Halocynthia)
- Ascidian (Boltenia)
- Ascidian (Styela)
- Sponge (Halichondria)
- Sea Whip (Halipteris)
- Basketstar (Gorgonocephalus)

Disks Clusters (or Bobbins) on Sweeps

- Test spans
- 30’ spacing
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Sled sampling of trawl tracks

- Door Track
  - Control Sweep 1
  - Sweep Track 1
  - Sweep Track 2
  - Footrope Track
  - Control Sweep 2
  - Sled Track

Effects on living-structure animals

- Animals in tracks of bare sweeps compared to those in tracks with disks
- More vertical seawhips
- More open basketstars
Effects on Fish Capture

- Tested with twin trawls
- No detectable effects with 6 or 8 inch disks (2 or 3 inch clearance)
- Small (5 – 10%) with 10 inch disks (4 inch clearance)

What configurations achieve effective clearance?

Could similar clearances be achieved with wider spacing? (Tests on 30’)

Developed clearance measurement devices based on tilt sensors.
Spacing effects on sweep clearance

- **Sag** depends on span, rope weight and tension
- **Sink** depends on surface area, weight supported and sediment composition

Tests were done on relatively soft sediments—Maximized sink values (and exaggerated differences in sink values)

Clearance range with 30 foot spacing

- Clearances range from 2.6 to 2.2 inches
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90 foot spacing, 8 inch bobbin

60 foot spacing, 8 inch bobbin
Measured Clearance Ranges

Clearance Ranges – less sink
Conclusions

- 60 ft spacing similar clearance to 30 foot – especially on firmer sediments

- 90 foot spacing with 10 inch bobbins - wider range, similar or better average

- Other potential improvements
  - Lighter Combination rope (less sag)
  - More bobbin surface area (less sink)