Common Bycatch in the Pink Shrimp Fishery

Fishermen and scientists work together to reduce bycatch

Since the 1980s, fishermen and scientists have experimented to progressively reduce bycatch in the US West Coast pink shrimp fishery without affecting shrimp catch rates. Specifically, two devices have been identified:

1) **Excluders** (aka Bycatch Reduction Devices (BRDs), or shrimp grates) physically bar larger fishes from entering the codend, directing them out an escape hole.

2) **Footrope Lighting** (e.g. LED fishing lights) are attached at the fishing line, allowing fish to avoid the net prior to entrainment.

**Bycatch species and frequency**

- **Pacific Hake** 47%
- **Slender Sole** 12%
- **Rex Sole** 4%
- **Whitebait Smelt** 2%
- **Arrowtooth Flounder** 2%
- **Petrale Sole** 1%
- **Pacific Herring**
- **Pacific Sanddab**
- **Hagfishes**
- **Flathead Sole**
- **Poachers**

*Other bycatch species in order of frequency:

- **Smelts**
- **Darkblotched Rockfish**
- **Eelpouts**
- **Dover Sole**
- **Pacific Herring**

Fish bycatch in the pink shrimp fishery is very low, less than 5% of the entire catch; of this, Pacific Hake accounts for about half. The fishery uses fine mesh nets to harvest the small-sized shrimp. Left untreated, this would result in high bycatch rates. Today, with the use of excluders, nearly all large fishes are safely avoided. The remaining bycatch tends to be smaller species and/or juveniles, which may be difficult to identify.

**Excluders**

These devices are effective at reducing bycatch (66-88%). Fishermen experimented with them in the 1980s, testing many different types. As a result, they were optimized to minimize impacts on overfished and threatened species.²

¹ Excluders (aka Bycatch Reduction Devices (BRDs), or shrimp grates) physically bar larger fishes from entering the codend, directing them out an escape hole.

² Footrope Lighting

Illuminating the footrope using LEDs dramatically reduces bycatch of Eulachon (82-91%) and many other species.

**Footrope Lighting**

- Dramatically reduce bycatch of Eulachon (82-91%)
- Many other species

**ADB long**

**ADB moderate**

**Elongate dorsal fin rays**

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**Slender Sole** *Lyopsetta exilis*

- Most common flatfish species in bycatch
- Typically the smallest flatfish, but look for Rex Sole mixed in!
- Lateral line nearly straight

**Rex Sole** *Glyptocephalus zachirus*

- Long pectoral fin
- Straight lateral line

**Arrowtooth Flounder** *Atheresthes stomias*

- Left eye visible from blind side
- Large mouth, with sharp teeth
- Triangular head
- Lacks anal spine

**Dover Sole** *Microstomus pacificus*

- Large bulging eyes
- Slimy, flabby body
- Small mouth
- Lateral line nearly straight
- Lacks anal spine

**English Sole** *Parophrys vetulus*

- Mouth looks twisted when viewed from the front
- Lateral line with slight curve and long Accessory Dorsal Branch (ADB)
- Left eye visible from blind side

**Petrale Sole** *Eopsetta jordani*

- Large mouth. Two rows of teeth on upper jaw, only one row on lower jaw
- Broad space between eyes, with five to six rows of scales
- Lateral line with low curve over pectoral fin

**Flathead Sole** *Hippoglossoides elassodon*

- Only one row of teeth on upper jaw. Pores sometimes behind lower (right) eye
- Ridge between eyes, with ~3 rows of scales
- Lateral line with flattened curve over pectoral fin

**Pacific Sanddab** *Pacific Hake (Whiting)*

- Merluccius productus

- Only one row of teeth on upper jaw. Pores sometimes behind lower (right) eye
- Ridge between eyes, with ~3 rows of scales
- Lateral line with flattened curve over pectoral fin

**Pacific Hake** 47%

**Slender Sole** 12%

**Rex Sole** 4%

**Whitebait Smelt** 2%

**Arrowtooth Flounder** 2%

**Sand Sole** *Psettichthys melanostictus*

- First 5-6 dorsal fin rays are long and lack connective membrane
- Accessory dorsal branch of lateral line moderately long
- Eyed side feels like fine sandpaper

**Petrale Sole**

- Often confused with Slender Sole

**Pacific Sanddab**

- Often confused with Petrale Sole

**Right-eyed Bycatch**

**Similar to Speckled Sanddab, which is more often found in estuaries/bays**