

FishSmart

A Standards-Based Information System for Fish Harvesting

Robert Verge, P.Eng., MBA, CA, CMC
Managing Director
Canadian Centre for Fisheries Innovation
September, 2013

► Safety

- ◆ Fishing is the most dangerous occupation in the world

► Marine Operations

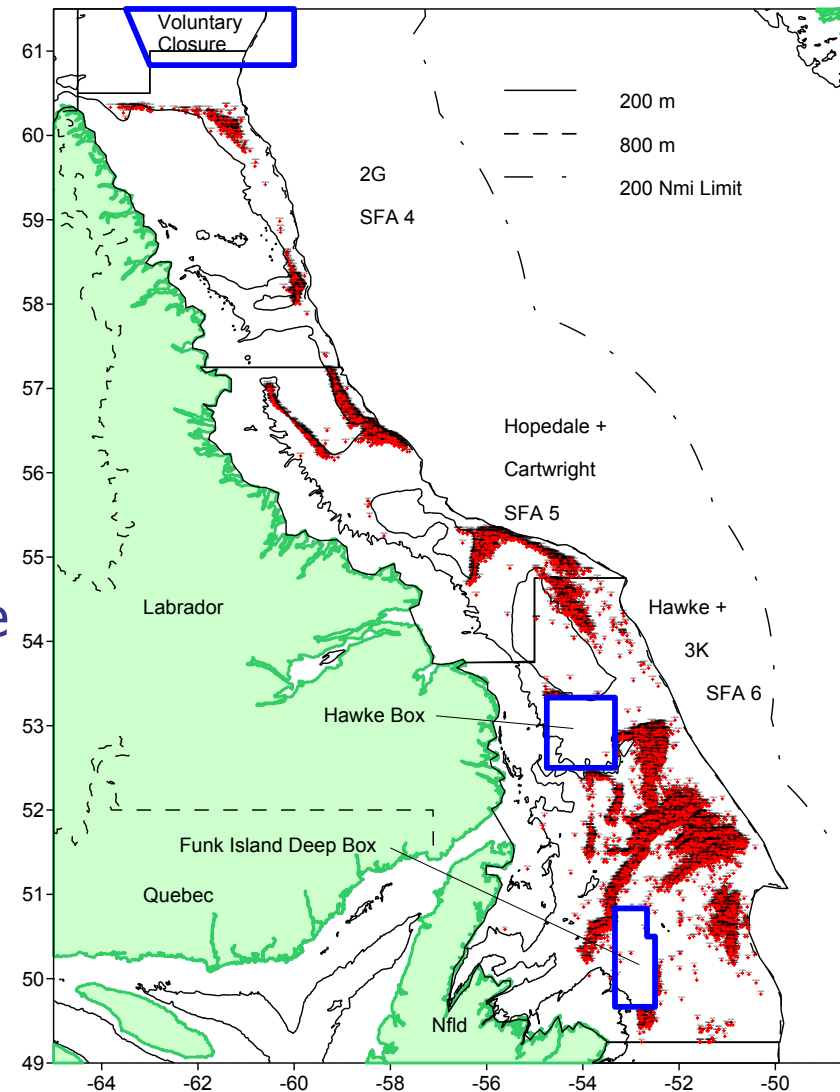
- ◆ Fishing is energy-intensive and must contend with hazards – weather, ocean conditions, snags and wrecks, other marine activities
- ◆ Marine transport and oil exploration and production must contend with hazards – weather, ocean conditions, fishing and other marine activities
- ◆ Search and rescue often must respond to situations that have high levels of uncertainty – location, weather, ocean conditions, vessel characteristics, vessel and crew condition

► Science

- ◆ We need more – but we need to do it economically
- ◆ Climate change
- ◆ Ecosystems
- ◆ Fish habitat
- ◆ Resource abundance

Opportunity

- ▶ Many “points of presence” to provide rich dataset
- ▶ Accumulate data over time to identify patterns, changes
- ▶ Value in sharing – collective knowledge vs. individual knowledge



Source: D. Orr, DFO

It's About Solving Problems



- ▶ It's not about having information – it's about solving problems
- ▶ Better information leads to better decisions – and better solutions
 - ◆ Faster response
 - ◆ Outcomes better suited to the need
 - ◆ Less risk
- ▶ Fishing problems require better solutions
 - ◆ Risk
 - Safety of vessel and crew
 - Finding fish to catch
 - Gear damage/loss
 - ◆ Operational efficiency
 - Steaming time vs. fishing time
 - Catch per unit of effort
 - ◆ Resource sustainability
 - Ocean conditions
 - Resource presence and abundance
 - Fish size and condition
 - By-catch

Enabling Technologies

- ▶ The past 60 years have been shaped by the evolution of computers and communications technology
- ▶ Two critical pieces – inexpensive powerful computers and the Internet – became established in the 1990s and rolled out across the world in the early 2000s
- ▶ More recent technological developments have included
 - ◆ A wide variety of sensors
 - ◆ Satellite-based geographic tracking
 - ◆ Inter-connected real-time digital infrastructure
 - ◆ Data analytics
 - ◆ Search engines
 - ◆ Hand-held devices for both data entry and data access
 - ◆ Digital supply chains
- ▶ These have fundamentally altered our society through capturing information, improving knowledge, and gaining insight



Information Use is Changing



Personal holdings	➔	Shared Holdings
Paper-based	➔	Digital
Dispersed	➔	Centralized, comprehensive
Structured reports	➔	Data mining to gain insight

A Social Media Approach



- ▶ Social media employ web- and mobile-based technologies to allow creation and exchange of **user-created content** and support **interactive dialogue** – i.e. two-way flow of information
 - ◆ Technology and interaction together lead to co-creation of value
- ▶ FishSmart will use similar principles
 - ◆ User-created content
 - ◆ Sharing through the Internet and mobile technologies
 - ◆ Feedback and interactivity
- ▶ Fishers have a commonality of interest in
 - ◆ Safety
 - ◆ Operational efficiency
 - ◆ Resource sustainability
- ▶ It's about improving the probability of success and reducing and managing risks

Existing Applications

Keeping An Eye On Pollock

June 3, 2013

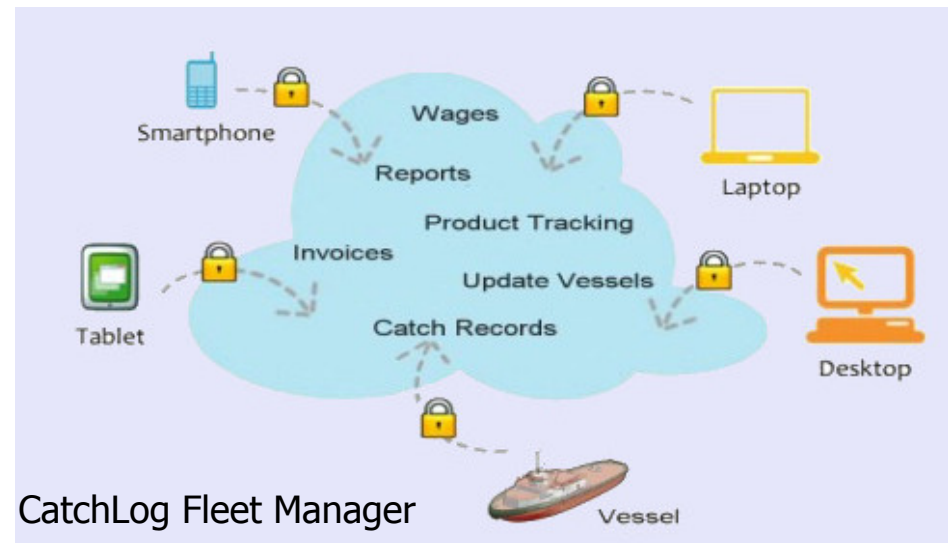
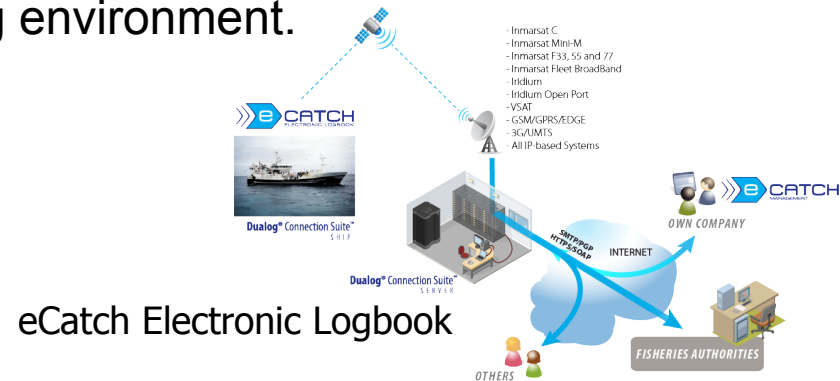
Scientists and fishermen work together to understand how walleye pollock respond to a changing environment.

Smarter business for a Smarter Planet:

The cloud that's transforming an industry, one fish at a time.

At the University of Bari, a new computing model is creating new business models. Using an IBM SmartCloud™ their team built a solution that allows local fishermen to auction their catch while still at sea. By creating more demand for the fishermen's product, the cloud has increased income by 25% while reducing time to market by 70%. Now the team is scaling the solution to create new business models for the winemaking and transportation industries. What can cloud do for your business? A smarter planet is built on smarter software, systems and services.

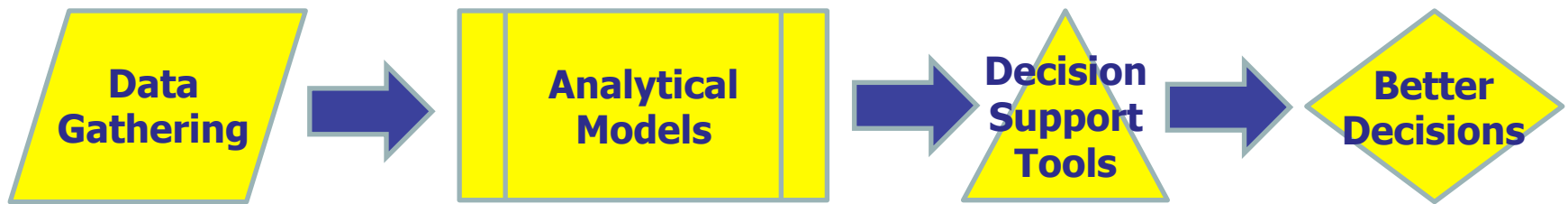
Let's build a smarter planet. ibm.com/cloudsolutions



The Future

- ▶ With the basic infrastructure in place, both businesses and consumers are demanding more from software and services
- ▶ The mobile portable device is becoming an all-purpose digital gateway
- ▶ All this is changing the way we live and work





Key Decisions – Fishing



- ▶ Where to fish
 - ◆ Fish habitat – e.g. bottom type, depth, water temperature, ocean currents
 - ◆ Resource presence and abundance
 - ◆ Obstructions
 - ◆ Interaction with other harvesters
- ▶ When to fish
 - ◆ Ocean conditions
 - ◆ Atmospheric conditions
- ▶ How to fish
 - ◆ Ocean conditions
 - ◆ Atmospheric conditions
- ▶ Decision period
 - ◆ Short-term – next fishing trip, today
 - ◆ Long-term – planning for a fishing season

Key Questions – Science



- ▶ How many fish are out there?
- ▶ Where do they congregate?
- ▶ What are their migration paths?
- ▶ Is their habitat changing?
- ▶ How are habitat changes impacting on resource abundance and distribution?

► Ocean bottom conditions

- ◆ Fish habitat
 - Depth
 - Bottom type
 - Water temperature
 - Ocean currents
- ◆ Obstructions – wrecks, snags

► Ocean conditions

- ◆ Sea state
- ◆ Water temperature
- ◆ Ocean currents

► Atmospheric conditions

- ◆ Air temperature
- ◆ Wind speed
- ◆ Precipitation

- ▶ Vessel operation
 - ◆ Location
 - ◆ Heading
 - ◆ Fuel consumption

- ▶ Fishing effort
 - ◆ No. tows
 - ◆ Duration of tows
 - ◆ Tow depth

- ▶ Catch
 - ◆ Weight
 - ◆ By-catch
 - ◆ Size
 - ◆ Condition

- ▶ Ocean bottom conditions
- ▶ Ocean conditions
- ▶ Atmospheric conditions
- ▶ Vessel traffic
- ▶ Vessel operations
- ▶ Catch characteristics
- ▶ Operational efficiency
- ▶ Special inquiries (data mining)

This information is useful for vessel owners/operators, DFO, Coast Guard, SAR, Environment Canada, Transport Canada, other commercial marine operators

- ▶ Are fishers willing to allow their vessels to be used for data collection?
Under what conditions?
 - ◆ We need to define the value proposition that makes it worthwhile
- ▶ Are potential users interested in the data? Under what conditions?
 - ◆ We need to define users' decision making protocols, data needs, and reporting requirements
- ▶ What technologies are available to collect, transmit, process, and report the data?
 - ◆ Can these technologies meet users' requirements?
- ▶ What will it cost?
 - ◆ Development
 - ◆ Operation
- ▶ How can development and operational costs be financed?