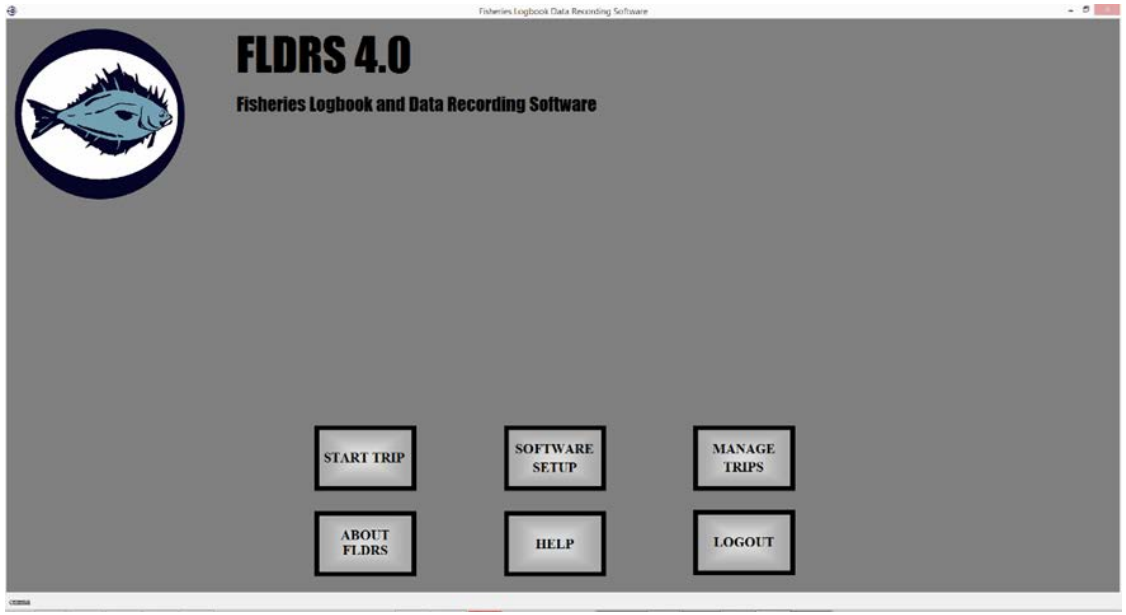
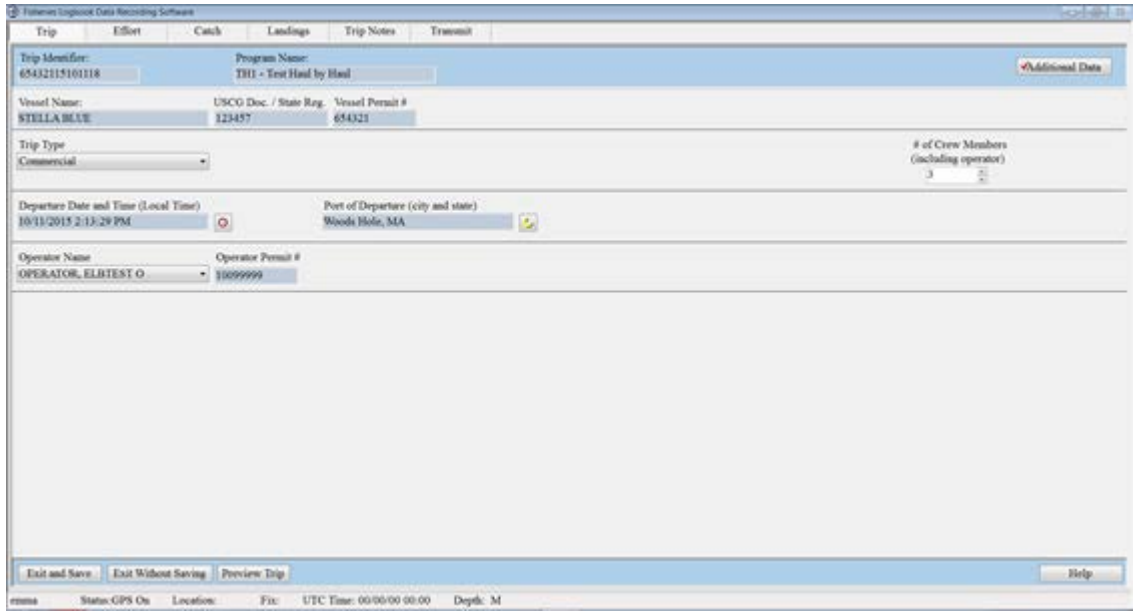
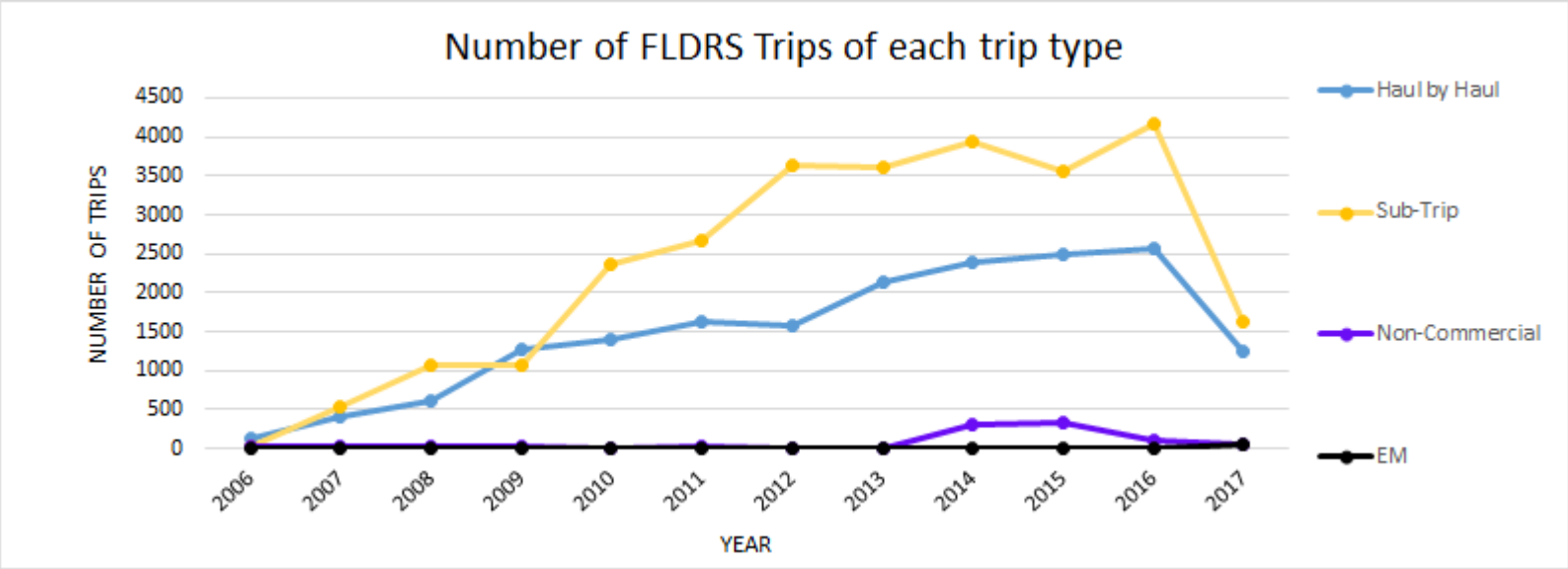
FLDRS: An origin story

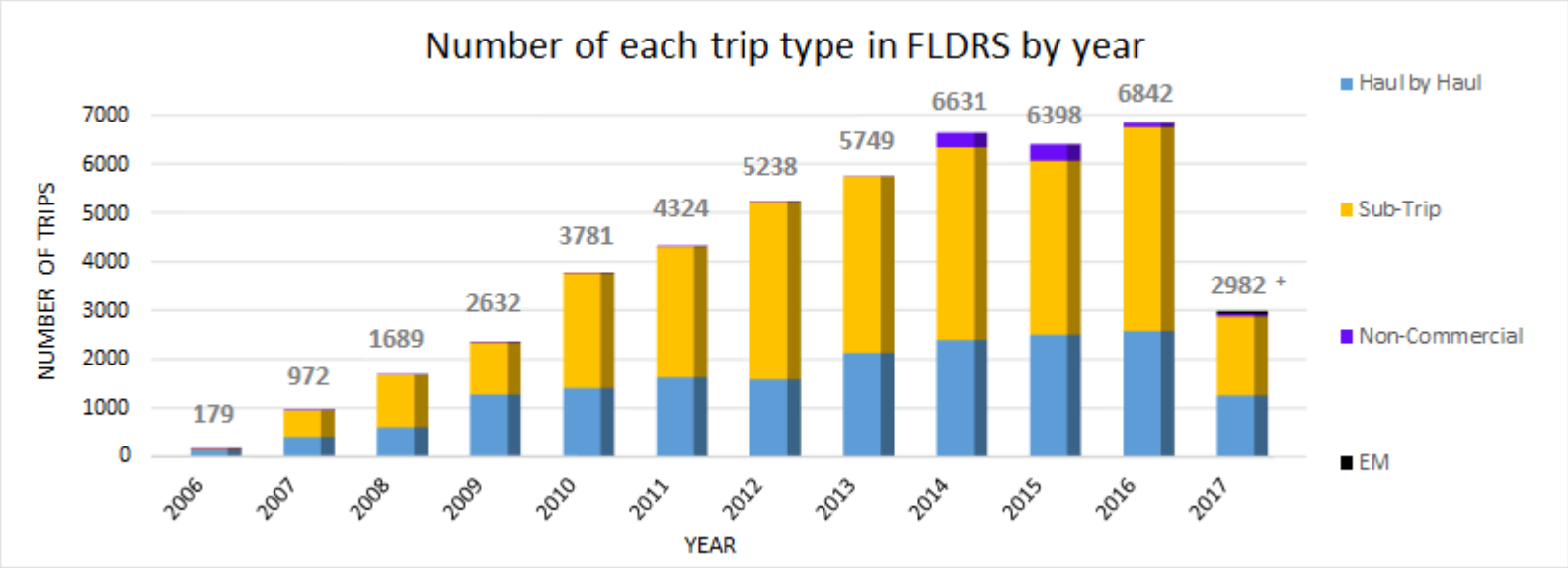
- ★ FLDRS is a database driven application deployed on commercial and recreational fishing vessels.
- ★ Software can be customized based on program code
  - Specific reporting rules enforced
  - Dynamic data elements available
  - Many required fields displayed as pre-populated dropdowns.
- ★ FLDRS can collect data both at the sub-trip and haul-by-haul level.
- ★ Data collected at 5 levels: Trip, Effort, Catch, Landing, and Apportionment.
- ★ Electronic data submissions began in late 2006 and were limited to only a few program types.
- ★ In the years since, FLDRS usage has broadened.
  - Gear research studies
  - Dogfish tagging studies
  - Bottom longline survey
  - Electronic monitoring
  - Electronic jig EFP





FLDRS: By the numbers





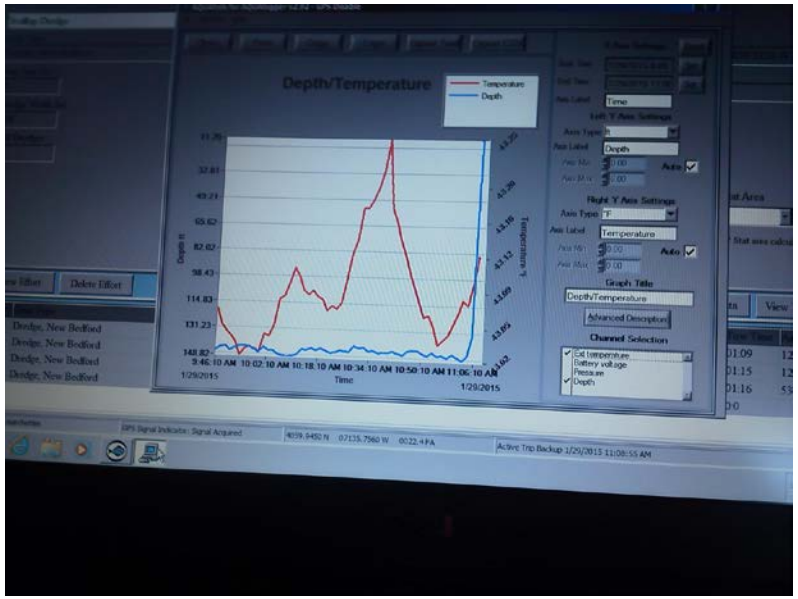
FLDRS: Study Fleet
The who, what, where, when, why, and how of GTE data processing

Who: The Study Fleet program consists of commercial fishing vessels contracted to collect data at a finer scale (HbyH) than is required.

Where: Maine to the Mid-Atlantic

What (data is collected):

- ★ Study Fleet (SF) data represents a subset of data submitted by vessels using FLDRS.
- ★ GTE stands for: **G**PS Data, **T**emperature/Depth Data, and **E**ffort Data (Electronic Logbook)
- ★ SF vessels also collect GPS and Temperature/Depth data that is submitted directly to CRB.
- ★ GPS Data: Collected at the trip level. Data written to file at 20 second intervals.
- ★ Temperature/Depth data: Probe attached to fishing gear. Data captured every 90 seconds. Data collected by CRB staff. Working on developing a method for automatic wireless transmission of data.
- ★ Effort Data: Collected at the haul level using an electronic logbook (FLDRS).



FLDRS: Taking the data and doing stuff with it

How (do we process the data):

★ GPS and Temperature/Depth (TD) data loaded by staff using a web-based GUI.

★ Logbook data submitted to DMS who performs QA/QC procedures. Data then filtered to tables/views accessible to CRB.

★ A PL/SQL procedure runs nightly, if new data is available, GPS, TD, and logbook data is joined into a single table.

★ QA/QC routines embedded into procedure.

★ CRB staff use web-based GUI to perform additional audits.

★ Common issues found:

- Inaccurate start/end of an effort.
- Efforts where logbook was not used.
- Efforts with GPS and/or TD data quality issues.
- Incorrect data entered into logbook.
- Gear deployment related to non-fishing activity.

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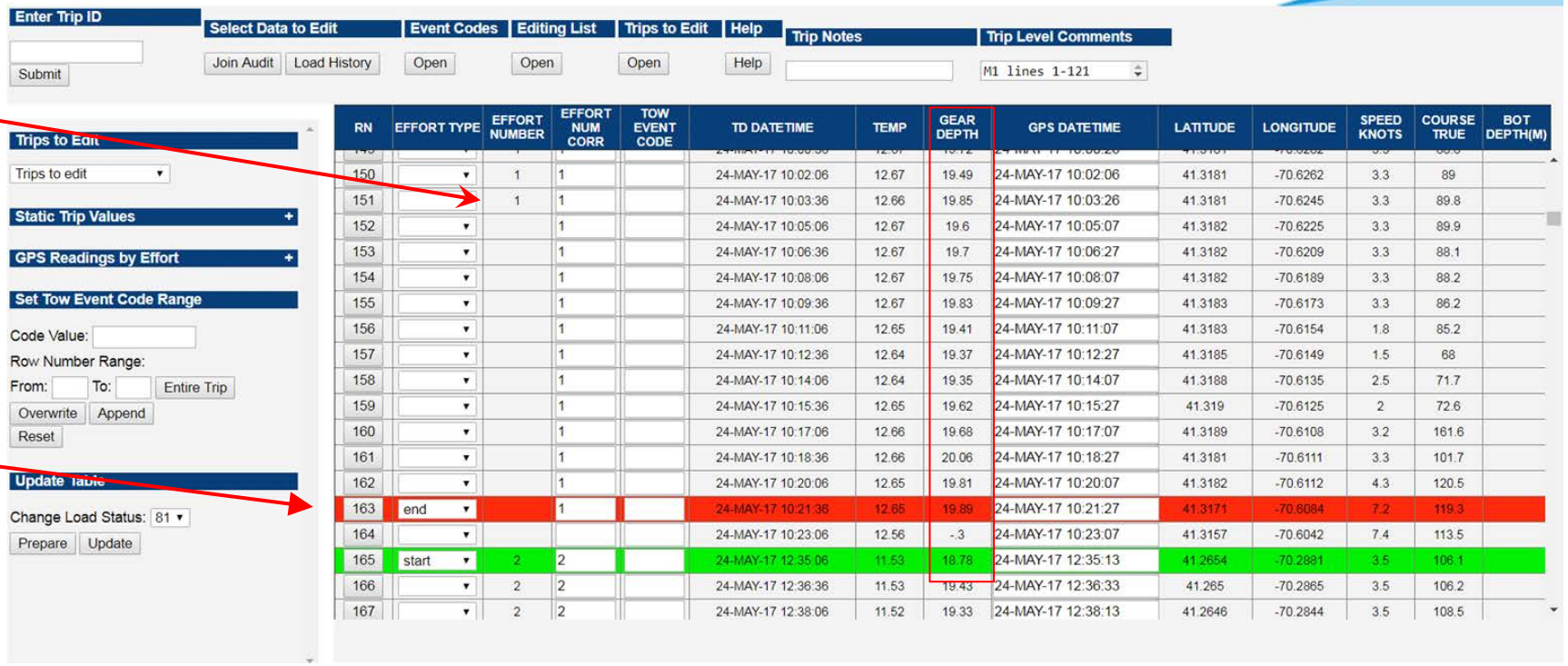
End of effort determined by Button pushing

End of effort validated by gear depth profile



RN	EFFORT TYPE	EFFORT NUMBER	EFFORT NUM CORR	TOW EVENT CODE	TD DATETIME	TEMP	GEAR DEPTH	GPS DATETIME	LATITUDE	LONGITUDE	SPEED KNOTS	COURSE TRUE	BOT DEPTH(M)
150		1	1		24-MAY-17 10:02:06	12.67	19.49	24-MAY-17 10:02:06	41.3181	-70.6262	3.3	89	
151		1	1		24-MAY-17 10:03:36	12.66	19.85	24-MAY-17 10:03:26	41.3181	-70.6245	3.3	89.8	
152			1		24-MAY-17 10:05:06	12.67	19.6	24-MAY-17 10:05:07	41.3182	-70.6225	3.3	89.9	
153			1		24-MAY-17 10:06:36	12.67	19.7	24-MAY-17 10:06:27	41.3182	-70.6209	3.3	88.1	
154			1		24-MAY-17 10:08:06	12.67	19.75	24-MAY-17 10:08:07	41.3182	-70.6189	3.3	88.2	
155			1		24-MAY-17 10:09:36	12.67	19.83	24-MAY-17 10:09:27	41.3183	-70.6173	3.3	86.2	
156			1		24-MAY-17 10:11:06	12.65	19.41	24-MAY-17 10:11:07	41.3183	-70.6154	1.8	85.2	
157			1		24-MAY-17 10:12:36	12.64	19.37	24-MAY-17 10:12:27	41.3185	-70.6149	1.5	68	
158			1		24-MAY-17 10:14:06	12.64	19.35	24-MAY-17 10:14:07	41.3188	-70.6135	2.5	71.7	
159			1		24-MAY-17 10:15:36	12.65	19.62	24-MAY-17 10:15:27	41.319	-70.6125	2	72.6	
160			1		24-MAY-17 10:17:06	12.66	19.68	24-MAY-17 10:17:07	41.3189	-70.6108	3.2	161.6	
161			1		24-MAY-17 10:18:36	12.66	20.06	24-MAY-17 10:18:27	41.3181	-70.6111	3.3	101.7	
162			1		24-MAY-17 10:20:06	12.65	19.81	24-MAY-17 10:20:07	41.3182	-70.6112	4.3	120.5	
163	end		1		24-MAY-17 10:21:36	12.65	19.89	24-MAY-17 10:21:27	41.3171	-70.6084	7.2	119.3	
164					24-MAY-17 10:23:06	12.56	-.3	24-MAY-17 10:23:07	41.3157	-70.6042	7.4	113.5	
165	start	2	2		24-MAY-17 12:35:06	11.53	18.78	24-MAY-17 12:35:13	41.2654	-70.2881	3.5	106.1	
166		2	2		24-MAY-17 12:36:36	11.53	19.43	24-MAY-17 12:36:33	41.265	-70.2865	3.5	106.2	
167		2	2		24-MAY-17 12:38:06	11.52	19.33	24-MAY-17 12:38:13	41.2646	-70.2844	3.5	108.5	

FLDRS: Producing something useful

Why (do we go through all this trouble):

GTE data processing can:

- ★ Provide more accurate estimations of fishing time by using depth profiles.
- ★ Identify efforts that were missed by a logbook user.
- ★ Identify efforts with data quality issues which may not be appropriate for analysis.
  - Gear damage
  - Issues with setting/hauling gear

When (will this data be available to end users):

- ★ Soon I hope.
- ★ Trip, Effort, Catch, Landing, and Apportionment data is accessible through DMS.
- ★ CRB working on providing access to other data products.

GTE Data Products

- ★ Binned Temperature/depth/location data
  - Data is binned by 1-minute latitude, 1-minute longitude, 1-hour groups.
  - For each bin, min, max, mean, and stdev are calculated for temperature and depth.
  - Number of observations for temp and depth are noted for each bin
  - Currently there are 87,803 binned records.

- ★ **Fishing effort summaries**
  - For all efforts with sufficient data, an effort summary profile is created.
  - 57,668 effort summary records to date.
  - Variables recorded: TRIP_ID, EFFORT_NUM, TOTAL_NUM_RECORDS, PERCENT_RECORDS_MATCH, EFFORT_START_DATE_GMT, EFFORT_END_DATE_GMT, EFFORT_END_LAT, EFFORT_END_LONG, CALC_DUR_HR, CALC_DIST_NM, MIN_TEMP_C, MEAN_TEMP_C, MAX_TEMP_C, TEMP_VARIANCE, TEMP_DEVIATION, MIN_DPTH_M, MEAN_DPTH_M, MAX_DPTH_M, DPTH_VARIANCE, DPTH_DEVIATION, MIN_SPD_NMPH, MEAN_SPD_NMPH, MAX_SPD_NMPH, SPD_VARIANCE, SPD_DEVIATION, GTE_CODE, GEAR_CODE