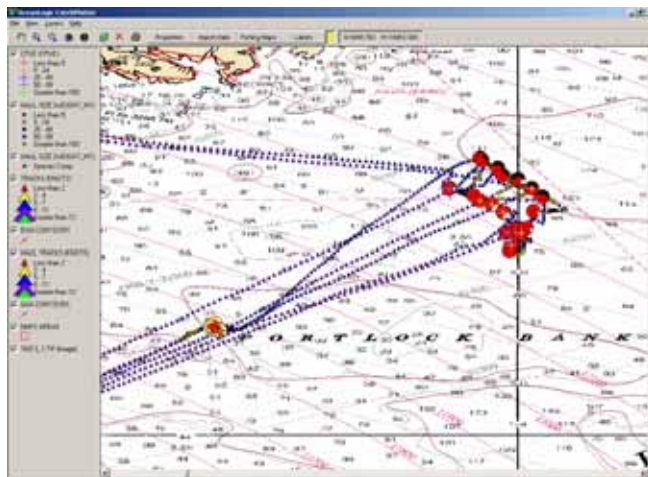


Data collection methods and GIS uses to enhance catch and reduce bycatch in the North Pacific fisheries

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OceanLogic L.L.C. specializes in low cost/high quality solutions to the development of data collection programs for local and regional fisheries. We do this through the development of simple, hands-on data collection procedures incorporated into daily fishing routine and through the use of intuitive, easy to use data collection software. This software, known as the *Electronic LogBook* (or ELB), also provides a platform for data reporting and data visualization for analysis.





This paper will cover data collection methods, data recording, analysis and data visualization, and fleet management.

We start with the premise that fishermen are scientists in their own right and will collect good data if it is convenient and useful to them. Fortunately, the data that is most valuable to fishermen is also useful for fisheries scientists and quite valuable to fisheries managers.

In fisheries, everyone needs the same data, yet they speak a slightly different language. Fishermen want to know where the fish are; scientists want to know the distribution. Fishermen ask, "How many fish are there?" Scientists ask, "What's the abundance?" Fishermen ask questions about size, sex and roe content. Scientists ask about the assessment. Through the use of Fisheries GIS, OceanLogic helps to develop a common language where data is standardized and analyzed. Our work has been successful in both government and industry-sponsored projects.

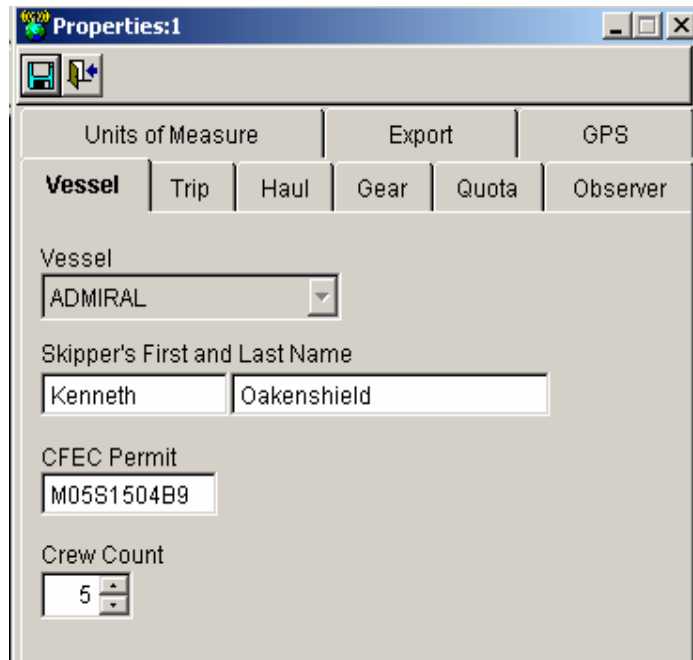
As mentioned above, we start off by working very closely with fishermen to collect commercially valuable fisheries data. We use simple techniques that allow for quick and accurate data collection. These methods have proven accurate and popular on all sizes of vessels, in many different fisheries.

	<p>Vessels do not have accurate scales</p> <p>Ship's crew determines average weight by number of fish in basket (average full basket weight 41kg) and sexes 200 fish per haul.</p>
<p>Roe percent is determined by volume, average weight per cup is 262.3 grams</p>	

The next phase of the data collection program is the data-recording phase. For this, we use an electronic logbook (ELB) that is connected to the vessel's GPS. This GPS component of the electronic logbook is crucial to the success of the program. It provides for simple, accurate and very precise data points.

By default, OceanLogic's *Electronic LogBook* records the vessel's GPS position every five minutes. It records the GPS' RMC (Recommended Minimum Content) data string logging: date, time, position, speed and course. This feature provides two very important functions. One, it provides an active record that the fisherman can draw upon to determine set and retrieval data in case it was not recorded at the time of the event. Two, it provides a tamper-resistant vessel position logging backup to augment a vessel's government mandated VMS (Vessel Monitoring System). This system is called a VVS or *Vessel Verification System*.

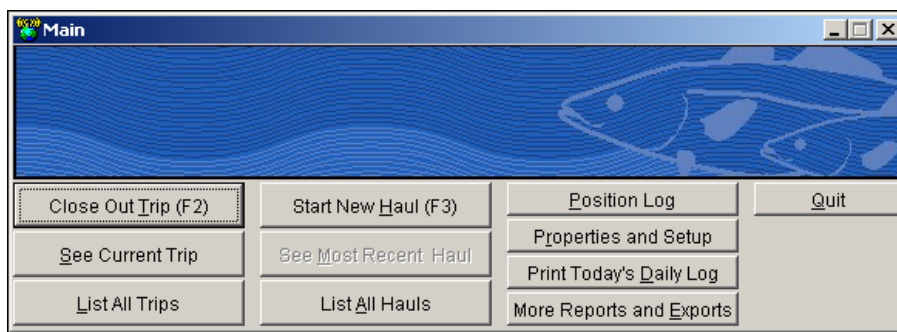
Before fishing, a fisherman preloads information about the vessel, skipper, crew, observer and target species in the Properties and Setup section of the software. Then, during normal fishing operations, fishermen need only press a single key on their key board in order to record the beginning (or end) of their fishing trip or set. In some fisheries, the only additional information required is the estimated weight of the catch, the sea floor depth and the gear depth.



The screenshot shows a software window titled "Properties:1" with a standard Windows-style title bar. Below the title bar is a toolbar with icons for save, print, and help. The main area of the window is divided into several sections:

- Units of Measure**: A section with a dropdown menu.
- Export**: A section with a dropdown menu.
- GPS**: A section with a dropdown menu.
- Vessel**: A section with a dropdown menu showing "ADMIRAL".
- Skipper's First and Last Name**: Two text input fields containing "Kenneth" and "Oakenshield".
- CFEC Permit**: A text input field containing "M05S1504B9".
- Crew Count**: A spin box containing the number "5".

This single keystroke action on the part of the skipper polls the GPS, recording and storing the date, time, latitude and longitude. When data points are collected, such as the end of a set, the program geo-references the vessel's position to the appropriate management area. This avoids many mistakes that users make with paper logbooks. Additionally, when the estimated weight has been recorded, the program calculates with the duration of set, along with the Catch per Unit of Effort (CPUE).



Electronic logbooks allow fishermen to record the data they need and provide incentives to record additional data they can use. When fishermen record additional catch information about species composition, average fish size, sex ratios, roe count, etc., they create a catch profile that when combined with other fishing vessels and relevant environmental data, allows all users of the data to see fisheries behavior in a dynamic ocean.

Good data, collected at the time of the fishing event, provides reliable observations for trend analysis.

However, for the individual fisherman, the immediate incentive for extended data collection is the ability to receive immediate and relevant data analysis.

Also, if an electronic logbook has been developed in cooperation with a regional fisheries agency that has an observer program, the observers can use an electronic logbook to record scientific data and share it with the skipper or import the observer's data into the vessel's ELB for higher resolution data.

Mikol (OceanLogic) - Data collection methods & GIS uses to enhance catch & reduce bycatch (607-614)

Hauls:1

Haul Begin/End | Additional Haul Information | ADMIRAL | Trip: 2002-7 | Duration: 21

Begin Fishing

GPS: Now List Manual

Time/Zone: Jul 19, 2002 9:54 AM -9

Latitude: N 57 23.610 Knots: 3

Longitude: W 168 45.280 Heading: 312

Stat. Area: 685700 Fed. Area: 513

In COBLZ: In RKCSA:

Haul Number: 2002-01

End Fishing

GPS: Now List Manual

Time/Zone: Jul 19, 2002 10:15 AM -9

Latitude: N 56 16.123 Knots: 3.00

Longitude: W 172 52.268 Heading: 312

Stat. Area: 725600 Fed. Area: 523

In COBLZ: In RKCSA:

Bottom Depth: 80 Gear Depth: 50 F

Haul Weight mt: 150.262 Add Species Target Only

Haul Complete:

Specie	Program	Quota Owner	Count	Specie Wt. ML	Fish Wt. Kg.	Percent	CPUE
Pollock	AFA	Unalaska Co-op	14209	142.088	10.00	94.5600	0.0000
Pacific Cod	AFA	Unalaska Co-op	2654	8.174	3.08	5.4400	0.0000
Chum Salmon	AFA	Westward Fleet Coop	80	0.273	4.55	0.1817	0.0000

Haul Species (113)

CPUE: 0.251

Est. Total Wt: 150.000

Haul Number: 2002-13

Program: CDO

Owner: APICDA

Product: Whole fishfood.

PSC:

Discard/Donate:

Specie: Pollock

Sex: Female

Calculate by Weight or % of Haul

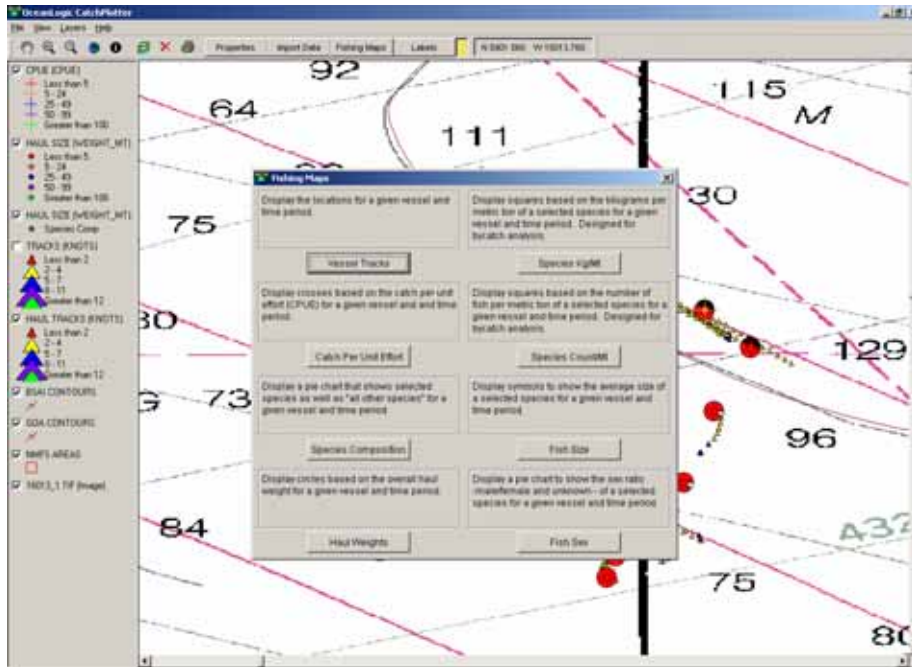
Calculate by Count and Fish Size

% of Haul: 65.00

Weight mt: 97.500 Metric Tons

Fish Size: 0.70 Kilograms

Count: 139,206



Most industrial-strength electronic logbooks today have some form of data visualization program incorporated into the database program. In short, more than a simple plotter, they have a fisheries-dedicated Geographic Information System (GIS).

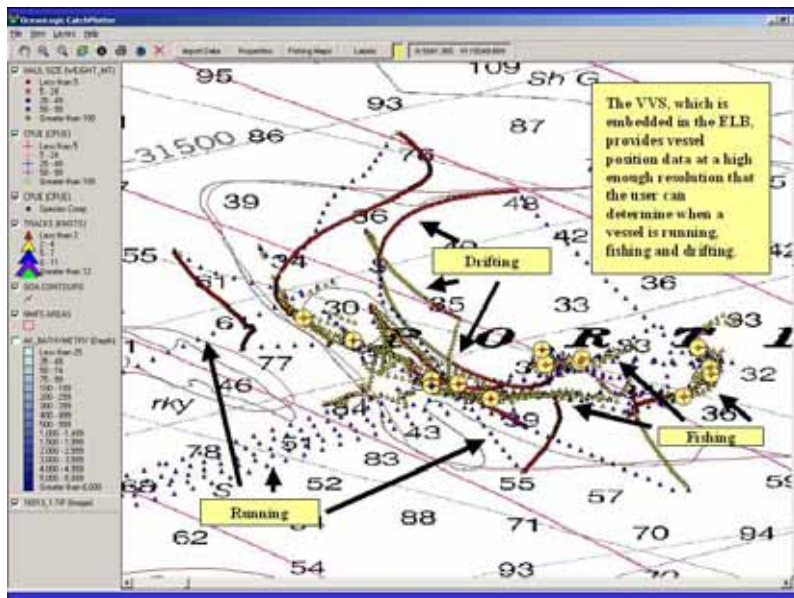
Though the GIS may be query specific it will normally cover the basic assessment information of species composition, average fish size, male to female ratios, individual species weight (or count) per metric tonne, catch weights and catch CPUE's.

If the electronic logbook has any kind of vessel tracking system, then it is likely that the vessel tracks can be removed for further fishing analysis. This feature allows the analyst to view the entire fishing trip or just the fishing events. This data is particularly useful in identifying actual fishing habitat within the fishing grounds.

Industry and government managers find this higher resolution, track data more valuable than the less versatile, less precise VMS data.

Also, because industry managers derive significant value from both the high-resolution catch and the track data, they are requiring their fishermen to collect this data on a regular basis.

All Vessel Tracks



Only Fishing Tracks

