Catch Accounting using Integrated Monitoring and an Audit Approach

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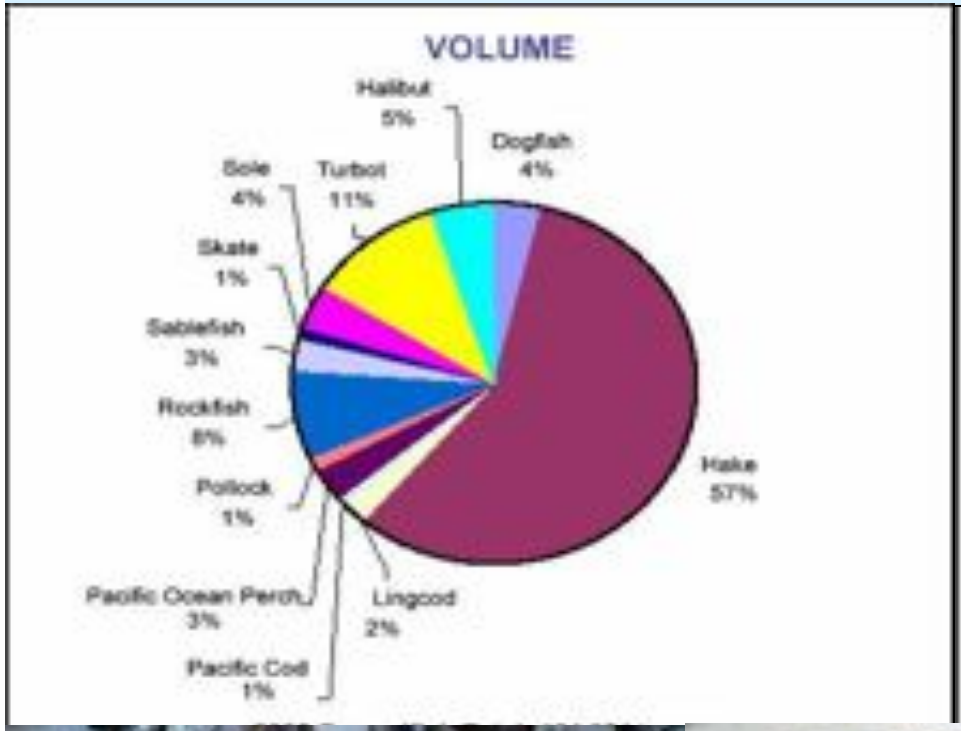
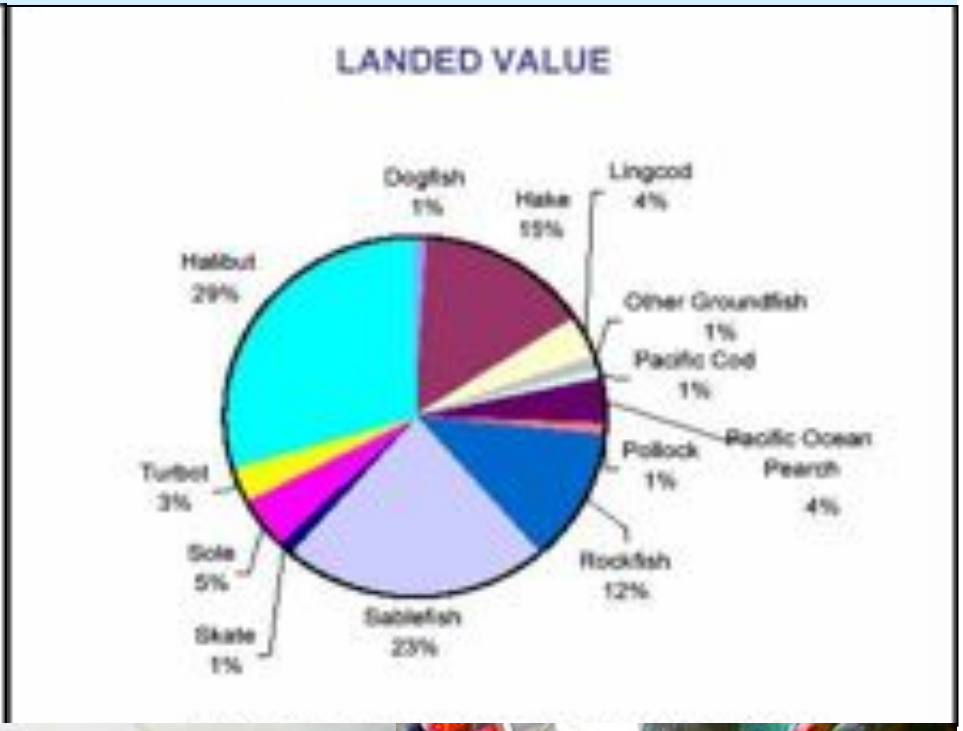
The BC Groundfish Fishery

Fishery Characteristics

- 7 licence categories, 6 gear types
- 28 TAC managed species
- 68 species/area management categories
- >100 by-catch species
- Vessel size 22’ to 175’
- Fishery occurs over 15,000 miles of coastline in depths from 5 to 500 fathoms

BC Groundfish Fishery





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The Active Groundfish Fleet

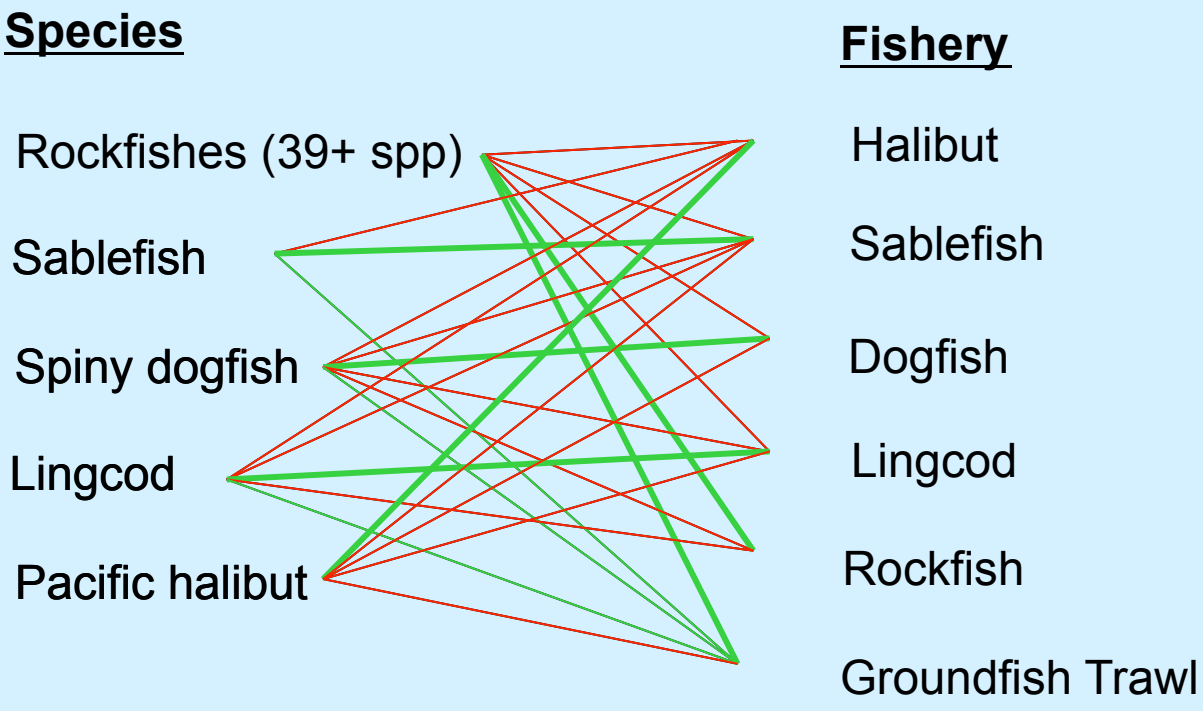
Fishery	Gear	Vessels
Hook and Line		
Offshore Rockfish/Snapper	Longline	45
Inshore Rockfish/Snapper	Longline/Handline	10
Lincod	Troll/Longline/Handline	25
Dogfish	Longline	20
Sablefish	LongLine/Trap	20
Halibut	Longline	140
		200
Trawl		
Offshore	Bottom Trawl	45
Inshore	Bottom Trawl	9
Whiting	Midwater Trawl	35
		65

The Problem

- 7 licence types allowed only one or a limited range of catch
- Rockfish by-catch in all fisheries
- Increasingly complex input controls
- Significant by-catch led to significant discarding, particularly rockfish
- Competition for non-quota share species

Fishery Management ~ 1990

Limited entry created species specific fisheries with overlapping catches (and discards)



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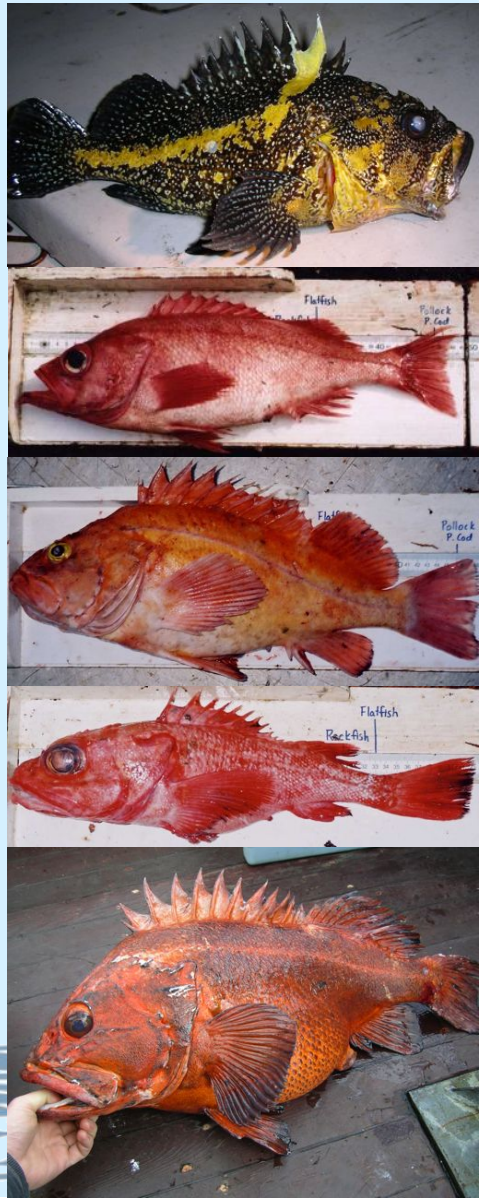
The Solution

Key Guiding Principles

- Fisheries and Oceans Canada (DFO) specified that the management system must:
  - Account for all catch, including discards
  - Enable stock specific management
  - Require fishers to be individually accountable for their catch
  - Establish new monitoring standards to ensure above principles are met



Industry Requirements

- Lowest cost solution
- Level playing field for all
- Minimize inconvenience and effect on operation
- Maximize efficiency of each operation
- Flexibility for schedule and catch
- Maximize value of catch

Fishery Reform

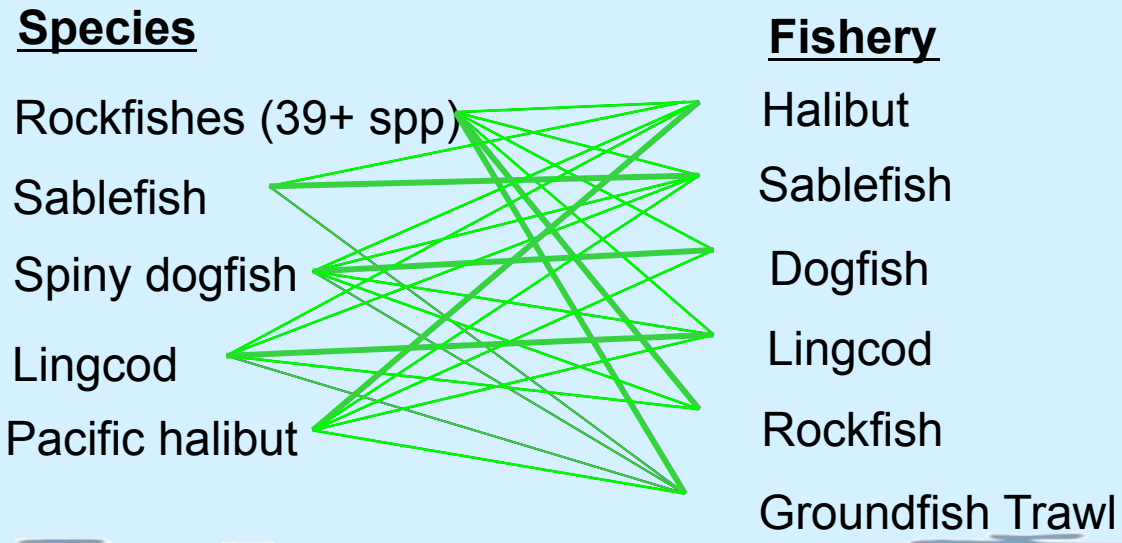
- Industry tasked with developing a solution
- 100% retention of rockfish
- All species moved to catch shares
- Quota transferability between licence types
- Individual accountability

New Monitoring Framework

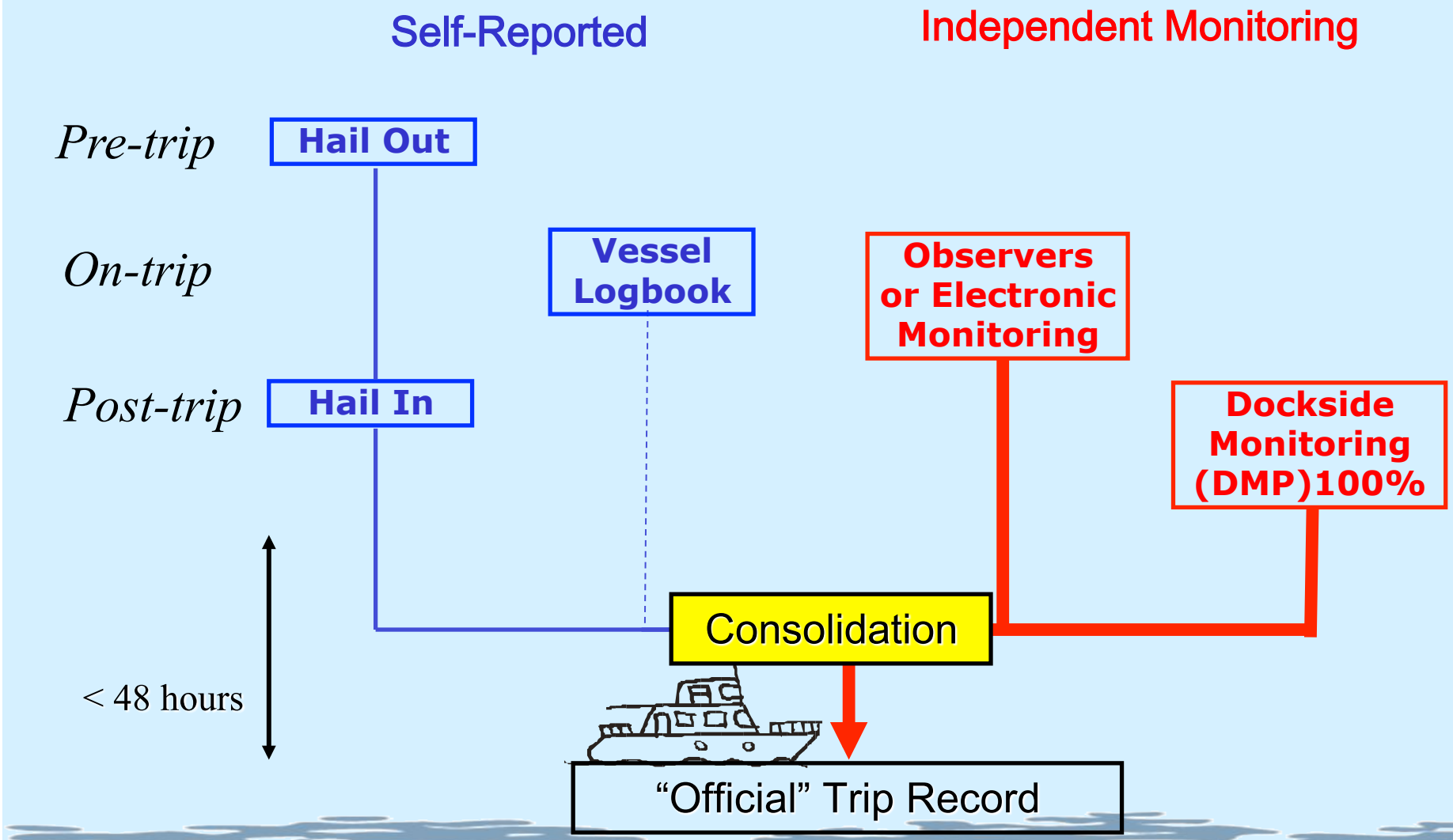
- ‘Self-Reported’ Data – Hails, logbooks, landing slips
- 100% Dockside Monitoring – Independent verification of all offload events (species, weights, counts)
- 100% At-sea Monitoring – Independent verification of fishing operations (location, catch)
  - At-sea Observers (offshore bottom trawl)
  - Electronic Monitoring (hook and line, trap, mid-water and inshore trawl)
- Data Consolidation – Timely compilation, analysis and reporting of data

Fishery Management Today

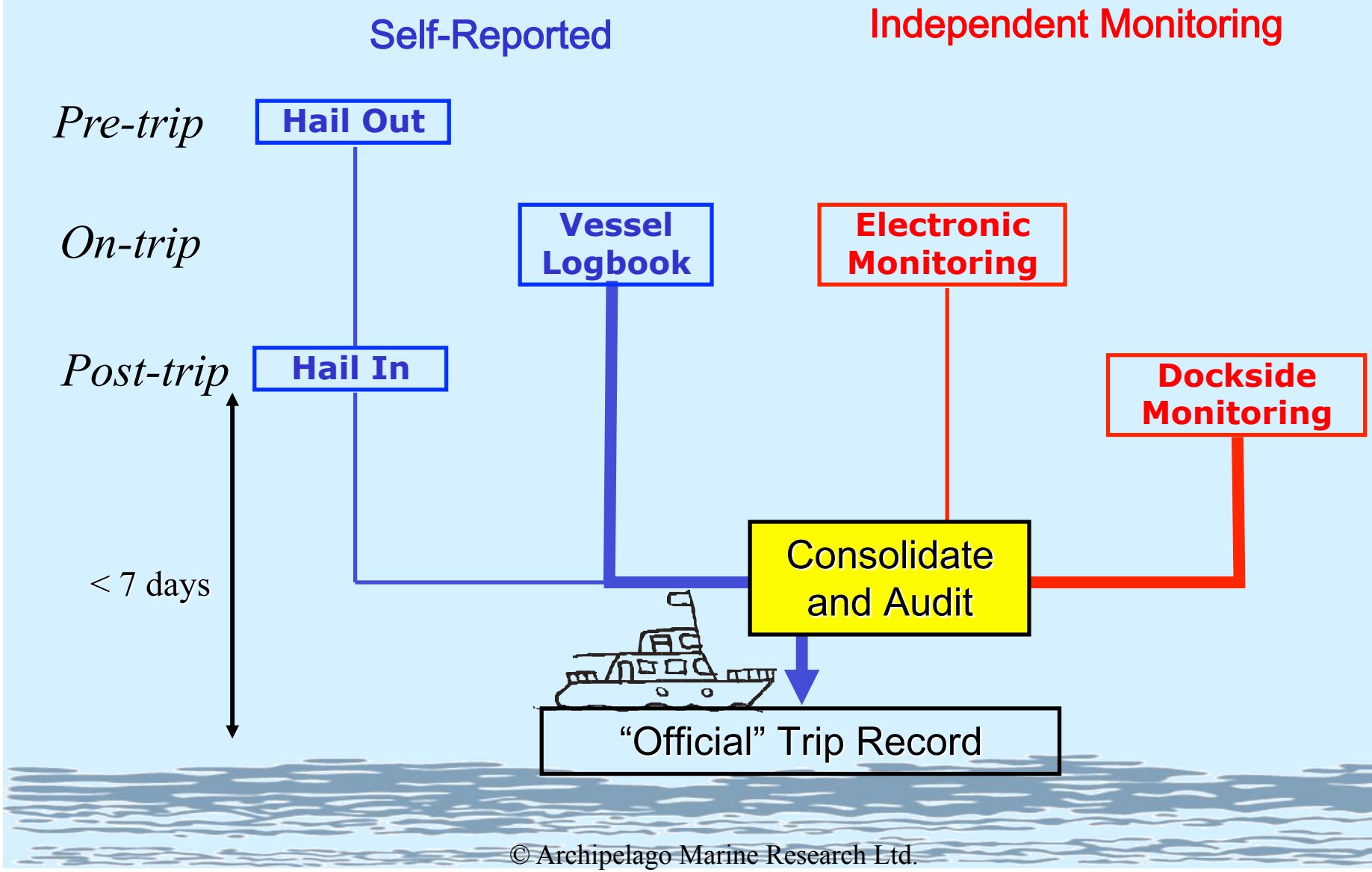
- Phased in catch shares (IVQs) by fishery
- Migration of the all fisheries into one 'Integrated' management plan
- Enable quota trading to cover bycatch



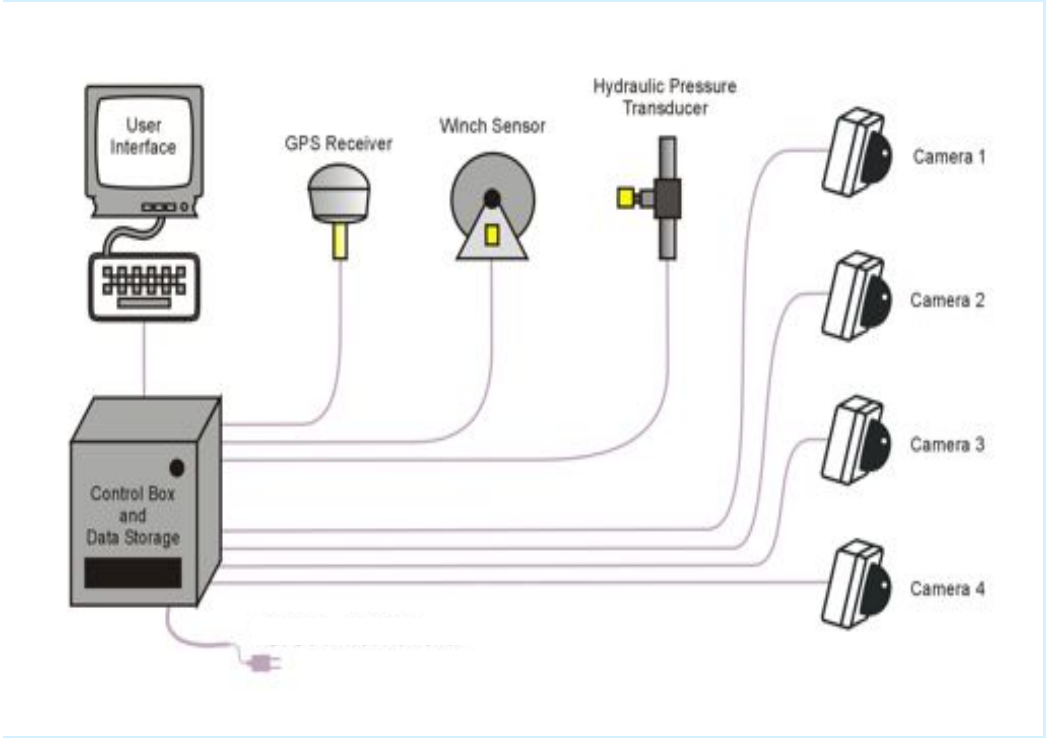
Fishery Data Model – Full Census



Fishery Data Model -Audit

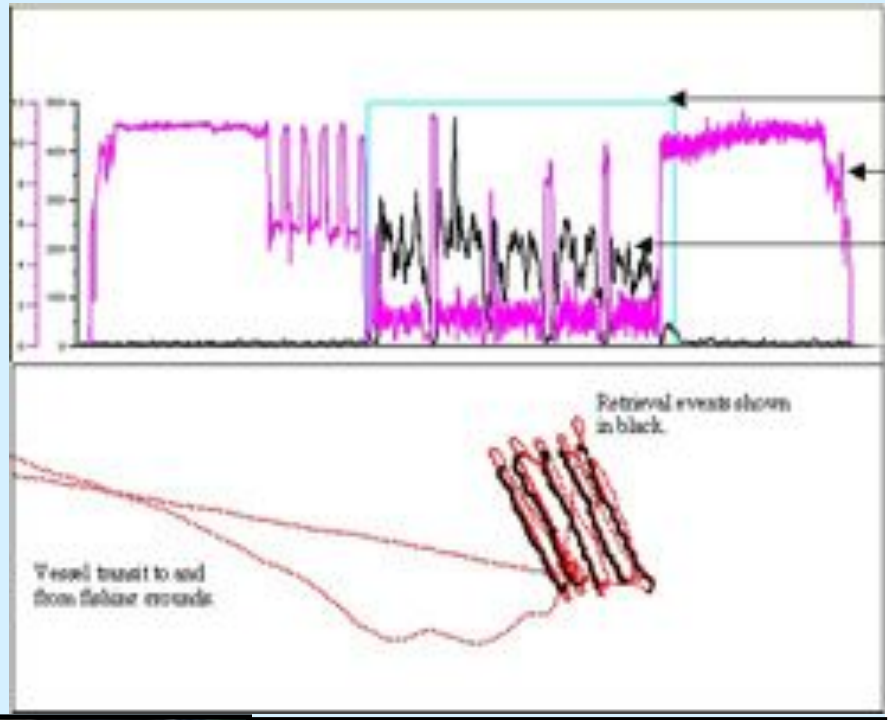


Electronic Monitoring

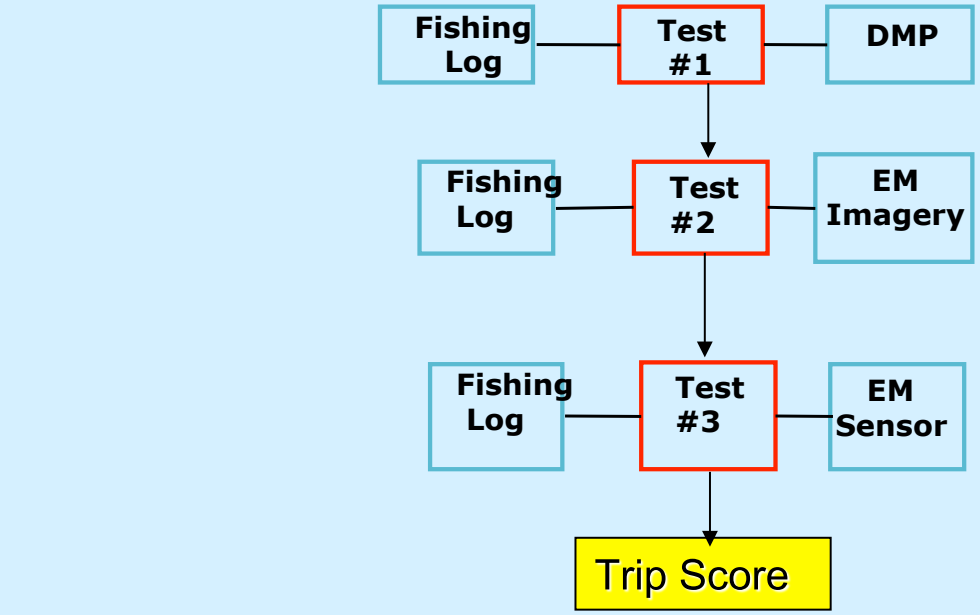


Program Overview

- Scope
  - ~250 EM systems,
  - ~11,000 seadays
- Objectives
  - Full census of catch
  - Audit self reported
  - Compliance monitoring
- Program Components
  - Equipment supply
  - Field services
  - Data services



The Audit – What's Tested?

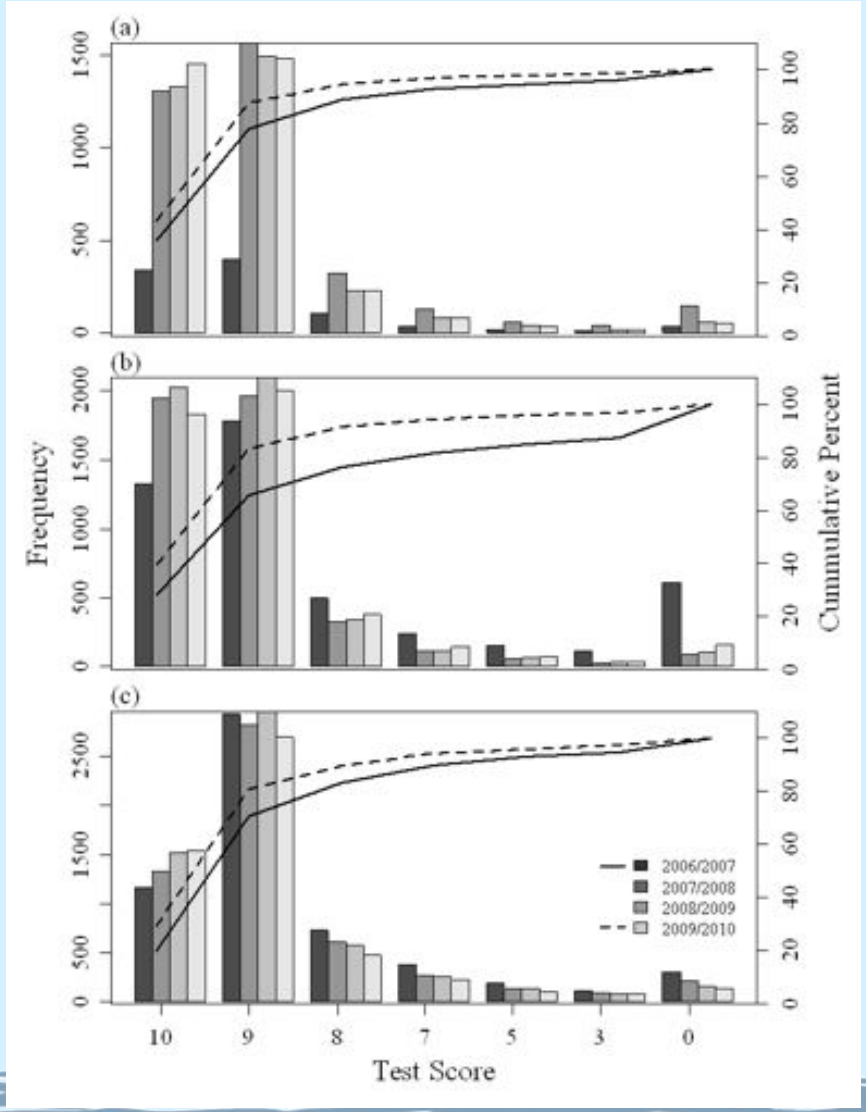


Retained catch (100% of trips) Species, Weights, Pieces

Retained and released catch (10% of sets) Species, Pieces, Size

Time and location of fishing events (100% of sets), also time gaps

Audit Scores 2006 - 2009



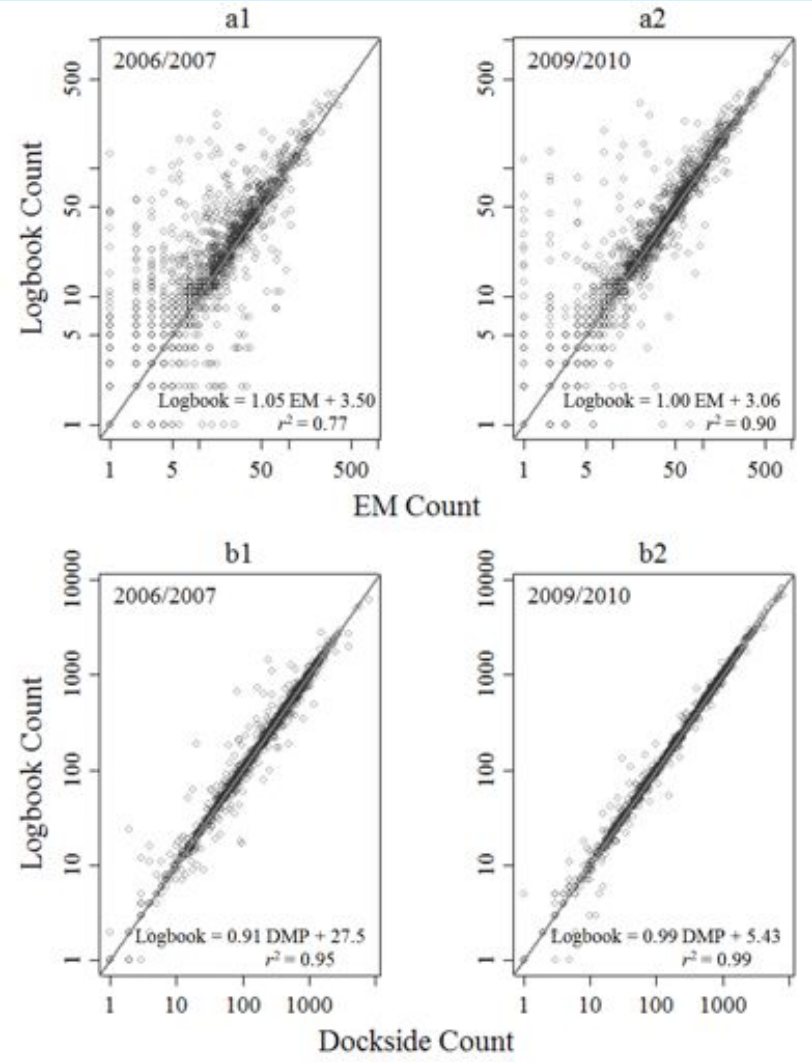
Logbook vs DMP

Logbook vs EM (retained)

Logbook vs EM (discarded)

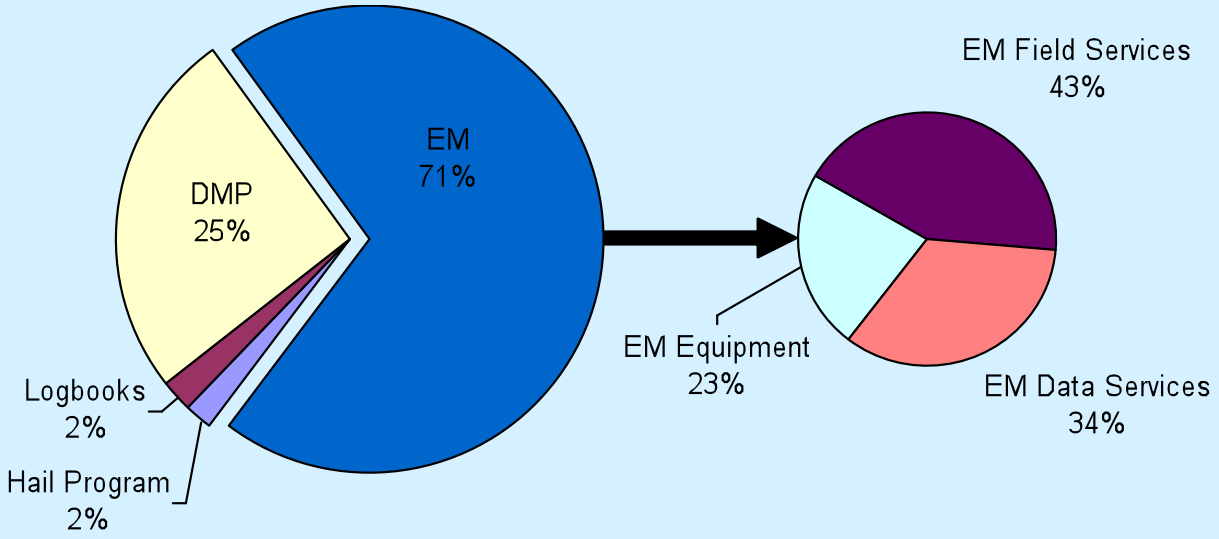
(Source: Stanley et al., 2011)

Logbook Accuracy 2006 vs 2009



(Source: Stanley et al., 2011)

Monitoring Cost Structure



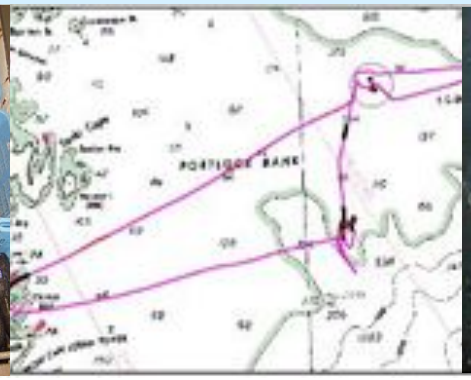
- Hook and Line Monitoring (EM Audit)
  - ~$200 CAD/Seaday
  - ~3% of Landed Value

- Substitute Audit with full video review (100% Census) – Increase by ~150%
- Substitute Audit with Observers – Increase by ~300%

(Source: Stanley et al., 2011)

Key Management Outcomes

- Full catch accounting
- Individual accountability
- Stock specific management
- Fishers are motivated to reduce by-catch, fish selectively and report accurately
- Cost effective monitoring system



Other Benefits

- Improves data quality
  - Fishery operates on ‘best available data’
  - Supports quota trading, traceability, MSC certification
- ‘Defends’ the fishery
- Levels the playing field
- Provides flexibility to individual fishers



Future of EM?

- EM will become more widespread in fisheries
- Cost of EM will decline
- EM technology will become more complex and more integrated (e.g., *e*logs, VMS, vessel data)
- EM will increasingly become tool for verification of Self-Reported Data

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