Project Profile – Fishery Operations System (FOS)

Client: Fisheries and Oceans Canada, Pacific Region

Project and System Overview:

The Fishery Operations System tracks commercial fishing activities across multiple fisheries. Electric Edge Systems re-created parts of the FOS system and added extensive new functionality to accommodate the integration of multiple groundfish fisheries (e.g. the groundfish trawl, halibut, sablefish, rockfish, lingcod, and dogfish fisheries) under a comprehensive integrated fisheries management plan. Electric Edge also created the quota catch merge process which automated what had previously been the time-consuming, manual process of calculating the remaining quota on licenses.

Trip Tracking

All aspects of a commercial fishing "trip" are recorded in FOS. Prior to leaving the dock, a vessel will "hail-out", usually via VHF radio, to provide a departure date and time, licence, skipper, anticipated catch offload location, and other relevant information. Later, vessels "hail-in" to indicate conclusion of fishing activities for the trip.

Between hailing out and hailing in, a log is kept that includes details for each fishing "set" and the quantity or weight of species that were retained and released in each set. In many fisheries, the skipper is responsible for keeping the log. In others, an independent fishery observer is placed on the vessel and produces the log. Upon landing at an offload location, a contractor ("dockside monitor") supervises and records the offload of catch. In some cases, trips will occur under more than one licence. These "combo trips" will involve more than one hail-in and offload.

FOS stores, organizes, and reports on all data relating to hails, offloads, and logbooks for all commercial groundfish trips off Canada's Pacific coast. The groundfish fishery is the largest of all Canadian Pacific fisheries. Its value far exceeds that of the more widely known salmon fishery.

Solving the Problem of Wasted Bycatch

Prior to integration of the fisheries, the dumping of unintended "bycatch" presented a major conservation and business problem. Fishers had to discard species that were caught but were not permitted to be retained under their commercial fishing licenses, even though the species were excellent food fish with a high commercial value and were valid quota species in other groundfish fisheries. The survival rate of such discarded "non-quota" species was very low.

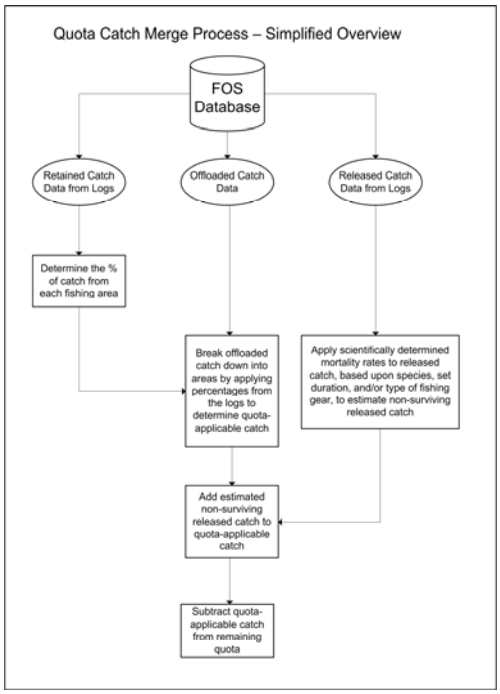
The work performed by Electric Edge Systems allowed the integration of fisheries, permitting quota for bycatch species to be assigned to each licence. For example, since integration, a fisher with a halibut licence may also retain various rockfish, flatfish, and other species. Quotas are set for each species within each geographical fishing area.

Electric Edge's fishery integration work paved the way for quota to be traded between a wider range of licence holders across more fisheries. Fishers who are nearing their quota for a given species/area can now obtain additional quota from another fisher by purchasing the quota or by trading their remaining quota in other species/areas. Quotas and quota transfers are managed in the Quota Management System (QMS), which was created by Electric Edge Systems Group and is described in a different project profile document. FOS is fully integrated with QMS at Fisheries and Oceans Canada.

Calculating Quota-Applicable Catch
After each trip is fully recorded, the quota remaining on the applicable licence(s) is calculated by FOS via the “Quota Catch Merge” process.

After a given trip, the calculation of remaining quota is not as simple as counting and weighing the species that were offloaded at a dock. While the offload data can provide totals for retained catch, it does not indicate the fishing areas where the catch was harvested and does not account for fish that were released (e.g. undersize or non-marketable catch). The information that is missing from the offload data can be found in the fishing logs. The merge process blends the data from the offload and the fishing log for each quota-applicable species, based upon complex business rules. A simplified overview is provided below.

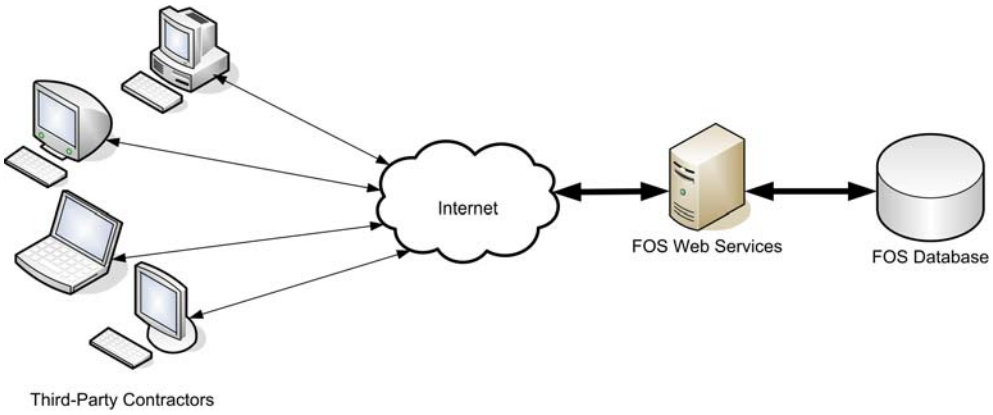
The functionality of the quota catch merge actually extends well beyond the illustrated process. For example, catch used as bait or as food for the crew will not show up in the offload, but is recorded in the logs. 100% of such catch is applied against the licence’s quota.



In some cases, a species may appear in the offload data, but not in the fishing log. Sometimes this can happen because it can be difficult to differentiate between similar looking species on the pitching deck of a vessel at sea. For example, in Pacific waters off British Columbia, the shortraker rockfish may be confused with the rougheye rockfish. These are set-up in FOS as “partner species”. If rougheye rockfish are offloaded, but none are recorded in the logs, the system will check the logs for shortraker rockfish. If any are found, the system will assume that the species were misidentified and the areas recorded in the logs for the catch of shortraker rockfish will be applied to the rougheye rockfish that were actually retained. FOS allows for the set-up of any number of partner species pairs.

Third-Party Accessibility via Web Services
Hail-ins, hail-outs, catch offload records, and fishing logs may be entered and maintained in FOS by various third-party contractors. Such contractors will have their own in-house systems to store and maintain the information that they are responsible for.

In order to allow third-party systems to integrate seamlessly with FOS, an extensive set of web services have been provided. The web services are basically a set of functions that are accessed via an Internet connection. These functions provide a bridge between third-party systems and the FOS database to allow the transfer and synchronization of data between systems, while ensuring compliance with all business rules and mandated regulations.



FOS – Functional Summary:

The following are just a few areas of functionality provided by FOS for Fisheries and Oceans Canada:

- **Record hail-outs**. These indicate the start of commercial fishing trips. Hail out data includes *licenses used, skipper, call date/time, departure date, departure port, estimated landing date, anticipated offload location, areas to be fished*, and more.

- **Record fishing logs**. Fishing logs may be recorded by vessel skippers, by third-party contractors placed on board vessels, or by onboard video recording equipment. The logs provide the fishing areas where the catch originated as well as a record of released catch. Recorded log data includes information about each fishing "set" such as *start and end dates/times, latitude, longitude, fishing area, depth, gear type, and target species*. Within each set, data is recorded for every species caught. This includes *species, legal/marketable status, retained pieces and/or weight, released pieces and/or weight, pieces used as bait, and fishing area*.

- **Record hail-ins**. These indicate that fishing activities for a trip have concluded and the vessel is on its way in to port. Hail-in data includes skipper, offload date/time, offload port, offload location, main buyer, catch state (e.g. fresh, frozen, etc.), weight of target species caught, weight of other species, areas fished, and whether the hail-in is the final one that marks the end of the trip. Hail-in details are sent to dockside monitoring contractors in order to ensure that a dockside monitor will meet the vessel upon its arrival.

- **Record offloaded catch**. As catch is offloaded, dockside monitoring contractors record data such as *vessel, captain, licence, offload location, offload start and end date/time, and main catch buyer*. For each offloaded species, the *species ID, buyer, catch state (e.g. fresh, frozen, etc.), catch form (e.g. head on, head off, tailed, etc.), quota applicability, number of fish, weight, conversion factor, and converted weight* are recorded.

- **Calculate catch against quota**. When a final hail-in has been entered and fishing log and offloaded catch has been recorded for a trip, a quota catch merge is performed for the trip. As explained earlier in this document, the merge process calculates the catch to be subtracted from the remaining quota on the applicable licence. When the quota catch merge(s) are completed for a trip, the vessel is given clearance to hail-out on a new trip, provided that sufficient quota remains.

- **Reporting**. An extensive variety of reports are available to Fisheries and Oceans staff. Quota status reports can be generated for individual fishing licenses, indicating total quota, catch-to-date, and remaining quota for each quota-applicable species.