FishSmart
A Standards-Based Information System for Fish Harvesting

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Need

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

Data Gathering → Analytical Models → Decision Support Tools → Better Decisions
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
Data – 2

► Vessel operation
  ◆ Location
  ◆ Heading
  ◆ Fuel consumption

► Fishing effort
  ◆ No. tows
  ◆ Duration of tows
  ◆ Tow depth

► Catch
  ◆ Weight
  ◆ By-catch
  ◆ Size
  ◆ Condition
Reports

- 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.
Development Issues

► 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?