LAKE AND RESERVOIR HYDROACOUSTIC ASSESSMENTS

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Annual Report

Colorado Parks & Wildlife
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The results of the research investigations contained in this report represent work of the authors and may or may not have been implemented as Parks and Wildlife policy by the Director or the Wildlife Commission.

INTRODUCTION

Hydroacoustic surveys enable rapid estimation of the depth-distribution, density and abundance of pelagic fish species such as kokanee (*Oncorhynchus nerka*; Brandt 1996). Mobile hydroacoustics is a quantitative method for sampling the water column of a large lake or reservoir that allows for greater spatial coverage than passive methods such as pelagic gill netting or active methods such as midwater trawling (Hubert 1996). However, some pelagic netting is required for target verification and assessment of key species. Hydroacoustic surveys are generally most effective in this regard when few pelagic species are present. Colorado has many coldwater reservoirs containing relatively simple pelagic fish assemblages comprised mostly of salmonid sport fish that lend themselves well to this sampling method. These waters are often large, deep, and have little structure to interfere with the transducer signal (Beauchamp et al. 2009).

Colorado Parks and Wildlife began using hydroacoustic sampling techniques in 1994, primarily as a tool for monitoring key kokanee fisheries and broodstocks that supply eggs to support statewide stocking efforts (Martinez 1994). Kokanee waters, such as Lake Granby and Blue Mesa Reservoir, provide upwards of $30 million in economic benefit to the state annually (Johnson et al. 2009). Hydroacoustic surveys conducted on these and other waters are necessary for monitoring the health of these valuable fisheries and identifying when additional management interventions or research might be required (Johnson and Martinez 2000). Here, we report on results from standard hydroacoustic surveys conducted in 2020.

METHODS

Hydroacoustic surveys were conducted during the week surrounding the new moon in August and September 2020 on five Colorado Reservoirs. Timing the surveys to coincide with the new moon is advantageous to hydroacoustic sampling because kokanee naturally disperse on the thermocline during dark nights (Parkinson et al. 1994; Beauchamp et al. 1997; Hardiman et al. 2004). This behavior facilitates target tracking and elimination of false targets during post-processing of raw data. August surveys included Blue Mesa (8/18/2020), Vallecito (8/20/20), and Williams Fork (8/17/2020) Reservoirs while September surveys included Blue Mesa (9/16/2020), Granby (9/14/2020), and Wolford Mountain (9/15/2020) Reservoirs. Blue Mesa Reservoir was surveyed on two occasions to quantify the difference in abundance of kokanee before and hypothetically after most mature individuals staging to spawn in Sapinero or Cebolla basins exited the reservoir and were migrating upstream. By conducting surveys during these two periods, it may be possible to better predict run size and egg take at the Roaring Judy Hatchery.

Nocturnal hydroacoustic surveys were completed using a Hydroacoustics Technology, Inc. (HTI; Seattle, Washington) model 241 digital split-beam echosounder operating at 200 kHz. This unit was linked to a laptop computer running HTI's Digital Echo Processing software (DEP) and corresponding real-time target tracking algorithm. A global positioning sensor (Lowrance HDS5, Tulsa, Oklahoma) was also attached to the laptop computer to provide high-resolution boat and transect locations. The HTI transducer was attached to an HTI model 624 tow fin and deployed on the starboard side of the boat approximately 0.5-1.0 m below the surface. A constant boat speed of 5 km/h, ping rate of 5 pings/sec and a pulse length of 0.4 ms was used during data acquisition. Proper system calibration was confirmed prior to every survey using a tungsten-carbide sphere.

After completion of each survey, transect data were scrutinized in Echoscape (HTI, Seattle, Washington) and erroneous targets were removed. Bottom tracks were also edited if necessary. Fish targets were considered false if moving erratically (multiple echoes and directional changes in the track) or if different parts of the same track were simultaneously recorded at different depths. Other targets were scrutinized if there were large fluctuations in target strength (≥10 dB) across the track. Once data were considered clean, the file was exported from Echoscape to an Access database. Two files were extracted from Access, which included the fish target (.FISH) and bottom (.BOT) files and both were saved as tab delimited text files for import into separate analysis software. This process was repeated for each transect.

The remainder of post-processing occurred in LabView 2011 (National Instruments, Austin, Texas) modules developed by Kevin Rogers in the HydroAcoustics Kit (HAcK; Rogers in preparation). The first step was to run the InterpretFish_2020.vi module. This module prompted the user for the previously mentioned fish target and bottom files for the desired transect. The output included transect- and depth-specific (every 5 m depth strata) prey and predator density estimates and corresponding length frequency distributions (5 cm bins) of fish targets observed across all depths in the water column. The length cutoff for parsing predators from prey was 42.5 cm. Target strengths of tracked fish were converted to lengths using the equation developed by Love (1971). Martinez (1995) showed that fish ≥42.5 cm total length or ≥

-33dB were piscivorous and primarily Lake Trout in key kokanee waters. Next, mean lake-wide density estimates were calculated using the SummarizeLake_4.0.vi module. Lake-wide length-frequency estimates were calculated using the PlotLake_2000.vi module. Both modules report estimates from depths ≥2 m. Unlike other waters, analyses for Blue Mesa Reservoir incorporated the RETRO SUMMARY 2020.vi module to ensure output format was consistent with historical survey results. This module has been used in conjunction with kokanee egg take from the following year in an effort to better predict future egg take trends at the Roaring Judy Hatchery. Results from the retro-summary are not used to estimate predator and prey densities. See Rogers (in preparation) for a complete description and underpinnings to each of these modules.

RESULTS and DISCUSSION

Blue Mesa Reservoir

Eleven standard transects (total length = 18,241 m) were surveyed on August 18, 2020, including six in Sapinero and five in the Cebolla basins. Water surface elevation during the survey was 7,482.3 ft and conditions were calm. The average lake-wide population estimate for all fish from these transects was 308,093 (Table 1). Appendix A shows detailed results from each transect. The corresponding estimated number of prey/acre (mean ± 95% CI) was 35.649 ± 13.462 and predators/acre was 1.042 ± 0.513. We observed a slight increase in 20-40 cm fish (potential spawning adult kokanee) targets from 2019 (80,000) to 2020 (107,456; Figure 1). Conversely, the estimated number of 10-20 cm fish (immature) targets was largely similar between 2019 (97,894) and 2020 (97,106; Figure 2). The retro-summary provided an estimate of 262,484 prey targets and 6,519 predator targets after applying the same 425 mm cutoff and after only considering fish inhabiting depths ≥10 m (Figure 3). After parsing the average lake-wide population estimate into different 5 cm size-bins, frequency was highest in the 5-10 cm size-range at 77,109 ± 38,888 fish and second highest within 10-15 cm at 56,359 ± 27,363 fish (Figure 4). Lastly, fish were most concentrated within 20-30 m depths when integrated across transects (Figure 5).

The same eleven transects (total length = 19,816 m) were surveyed on September 16, 2020. The surface elevation during the survey was 7,474.2 ft. Appendix B shows details of each transect. The estimated number of prey/acre (mean ± 95% CI) for September was 24.146 ± 5.209 and predators/acre was 0.746 ± 0.406. The lake-wide estimate of all fish targets was 208,784

(Table 1). The retro-summary demonstrated a decrease in the lake-wide abundance of prey fish from 262,484 individuals in August to 198,461 in September (difference of 64,023 fish). Similarly, the estimated abundance of predators decreased by 1,456 individuals to a total of 5,063 fish in September. Length-frequency was again highest in the 5-10 cm size-range at 52,408 ± 11,823 followed by 10-15 cm with 44,185 ± 11,020 (Figure 7). Similar to the August survey, fish were most concentrated within 20-30 m depths across transects and basins (Figure 8). August-September comparisons with regard to predicting kokanee run size and egg take are ongoing.

Table 1. Lake-wide predator and prey density estimates with total abundance for all fish for Hydroacoustic surveys completed in 2020. Surface elevation was at the time of sampling and surface acres represents the total when at full pool.

Water Name	Sampling Date	Surface Acres	Surface Elevation (ft)	Prey/ Acre	Predators/ Acre	Lake-wide Abundance
Blue Mesa Reservoir	8/18/2020	9,180	7,482.3	35.649	1.042	308,093
Blue Mesa Reservoir	9/16/2020	9,180	7,474.2	24.146	0.746	208,784
Lake Granby	9/14/2020	7,260	8,271.3	13.139	0.960	98,948
Vallecito Reservoir	8/20/2020	2,720	7,640.8	7.576	0.556	19,827
Williams Fork Reservoir	8/17/2020	1,860	7,805.8	15.208	0.903	27,371
Wolford Mountain Reservoir	9/15/2020	1,550	7,484.2	55.675	2.516	91,696

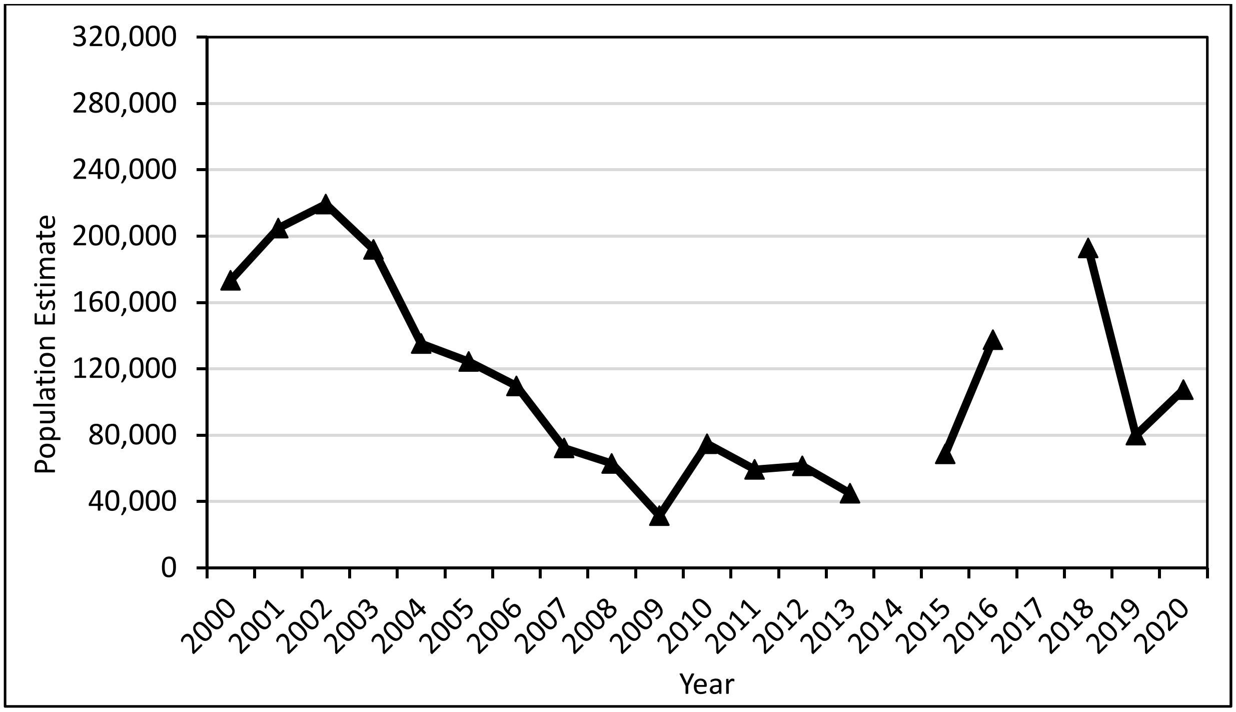


Figure 1. Estimated population size of 20-40 cm fish targets (sum over 25-40 cm size-bins and depths from HAcK output) from eleven transects acquired on August 18, 2020 in the Sapinero and Cebolla basins compared to estimates from previous years. Target strengths in decibels were converted to fish length using the equation developed by Love (1971).

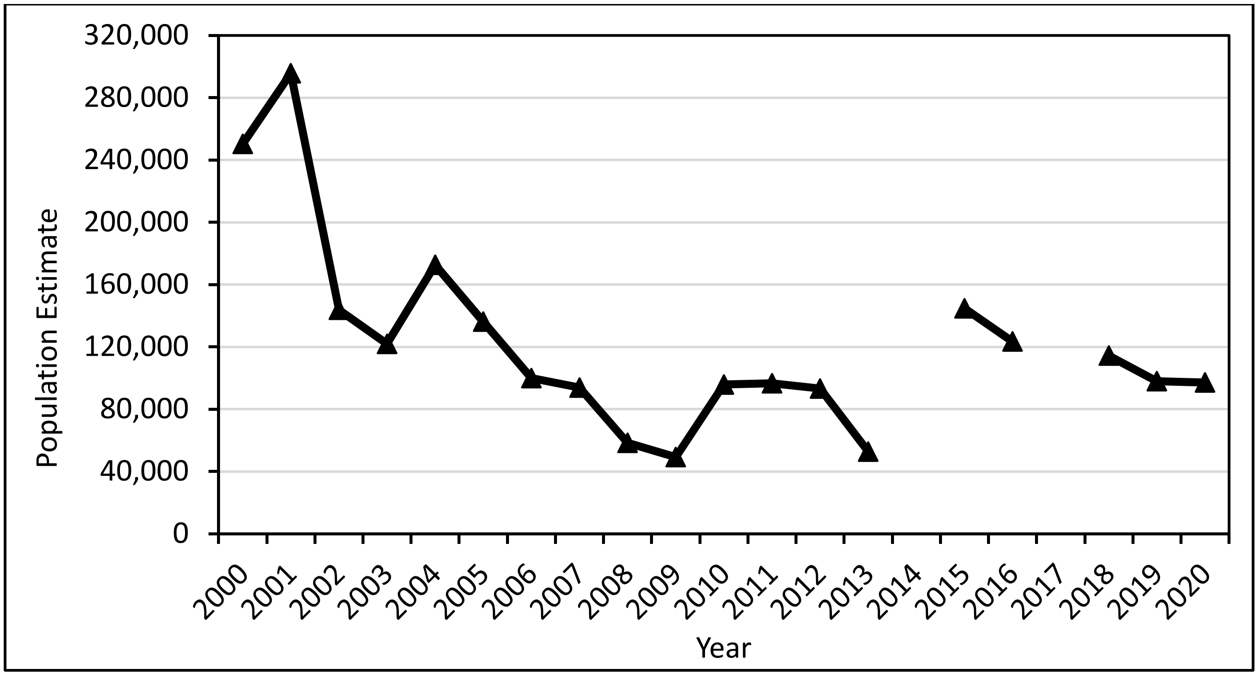
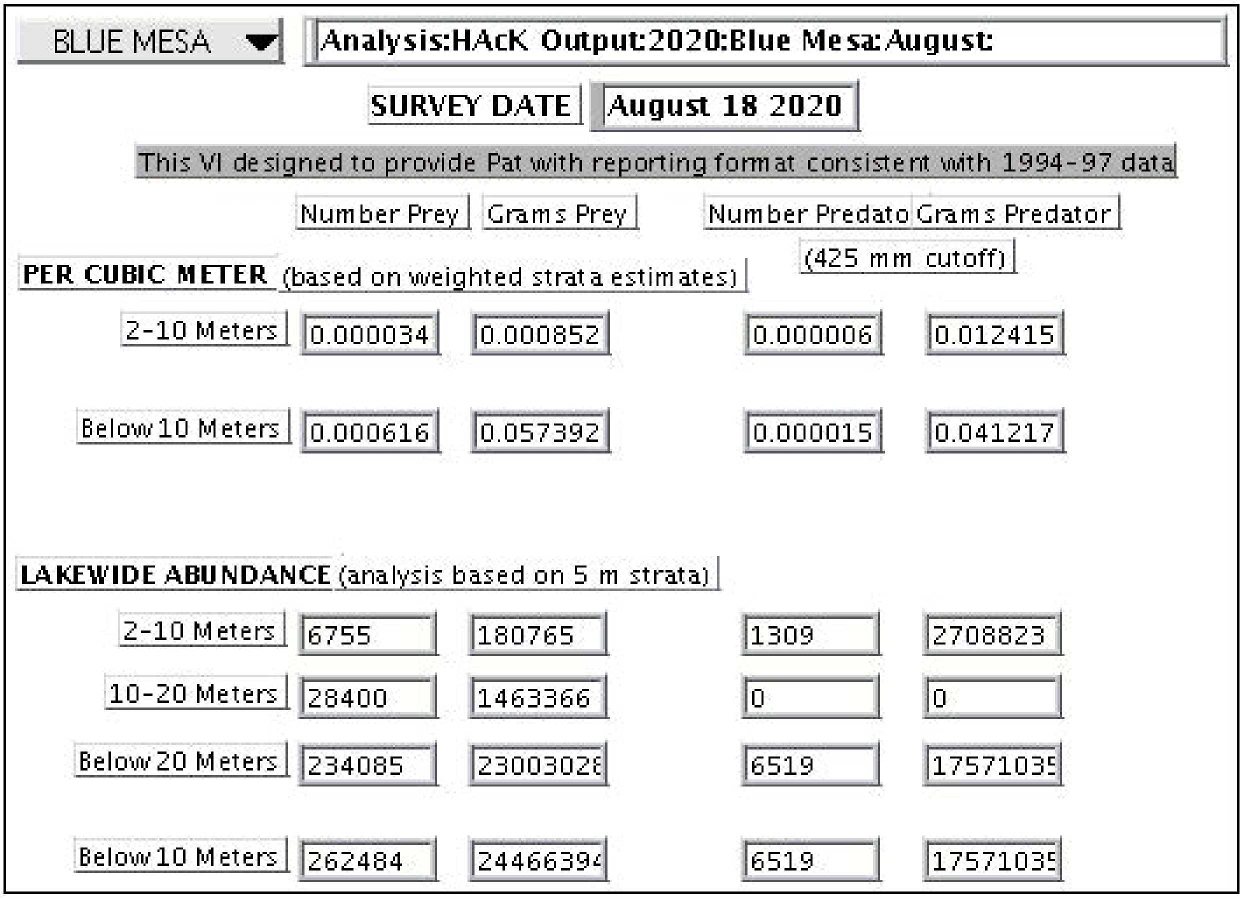


Figure 2. Estimated population size of 10-20 cm targets (sum over 15-20 cm size-bins and depths from HAcK output) from eleven transects acquired on August 18, 2020 in the Sapinero and Cebolla basins compared to estimates from previous years. Target strengths in decibels were converted to fish length using the equation developed by Love (1971).



BLUE MESA

Analysis:HAcK Output:2020:Blue Mesa:August:

SURVEY DATE August 18 2020

This VI designed to provide Pat with reporting format consistent with 1994-97 data

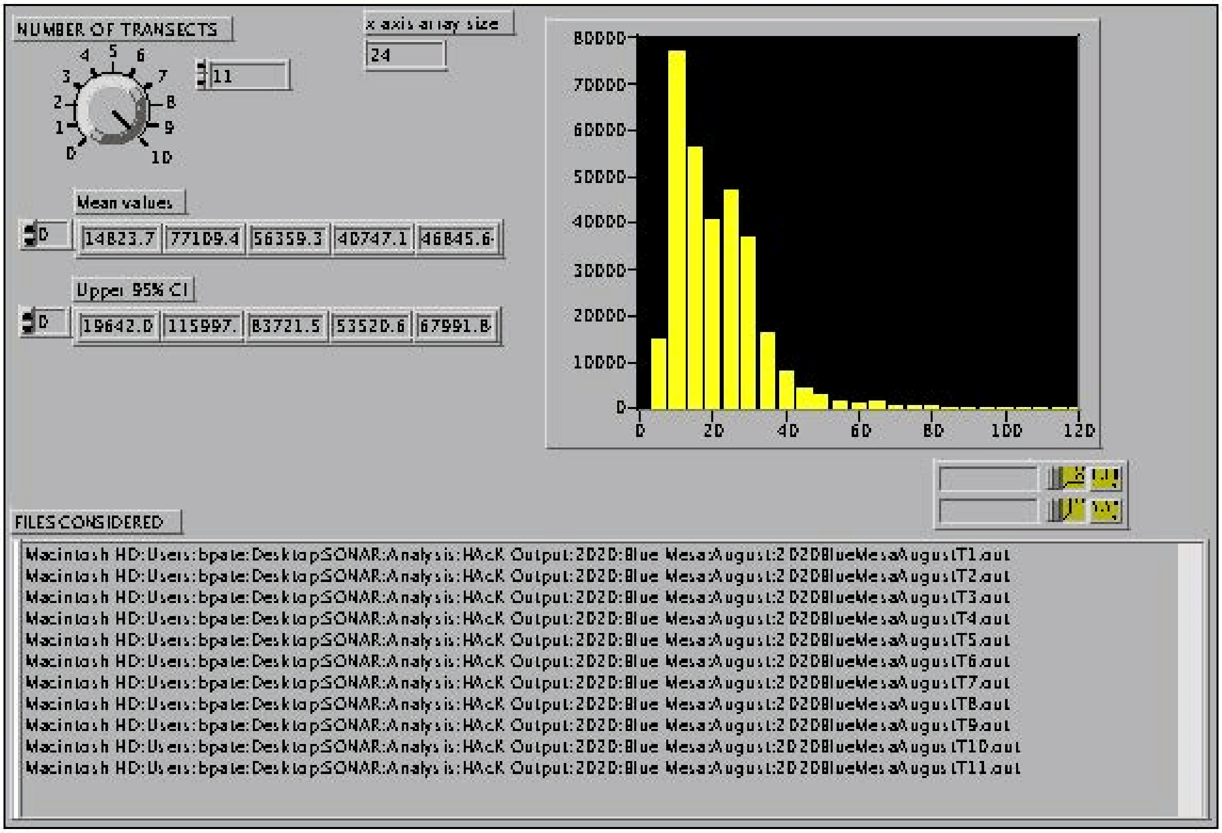
PER CUBIC METER (based on weighted strata estimates)

	Number Prey	Grams Prey	Number Predato (425 mm cutoff)	Grams Predator
2-10 Meters	0.000034	0.000852	0.000006	0.012415
Below 10 Meters	0.000616	0.057392	0.000015	0.041217

LAKEWIDE ABUNDANCE (analysis based on 5 m strata)

	Number Prey	Grams Prey	Number Predato (425 mm cutoff)	Grams Predator
2-10 Meters	6755	180765	1309	2708823
10-20 Meters	28400	1463366	0	0
Below 20 Meters	234085	2300302	6519	1757103
Below 10 Meters	262484	2446639	6519	1757103

Figure 3. Estimated predator (fish targets ≥425 mm total length) and prey (fish <425 mm) abundance in Cebolla and Sapinero basins of Blue Mesa Reservoir surveyed on August 18, 2020. Results were determined using a proprietary module in LabView (HydroAcoustic Kit Retro Summary 2020.vi) and raw data using a Hydroacoustic Technology Inc. Model 241 Digital Split-Beam Echosounder.



NUMBER OF TRANSECTS: 11

x axis array size: 24

Mean values: 0 | 14823.7 | 77109.4 | 56359.3 | 40747.1 | 46845.6

Upper 95% CI: 0 | 19642.0 | 115997. | 83721.5 | 53520.6 | 67991.8

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Figure 4. Mean abundance by fish length in Cebolla and Sapinero basins of Blue Mesa Reservoir surveyed on August 18, 2020. Length bins for the figure at right are in 5 cm increments. Mean values and corresponding upper 95% CIs are for the first five bins up to and including 25 cm. Raw data were obtained with a Hydroacoustic Technology Inc. Model 241 Digital Split-Beam Echosounder and post-processed using a proprietary module in LabView (HydroAcoustic Kit PlotLakeLF_2000.vi).

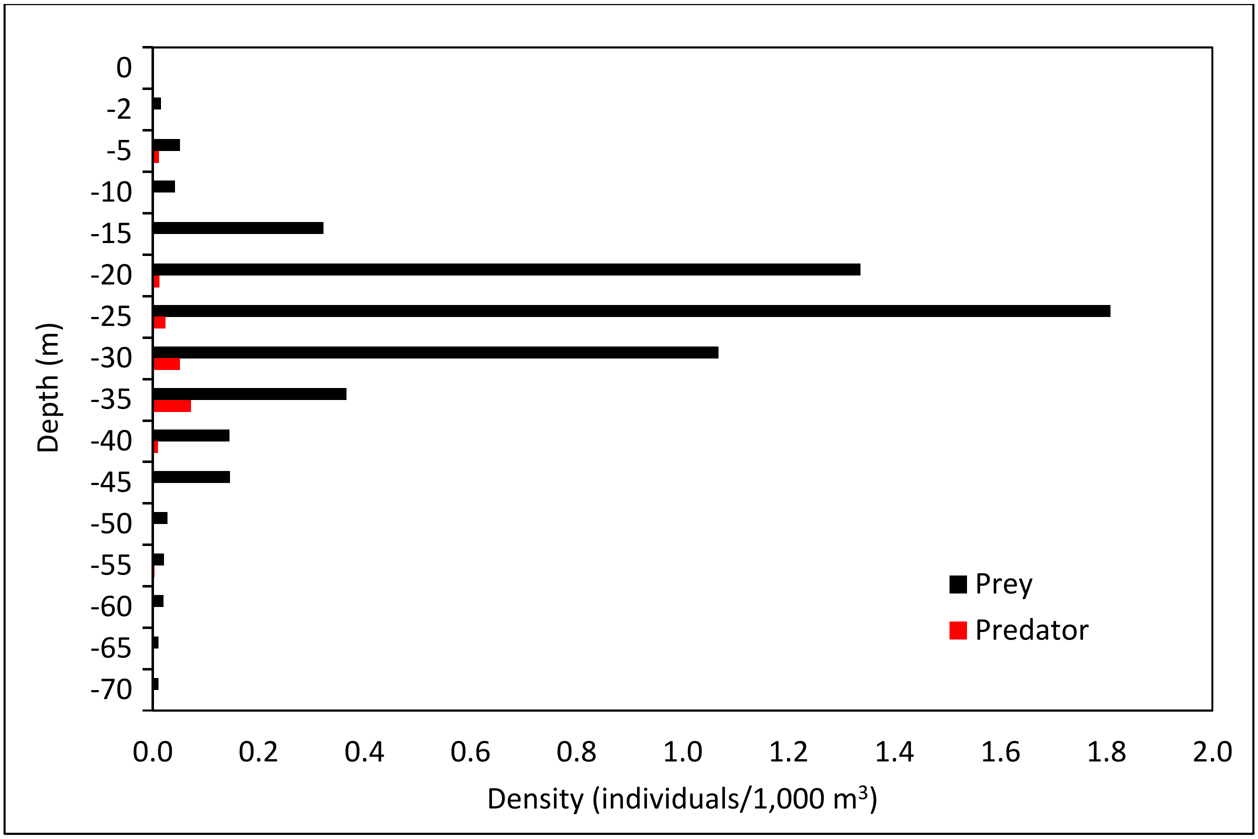
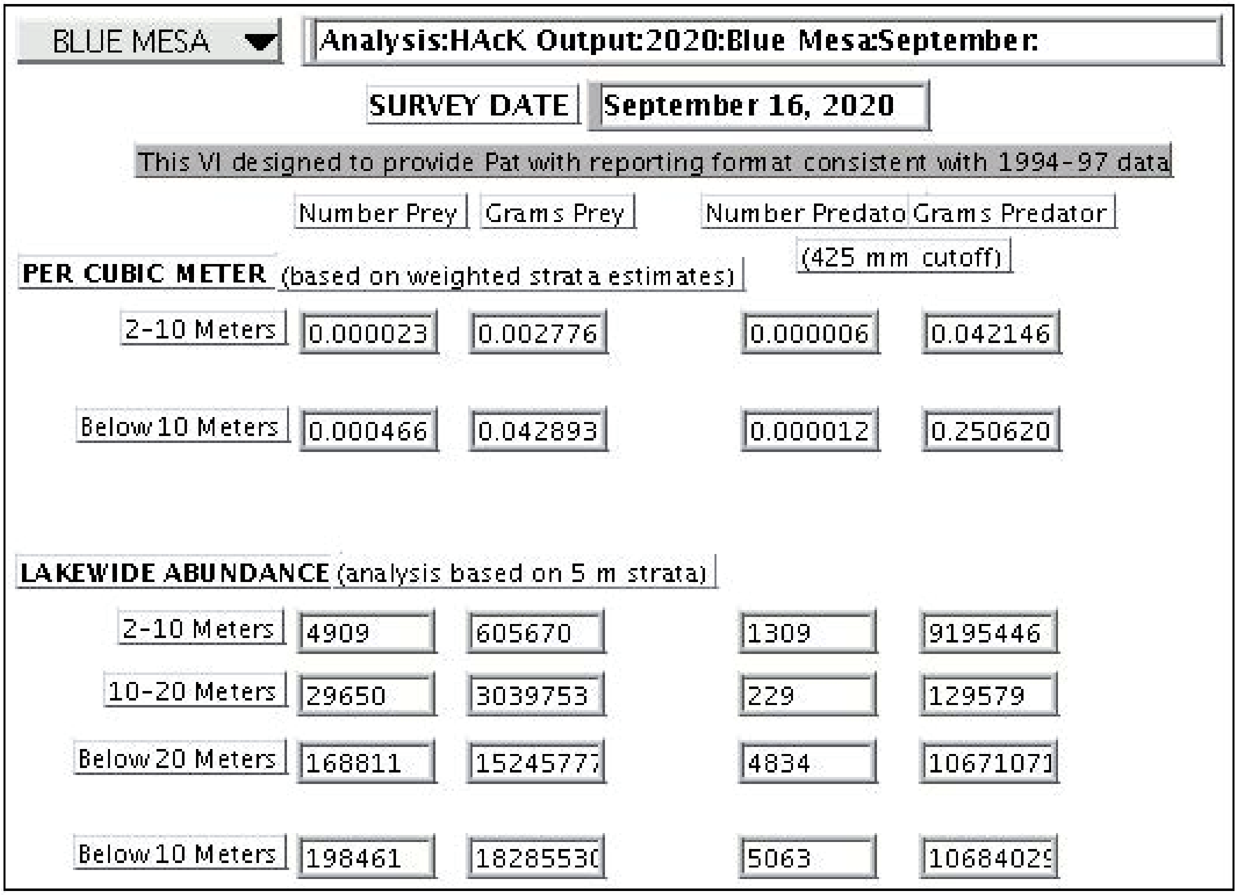


Figure 5. Estimated density of prey (fish targets <425 mm total length) and predators (fish targets ≥425 mm) by 5 m depth-strata from the hydroacoustic survey completed on August 18, 2020 in Cebolla and Sapinero basins of Blue Mesa Reservoir. Each depth category represents a 5 m bin (e.g., the -15 m bin represents the depth strata from ≥ -10 to < -15 m).



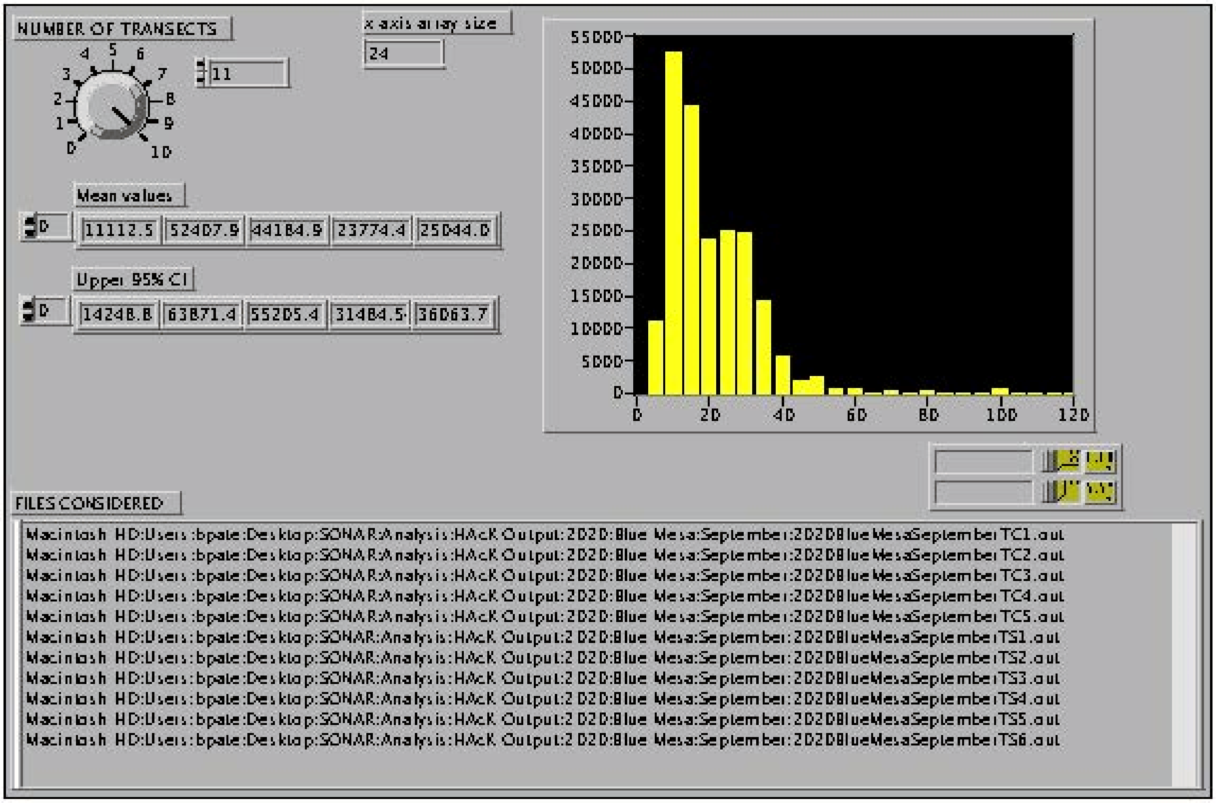
Analysis:HAcK Output:2020:Blue Mesa:September:

SURVEY DATE September 16, 2020

This VI designed to provide Pat with reporting format consistent with 1994-97 data

	Number Prey	Grams Prey	Number Predato	Grams Predator
			(425 mm cutoff)	
PER CUBIC METER (based on weighted strata estimates)				
2-10 Meters	0.000023	0.002776	0.000006	0.042146
Below 10 Meters	0.000466	0.042893	0.000012	0.250620
LAKEWIDE ABUNDANCE (analysis based on 5 m strata)				
2-10 Meters	4909	605670	1309	9195446
10-20 Meters	29650	3039753	229	129579
Below 20 Meters	168811	15245777	4834	10671071
Below 10 Meters	198461	18285530	5063	10684029

Figure 6. Estimated (fish targets ≥425 mm total length) and prey (fish <425 mm) abundance in Cebolla and Sapinero basins of Blue Mesa Reservoir surveyed on September 16, 2020. Results were determined using a proprietary module in LabView (HydroAcoustic Kit Retro Summary 2020.vi) and raw data using a Hydroacoustic Technology Inc. Model 241 Digital Split-Beam Echosounder.



NUMBER OF TRANSECTS: 11

x axis array size: 24

Mean values: 0 | 11112.5 | 52407.9 | 44184.9 | 23774.4 | 25044.0

Upper 95% CI: 0 | 14248.8 | 63871.4 | 55205.4 | 31484.5 | 36063.7

FILES CONSIDERED

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Figure 7. Mean abundance by fish length in Cebolla and Sapinero basins of Blue Mesa Reservoir surveyed on September 16, 2020. Length bins for the figure at right are in 5 cm increments. Mean values and corresponding upper 95% CIs are for the first five bins up to and including 25 cm. Raw data were obtained with a Hydroacoustic Technology Inc. Model 241 Digital Split-Beam Echosounder and post-processed using a proprietary module in LabView (HydroAcoustic Kit PlotLakeLF_2000.vi).

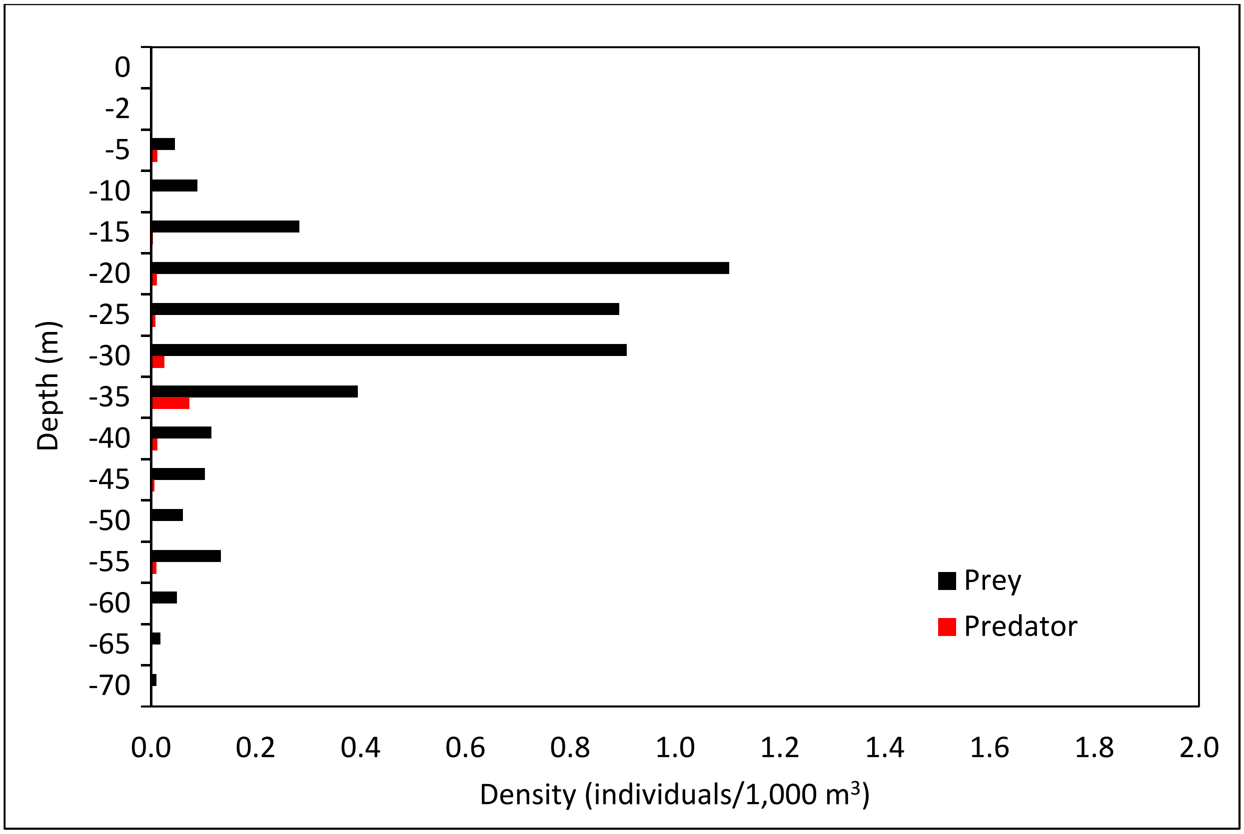
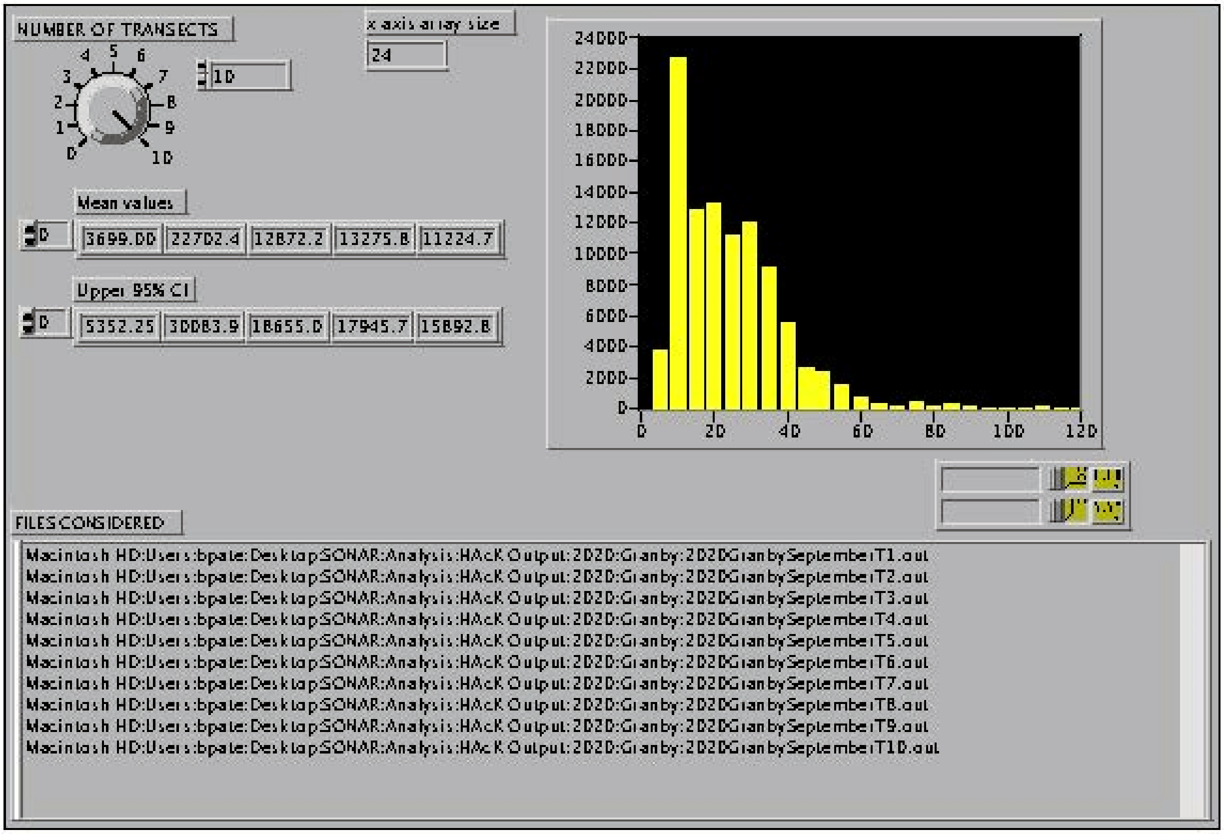


Figure 8. Estimated density of prey (fish targets <425 mm total length) and predators (fish targets ≥425 mm) by 5 m depth-strata from the hydroacoustic survey completed on September 16, 2020 in Cebolla and Sapinero basins of Blue Mesa Reservoir. Each depth category represents a 5 m bin (e.g., the -15 m bin represents the depth strata from ≥ -10 to < -15 m).

Lake Granby

There were ten transects (total length = 14,689 m) surveyed on September 14, 2020. The surface elevation during the survey was 8,271.3 ft. Appendix C shows results from each transect in detail. Length-frequency (mean ± 95% CI) was highest in the 5-10 cm size class at 22,702 ± 7,302 followed by 15-20 cm at 30,276 ± 4,670 fish (Figure 9). These two categories were followed closely by 10-15 cm, 25-30 cm, and then 20-25 cm. The highest density of prey was at 35-40 m depths followed by 25-30 m then 30-35 m (Figure 10). The highest predator density was observed in 25-30 m depths. The average number of prey/acre was 13.139 ± 3.768 fish and predators/acre was 0.960 ± 0.494. The lake-wide abundance of all fish was estimated at 98,948 (Table 1).

When comparing estimates of fish density in Blue Mesa Reservoir and Lake Granby from the same month (September), Blue Mesa Reservoir exhibited a greater density (by 11.007/acre) of prey-sized fish <42.5 cm, but slightly fewer (by 0.214/acre) predator-sized fish >42.5 cm. In addition, the estimated total prey biomass in Lake Granby (10.189 ± 3.812 MT) was far less than Blue Mesa Reservoir (18.806 ± 7.277 MT). The depth-distribution of fish in Granby also differed from Blue Mesa Reservoir. Fish were distributed more evenly across depths in Granby, including depths >20 m which were likely predominately Lake Trout.



NUMBER OF TRANSECTS: 10

x axis array size: 24

Mean values: 0 | 3699.00 | 22702.4 | 12872.2 | 13275.8 | 11224.7

Upper 95% CI: 0 | 5352.25 | 30083.9 | 18655.0 | 17945.7 | 15892.8

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Figure 9. Mean abundance by fish length for Lake Granby surveyed on September 14, 2020. Length bins for the figure at right are in 5 cm increments. Mean values and corresponding upper 95% CIs are for the first five bins up to and including 25 cm. Raw data were obtained with a Hydroacoustic Technology Inc. Model 241 Digital Split-Beam Echosounder and post-processed using a proprietary module in LabView (HydroAcoustic Kit PlotLakeLF_2000.vi).

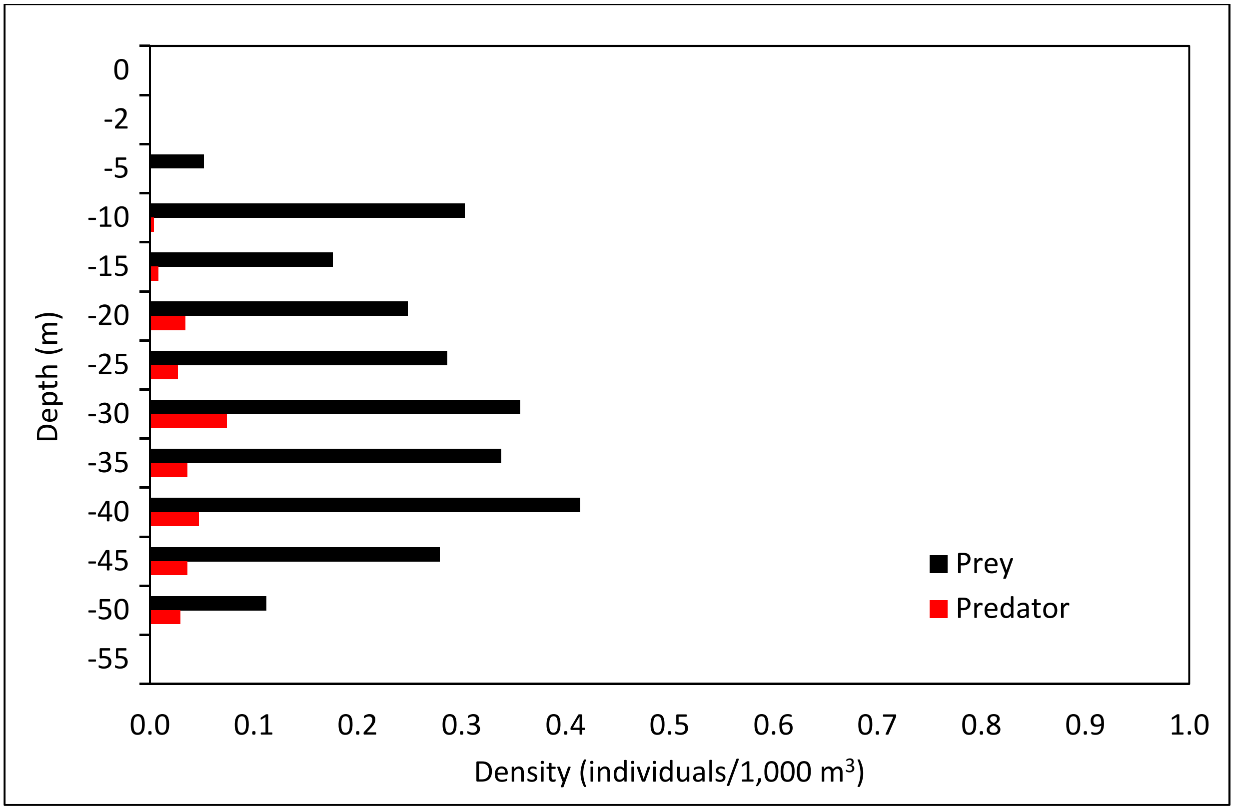
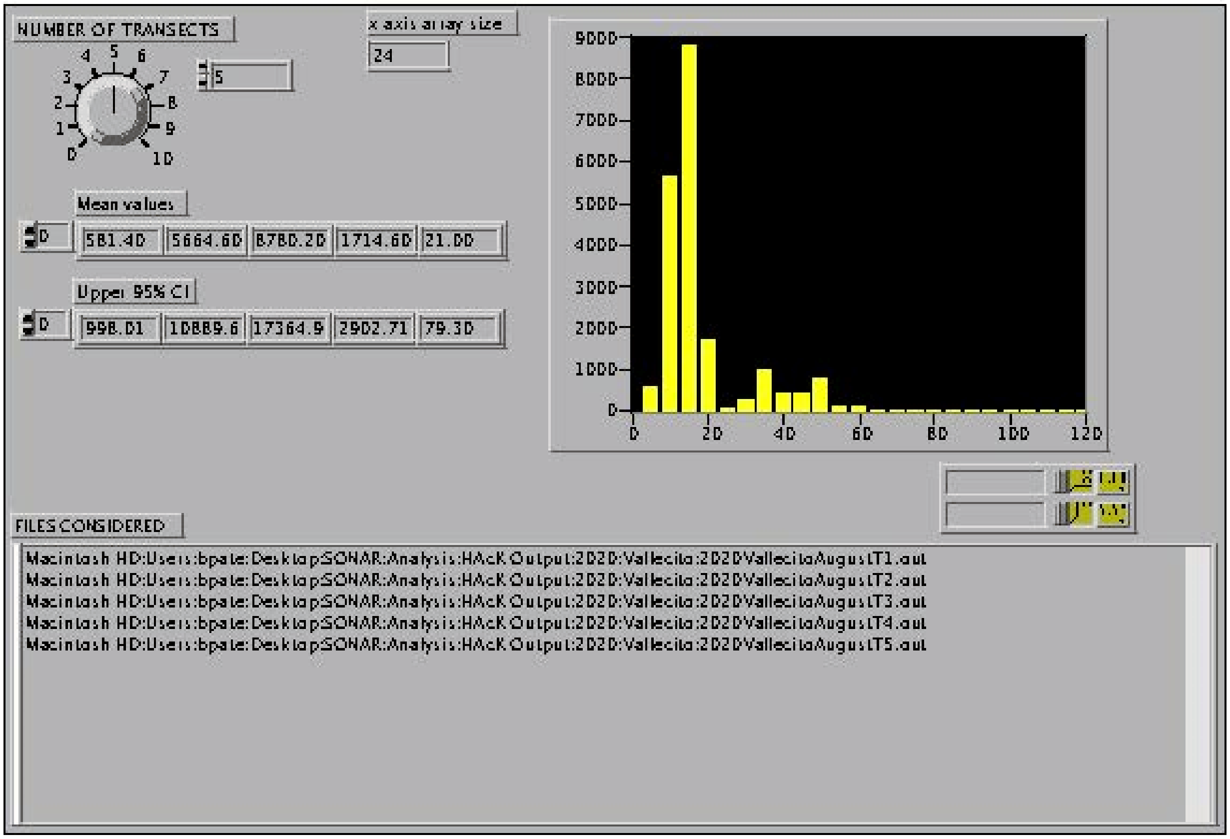


Figure 10. Estimated density of prey (fish targets <425 mm total length) and predators (fish targets ≥425 mm) by 5 m depth-strata from the hydroacoustic survey completed on September 14, 2020 in Lake Granby. Each depth category represents a 5 m bin (e.g., the -15 m bin represents the depth strata from ≥ -10 to < -15 m).

Vallecito Reservoir

There were five transects (total length = 6,877 m) surveyed on August 20, 2020. The surface elevation during the survey was 7,640.8 ft. Appendix D shows results from each transect in detail. Length-frequency (mean ± 95% CI) was highest in the 10-15 cm size class at 8,780 ± 8,585 fish followed by 5-10 cm at 5,665 ± 5,225 (Figure 11). There were <1,000 fish per 5 cm bin at sizes ≥25 cm. The estimate for the 15-20 cm size bin was 1,715 ± 1,188. The highest density of prey was observed within 10-15 m depths followed by 15-20 m and then 5-10 m (Figure 12). The highest predator density was observed within 2-5 m depths. The average number of prey/acre was estimated at 7.576 ± 7.168 and predators/acre was 0.556 ± 0.712. Total fish abundance was 19,827 (Table 1). Transect 5 was added in an attempt to increase sample size and survey deeper water. However, no part of the reservoir surveyed was deeper than 20 m.



NUMBER OF TRANSECTS: 5

x axis array size: 24

Mean values: 0 | 581.40 | 5664.60 | 8780.20 | 1714.60 | 21.00

Upper 95% CI: 0 | 998.01 | 10889.6 | 17364.9 | 2902.71 | 79.30

FILES CONSIDERED

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```

Figure 11. Mean abundance by fish length for Vallecito Reservoir surveyed on August 20, 2020. Length bins for the figure at right are in 5 cm increments. Mean values and corresponding upper 95% CIs are for the first five bins up to and including 25 cm. Raw data were obtained with a Hydroacoustic Technology Inc. Model 241 Digital Split-Beam Echosounder and post-processed using a proprietary module in LabView (HydroAcoustic Kit PlotLakeLF_2000.vi).

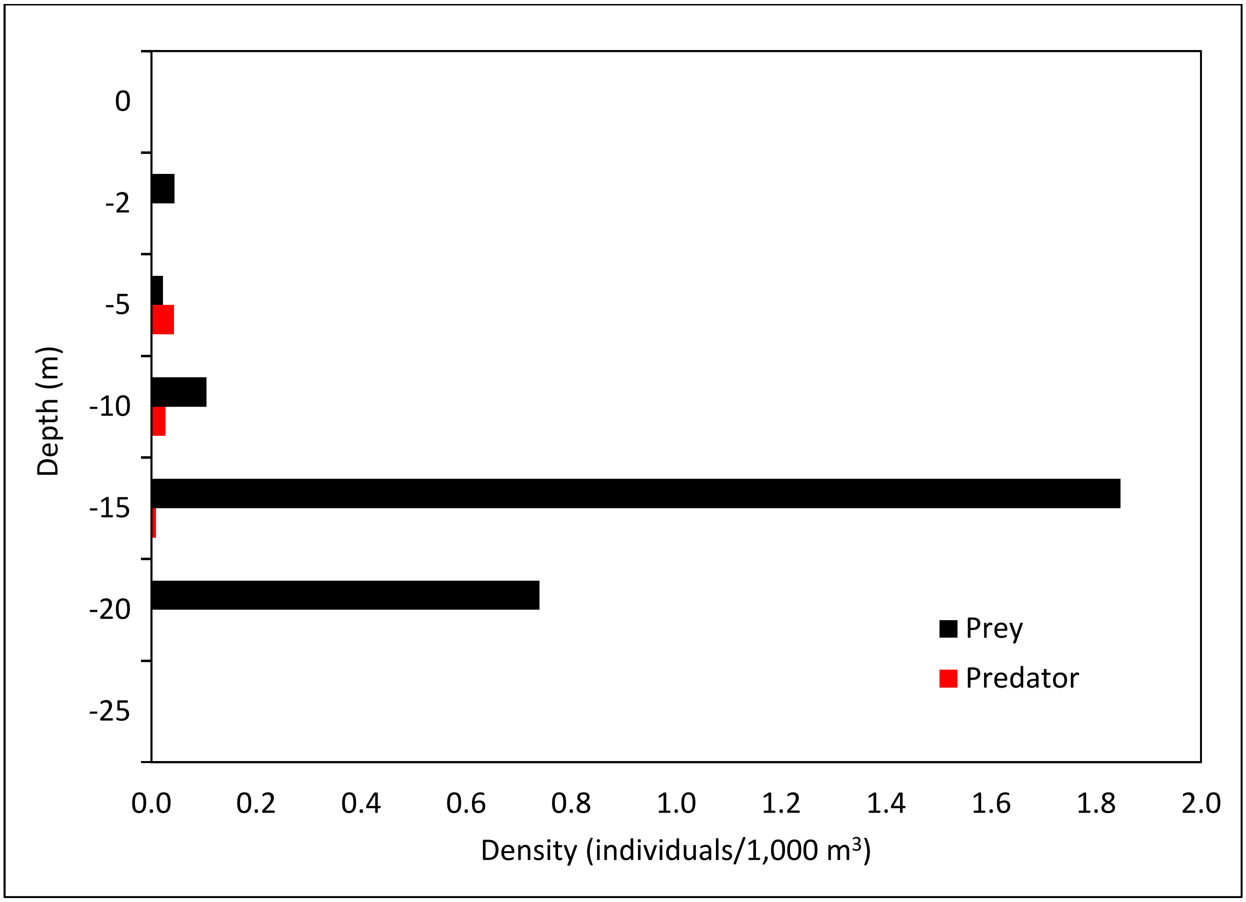
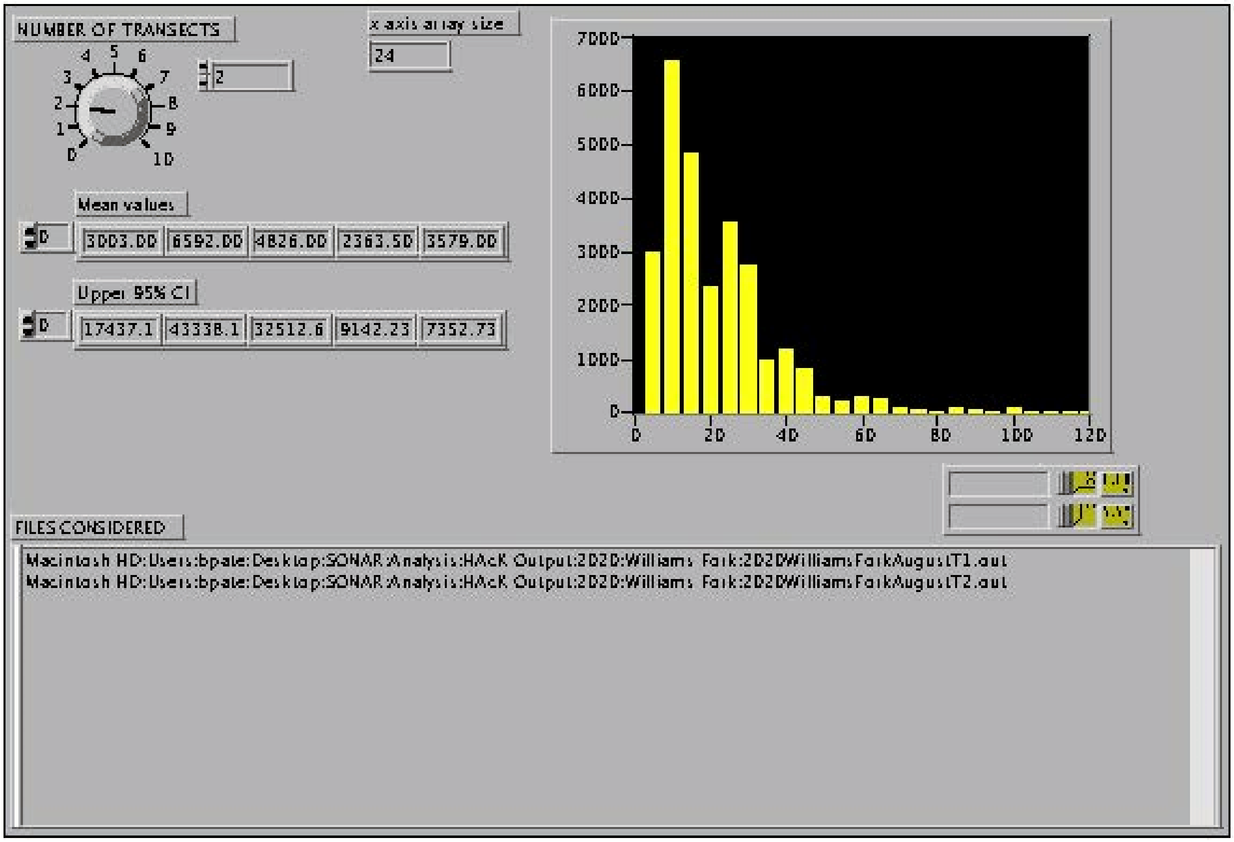


Figure 12. Estimated density of prey (fish targets <425 mm total length) and predators (fish targets ≥425 mm) by 5 m depth-strata from the hydroacoustic survey completed on August 20, 2020 in in Vallecito Reservoir. Each depth category represents a 5 m bin (e.g., the -15 m bin represents the depth strata from ≥ -10 to < -15 m).

Williams Fork Reservoir

There were only two transects (total length = 6,877 m) surveyed on August 17, 2020 in Williams Fork Reservoir. The surface elevation during the survey was 7,805.8 ft. Appendix E shows results from each transect in detail. Length-frequency (mean ± 95% CI) shows a typical right skewed graph, and abundance was highest for the 5-10 cm size class at 6,592 ± 36,746 fish followed by 10-15 cm targets at 4,826 ± 27,687 (Figure 13). The highest density of prey was observed within 15-20 m depths followed by 20-25 m then 10-15 m. The highest predator density was observed within 25-30 m depths. The average number of prey/acre was 15.208 ± 55.119 and predators/acre was 0.903 ± 0.260. Total fish abundance was estimated at 27,371 (Table 1). It should be noted that these very large confidence intervals are indicative of a large standard deviation between the two transects in this survey.



NUMBER OF TRANSECTS: 2

x axis array size: 24

Mean values: 0 | 3003.00 | 6592.00 | 4826.00 | 2363.50 | 3579.00

Upper 95% CI: 0 | 17437.1 | 43338.1 | 32512.6 | 9142.23 | 7352.73

FILES CONSIDERED

```
Macintosh HD:Users:bpate:Desktop:SONAR:Analysis:HAcK Output:2020:Williams Fork:2020WilliamsForkAugustT1.out
Macintosh HD:Users:bpate:Desktop:SONAR:Analysis:HAcK Output:2020:Williams Fork:2020WilliamsForkAugustT2.out
```

Figure 13. Mean abundance by fish length for Williams Fork Reservoir surveyed on August 17, 2020. Length bins for the figure at right are in 5 cm increments. Mean values and corresponding upper 95% CIs are for the first five bins up to and including 25 cm. Raw data were obtained with a Hydroacoustic Technology Inc. Model 241 Digital Split-Beam Echosounder and post-processed using a proprietary module in LabView (HydroAcoustic Kit PlotLakeLF_2000.vi).

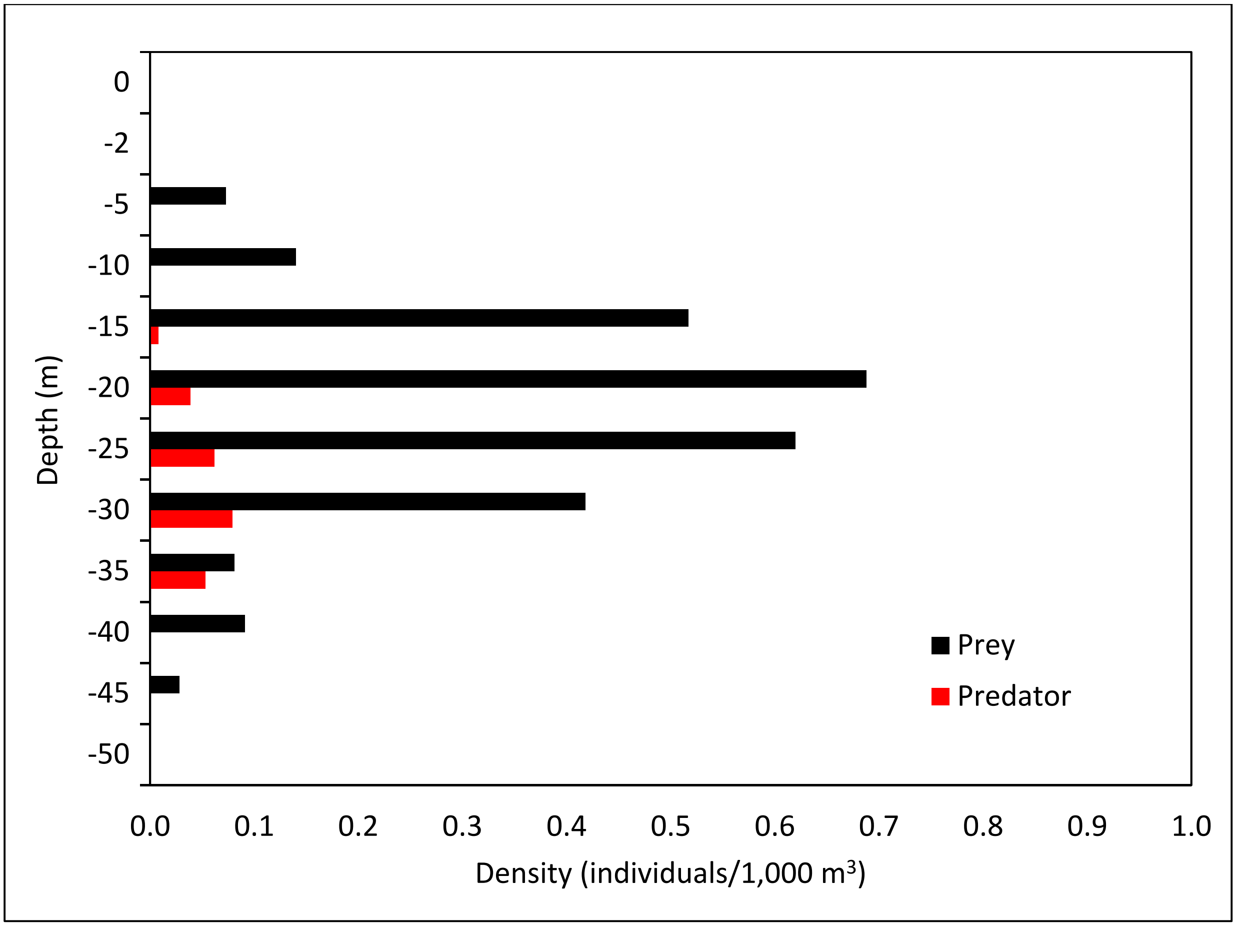
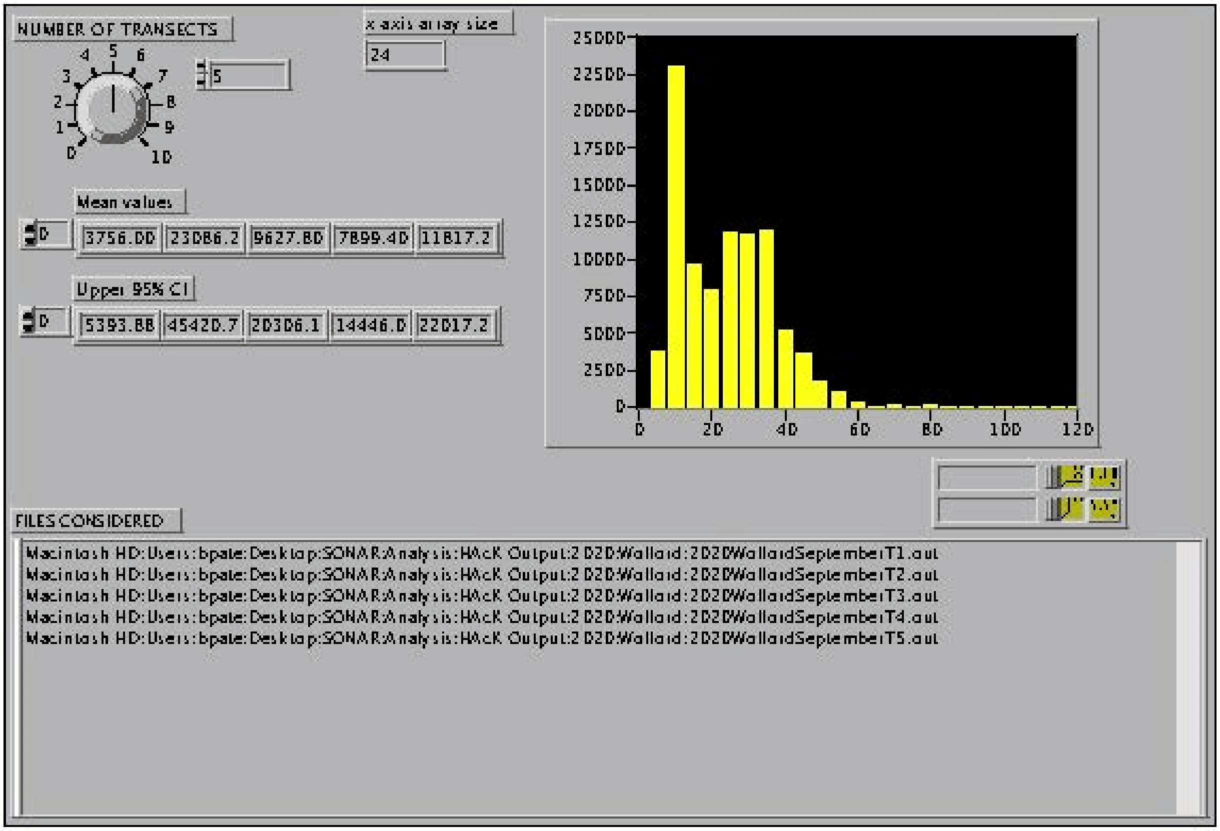


Figure 14. Estimated density of prey (fish targets <425 mm total length) and predators (fish targets ≥425 mm) by 5 m depth-strata from the hydroacoustic survey completed on August 17, 2020 in Williams Fork Reservoir. Each depth category represents a 5 m bin (e.g., the -15 m bin represents the depth strata from ≥ -10 to < -15 m).

Wolford Mountain Reservoir

There were five transects (total length = 6,101 m) surveyed on September 15, 2020. The surface elevation during the survey was 7,484.2 ft. Appendix F shows results from each transect in detail. Length-frequency (mean ± 95% CI) was highest in the 5-10 cm size class with 23,086 ± 22,335 fish followed by 30-35 cm fish at 11,923 ± 7,102, 20-25 cm fish at 11,817 ± 10,210, and 25-30 cm fish at 11,760 ± 4,330 (Figure 15). All other groupings contained an estimate of <10,000 fish. The highest density of prey was within 10-15 m depths followed by 5-10 m then 2-5 m (Figure 16). The highest predator density was observed within 10-15 m depths. The average number of prey/acre was estimated at 55.675 ± 34.289 fish and predators/acre was 2.516 ± 2.881. Total fish abundance was 91,696 (Table 1). Even though confidence intervals were large, Wolford Mountain Reservoir had the greatest estimated abundance of prey/acre.



NUMBER OF TRANSECTS: 5

x axis array size: 24

Mean values: 0 | 3756.00 | 23086.2 | 9627.80 | 7899.40 | 11817.2

Upper 95% CI: 0 | 5393.88 | 45420.7 | 20306.1 | 14446.0 | 22017.2

FILES CONSIDERED

```
Macintosh HD:Users:bpate:Desktop:SONAR:Analysis:HAcK Output:2020:Wolford:2020WolfordSeptemberT1.out
Macintosh HD:Users:bpate:Desktop:SONAR:Analysis:HAcK Output:2020:Wolford:2020WolfordSeptemberT2.out
Macintosh HD:Users:bpate:Desktop:SONAR:Analysis:HAcK Output:2020:Wolford:2020WolfordSeptemberT3.out
Macintosh HD:Users:bpate:Desktop:SONAR:Analysis:HAcK Output:2020:Wolford:2020WolfordSeptemberT4.out
Macintosh HD:Users:bpate:Desktop:SONAR:Analysis:HAcK Output:2020:Wolford:2020WolfordSeptemberT5.out
```

Figure 15. Mean abundance by fish length for Wolford Mountain Reservoir surveyed on September 15, 2020. Length bins for the figure at right are in 5 cm increments. Mean values and corresponding upper 95% CIs are for the first five bins up to and including 25 cm. Raw data were obtained with a Hydroacoustic Technology Inc. Model 241 Digital Split-Beam Echosounder and post-processed using a proprietary module in LabView (HydroAcoustic Kit PlotLakeLF_2000.vi).

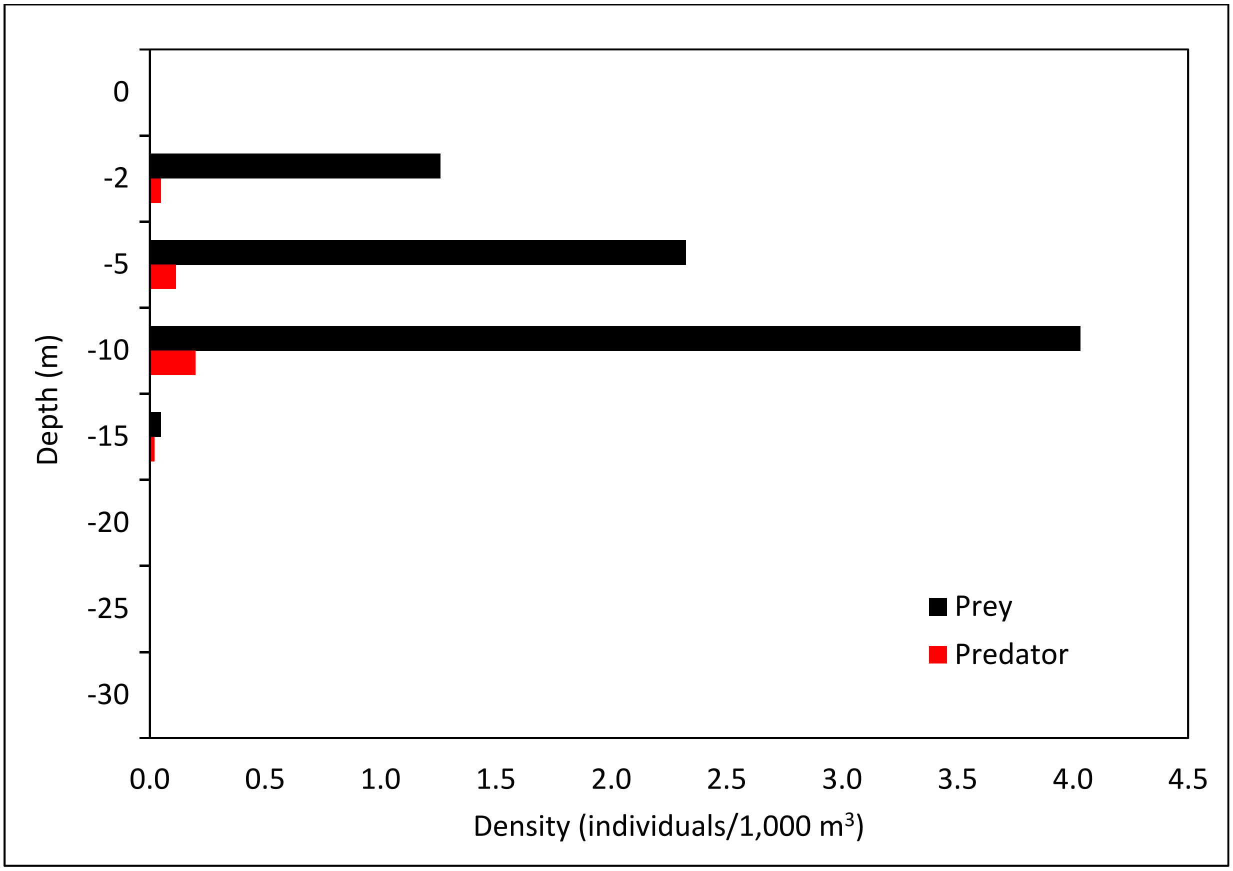


Figure 16. Estimated density of prey (fish targets <425 mm total length) and predators (fish targets ≥425 mm) by 5 m depth-strata from the hydroacoustic survey completed on September 15, 2020 in Wolford Mountain Reservoir. Each depth category represents a 5 m bin (e.g., the -15 m bin represents the depth strata from ≥ -10 to < -15 m).

ACKNOWLEDGEMENTS

We would like to thank Kevin Rogers for development and continued training with the proprietary software package (HydroAcoustics Kit) used in LabView. We would also like to thank Dan Brauch for assistance while completing surveys on Blue Mesa Reservoir.

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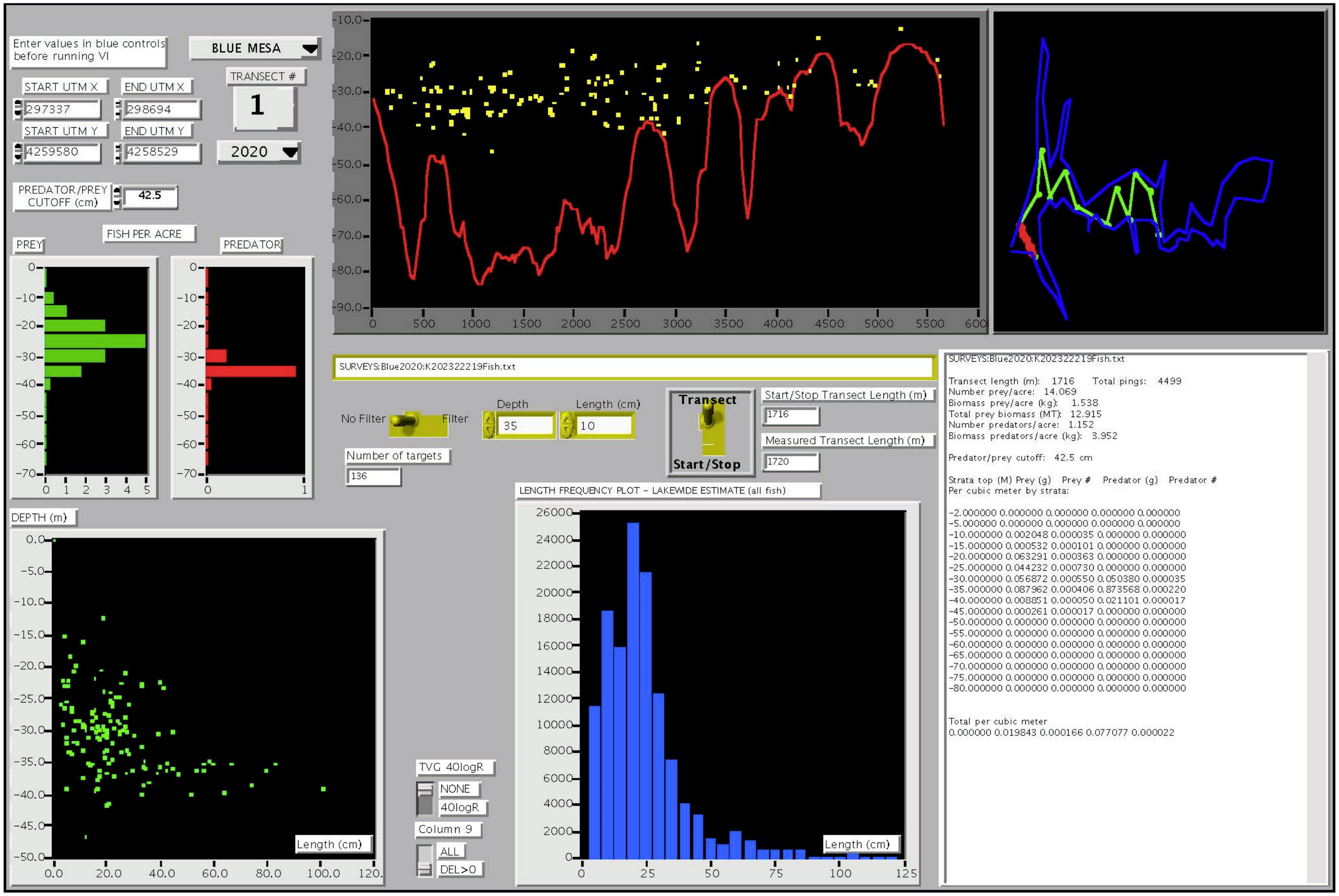
Appendix A

Individual transect output files from the Hydroacoustic Kit (InterpretFish_2020.vi) for Cebolla and Sapinero basins of Blue Mesa Reservoir surveyed on August 18, 2020.



Enter values in blue controls before running VI

BLUE MESA

TRANSECT # 1

START UTM X 297337

END UTM X 298694

START UTM Y 4259580

END UTM Y 4258529

2020

PREDATOR/PREY CUTOFF (cm) 42.5

SURVEYS:Blue2020:K202322219Fish.txt

Depth 35

Length (cm) 10

Number of targets 136

Start/Stop Transect Length (m) 1716

Measured Transect Length (m) 1720

TVG 40logR

Column 9

```
SURVEYS:Blue2020:K202322219Fish.txt

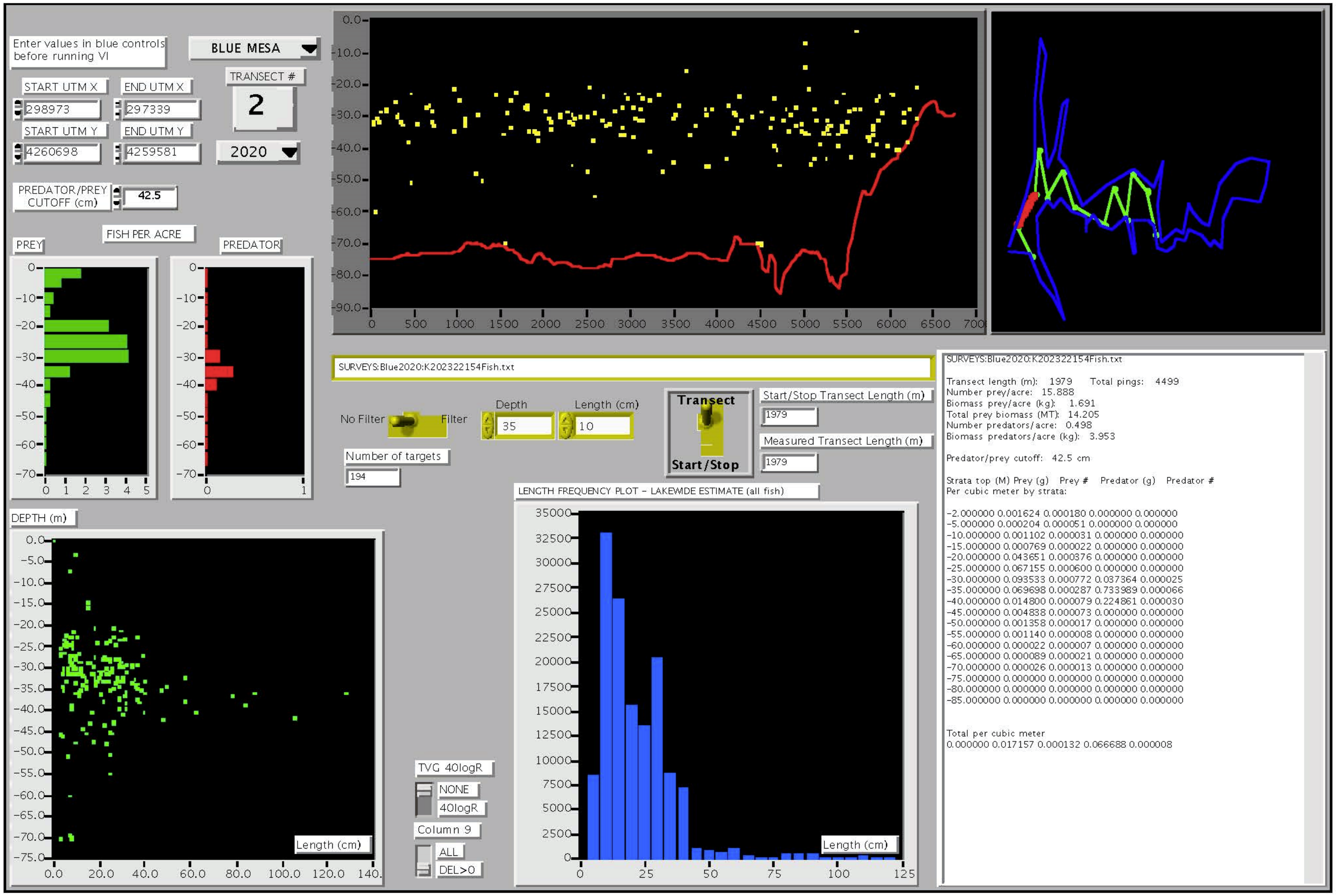
Transect length (m):   1716     Total pings:   4499
Number prey/acre:  14.069
Biomass prey/acre (kg):   1.538
Total prey biomass (MT):  12.915
Number predators/acre:  1.152
Biomass predators/acre (kg):  3.952

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.002048 0.000035 0.000000 0.000000
-15.000000 0.000532 0.000101 0.000000 0.000000
-20.000000 0.063291 0.000363 0.000000 0.000000
-25.000000 0.044232 0.000730 0.000000 0.000000
-30.000000 0.056872 0.000550 0.050380 0.000035
-35.000000 0.087962 0.000406 0.873568 0.000220
-40.000000 0.008851 0.000050 0.021101 0.000017
-45.000000 0.000261 0.000017 0.000000 0.000000
-50.000000 0.000000 0.000000 0.000000 0.000000
-55.000000 0.000000 0.000000 0.000000 0.000000
-60.000000 0.000000 0.000000 0.000000 0.000000
-65.000000 0.000000 0.000000 0.000000 0.000000
-70.000000 0.000000 0.000000 0.000000 0.000000
-75.000000 0.000000 0.000000 0.000000 0.000000
-80.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.019843 0.000166 0.077077 0.000022
```



Enter values in blue controls before running VI

BLUE MESA

START UTM X: 298973
END UTM X: 297339
START UTM Y: 4260698
END UTM Y: 4259581
TRANSECT #: 2
2020
PREDATOR/PREY CUTOFF (cm): 42.5

SURVEYS:Blue2020:K202322154Fish.txt

Depth: 35
Length (cm): 10
Number of targets: 194
Start/Stop Transect Length (m): 1979
Measured Transect Length (m): 1979
TVG 40logR
Column 9

```
SURVEYS:Blue2020:K202322154Fish.txt

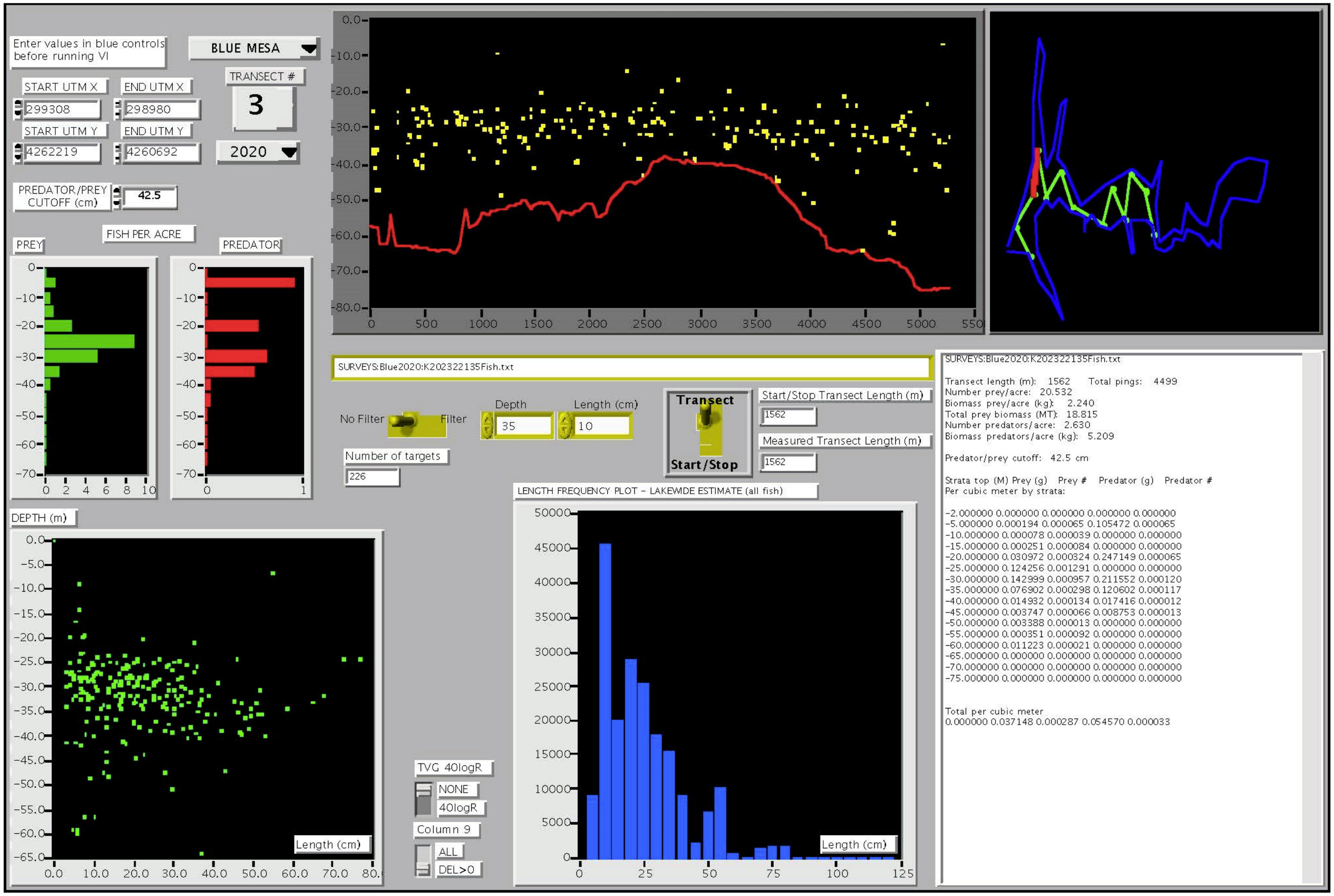
Transect length (m):   1979     Total pings:   4499
Number prey/acre:  15.888
Biomass prey/acre (kg):   1.691
Total prey biomass (MT):  14.205
Number predators/acre:  0.498
Biomass predators/acre (kg):  3.953

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.001624 0.000180 0.000000 0.000000
-5.000000 0.000204 0.000051 0.000000 0.000000
-10.000000 0.001102 0.000031 0.000000 0.000000
-15.000000 0.000769 0.000022 0.000000 0.000000
-20.000000 0.043651 0.000376 0.000000 0.000000
-25.000000 0.067155 0.000600 0.000000 0.000000
-30.000000 0.093533 0.000772 0.037364 0.000025
-35.000000 0.069698 0.000287 0.733989 0.000066
-40.000000 0.014800 0.000079 0.224861 0.000030
-45.000000 0.004838 0.000073 0.000000 0.000000
-50.000000 0.001358 0.000017 0.000000 0.000000
-55.000000 0.001140 0.000008 0.000000 0.000000
-60.000000 0.000022 0.000007 0.000000 0.000000
-65.000000 0.000089 0.000021 0.000000 0.000000
-70.000000 0.000026 0.000013 0.000000 0.000000
-75.000000 0.000000 0.000000 0.000000 0.000000
-80.000000 0.000000 0.000000 0.000000 0.000000
-85.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.017157 0.000132 0.066688 0.000008
```



BLUE MESA

TRANSECT # 3

2020

START UTM X 299308

END UTM X 298980

START UTM Y 4262219

END UTM Y 4260692

PREDATOR/PREY CUTOFF (cm) 42.5

SURVEYS:Blue2020:K202322135Fish.txt

Depth 35

Length (cm) 10

Number of targets 226

Start/Stop Transect Length (m) 1562

Measured Transect Length (m) 1562

```
SURVEYS:Blue2020:K202322135Fish.txt

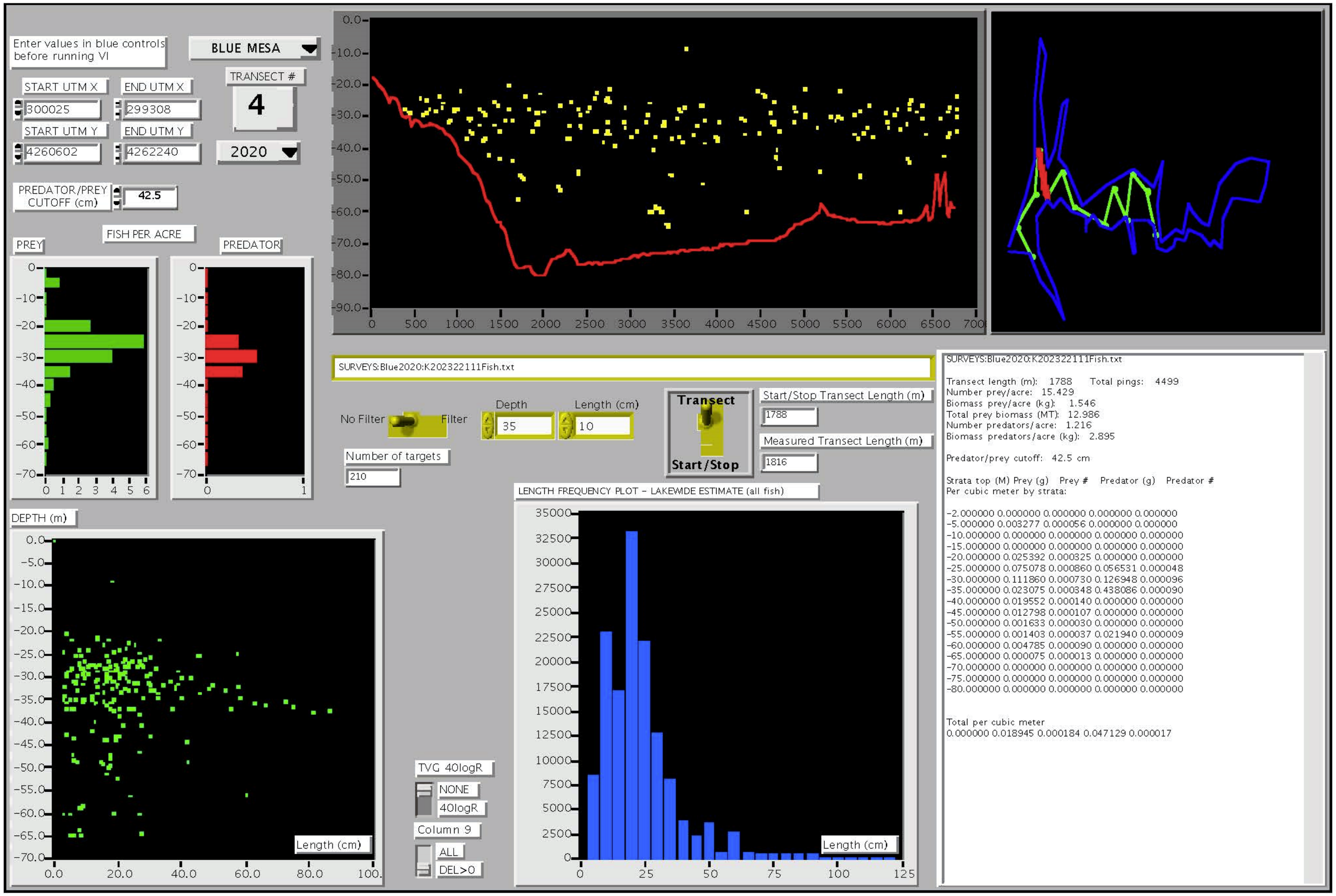
Transect length (m):   1562     Total pings:   4499
Number prey/acre:  20.532
Biomass prey/acre (kg):   2.240
Total prey biomass (MT):  18.815
Number predators/acre:  2.630
Biomass predators/acre (kg):  5.209

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000194 0.000065 0.105472 0.000065
-10.000000 0.000078 0.000039 0.000000 0.000000
-15.000000 0.000251 0.000084 0.000000 0.000000
-20.000000 0.030972 0.000324 0.247149 0.000065
-25.000000 0.124256 0.001291 0.000000 0.000000
-30.000000 0.142999 0.000957 0.211552 0.000120
-35.000000 0.076902 0.000298 0.120602 0.000117
-40.000000 0.014932 0.000134 0.017416 0.000012
-45.000000 0.003747 0.000066 0.008753 0.000013
-50.000000 0.003388 0.000013 0.000000 0.000000
-55.000000 0.000351 0.000092 0.000000 0.000000
-60.000000 0.011223 0.000021 0.000000 0.000000
-65.000000 0.000000 0.000000 0.000000 0.000000
-70.000000 0.000000 0.000000 0.000000 0.000000
-75.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.037148 0.000287 0.054570 0.000033
```



Enter values in blue controls before running VI

START UTM X: 300025
END UTM X: 299308
START UTM Y: 4260602
END UTM Y: 4262240
TRANSECT #: 4
2020
PREDATOR/PREY CUTOFF (cm): 42.5
SURVEYS:Blue2020:K202322111Fish.txt
Depth: 35
Length (cm): 10
Number of targets: 210
Start/Stop Transect Length (m): 1788
Measured Transect Length (m): 1816

```
SURVEYS:Blue2020:K202322111Fish.txt

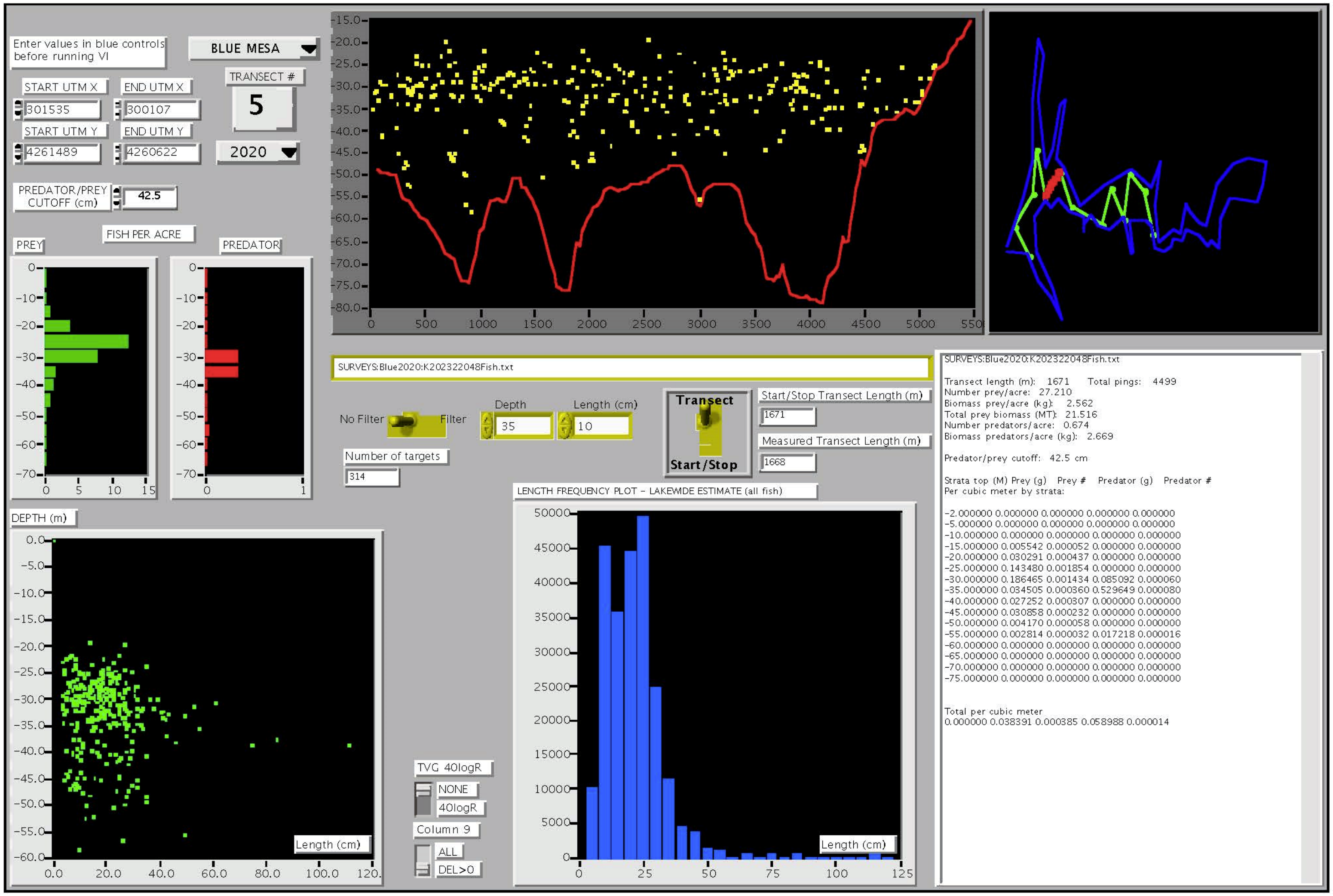
Transect length (m):   1788     Total pings:   4499
Number prey/acre:  15.429
Biomass prey/acre (kg):   1.546
Total prey biomass (MT):  12.986
Number predators/acre:  1.216
Biomass predators/acre (kg):  2.895

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.003277 0.000056 0.000000 0.000000
-10.000000 0.000000 0.000000 0.000000 0.000000
-15.000000 0.000000 0.000000 0.000000 0.000000
-20.000000 0.025392 0.000325 0.000000 0.000000
-25.000000 0.075078 0.000860 0.056531 0.000048
-30.000000 0.111860 0.000730 0.126948 0.000096
-35.000000 0.023075 0.000348 0.438086 0.000090
-40.000000 0.019552 0.000140 0.000000 0.000000
-45.000000 0.012798 0.000107 0.000000 0.000000
-50.000000 0.001633 0.000030 0.000000 0.000000
-55.000000 0.001403 0.000037 0.021940 0.000009
-60.000000 0.004785 0.000090 0.000000 0.000000
-65.000000 0.000075 0.000013 0.000000 0.000000
-70.000000 0.000000 0.000000 0.000000 0.000000
-75.000000 0.000000 0.000000 0.000000 0.000000
-80.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.018945 0.000184 0.047129 0.000017
```



START UTM X: 301535
END UTM X: 300107
START UTM Y: 4261489
END UTM Y: 4260622
TRANSECT #: 5
2020
PREDATOR/PREY CUTOFF (cm): 42.5
SURVEYS:Blue2020:K202322048Fish.txt
Depth: 35
Length (cm): 10
Number of targets: 314
Start/Stop Transect Length (m): 1671
Measured Transect Length (m): 1668

```
SURVEYS:Blue2020:K202322048Fish.txt

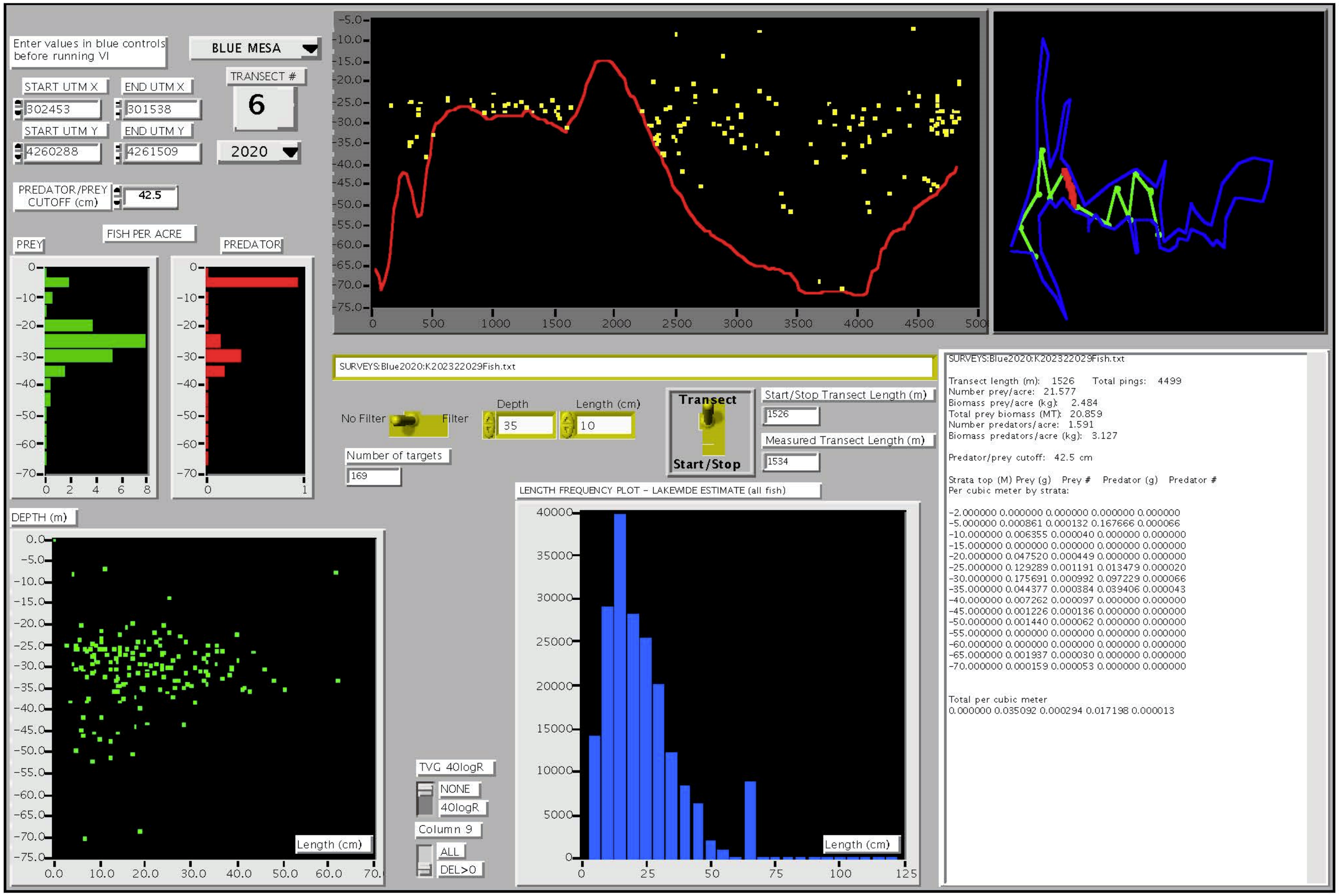
Transect length (m):   1671     Total pings:   4499
Number prey/acre:  27.210
Biomass prey/acre (kg):   2.562
Total prey biomass (MT):  21.516
Number predators/acre:  0.674
Biomass predators/acre (kg):  2.669

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.000000 0.000000 0.000000 0.000000
-15.000000 0.005542 0.000052 0.000000 0.000000
-20.000000 0.030291 0.000437 0.000000 0.000000
-25.000000 0.143480 0.001854 0.000000 0.000000
-30.000000 0.186465 0.001434 0.085092 0.000060
-35.000000 0.034505 0.000360 0.529649 0.000080
-40.000000 0.027252 0.000307 0.000000 0.000000
-45.000000 0.030858 0.000232 0.000000 0.000000
-50.000000 0.004170 0.000058 0.000000 0.000000
-55.000000 0.002814 0.000032 0.017218 0.000016
-60.000000 0.000000 0.000000 0.000000 0.000000
-65.000000 0.000000 0.000000 0.000000 0.000000
-70.000000 0.000000 0.000000 0.000000 0.000000
-75.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.038391 0.000385 0.058988 0.000014
```



Enter values in blue controls before running VI

BLUE MESA

TRANSECT # 6

START UTM X 302453

END UTM X 301538

START UTM Y 4260288

END UTM Y 4261509

2020

PREDATOR/PREY CUTOFF (cm) 42.5

SURVEYS:Blue2020:K202322029Fish.txt

Depth 35

Length (cm) 10

Number of targets 169

Start/Stop Transect Length (m) 1526

Measured Transect Length (m) 1534

TVG 40logR

Column 9

```
SURVEYS:Blue2020:K202322029Fish.txt

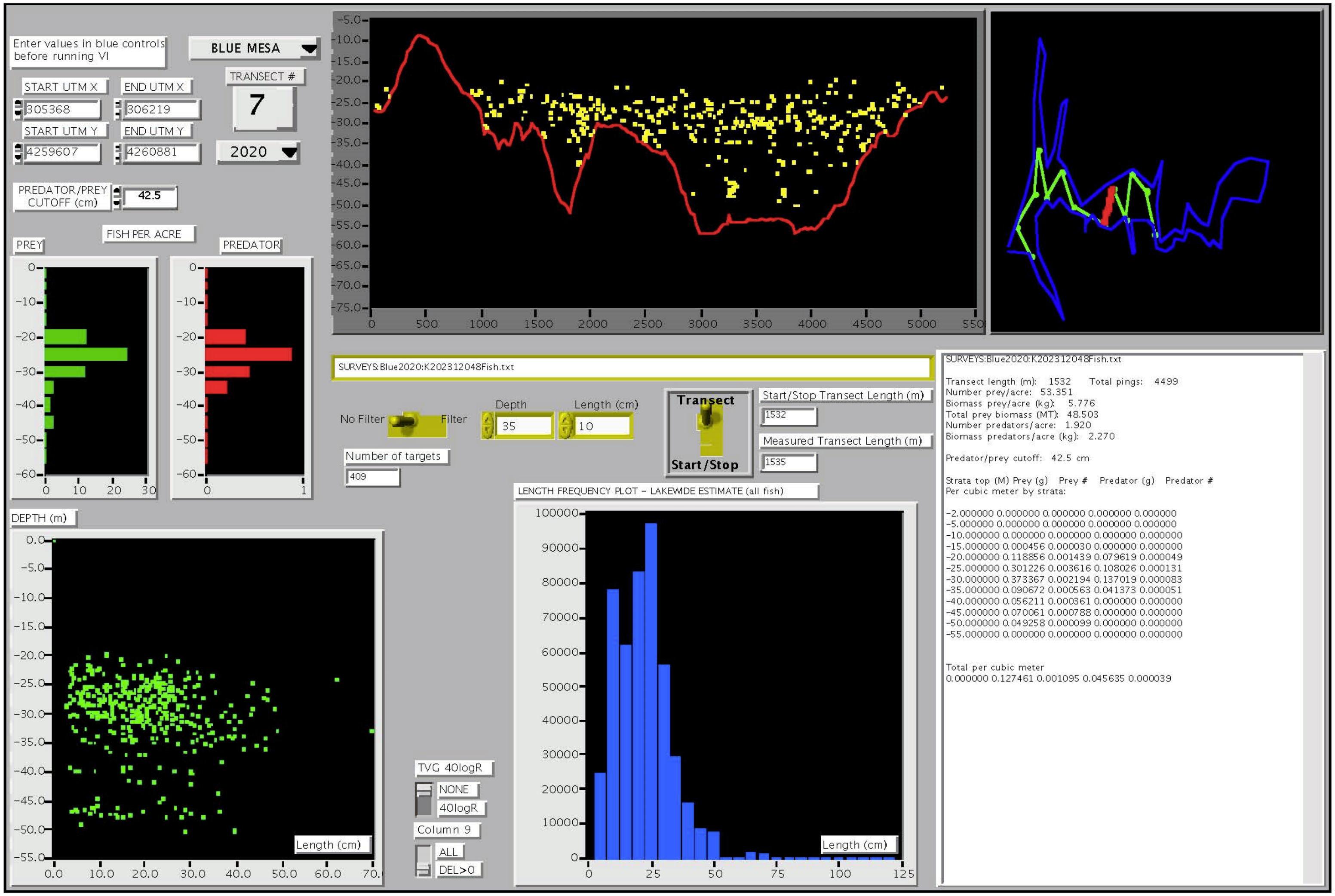
Transect length (m):   1526     Total pings:   4499
Number prey/acre:  21.577
Biomass prey/acre (kg):   2.484
Total prey biomass (MT):  20.859
Number predators/acre:  1.591
Biomass predators/acre (kg):  3.127

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000861 0.000132 0.167666 0.000066
-10.000000 0.006355 0.000040 0.000000 0.000000
-15.000000 0.000000 0.000000 0.000000 0.000000
-20.000000 0.047520 0.000449 0.000000 0.000000
-25.000000 0.129289 0.001191 0.013479 0.000020
-30.000000 0.175691 0.000992 0.097229 0.000066
-35.000000 0.044377 0.000384 0.039406 0.000043
-40.000000 0.007262 0.000097 0.000000 0.000000
-45.000000 0.001226 0.000136 0.000000 0.000000
-50.000000 0.001440 0.000062 0.000000 0.000000
-55.000000 0.000000 0.000000 0.000000 0.000000
-60.000000 0.000000 0.000000 0.000000 0.000000
-65.000000 0.001937 0.000030 0.000000 0.000000
-70.000000 0.000159 0.000053 0.000000 0.000000


Total per cubic meter
0.000000 0.035092 0.000294 0.017198 0.000013
```



BLUE MESA

START UTM X: 305368

END UTM X: 306219

START UTM Y: 4259607

END UTM Y: 4260881

TRANSECT #: 7

2020

PREDATOR/PREY CUTOFF (cm): 42.5

SURVEYS:Blue2020:K202312048Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 409

Start/Stop Transect Length (m): 1532

Measured Transect Length (m): 1535

```
SURVEYS:Blue2020:K202312048Fish.txt

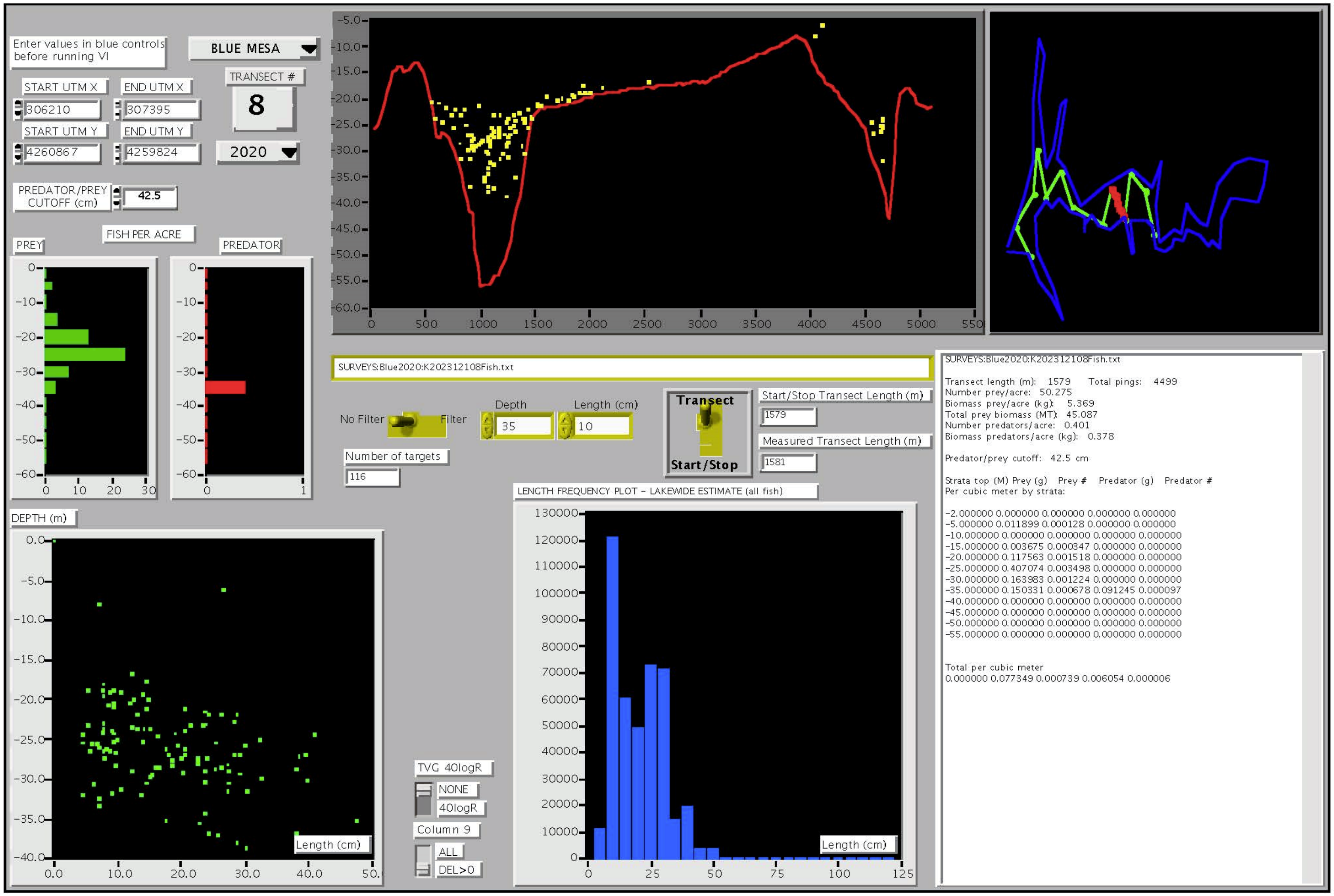
Transect length (m):   1532     Total pings:   4499
Number prey/acre:  53.351
Biomass prey/acre (kg):   5.776
Total prey biomass (MT):  48.503
Number predators/acre:  1.920
Biomass predators/acre (kg):  2.270

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.000000 0.000000 0.000000 0.000000
-15.000000 0.000456 0.000030 0.000000 0.000000
-20.000000 0.118856 0.001439 0.079619 0.000049
-25.000000 0.301226 0.003616 0.108026 0.000131
-30.000000 0.373367 0.002194 0.137019 0.000083
-35.000000 0.090672 0.000563 0.041373 0.000051
-40.000000 0.056211 0.000361 0.000000 0.000000
-45.000000 0.070061 0.000788 0.000000 0.000000
-50.000000 0.049258 0.000099 0.000000 0.000000
-55.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.127461 0.001095 0.045635 0.000039
```



START UTM X: 306210

END UTM X: 307395

START UTM Y: 4260867

END UTM Y: 4259824

2020

PREDATOR/PREY CUTOFF (cm): 42.5

SURVEYS:Blue2020:K202312108Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 116

Start/Stop Transect Length (m): 1579

Measured Transect Length (m): 1581

```
SURVEYS:Blue2020:K202312108Fish.txt

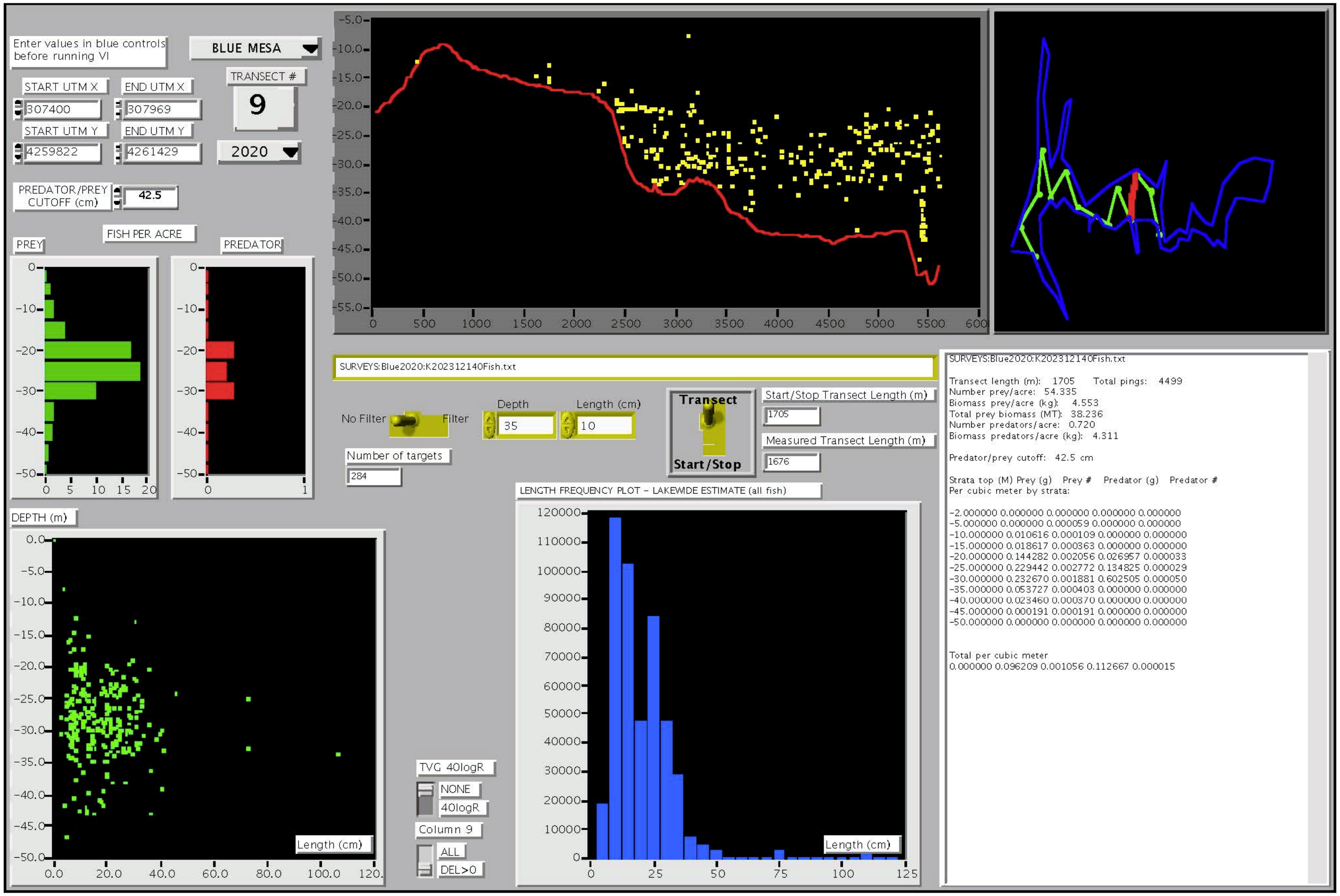
Transect length (m):   1579    Total pings:   4499
Number prey/acre:  50.275
Biomass prey/acre (kg):   5.369
Total prey biomass (MT):  45.087
Number predators/acre:  0.401
Biomass predators/acre (kg):  0.378

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.011899 0.000128 0.000000 0.000000
-10.000000 0.000000 0.000000 0.000000 0.000000
-15.000000 0.003675 0.000347 0.000000 0.000000
-20.000000 0.117563 0.001518 0.000000 0.000000
-25.000000 0.407074 0.003498 0.000000 0.000000
-30.000000 0.163983 0.001224 0.000000 0.000000
-35.000000 0.150331 0.000678 0.091245 0.000097
-40.000000 0.000000 0.000000 0.000000 0.000000
-45.000000 0.000000 0.000000 0.000000 0.000000
-50.000000 0.000000 0.000000 0.000000 0.000000
-55.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.077349 0.000739 0.006054 0.000006
```



Enter values in blue controls before running VI

BLUE MESA

TRANSECT # 9

START UTM X 307400

END UTM X 307969

START UTM Y 4259822

END UTM Y 4261429

2020

PREDATOR/PREY CUTOFF (cm) 42.5

SURVEYS:Blue2020:K202312140Fish.txt

Depth 35

Length (cm) 10

Number of targets 284

Start/Stop Transect Length (m) 1705

Measured Transect Length (m) 1676

TVG 40logR
NONE
40logR

Column 9
ALL
DEL>0

```
SURVEYS:Blue2020:K202312140Fish.txt

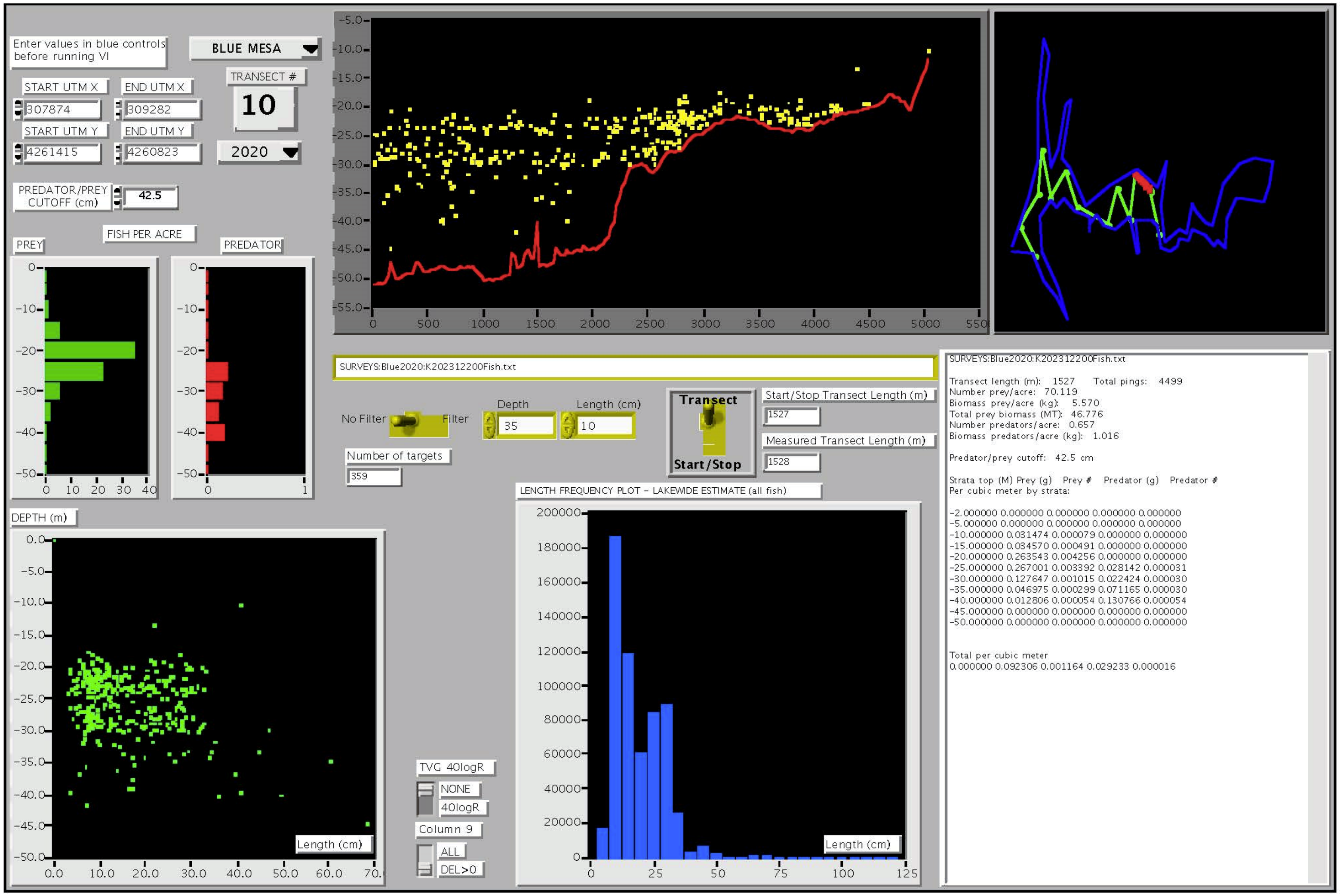
Transect length (m):   1705     Total pings:   4499
Number prey/acre:  54.335
Biomass prey/acre (kg):   4.553
Total prey biomass (MT):  38.236
Number predators/acre:  0.720
Biomass predators/acre (kg):  4.311

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000059 0.000000 0.000000
-10.000000 0.010616 0.000109 0.000000 0.000000
-15.000000 0.018617 0.000363 0.000000 0.000000
-20.000000 0.144282 0.002056 0.026957 0.000033
-25.000000 0.229442 0.002772 0.134825 0.000029
-30.000000 0.232670 0.001881 0.602505 0.000050
-35.000000 0.053727 0.000403 0.000000 0.000000
-40.000000 0.023460 0.000370 0.000000 0.000000
-45.000000 0.000191 0.000191 0.000000 0.000000
-50.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.096209 0.001056 0.112667 0.000015
```



Enter values in blue controls before running VI

BLUE MESA

TRANSECT # 10

START UTM X 307874

END UTM X 309282

START UTM Y 4261415

END UTM Y 4260823

2020

PREDATOR/PREY CUTOFF (cm) 42.5

FISH PER ACRE

PREY

PREDATOR

DEPTH (m)

SURVEYS:Blue2020:K202312200Fish.txt

No Filter Filter

Depth 35

Length (cm) 10

Number of targets 359

Transect Start/Stop

Start/Stop Transect Length (m) 1527

Measured Transect Length (m) 1528

LENGTH FREQUENCY PLOT – LAKEWIDE ESTIMATE (all fish)

TVG 40logR

NONE

40logR

Column 9

ALL

DEL>0

```
SURVEYS:Blue2020:K202312200Fish.txt

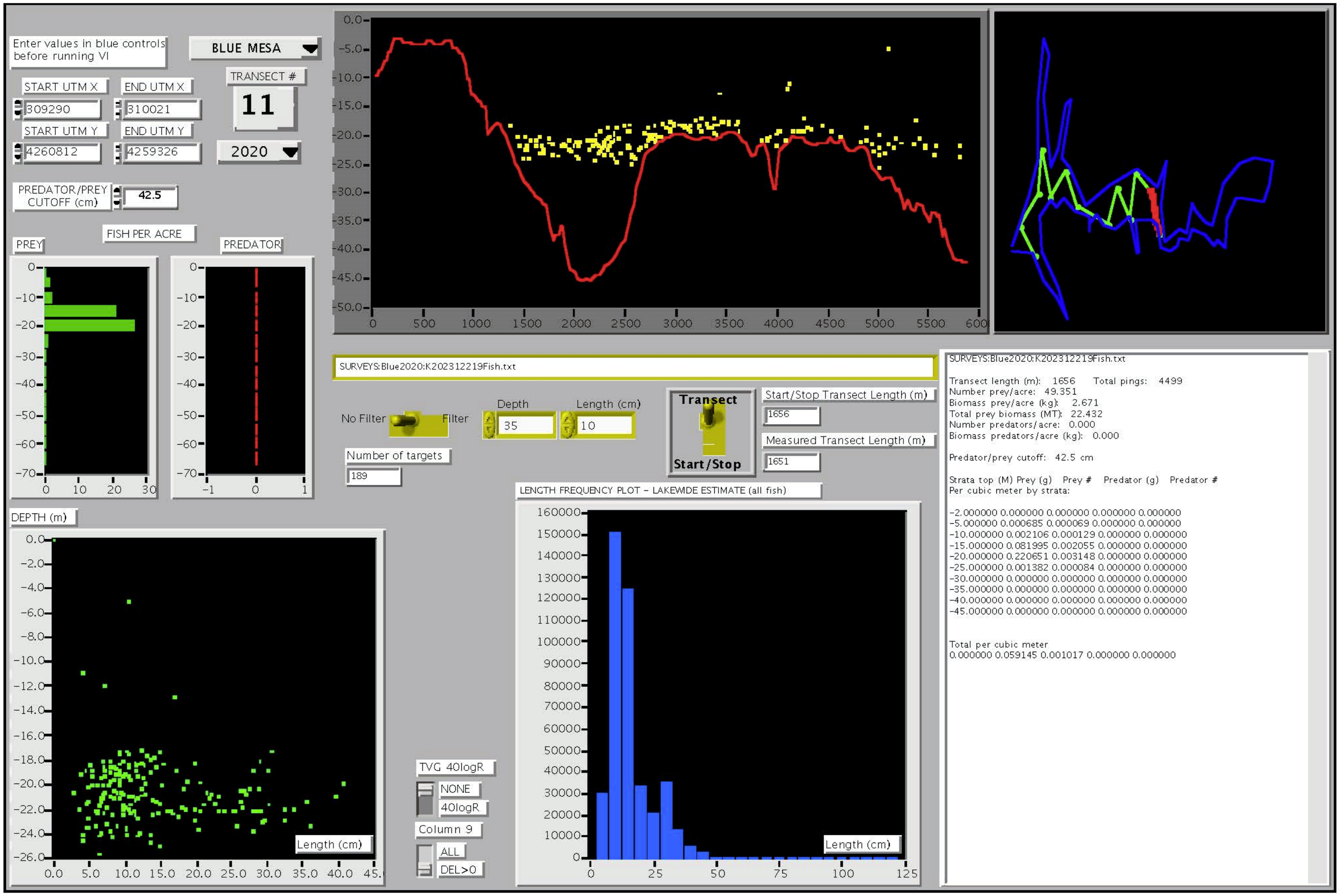
Transect length (m):   1527     Total pings:   4499
Number prey/acre:  70.119
Biomass prey/acre (kg):   5.570
Total prey biomass (MT):  46.776
Number predators/acre:  0.657
Biomass predators/acre (kg):  1.016

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.031474 0.000079 0.000000 0.000000
-15.000000 0.034570 0.000491 0.000000 0.000000
-20.000000 0.263543 0.004256 0.000000 0.000000
-25.000000 0.267001 0.003392 0.028142 0.000031
-30.000000 0.127647 0.001015 0.022424 0.000030
-35.000000 0.046975 0.000299 0.071165 0.000030
-40.000000 0.012806 0.000054 0.130766 0.000054
-45.000000 0.000000 0.000000 0.000000 0.000000
-50.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.092306 0.001164 0.029233 0.000016
```


Enter values in blue controls before running VI

BLUE MESA

TRANSECT # 11

2020

START UTM X 309290

END UTM X 310021

START UTM Y 4260812

END UTM Y 4259326

PREDATOR/PREY CUTOFF (cm) 42.5

SURVEYS:Blue2020:K202312219Fish.txt

No Filter / Filter

Depth 35

Length (cm) 10

Number of targets 189

Start/Stop Transect Length (m) 1656

Measured Transect Length (m) 1651

TVG 40logR

Column 9

```
SURVEYS:Blue2020:K202312219Fish.txt

Transect length (m):   1656     Total pings:   4499
Number prey/acre:  49.351
Biomass prey/acre (kg):   2.671
Total prey biomass (MT):  22.432
Number predators/acre:  0.000
Biomass predators/acre (kg):  0.000

Predator/prey cutoff:  42.5 cm

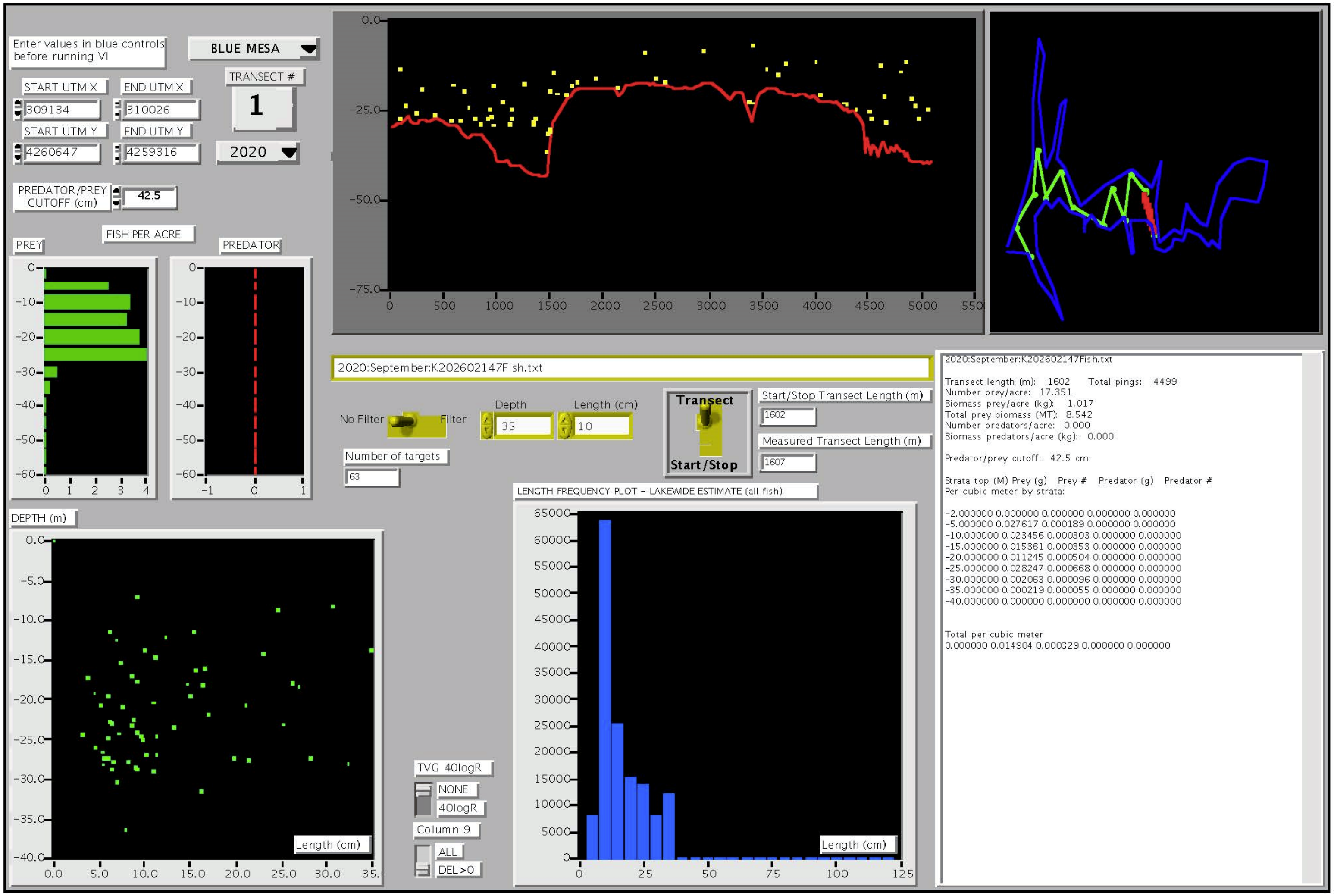
Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000685 0.000069 0.000000 0.000000
-10.000000 0.002106 0.000129 0.000000 0.000000
-15.000000 0.081995 0.002055 0.000000 0.000000
-20.000000 0.220651 0.003148 0.000000 0.000000
-25.000000 0.001382 0.000084 0.000000 0.000000
-30.000000 0.000000 0.000000 0.000000 0.000000
-35.000000 0.000000 0.000000 0.000000 0.000000
-40.000000 0.000000 0.000000 0.000000 0.000000
-45.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.059145 0.001017 0.000000 0.000000
```

Appendix B

Individual transect output files from the Hydroacoustic Kit (InterpretFish_2020.vi) for Cebolla and Sapinero basins of Blue Mesa Reservoir surveyed on September 16, 2020.



BLUE MESA

TRANSECT # 1

2020

START UTM X 309134

END UTM X 310026

START UTM Y 4260647

END UTM Y 4259316

PREDATOR/PREY CUTOFF (cm) 42.5

2020:September:K202602147Fish.txt

Depth 35

Length (cm) 10

Number of targets 63

Start/Stop Transect Length (m) 1602

Measured Transect Length (m) 1607

TVG 40logR

Column 9

ALL

```
2020:September:K202602147Fish.txt

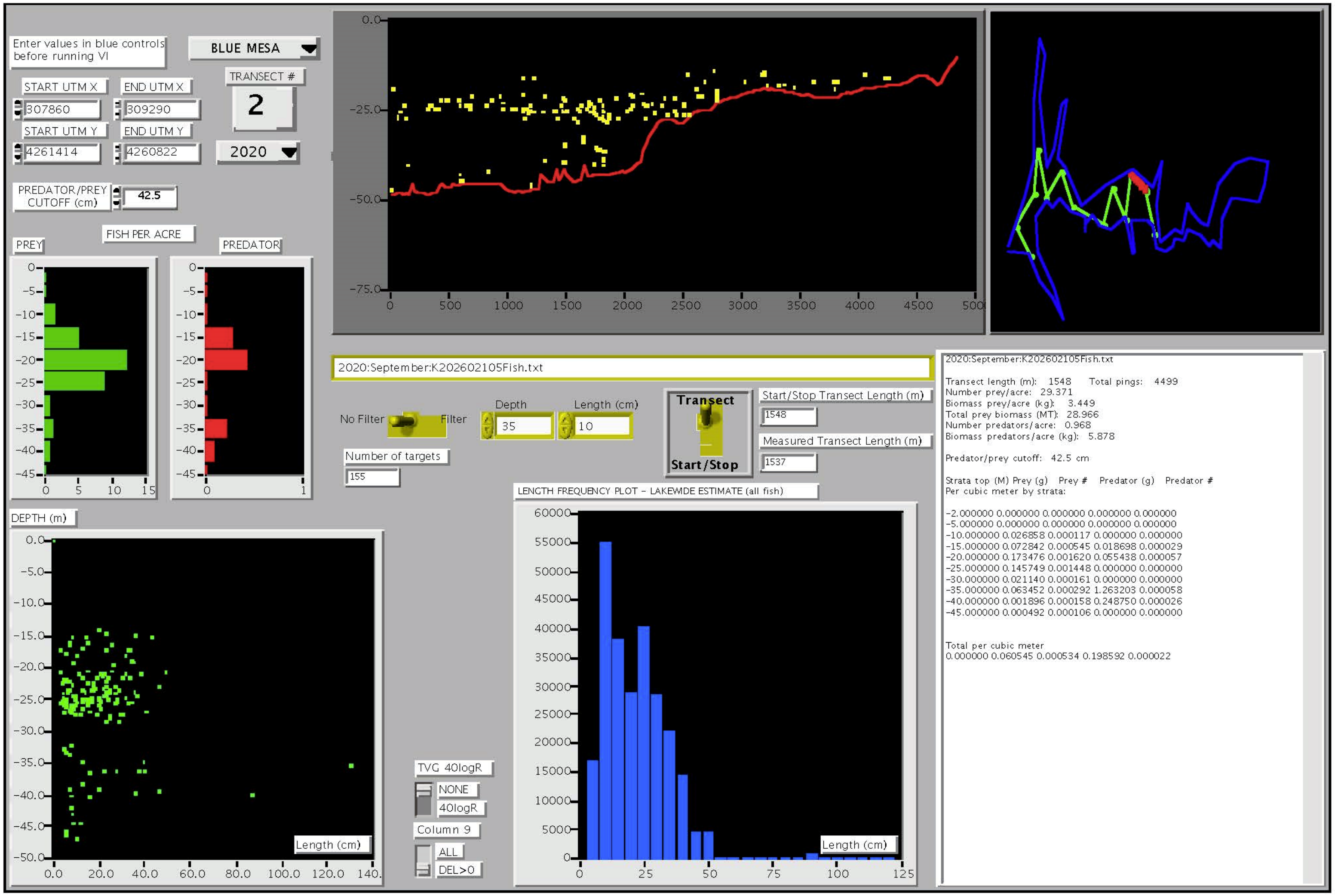
Transect length (m):   1602     Total pings:   4499
Number prey/acre:   17.351
Biomass prey/acre (kg):    1.017
Total prey biomass (MT):  8.542
Number predators/acre:   0.000
Biomass predators/acre (kg):   0.000

Predator/prey cutoff:   42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.027617 0.000189 0.000000 0.000000
-10.000000 0.023456 0.000303 0.000000 0.000000
-15.000000 0.015361 0.000353 0.000000 0.000000
-20.000000 0.011245 0.000504 0.000000 0.000000
-25.000000 0.028247 0.000668 0.000000 0.000000
-30.000000 0.002063 0.000096 0.000000 0.000000
-35.000000 0.000219 0.000055 0.000000 0.000000
-40.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.014904 0.000329 0.000000 0.000000
```



Enter values in blue controls before running VI

BLUE MESA

START UTM X: 307860

END UTM X: 309290

START UTM Y: 4261414

END UTM Y: 4260822

TRANSECT #: 2

2020

PREDATOR/PREY CUTOFF (cm): 42.5

2020:September:K202602105Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 155

Start/Stop Transect Length (m): 1548

Measured Transect Length (m): 1537

TVG 40logR

Column 9

```
2020:September:K202602105Fish.txt

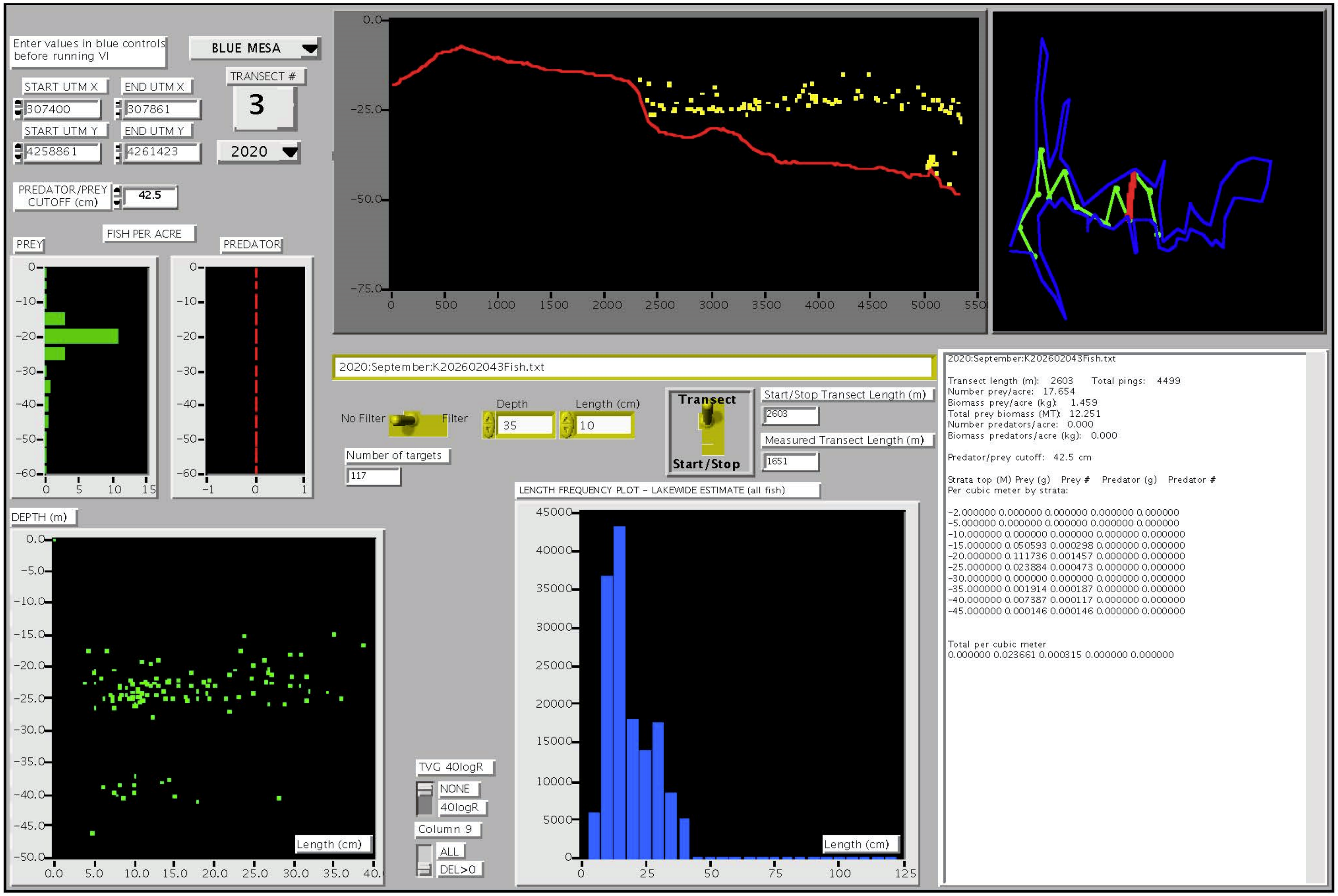
Transect length (m):   1548     Total pings:   4499
Number prey/acre:  29.371
Biomass prey/acre (kg):   3.449
Total prey biomass (MT):  28.966
Number predators/acre:  0.968
Biomass predators/acre (kg):  5.878

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.026858 0.000117 0.000000 0.000000
-15.000000 0.072842 0.000545 0.018698 0.000029
-20.000000 0.173476 0.001620 0.055438 0.000057
-25.000000 0.145749 0.001448 0.000000 0.000000
-30.000000 0.021140 0.000161 0.000000 0.000000
-35.000000 0.063452 0.000292 1.263203 0.000058
-40.000000 0.001896 0.000158 0.248750 0.000026
-45.000000 0.000492 0.000106 0.000000 0.000000


Total per cubic meter
0.000000 0.060545 0.000534 0.198592 0.000022
```



Enter values in blue controls before running VI

BLUE MESA

START UTM X: 307400

END UTM X: 307861

START UTM Y: 4258861

END UTM Y: 4261423

TRANSECT #: 3

2020

PREDATOR/PREY CUTOFF (cm): 42.5

No Filter / Filter

Depth: 35

Length (cm): 10

Number of targets: 117

Transect Start/Stop

Start/Stop Transect Length (m): 2603

Measured Transect Length (m): 1651

TVG 40logR: NONE / 40logR

Column 9: ALL / DEL>0

2020:September:K202602043Fish.txt

```
2020:September:K202602043Fish.txt

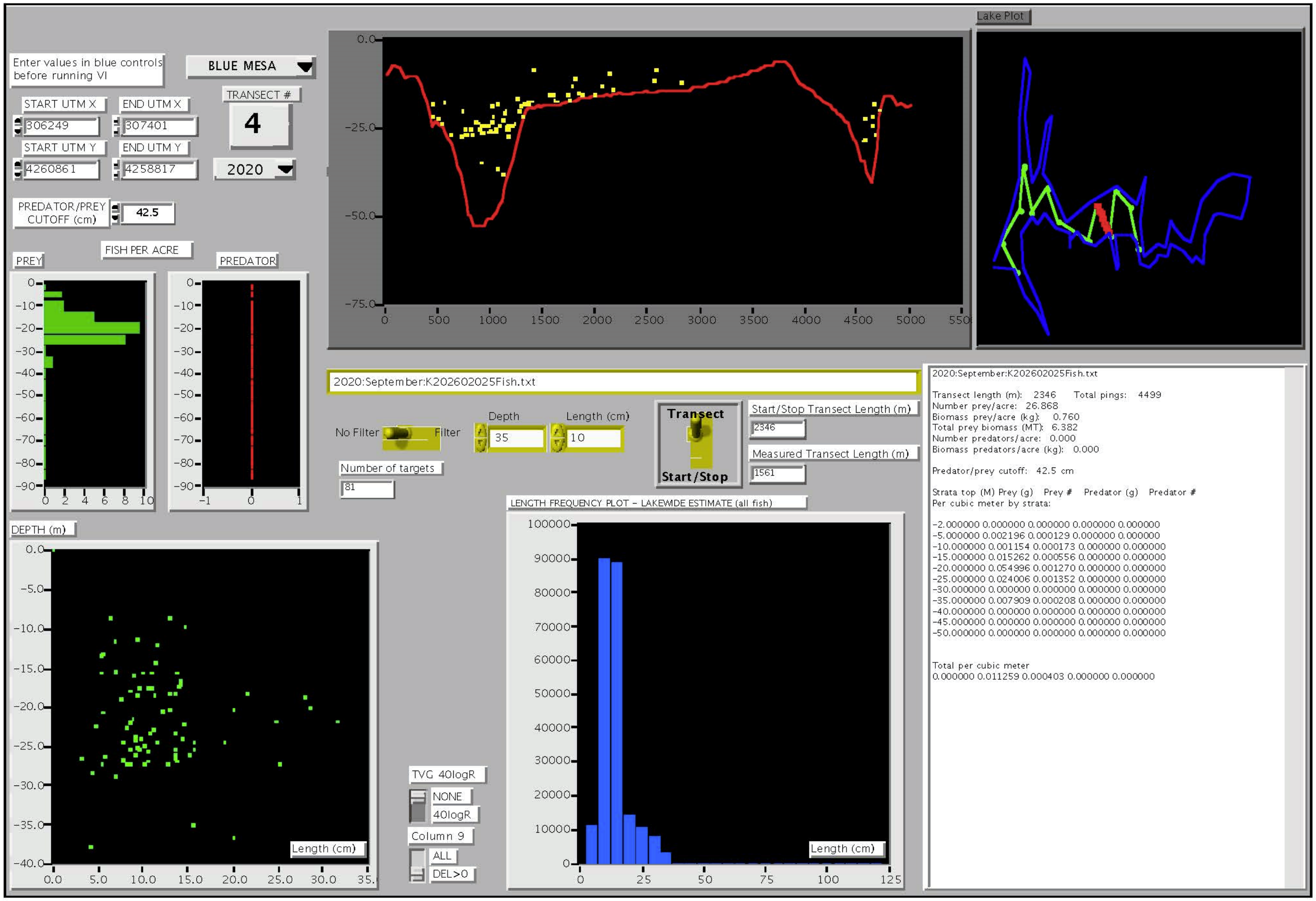
Transect length (m):   2603     Total pings:   4499
Number prey/acre:  17.654
Biomass prey/acre (kg):   1.459
Total prey biomass (MT):  12.251
Number predators/acre:  0.000
Biomass predators/acre (kg):  0.000

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.000000 0.000000 0.000000 0.000000
-15.000000 0.050593 0.000298 0.000000 0.000000
-20.000000 0.111736 0.001457 0.000000 0.000000
-25.000000 0.023884 0.000473 0.000000 0.000000
-30.000000 0.000000 0.000000 0.000000 0.000000
-35.000000 0.001914 0.000187 0.000000 0.000000
-40.000000 0.007387 0.000117 0.000000 0.000000
-45.000000 0.000146 0.000146 0.000000 0.000000


Total per cubic meter
0.000000 0.023661 0.000315 0.000000 0.000000
```



BLUE MESA

START UTM X: 306249

END UTM X: 307401

START UTM Y: 4260861

END UTM Y: 4258817

TRANSECT #: 4

2020

PREDATOR/PREY CUTOFF (cm): 42.5

2020:September:K202602025Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 81

Start/Stop Transect Length (m): 2346

Measured Transect Length (m): 1561

TVG 40logR: ☐ NONE ☑ 40logR

Column 9: ☐ ALL ☑ DEL>0

```
2020:September:K202602025Fish.txt

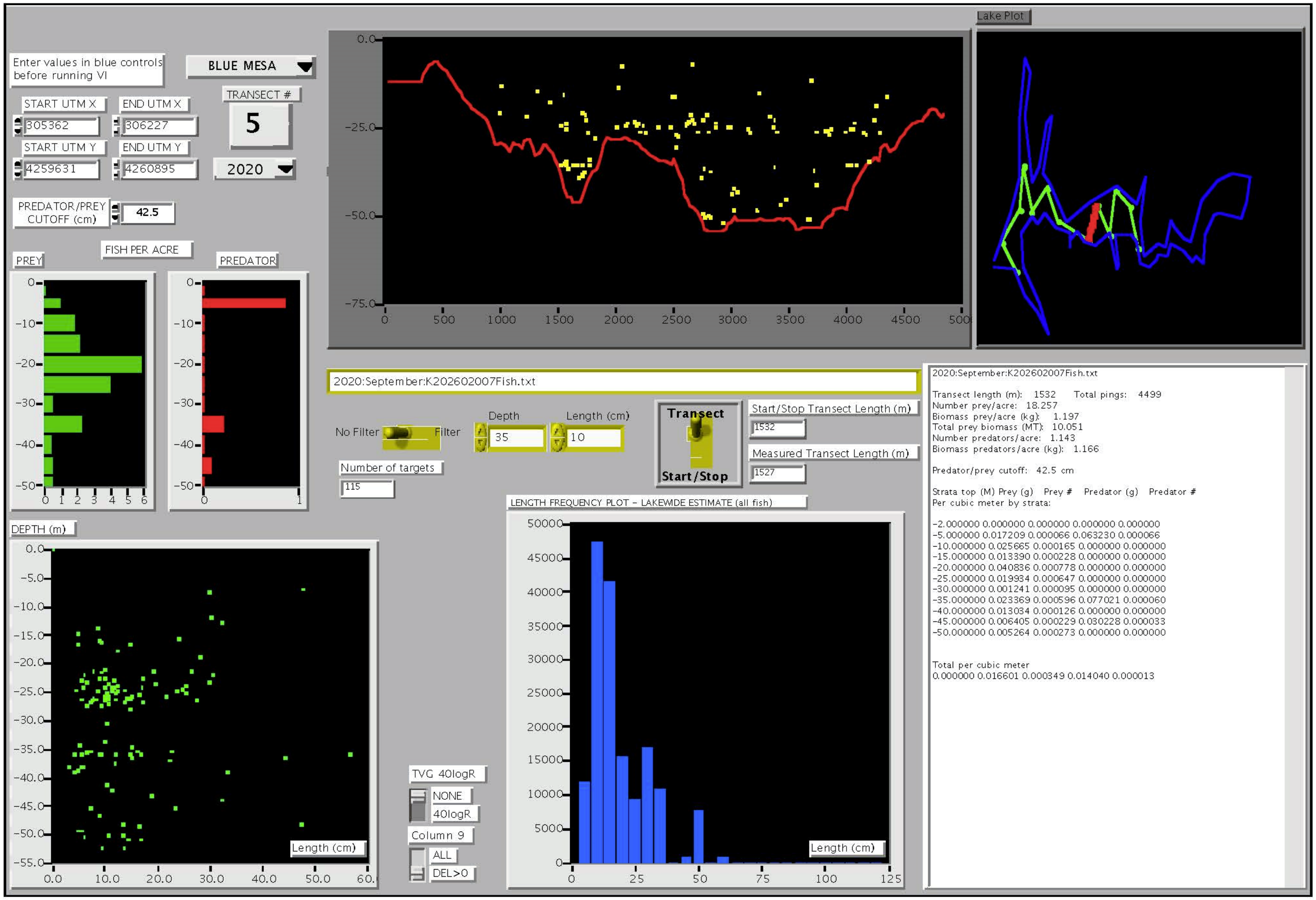
Transect length (m):   2346     Total pings:   4499
Number prey/acre:  26.868
Biomass prey/acre (kg):   0.760
Total prey biomass (MT):  6.382
Number predators/acre:  0.000
Biomass predators/acre (kg):  0.000

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.002196 0.000129 0.000000 0.000000
-10.000000 0.001154 0.000173 0.000000 0.000000
-15.000000 0.015262 0.000556 0.000000 0.000000
-20.000000 0.054996 0.001270 0.000000 0.000000
-25.000000 0.024006 0.001352 0.000000 0.000000
-30.000000 0.000000 0.000000 0.000000 0.000000
-35.000000 0.007909 0.000208 0.000000 0.000000
-40.000000 0.000000 0.000000 0.000000 0.000000
-45.000000 0.000000 0.000000 0.000000 0.000000
-50.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.011259 0.000403 0.000000 0.000000
```



BLUE MESA

TRANSECT #: 5

START UTM X: 305362

END UTM X: 306227

START UTM Y: 4259631

END UTM Y: 4260895

2020

PREDATOR/PREY CUTOFF (cm): 42.5

2020:September:K202602007Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 115

Start/Stop Transect Length (m): 1532

Measured Transect Length (m): 1527

TVG 40logR

Column 9

```
2020:September:K202602007Fish.txt

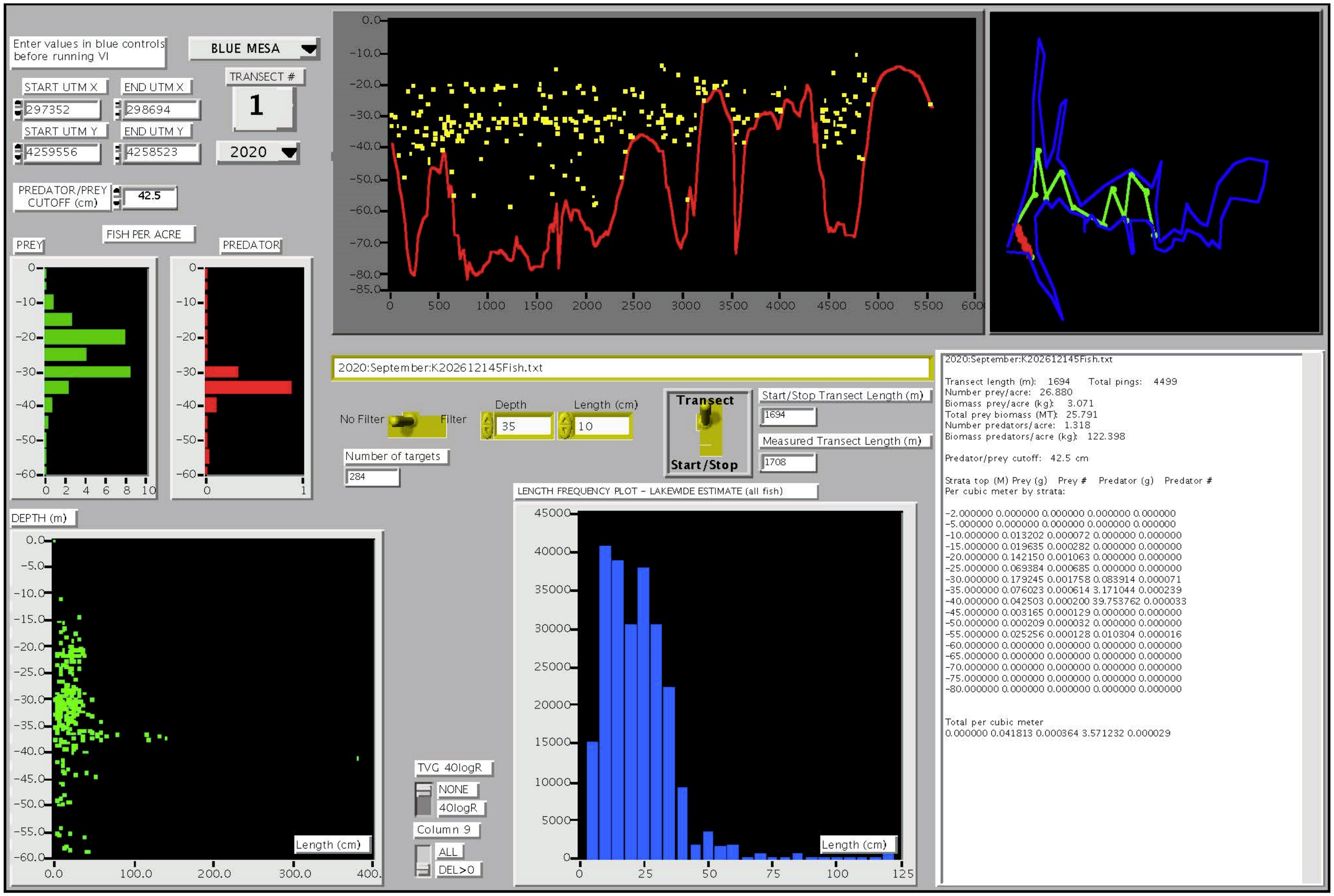
Transect length (m):   1532     Total pings:   4499
Number prey/acre:   18.257
Biomass prey/acre (kg):    1.197
Total prey biomass (MT):   10.051
Number predators/acre:   1.143
Biomass predators/acre (kg):   1.166

Predator/prey cutoff:   42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.017209 0.000066 0.063230 0.000066
-10.000000 0.025665 0.000165 0.000000 0.000000
-15.000000 0.013390 0.000228 0.000000 0.000000
-20.000000 0.040836 0.000778 0.000000 0.000000
-25.000000 0.019934 0.000647 0.000000 0.000000
-30.000000 0.001241 0.000095 0.000000 0.000000
-35.000000 0.023369 0.000596 0.077021 0.000060
-40.000000 0.013034 0.000126 0.000000 0.000000
-45.000000 0.006405 0.000229 0.030228 0.000033
-50.000000 0.005264 0.000273 0.000000 0.000000


Total per cubic meter
0.000000 0.016601 0.000349 0.014040 0.000013
```



BLUE MESA

TRANSECT # 1

START UTM X 297352

END UTM X 298694

START UTM Y 4259556

END UTM Y 4258523

2020

PREDATOR/PREY CUTOFF (cm) 42.5

2020:September:K202612145Fish.txt

No Filter / Filter

Depth 35

Length (cm) 10

Number of targets 284

Start/Stop Transect Length (m) 1694

Measured Transect Length (m) 1708

TVG 40logR: NONE / 40logR

Column 9: ALL / DEL>0

```
2020:September:K202612145Fish.txt

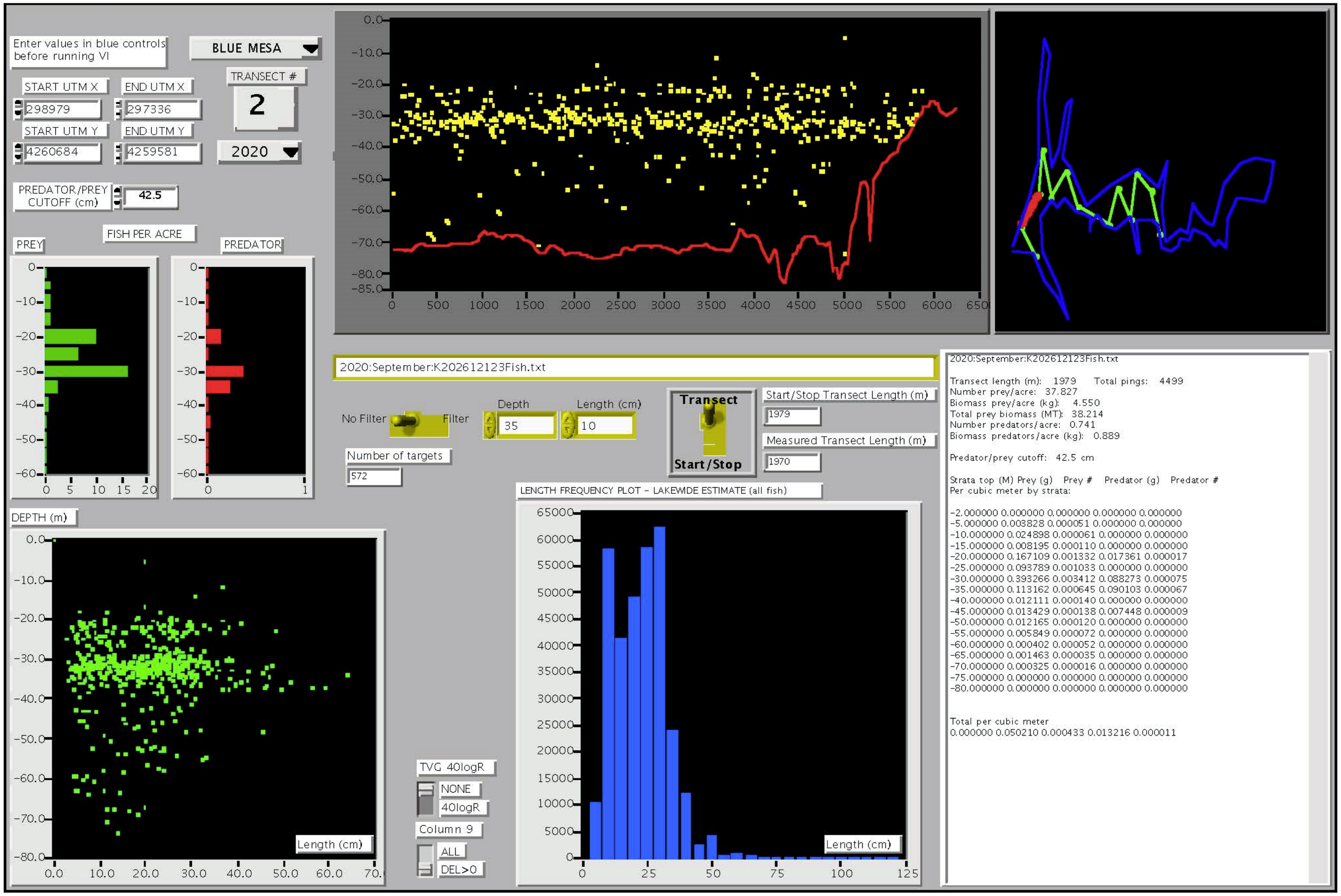
Transect length (m):   1694     Total pings:   4499
Number prey/acre:  26.880
Biomass prey/acre (kg):   3.071
Total prey biomass (MT):  25.791
Number predators/acre:  1.318
Biomass predators/acre (kg):  122.398

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.013202 0.000072 0.000000 0.000000
-15.000000 0.019635 0.000282 0.000000 0.000000
-20.000000 0.142150 0.001063 0.000000 0.000000
-25.000000 0.069384 0.000685 0.000000 0.000000
-30.000000 0.179245 0.001758 0.083914 0.000071
-35.000000 0.076023 0.000614 3.171044 0.000239
-40.000000 0.042503 0.000200 39.753762 0.000033
-45.000000 0.003165 0.000129 0.000000 0.000000
-50.000000 0.000209 0.000032 0.000000 0.000000
-55.000000 0.025256 0.000128 0.010304 0.000016
-60.000000 0.000000 0.000000 0.000000 0.000000
-65.000000 0.000000 0.000000 0.000000 0.000000
-70.000000 0.000000 0.000000 0.000000 0.000000
-75.000000 0.000000 0.000000 0.000000 0.000000
-80.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.041813 0.000364 3.571232 0.000029
```



Enter values in blue controls before running VI

BLUE MESA

START UTM X: 298979

END UTM X: 297336

START UTM Y: 4260684

END UTM Y: 4259581

TRANSECT #: 2

2020

PREDATOR/PREY CUTOFF (cm): 42.5

2020:September:K202612123Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 572

Start/Stop Transect Length (m): 1979

Measured Transect Length (m): 1970

```
2020:September:K202612123Fish.txt

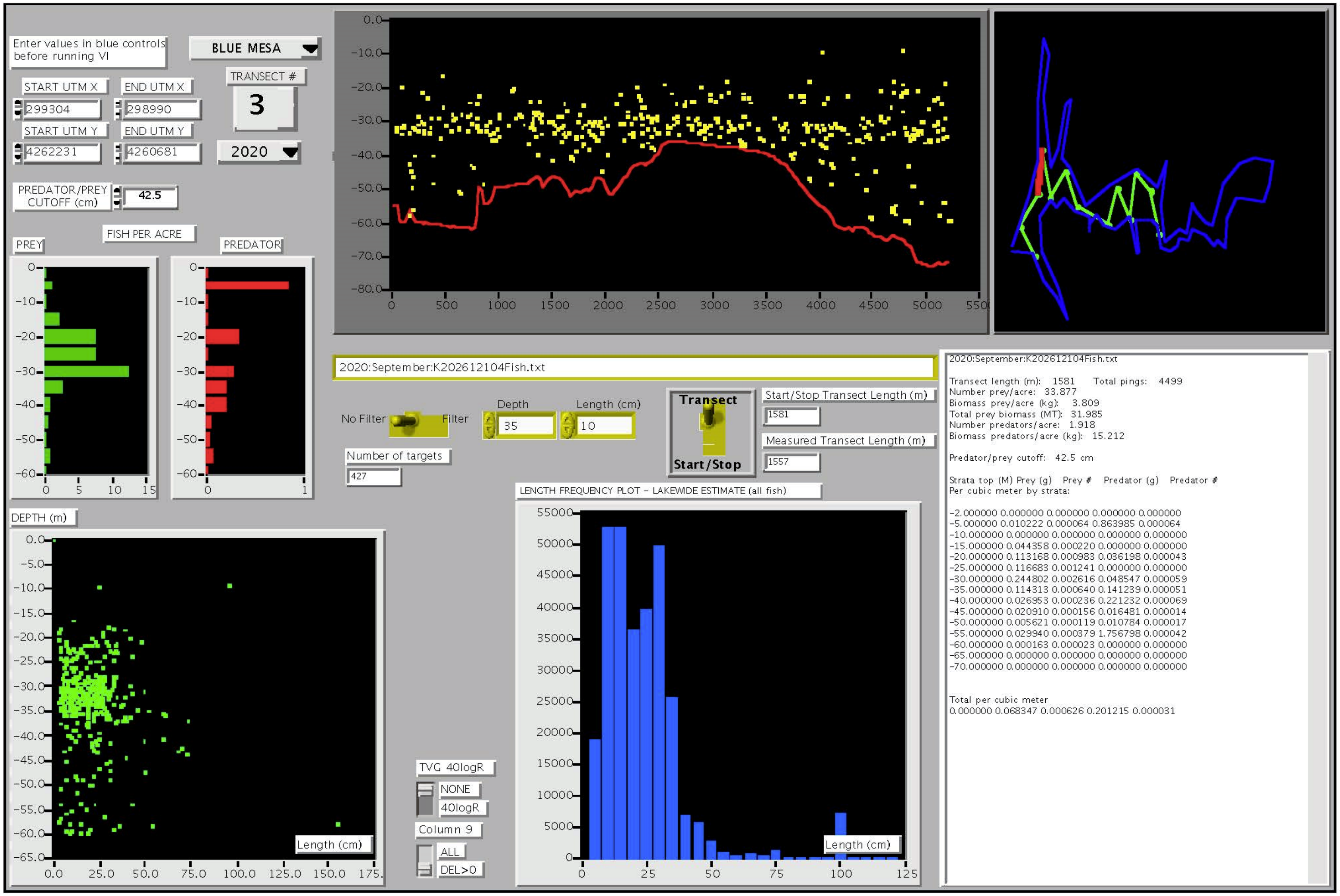
Transect length (m):   1979     Total pings:   4499
Number prey/acre:  37.827
Biomass prey/acre (kg):   4.550
Total prey biomass (MT):  38.214
Number predators/acre:  0.741
Biomass predators/acre (kg):  0.889

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.003828 0.000051 0.000000 0.000000
-10.000000 0.024898 0.000061 0.000000 0.000000
-15.000000 0.008195 0.000110 0.000000 0.000000
-20.000000 0.167109 0.001332 0.017361 0.000017
-25.000000 0.093789 0.001033 0.000000 0.000000
-30.000000 0.393266 0.003412 0.088273 0.000075
-35.000000 0.113162 0.000645 0.090103 0.000067
-40.000000 0.012111 0.000140 0.000000 0.000000
-45.000000 0.013429 0.000138 0.007448 0.000009
-50.000000 0.012165 0.000120 0.000000 0.000000
-55.000000 0.005849 0.000072 0.000000 0.000000
-60.000000 0.000402 0.000052 0.000000 0.000000
-65.000000 0.001463 0.000035 0.000000 0.000000
-70.000000 0.000325 0.000016 0.000000 0.000000
-75.000000 0.000000 0.000000 0.000000 0.000000
-80.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.050210 0.000433 0.013216 0.000011
```



Enter values in blue controls before running VI

START UTM X: 299304

END UTM X: 298990

START UTM Y: 4262231

END UTM Y: 4260681

TRANSECT #: 3

2020

PREDATOR/PREY CUTOFF (cm): 42.5

2020:September:K202612104Fish.txt

No Filter / Filter

Depth: 35

Length (cm): 10

Number of targets: 427

Start/Stop Transect Length (m): 1581

Measured Transect Length (m): 1557

TVG 40logR: NONE / 40logR

Column 9: ALL / DEL>0

```
2020:September:K202612104Fish.txt

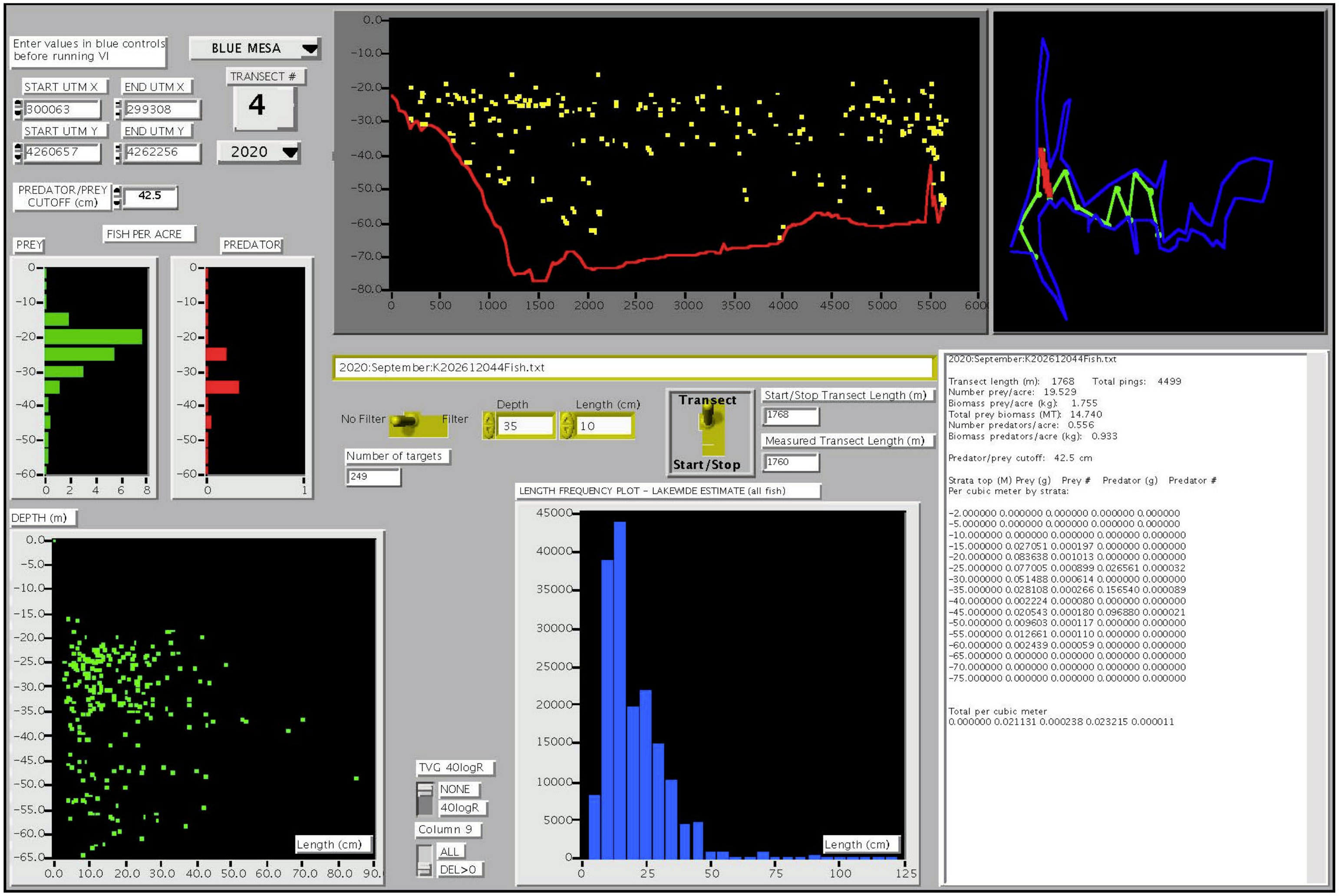
Transect length (m):   1581     Total pings:   4499
Number prey/acre:  33.877
Biomass prey/acre (kg):   3.809
Total prey biomass (MT):  31.985
Number predators/acre:  1.918
Biomass predators/acre (kg):  15.212

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.010222 0.000064 0.863985 0.000064
-10.000000 0.000000 0.000000 0.000000 0.000000
-15.000000 0.044358 0.000220 0.000000 0.000000
-20.000000 0.113168 0.000983 0.036198 0.000043
-25.000000 0.116683 0.001241 0.000000 0.000000
-30.000000 0.244802 0.002616 0.048547 0.000059
-35.000000 0.114313 0.000640 0.141239 0.000051
-40.000000 0.026953 0.000236 0.221232 0.000069
-45.000000 0.020910 0.000156 0.016481 0.000014
-50.000000 0.005621 0.000119 0.010784 0.000017
-55.000000 0.029940 0.000379 1.756798 0.000042
-60.000000 0.000163 0.000023 0.000000 0.000000
-65.000000 0.000000 0.000000 0.000000 0.000000
-70.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.068347 0.000626 0.201215 0.000031
```



Enter values in blue controls before running VI

BLUE MESA

TRANSECT #: 4

START UTM X: 300063

END UTM X: 299308

START UTM Y: 4260657

END UTM Y: 4262256

2020

PREDATOR/PREY CUTOFF (cm): 42.5

2020:September:K202612044Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 249

Start/Stop Transect Length (m): 1768

Measured Transect Length (m): 1760

TVG 40logR

Column 9

```
2020:September:K202612044Fish.txt

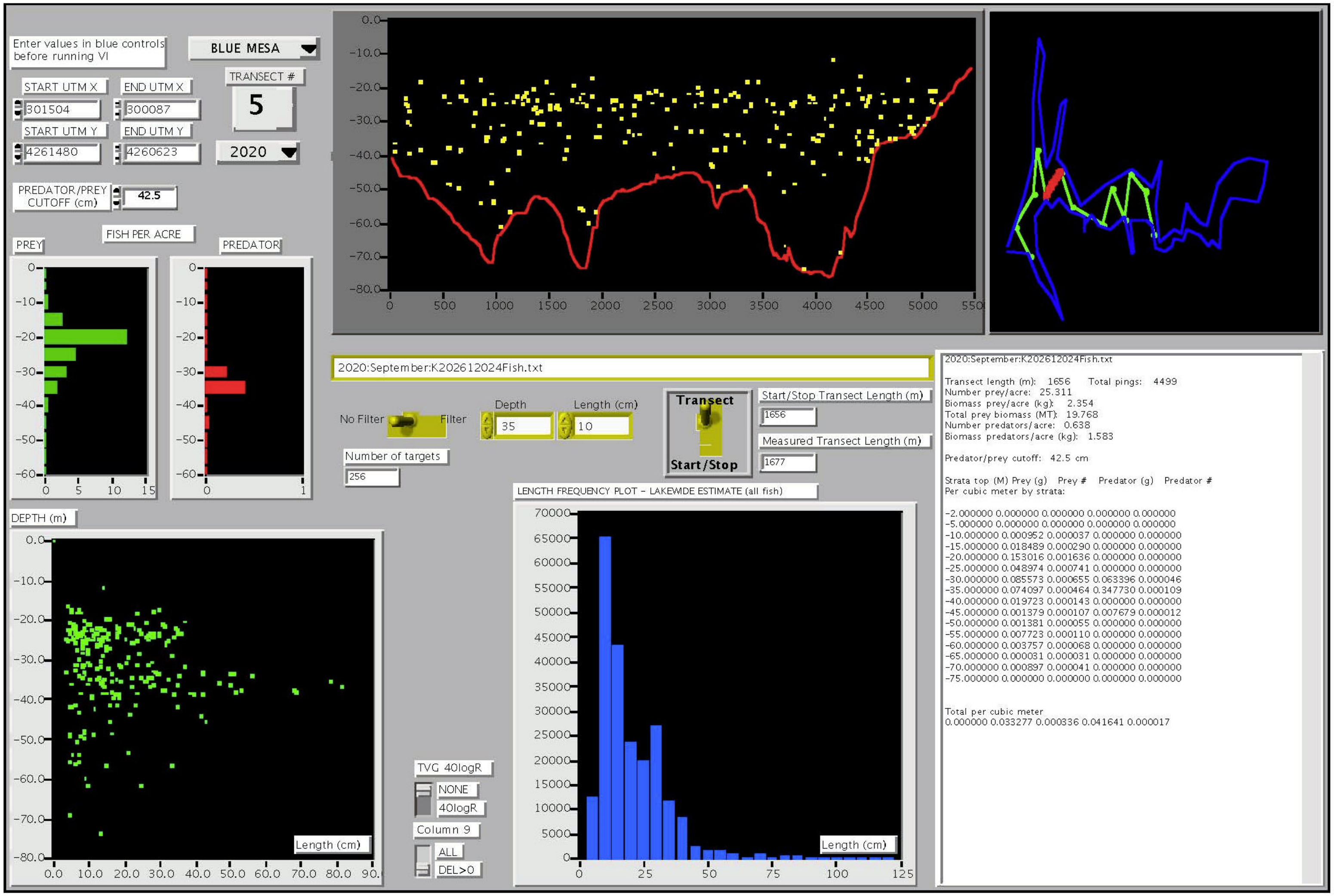
Transect length (m):   1768     Total pings:   4499
Number prey/acre:   19.529
Biomass prey/acre (kg):    1.755
Total prey biomass (MT):   14.740
Number predators/acre:   0.556
Biomass predators/acre (kg):   0.933

Predator/prey cutoff:   42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.000000 0.000000 0.000000 0.000000
-15.000000 0.027051 0.000197 0.000000 0.000000
-20.000000 0.083638 0.001013 0.000000 0.000000
-25.000000 0.077005 0.000899 0.026561 0.000032
-30.000000 0.051488 0.000614 0.000000 0.000000
-35.000000 0.028108 0.000266 0.156540 0.000089
-40.000000 0.002224 0.000080 0.000000 0.000000
-45.000000 0.020543 0.000180 0.096880 0.000021
-50.000000 0.009603 0.000117 0.000000 0.000000
-55.000000 0.012661 0.000110 0.000000 0.000000
-60.000000 0.002439 0.000059 0.000000 0.000000
-65.000000 0.000000 0.000000 0.000000 0.000000
-70.000000 0.000000 0.000000 0.000000 0.000000
-75.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.021131 0.000238 0.023215 0.000011
```



BLUE MESA

START UTM X: 301504

END UTM X: 300087

START UTM Y: 4261480

END UTM Y: 4260623

TRANSECT #: 5

2020

PREDATOR/PREY CUTOFF (cm): 42.5

2020:September:K202612024Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 256

Start/Stop Transect Length (m): 1656

Measured Transect Length (m): 1677

```
2020:September:K202612024Fish.txt

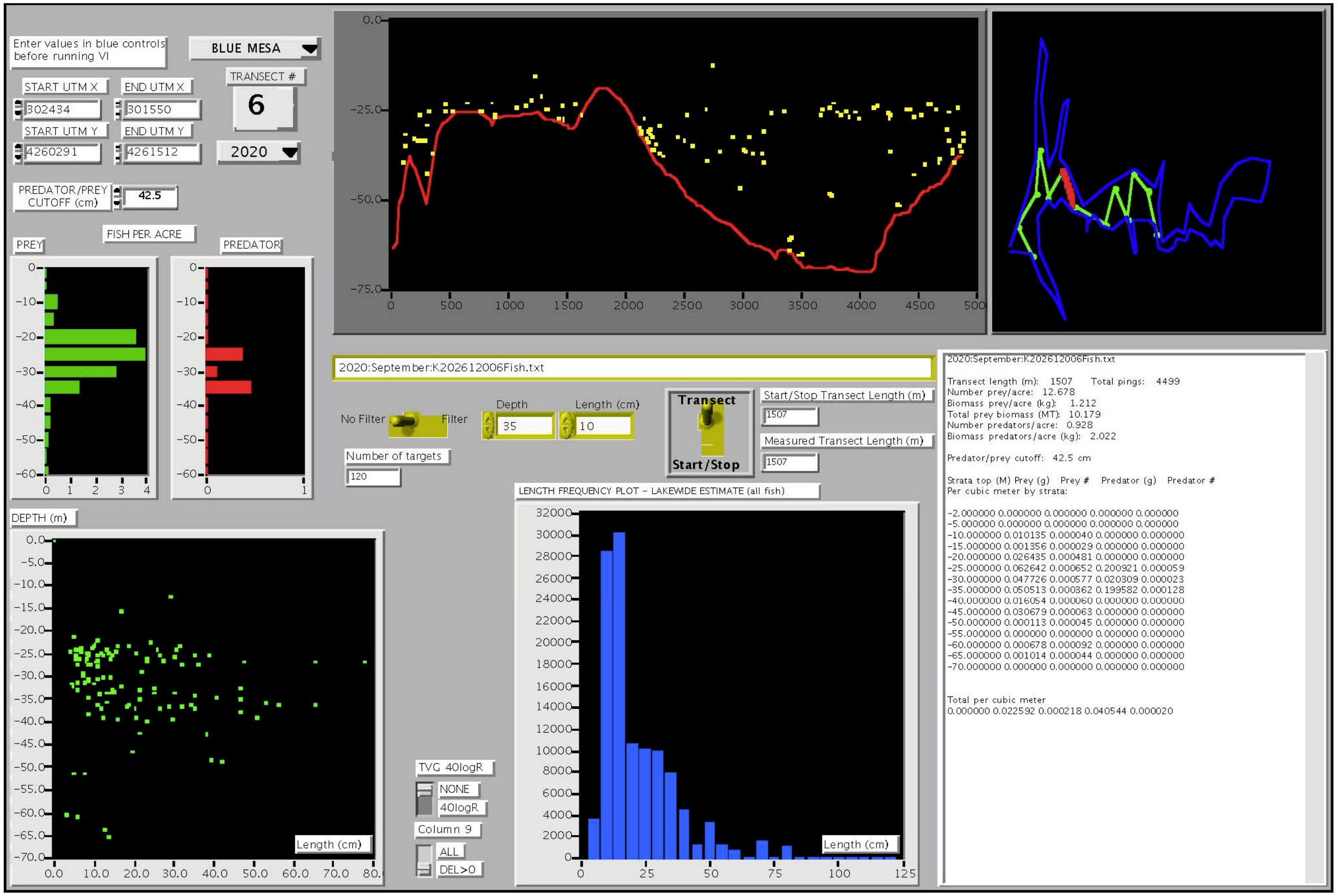
Transect length (m):   1656     Total pings:   4499
Number prey/acre:  25.311
Biomass prey/acre (kg):    2.354
Total prey biomass (MT):  19.768
Number predators/acre:  0.638
Biomass predators/acre (kg):  1.583

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.000952 0.000037 0.000000 0.000000
-15.000000 0.018489 0.000290 0.000000 0.000000
-20.000000 0.153016 0.001636 0.000000 0.000000
-25.000000 0.048974 0.000741 0.000000 0.000000
-30.000000 0.085573 0.000655 0.063396 0.000046
-35.000000 0.074097 0.000464 0.347730 0.000109
-40.000000 0.019723 0.000143 0.000000 0.000000
-45.000000 0.001379 0.000107 0.007679 0.000012
-50.000000 0.001381 0.000055 0.000000 0.000000
-55.000000 0.007723 0.000110 0.000000 0.000000
-60.000000 0.003757 0.000068 0.000000 0.000000
-65.000000 0.000031 0.000031 0.000000 0.000000
-70.000000 0.000897 0.000041 0.000000 0.000000
-75.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.033277 0.000336 0.041641 0.000017
```



BLUE MESA

TRANSECT # 6

2020

START UTM X: 302434

END UTM X: 301550

START UTM Y: 4260291

END UTM Y: 4261512

PREDATOR/PREY CUTOFF (cm): 42.5

2020:September:K202612006Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 120

Start/Stop Transect Length (m): 1507

Measured Transect Length (m): 1507

```
2020:September:K202612006Fish.txt

Transect length (m):   1507     Total pings:   4499
Number prey/acre:  12.678
Biomass prey/acre (kg):    1.212
Total prey biomass (MT):  10.179
Number predators/acre:  0.928
Biomass predators/acre (kg):  2.022

Predator/prey cutoff:  42.5 cm

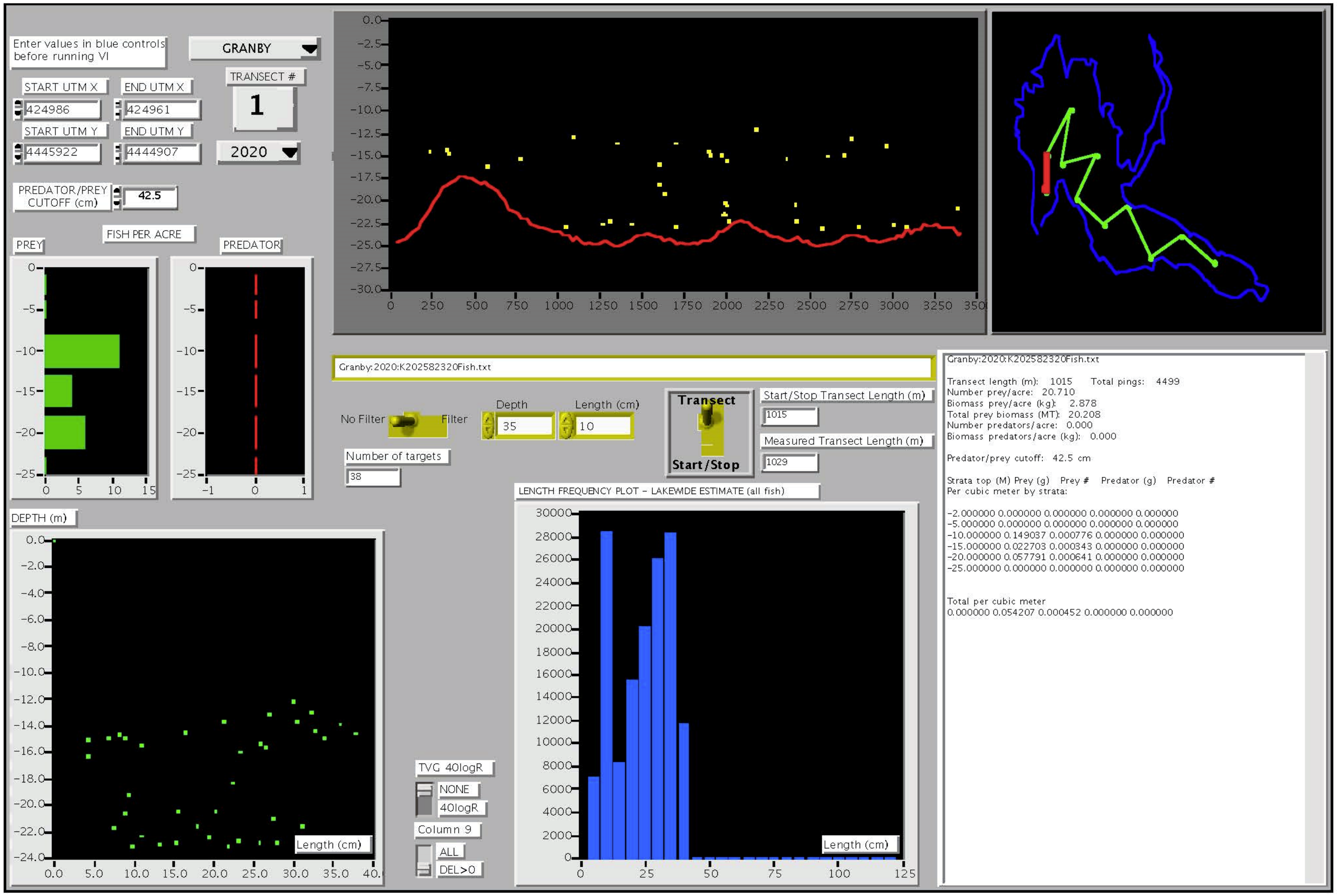
Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.010135 0.000040 0.000000 0.000000
-15.000000 0.001356 0.000029 0.000000 0.000000
-20.000000 0.026435 0.000481 0.000000 0.000000
-25.000000 0.062642 0.000652 0.200921 0.000059
-30.000000 0.047726 0.000577 0.020309 0.000023
-35.000000 0.050513 0.000362 0.199582 0.000128
-40.000000 0.016054 0.000060 0.000000 0.000000
-45.000000 0.030679 0.000063 0.000000 0.000000
-50.000000 0.000113 0.000045 0.000000 0.000000
-55.000000 0.000000 0.000000 0.000000 0.000000
-60.000000 0.000678 0.000092 0.000000 0.000000
-65.000000 0.001014 0.000044 0.000000 0.000000
-70.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.022592 0.000218 0.040544 0.000020
```

Appendix C

Individual transect output files from the HydroAcoustic Kit (InterpretFish_2020.vi) for Lake Granby surveyed on September 14, 2020.



Enter values in blue controls before running VI

GRANBY

TRANSECT #: 1

START UTM X: 424986

END UTM X: 424961

START UTM Y: 4445922

END UTM Y: 4444907

2020

PREDATOR/PREY CUTOFF (cm): 42.5

Granby:2020:K202582320Fish.txt

No Filter / Filter

Depth: 35

Length (cm): 10

Number of targets: 38

Start/Stop Transect Length (m): 1015

Measured Transect Length (m): 1029

TVG 40logR: NONE / 40logR

Column 9: ALL / DEL>0

```
Granby:2020:K202582320Fish.txt

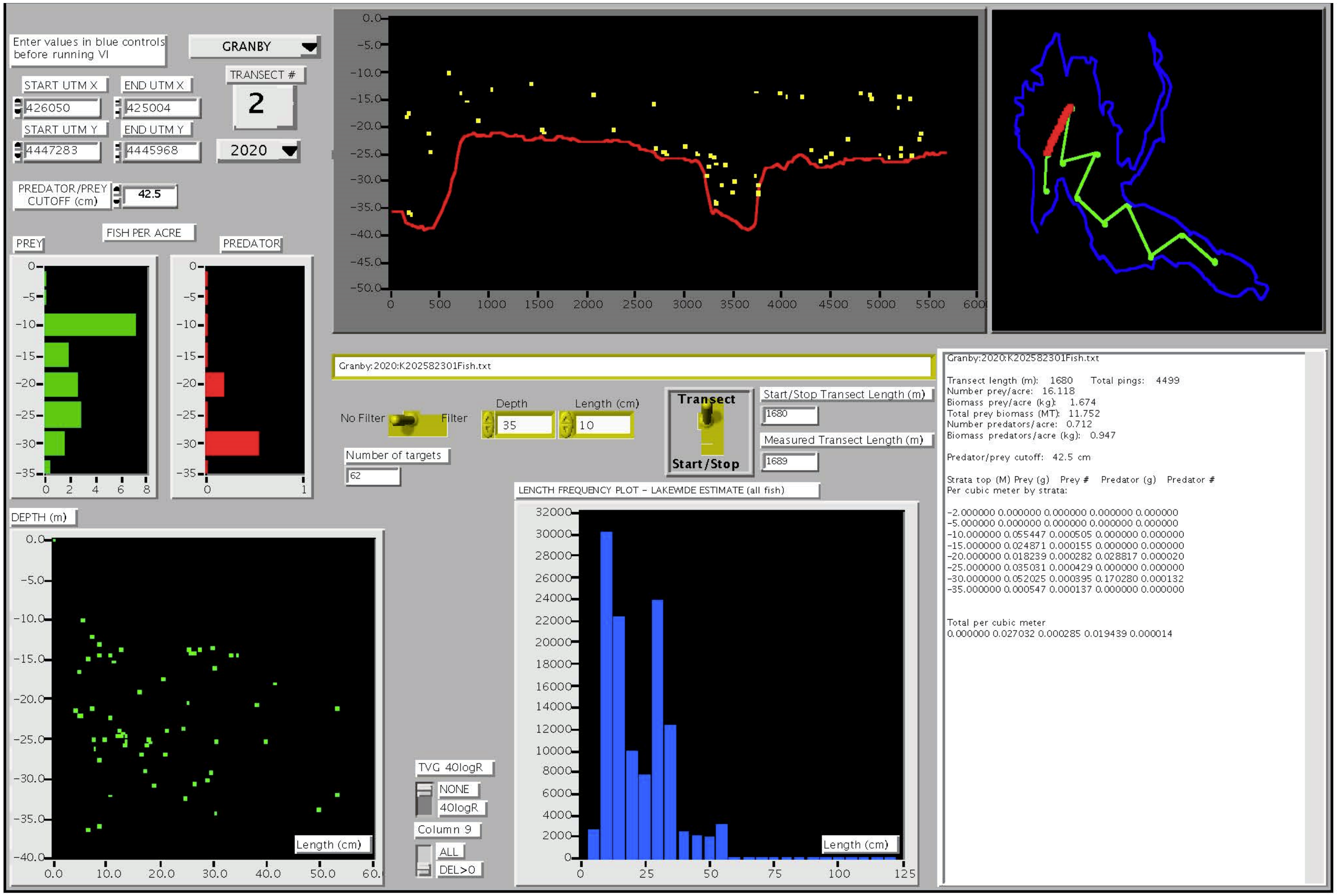
Transect length (m):   1015     Total pings:   4499
Number prey/acre:  20.710
Biomass prey/acre (kg):   2.878
Total prey biomass (MT):  20.208
Number predators/acre:  0.000
Biomass predators/acre (kg):  0.000

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.149037 0.000776 0.000000 0.000000
-15.000000 0.022703 0.000343 0.000000 0.000000
-20.000000 0.057791 0.000641 0.000000 0.000000
-25.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.054207 0.000452 0.000000 0.000000
```



Enter values in blue controls before running VI

GRANBY

TRANSECT # 2

2020

START UTM X 426050

END UTM X 425004

START UTM Y 4447283

END UTM Y 4445968

PREDATOR/PREY CUTOFF (cm) 42.5

Granby:2020:K202582301Fish.txt

No Filter / Filter

Depth 35

Length (cm) 10

Start/Stop Transect Length (m) 1680

Measured Transect Length (m) 1689

Number of targets 62

TVG 40logR

NONE / 40logR

Column 9

ALL / DEL>0

```
Granby:2020:K202582301Fish.txt

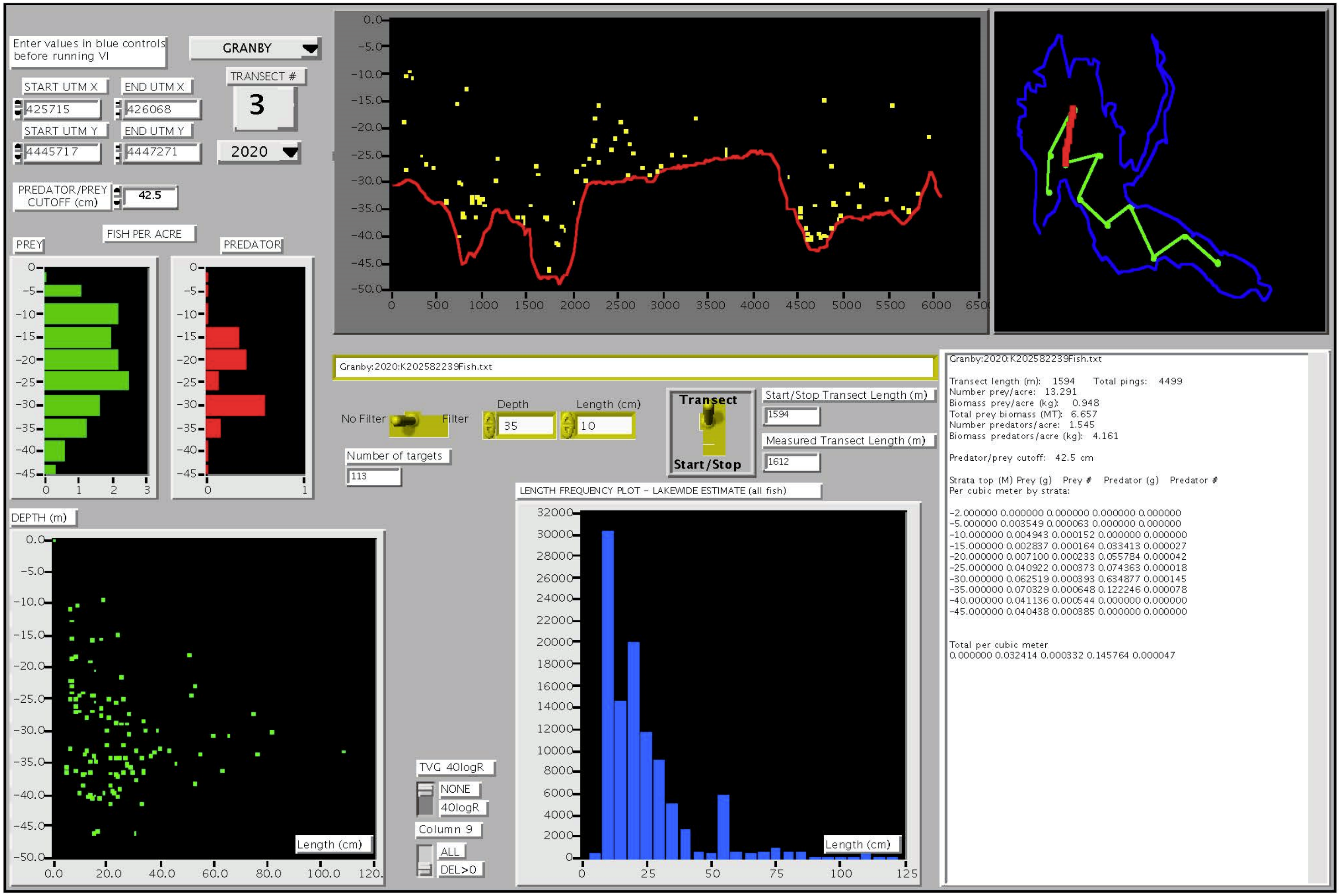
Transect length (m):   1680     Total pings:   4499
Number prey/acre:  16.118
Biomass prey/acre (kg):   1.674
Total prey biomass (MT):  11.752
Number predators/acre:  0.712
Biomass predators/acre (kg):  0.947

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.055447 0.000505 0.000000 0.000000
-15.000000 0.024871 0.000155 0.000000 0.000000
-20.000000 0.018239 0.000282 0.028817 0.000020
-25.000000 0.035031 0.000429 0.000000 0.000000
-30.000000 0.052025 0.000395 0.170280 0.000132
-35.000000 0.000547 0.000137 0.000000 0.000000


Total per cubic meter
0.000000 0.027032 0.000285 0.019439 0.000014
```



GRANBY
START UTM X 425715
END UTM X 426068
TRANSECT # 3
START UTM Y 4445717
END UTM Y 4447271
2020
PREDATOR/PREY CUTOFF (cm) 42.5
Granby:2020:K202582239Fish.txt
Depth 35
Length (cm) 10
Number of targets 113
Start/Stop Transect Length (m) 1594
Measured Transect Length (m) 1612
Column 9

```
Granby:2020:K202582239Fish.txt

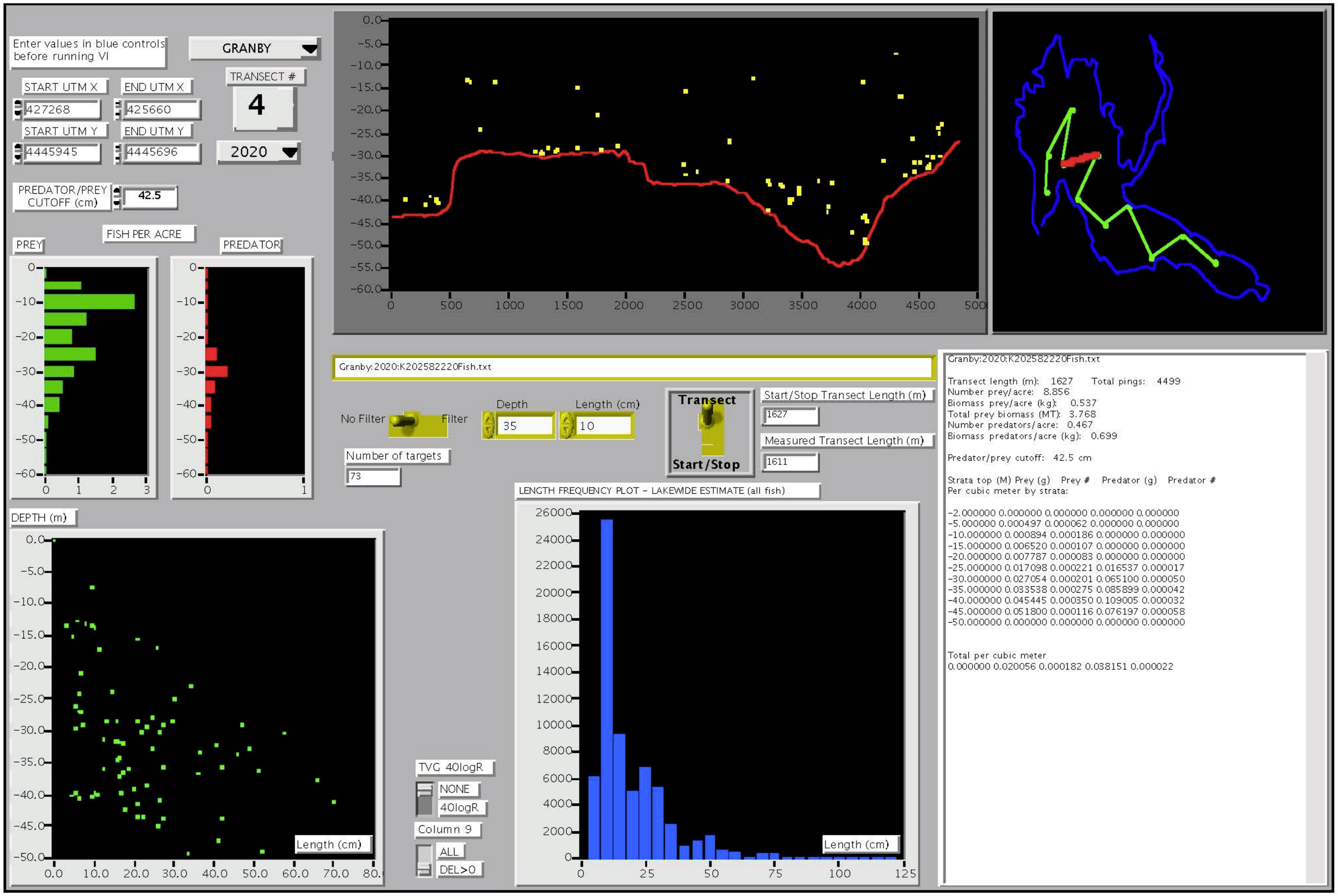
Transect length (m):   1594     Total pings:   4499
Number prey/acre:  13.291
Biomass prey/acre (kg):   0.948
Total prey biomass (MT):  6.657
Number predators/acre:  1.545
Biomass predators/acre (kg):  4.161

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.003549 0.000063 0.000000 0.000000
-10.000000 0.004943 0.000152 0.000000 0.000000
-15.000000 0.002837 0.000164 0.033413 0.000027
-20.000000 0.007100 0.000233 0.055784 0.000042
-25.000000 0.040922 0.000373 0.074363 0.000018
-30.000000 0.062519 0.000393 0.634877 0.000145
-35.000000 0.070329 0.000648 0.122246 0.000078
-40.000000 0.041136 0.000544 0.000000 0.000000
-45.000000 0.040438 0.000385 0.000000 0.000000


Total per cubic meter
0.000000 0.032414 0.000332 0.145764 0.000047
```



Enter values in blue controls before running VI

GRANBY

START UTM X: 427268

END UTM X: 425660

START UTM Y: 4445945

END UTM Y: 4445696

TRANSECT #: 4

2020

PREDATOR/PREY CUTOFF (cm): 42.5

Granby:2020:K202582220Fish.txt

No Filter / Filter

Depth: 35

Length (cm): 10

Number of targets: 73

Start/Stop Transect Length (m): 1627

Measured Transect Length (m): 1611

TVG 40logR

Column 9

```
Granby:2020:K202582220Fish.txt

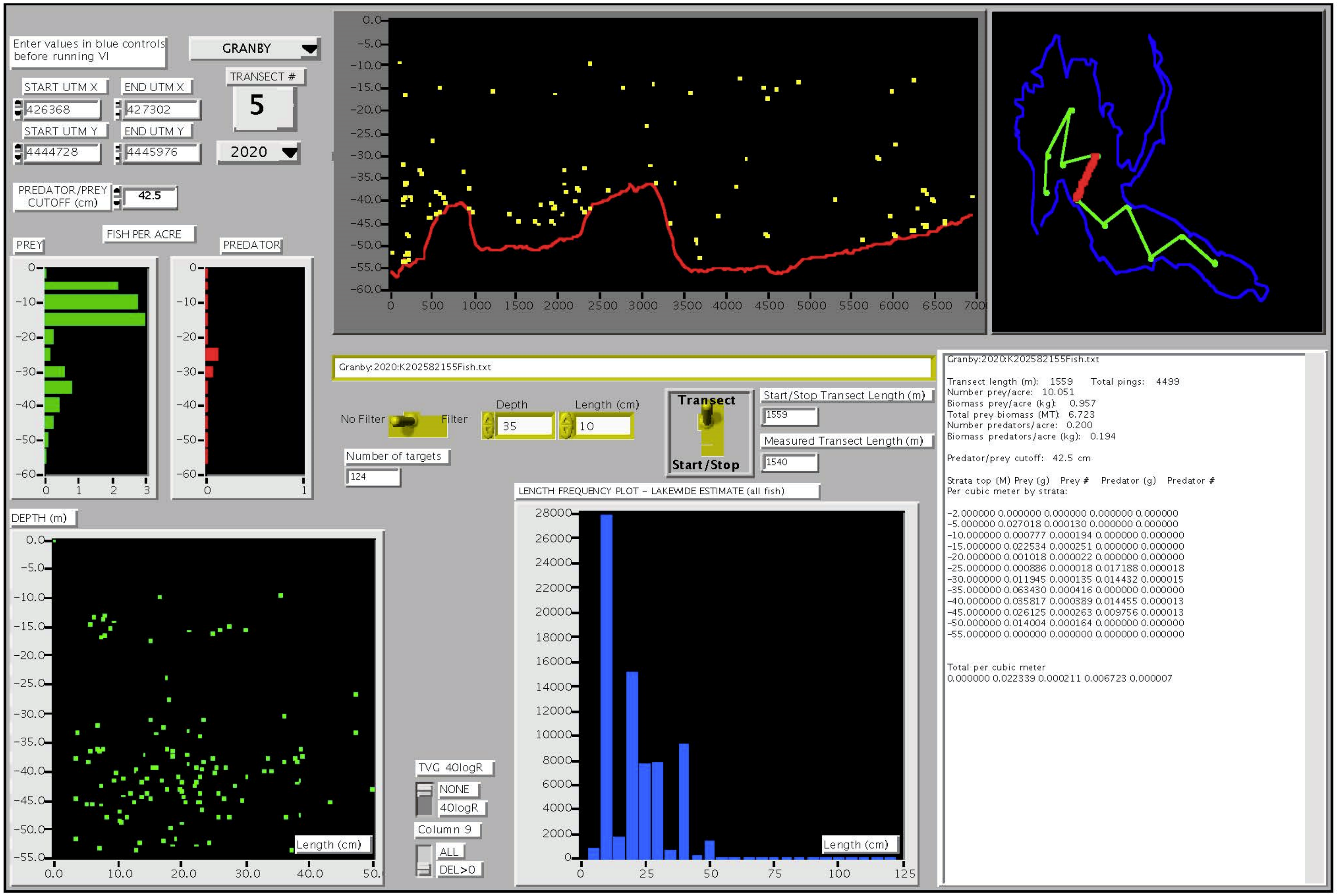
Transect length (m):   1627     Total pings:   4499
Number prey/acre:   8.856
Biomass prey/acre (kg):    0.537
Total prey biomass (MT):  3.768
Number predators/acre:   0.467
Biomass predators/acre (kg):   0.699

Predator/prey cutoff:   42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000497 0.000062 0.000000 0.000000
-10.000000 0.000894 0.000186 0.000000 0.000000
-15.000000 0.006520 0.000107 0.000000 0.000000
-20.000000 0.007787 0.000083 0.000000 0.000000
-25.000000 0.017098 0.000221 0.016537 0.000017
-30.000000 0.027054 0.000201 0.065100 0.000050
-35.000000 0.033538 0.000275 0.085899 0.000042
-40.000000 0.045445 0.000350 0.109005 0.000032
-45.000000 0.051800 0.000116 0.076197 0.000058
-50.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.020056 0.000182 0.038151 0.000022
```



Enter values in blue controls before running VI

GRANBY

START UTM X: 426368
END UTM X: 427302
START UTM Y: 4444728
END UTM Y: 4445976
TRANSECT #: 5
2020
PREDATOR/PREY CUTOFF (cm): 42.5

Granby:2020:K202582155Fish.txt

No Filter / Filter
Depth: 35
Length (cm): 10
Number of targets: 124
Start/Stop Transect Length (m): 1559
Measured Transect Length (m): 1540
TVG 40logR
Column 9

```
Granby:2020:K202582155Fish.txt

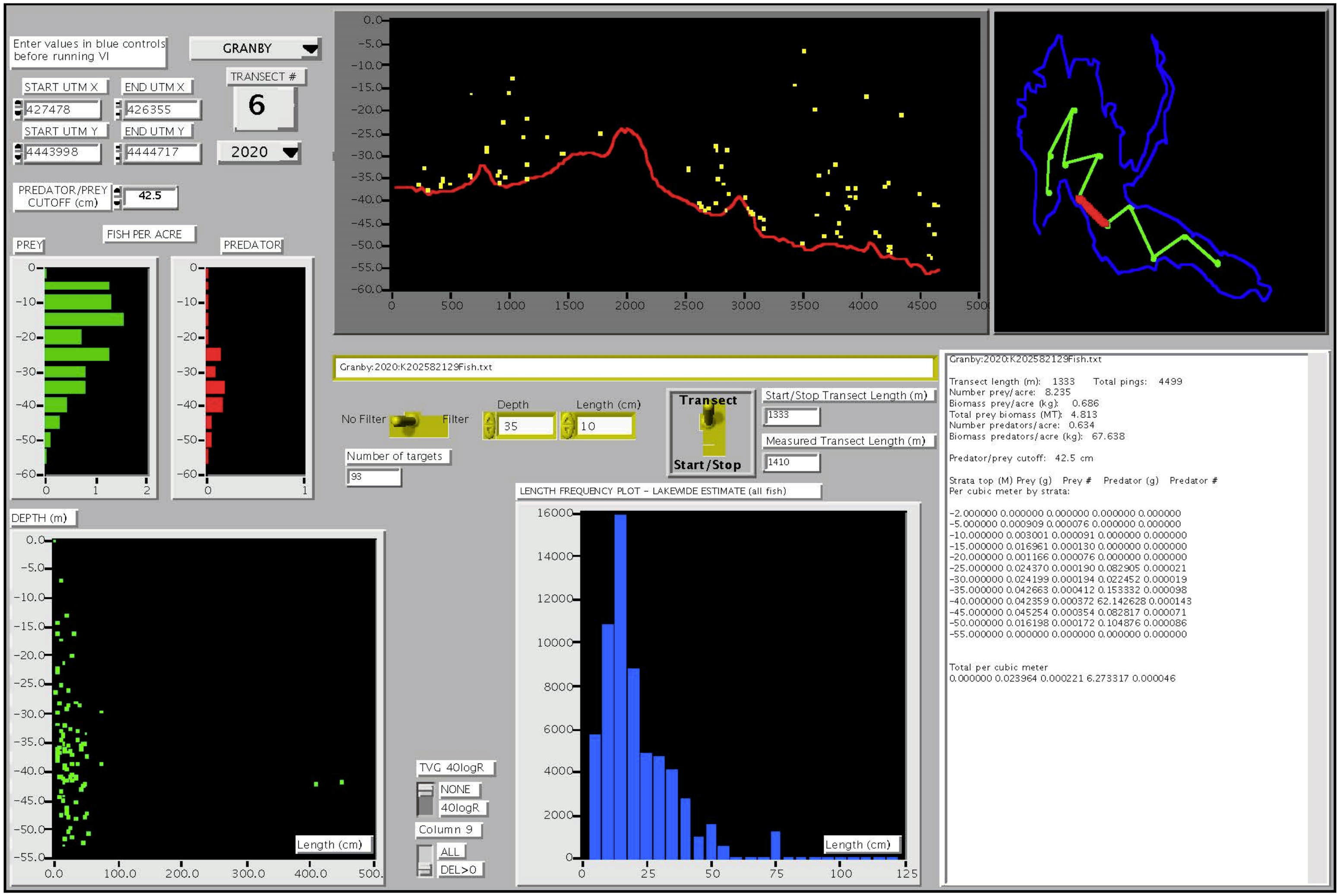
Transect length (m):   1559     Total pings:   4499
Number prey/acre:  10.051
Biomass prey/acre (kg):    0.957
Total prey biomass (MT):  6.723
Number predators/acre:  0.200
Biomass predators/acre (kg):  0.194

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.027018 0.000130 0.000000 0.000000
-10.000000 0.000777 0.000194 0.000000 0.000000
-15.000000 0.022534 0.000251 0.000000 0.000000
-20.000000 0.001018 0.000022 0.000000 0.000000
-25.000000 0.000886 0.000018 0.017188 0.000018
-30.000000 0.011945 0.000135 0.014432 0.000015
-35.000000 0.063430 0.000416 0.000000 0.000000
-40.000000 0.035817 0.000389 0.014455 0.000013
-45.000000 0.026125 0.000263 0.009756 0.000013
-50.000000 0.014004 0.000164 0.000000 0.000000
-55.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.022339 0.000211 0.006723 0.000007
```



Enter values in blue controls before running VI

GRANBY

TRANSECT # 6

START UTM X 427478

END UTM X 426355

START UTM Y 4443998

END UTM Y 4444717

2020

PREDATOR/PREY CUTOFF (cm) 42.5

Granby:2020:K202582129Fish.txt

Depth 35

Length (cm) 10

Number of targets 93

Start/Stop Transect Length (m) 1333

Measured Transect Length (m) 1410

```
Granby:2020:K202582129Fish.txt

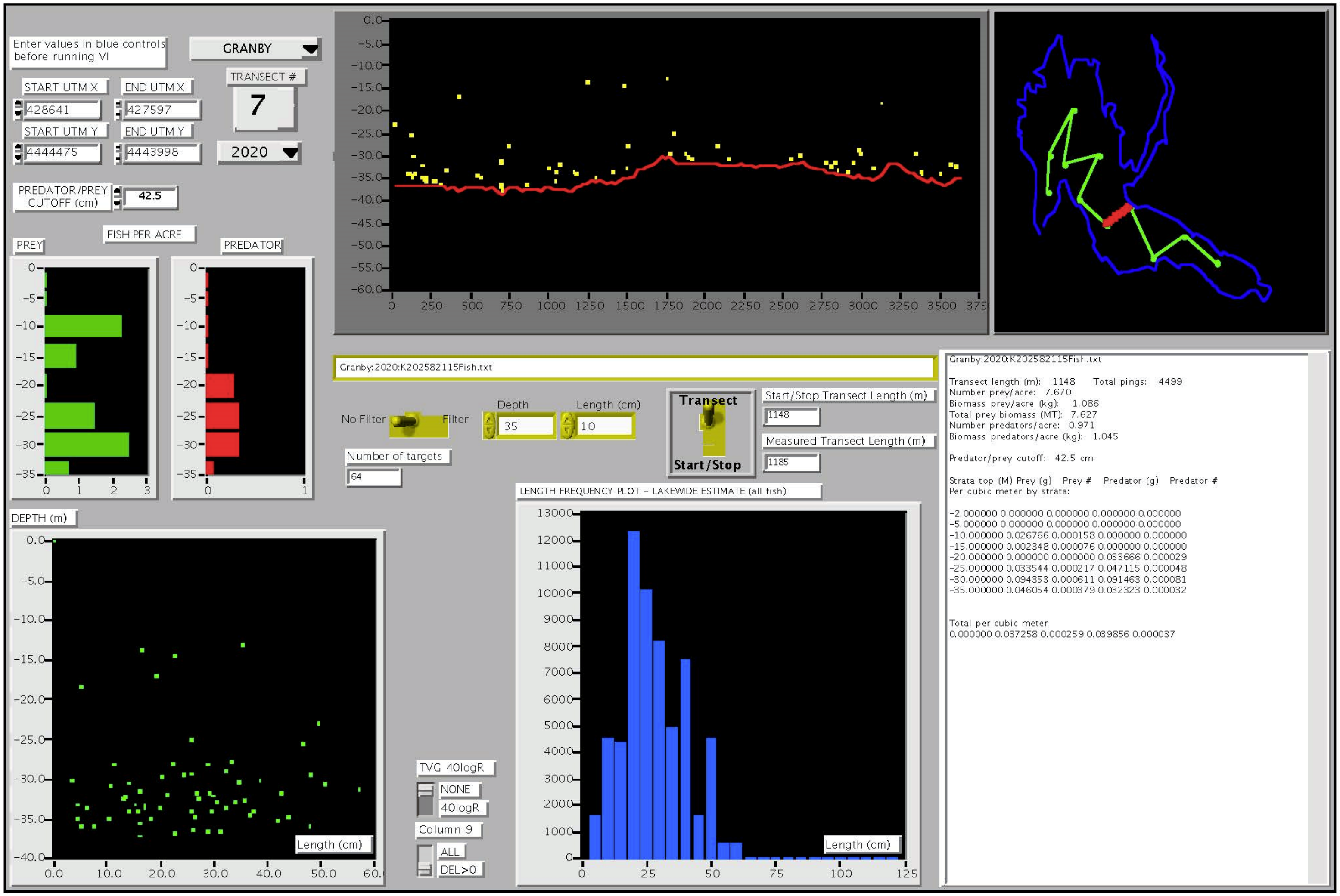
Transect length (m):   1333     Total pings:   4499
Number prey/acre:   8.235
Biomass prey/acre (kg):    0.686
Total prey biomass (MT):   4.813
Number predators/acre:   0.634
Biomass predators/acre (kg):   67.638

Predator/prey cutoff:   42.5  cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000909 0.000076 0.000000 0.000000
-10.000000 0.003001 0.000091 0.000000 0.000000
-15.000000 0.016961 0.000130 0.000000 0.000000
-20.000000 0.001166 0.000076 0.000000 0.000000
-25.000000 0.024370 0.000190 0.082905 0.000021
-30.000000 0.024199 0.000194 0.022452 0.000019
-35.000000 0.042663 0.000412 0.153332 0.000098
-40.000000 0.042359 0.000372 62.142628 0.000143
-45.000000 0.045254 0.000354 0.082817 0.000071
-50.000000 0.016198 0.000172 0.104876 0.000086
-55.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.023964 0.000221 6.273317 0.000046
```



Enter values in blue controls before running VI

GRANBY

TRANSECT #: 7

START UTM X: 428641

END UTM X: 427597

START UTM Y: 4444475

END UTM Y: 4443998

2020

PREDATOR/PREY CUTOFF (cm): 42.5

Granby:2020:K202582115Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 64

Start/Stop Transect Length (m): 1148

Measured Transect Length (m): 1185

```
Granby:2020:K202582115Fish.txt

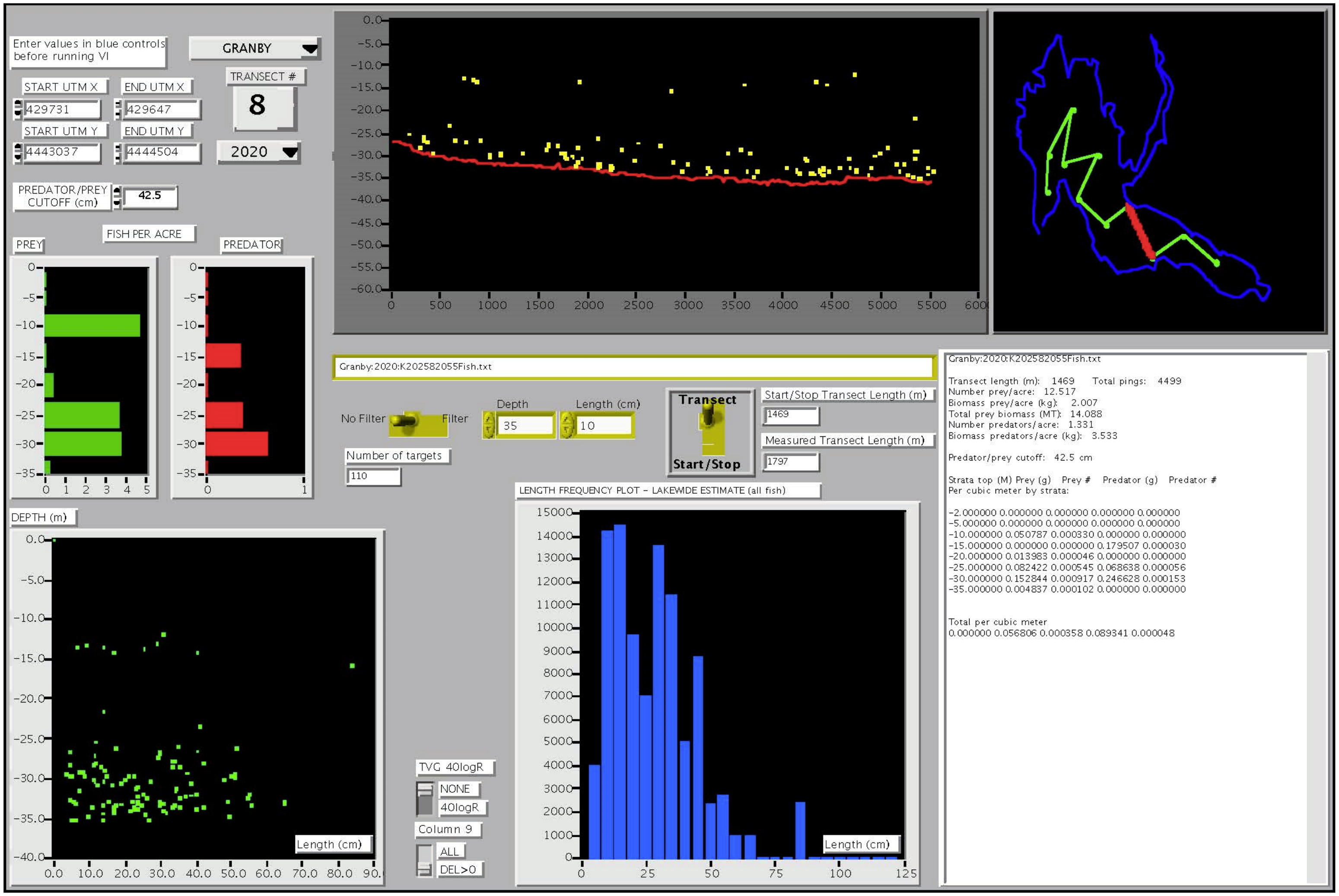
Transect length (m):   1148    Total pings:   4499
Number prey/acre:   7.670
Biomass prey/acre (kg):   1.086
Total prey biomass (MT):  7.627
Number predators/acre:  0.971
Biomass predators/acre (kg):  1.045

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.026766 0.000158 0.000000 0.000000
-15.000000 0.002348 0.000076 0.000000 0.000000
-20.000000 0.000000 0.000000 0.033666 0.000029
-25.000000 0.033544 0.000217 0.047115 0.000048
-30.000000 0.094353 0.000611 0.091463 0.000081
-35.000000 0.046054 0.000379 0.032323 0.000032


Total per cubic meter
0.000000 0.037258 0.000259 0.039856 0.000037
```



Enter values in blue controls before running VI

GRANBY

TRANSECT # 8

START UTM X 429731

END UTM X 429647

START UTM Y 4443037

END UTM Y 4444504

2020

PREDATOR/PREY CUTOFF (cm) 42.5

FISH PER ACRE

PREY

PREDATOR

Granby:2020:K202582055Fish.txt

No Filter Filter

Depth 35

Length (cm) 10

Number of targets 110

Transect Start/Stop

Start/Stop Transect Length (m) 1469

Measured Transect Length (m) 1797

LENGTH FREQUENCY PLOT – LAKEWIDE ESTIMATE (all fish)

TVG 40logR

NONE

40logR

Column 9

ALL

DEL>0

```
Granby:2020:K202582055Fish.txt

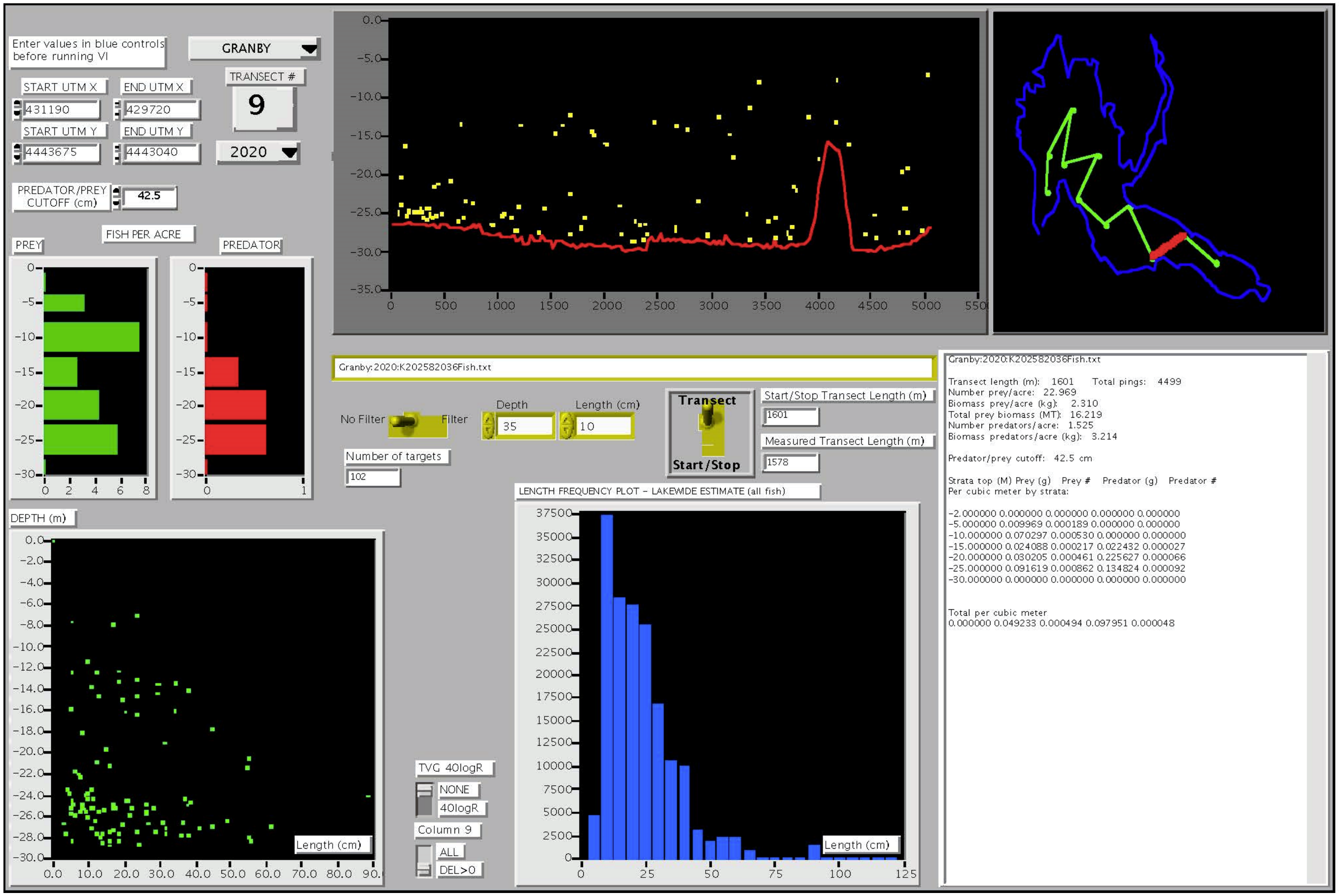
Transect length (m):   1469     Total pings:   4499
Number prey/acre:  12.517
Biomass prey/acre (kg):   2.007
Total prey biomass (MT):  14.088
Number predators/acre:  1.331
Biomass predators/acre (kg):  3.533

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.050787 0.000330 0.000000 0.000000
-15.000000 0.000000 0.000000 0.179507 0.000030
-20.000000 0.013983 0.000046 0.000000 0.000000
-25.000000 0.082422 0.000545 0.068638 0.000056
-30.000000 0.152844 0.000917 0.246628 0.000153
-35.000000 0.004837 0.000102 0.000000 0.000000


Total per cubic meter
0.000000 0.056806 0.000358 0.089341 0.000048
```



Enter values in blue controls before running VI

GRANBY

START UTM X: 431190

END UTM X: 429720

START UTM Y: 4443675

END UTM Y: 4443040

TRANSECT #: 9

2020

PREDATOR/PREY CUTOFF (cm): 42.5

Granby:2020:K202582036Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 102

Start/Stop Transect Length (m): 1601

Measured Transect Length (m): 1578

Column 9

```
Granby:2020:K202582036Fish.txt

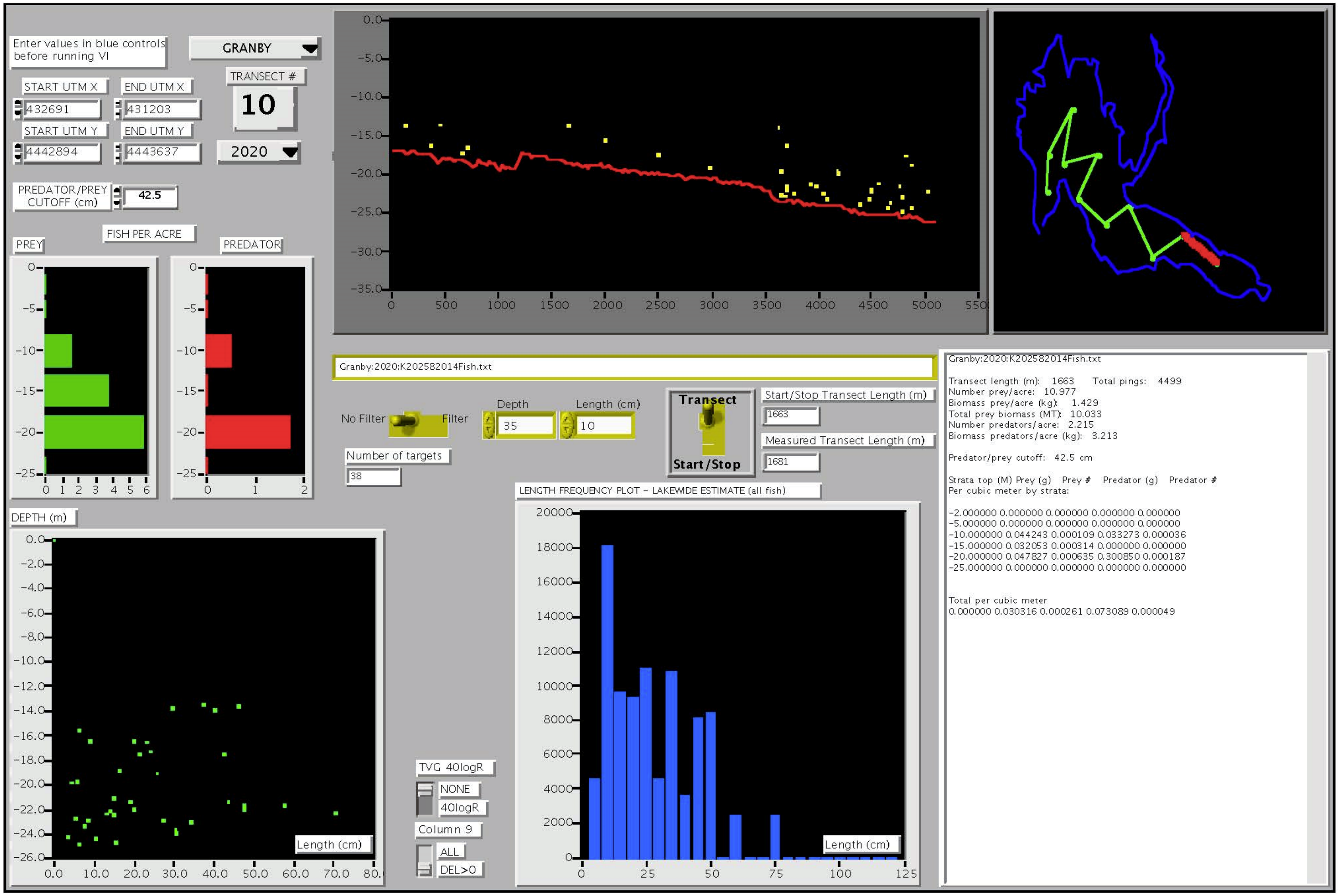
Transect length (m):   1601     Total pings:   4499
Number prey/acre:  22.969
Biomass prey/acre (kg):   2.310
Total prey biomass (MT):  16.219
Number predators/acre:  1.525
Biomass predators/acre (kg):  3.214

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.009969 0.000189 0.000000 0.000000
-10.000000 0.070297 0.000530 0.000000 0.000000
-15.000000 0.024088 0.000217 0.022432 0.000027
-20.000000 0.030205 0.000461 0.225627 0.000066
-25.000000 0.091619 0.000862 0.134824 0.000092
-30.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.049233 0.000494 0.097951 0.000048
```



Enter values in blue controls before running VI

GRANBY

TRANSECT # 10

START UTM X 432691

END UTM X 431203

START UTM Y 4442894

END UTM Y 4443637

2020

PREDATOR/PREY CUTOFF (cm) 42.5

Granby:2020:K202582014Fish.txt

Depth 35

Length (cm) 10

Number of targets 38

Start/Stop Transect Length (m) 1663

Measured Transect Length (m) 1681

TVG 40logR

Column 9

```
Granby:2020:K202582014Fish.txt

Transect length (m):   1663     Total pings:   4499
Number prey/acre:  10.977
Biomass prey/acre (kg):   1.429
Total prey biomass (MT):  10.033
Number predators/acre:  2.215
Biomass predators/acre (kg):  3.213

Predator/prey cutoff:  42.5 cm

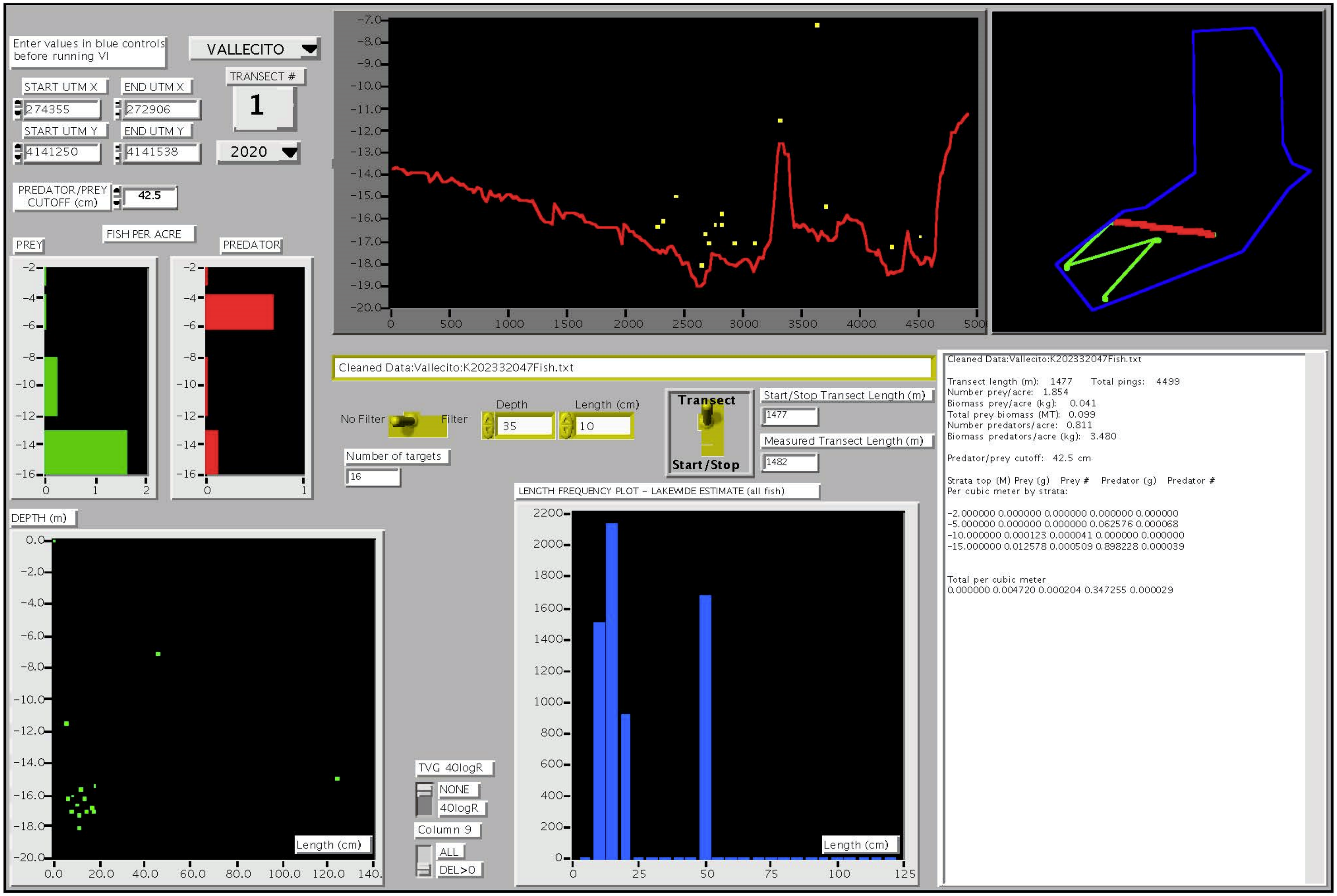
Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.044243 0.000109 0.033273 0.000036
-15.000000 0.032053 0.000314 0.000000 0.000000
-20.000000 0.047827 0.000635 0.300850 0.000187
-25.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.030316 0.000261 0.073089 0.000049
```

Appendix D

Individual transect output files from the HydroAcoustic Kit (InterpretFish_2020.vi) for Vallecito Reservoir surveyed on August 20, 2020.



VALLECITO

TRANSECT # 1

2020

START UTM X 274355

END UTM X 272906

START UTM Y 4141250

END UTM Y 4141538

PREDATOR/PREY CUTOFF (cm) 42.5

Cleaned Data:Vallecito:K202332047Fish.txt

Depth 35

Length (cm) 10

Number of targets 16

Start/Stop Transect Length (m) 1477

Measured Transect Length (m) 1482

```
Cleaned Data:Vallecito:K202332047Fish.txt

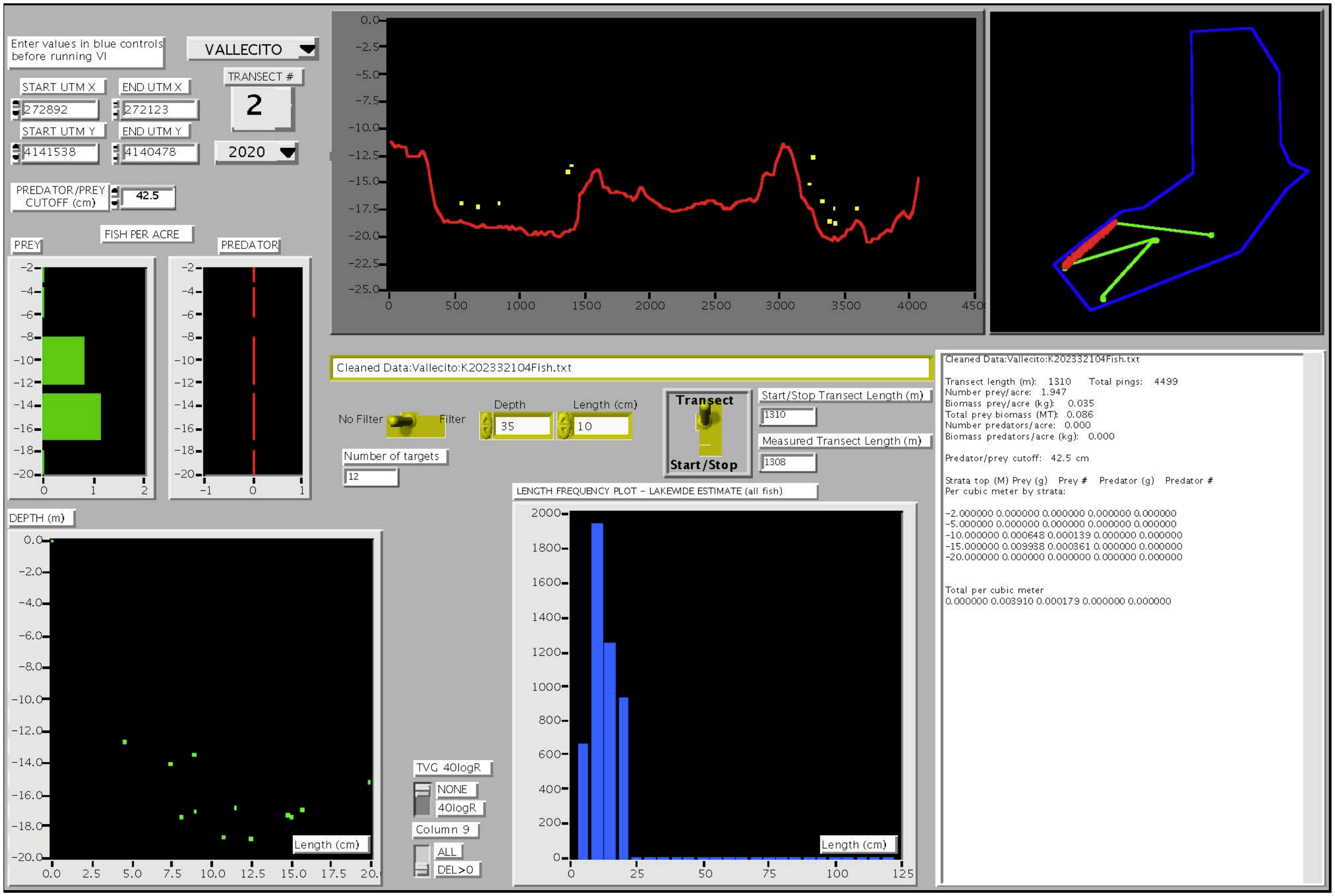
Transect length (m):   1477     Total pings:   4499
Number prey/acre:  1.854
Biomass prey/acre (kg):   0.041
Total prey biomass (MT):  0.099
Number predators/acre:  0.811
Biomass predators/acre (kg):  3.480

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.062576 0.000068
-10.000000 0.000123 0.000041 0.000000 0.000000
-15.000000 0.012578 0.000509 0.898228 0.000039


Total per cubic meter
0.000000 0.004720 0.000204 0.347255 0.000029
```



Enter values in blue controls before running VI

VALLECITO

START UTM X: 272892

END UTM X: 272123

START UTM Y: 4141538

END UTM Y: 4140478

TRANSECT #: 2

2020

PREDATOR/PREY CUTOFF (cm): 42.5

Cleaned Data:Vallecito:K202332104Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 12

Start/Stop Transect Length (m): 1310

Measured Transect Length (m): 1308

TVG 40logR

Column 9

```
Cleaned Data:Vallecito:K202332104Fish.txt

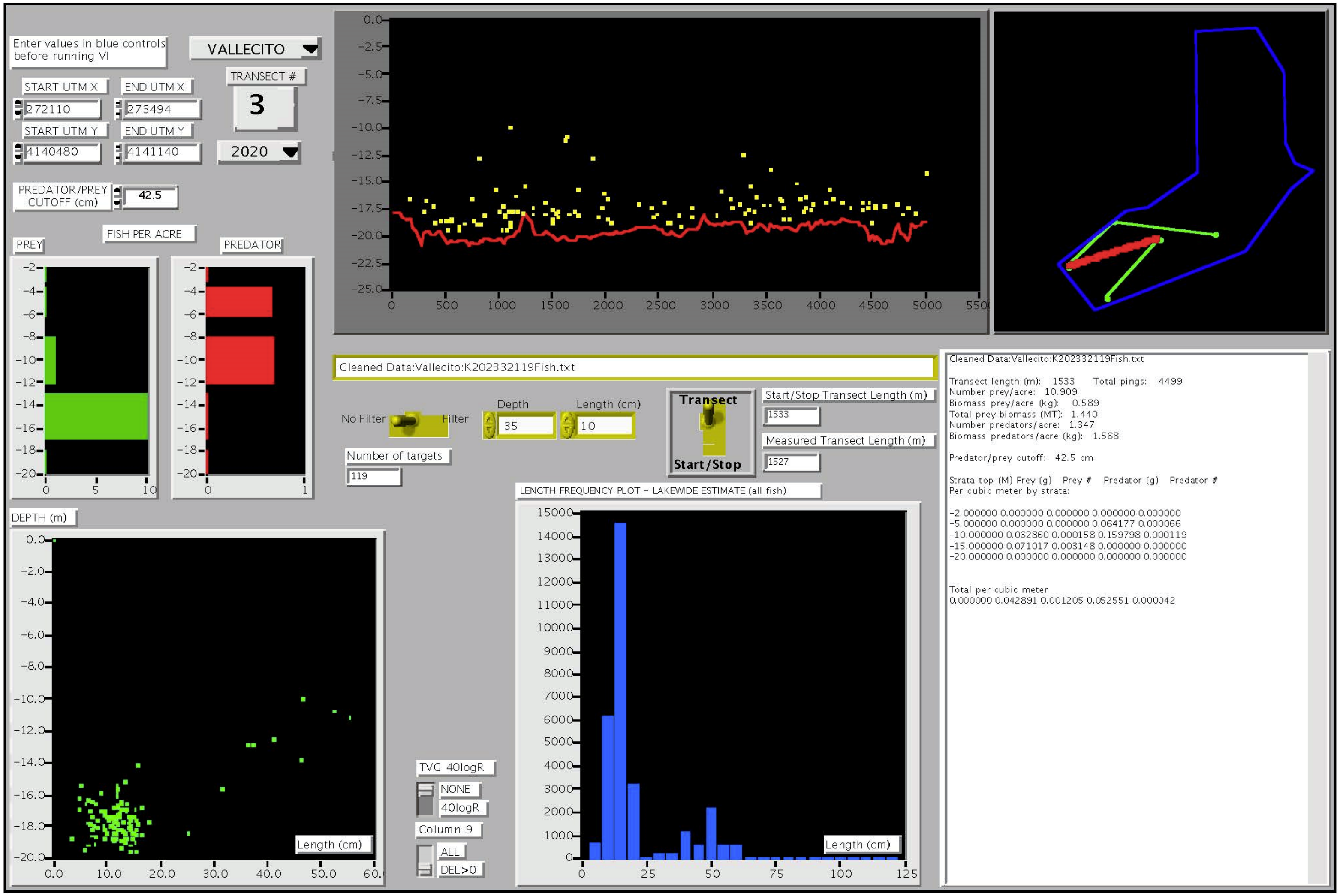
Transect length (m):   1310     Total pings:   4499
Number prey/acre:   1.947
Biomass prey/acre (kg):    0.035
Total prey biomass (MT):  0.086
Number predators/acre:   0.000
Biomass predators/acre (kg):   0.000

Predator/prey cutoff:   42.5  cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.000648 0.000139 0.000000 0.000000
-15.000000 0.009938 0.000361 0.000000 0.000000
-20.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.003910 0.000179 0.000000 0.000000
```



VALLECITO

START UTM X: 272110

END UTM X: 273494

START UTM Y: 4140480

END UTM Y: 4141140

TRANSECT #: 3

2020

PREDATOR/PREY CUTOFF (cm): 42.5

Cleaned Data:Vallecito:K202332119Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 119

Start/Stop Transect Length (m): 1533

Measured Transect Length (m): 1527

```
Cleaned Data:Vallecito:K202332119Fish.txt

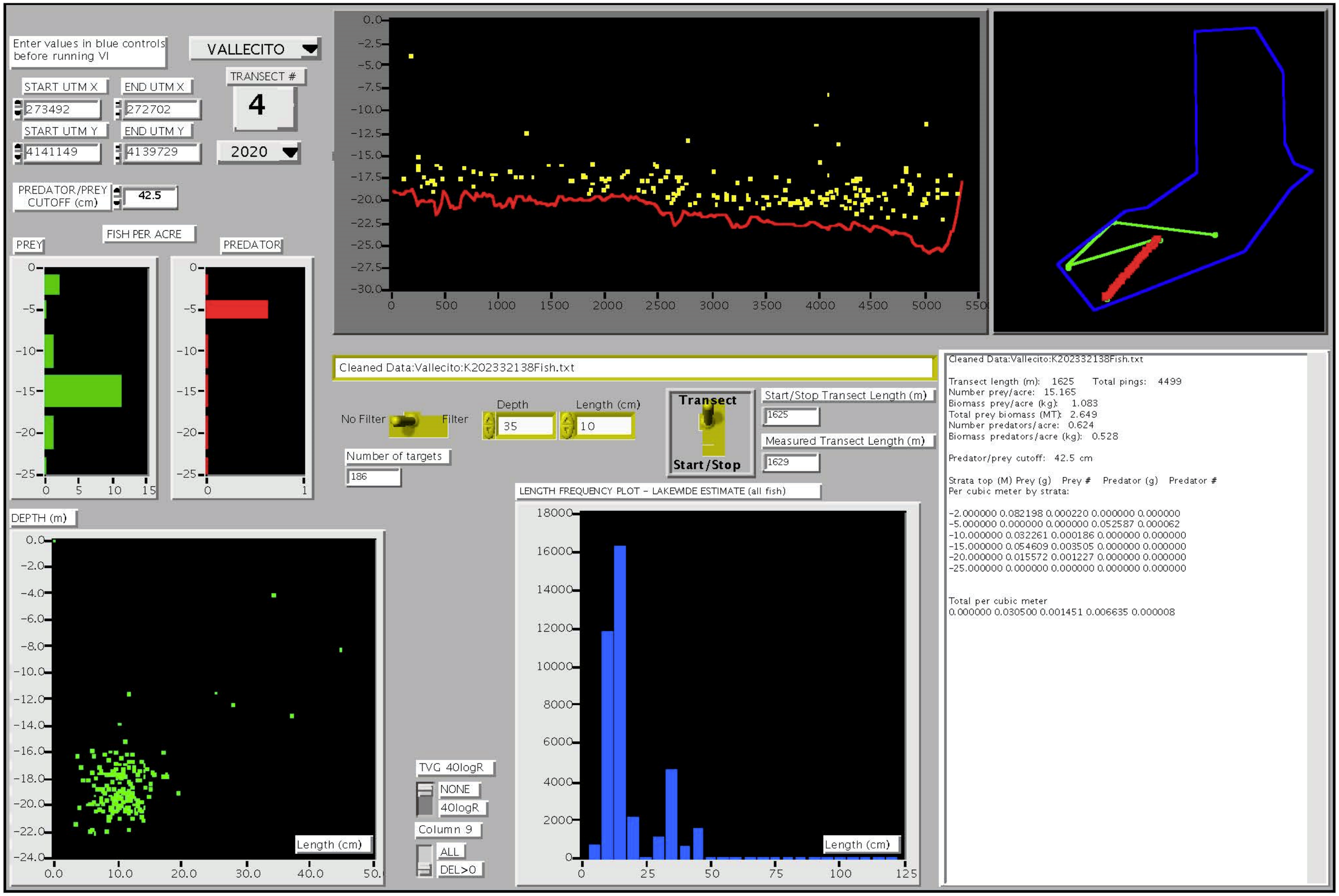
Transect length (m):   1533     Total pings:   4499
Number prey/acre:  10.909
Biomass prey/acre (kg):   0.589
Total prey biomass (MT):  1.440
Number predators/acre:  1.347
Biomass predators/acre (kg):  1.568

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.064177 0.000066
-10.000000 0.062860 0.000158 0.159798 0.000119
-15.000000 0.071017 0.003148 0.000000 0.000000
-20.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.042891 0.001205 0.052551 0.000042
```



Enter values in blue controls before running VI

VALLECITO

START UTM X: 273492
END UTM X: 272702
START UTM Y: 4141149
END UTM Y: 4139729
TRANSECT #: 4
2020
PREDATOR/PREY CUTOFF (cm): 42.5

Cleaned Data:Vallecito:K202332138Fish.txt

No Filter / Filter
Depth: 35
Length (cm): 10
Number of targets: 186
Start/Stop Transect Length (m): 1625
Measured Transect Length (m): 1629

TVG 40logR: NONE / 40logR
Column 9: ALL / DEL>0

```
Cleaned Data:Vallecito:K202332138Fish.txt

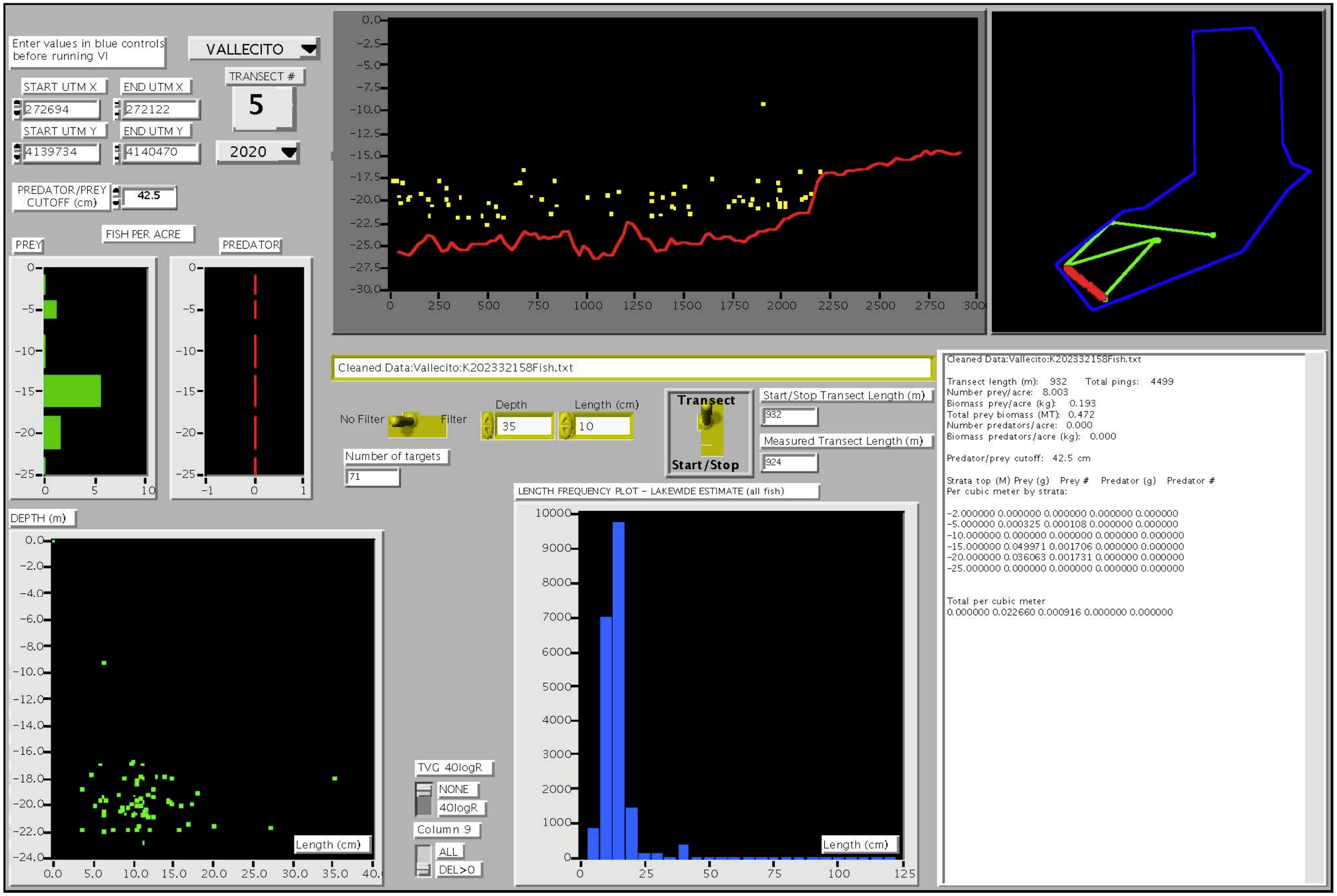
Transect length (m):   1625     Total pings:   4499
Number prey/acre:  15.165
Biomass prey/acre (kg):   1.083
Total prey biomass (MT):  2.649
Number predators/acre:  0.624
Biomass predators/acre (kg):  0.528

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.082198 0.000220 0.000000 0.000000
-5.000000 0.000000 0.000000 0.052587 0.000062
-10.000000 0.032261 0.000186 0.000000 0.000000
-15.000000 0.054609 0.003505 0.000000 0.000000
-20.000000 0.015572 0.001227 0.000000 0.000000
-25.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.030500 0.001451 0.006635 0.000008
```



VALLECITO

START UTM X: 272694

END UTM X: 272122

START UTM Y: 4139734

END UTM Y: 4140470

TRANSECT #: 5

2020

PREDATOR/PREY CUTOFF (cm): 42.5

Cleaned Data:Vallecito:K202332158Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 71

Start/Stop Transect Length (m): 932

Measured Transect Length (m): 924

TVG 40logR

Column 9

```
Cleaned Data:Vallecito:K202332158Fish.txt

Transect length (m):   932     Total pings:   4499
Number prey/acre:  8.003
Biomass prey/acre (kg):    0.193
Total prey biomass (MT):  0.472
Number predators/acre:  0.000
Biomass predators/acre (kg):  0.000

Predator/prey cutoff:  42.5 cm

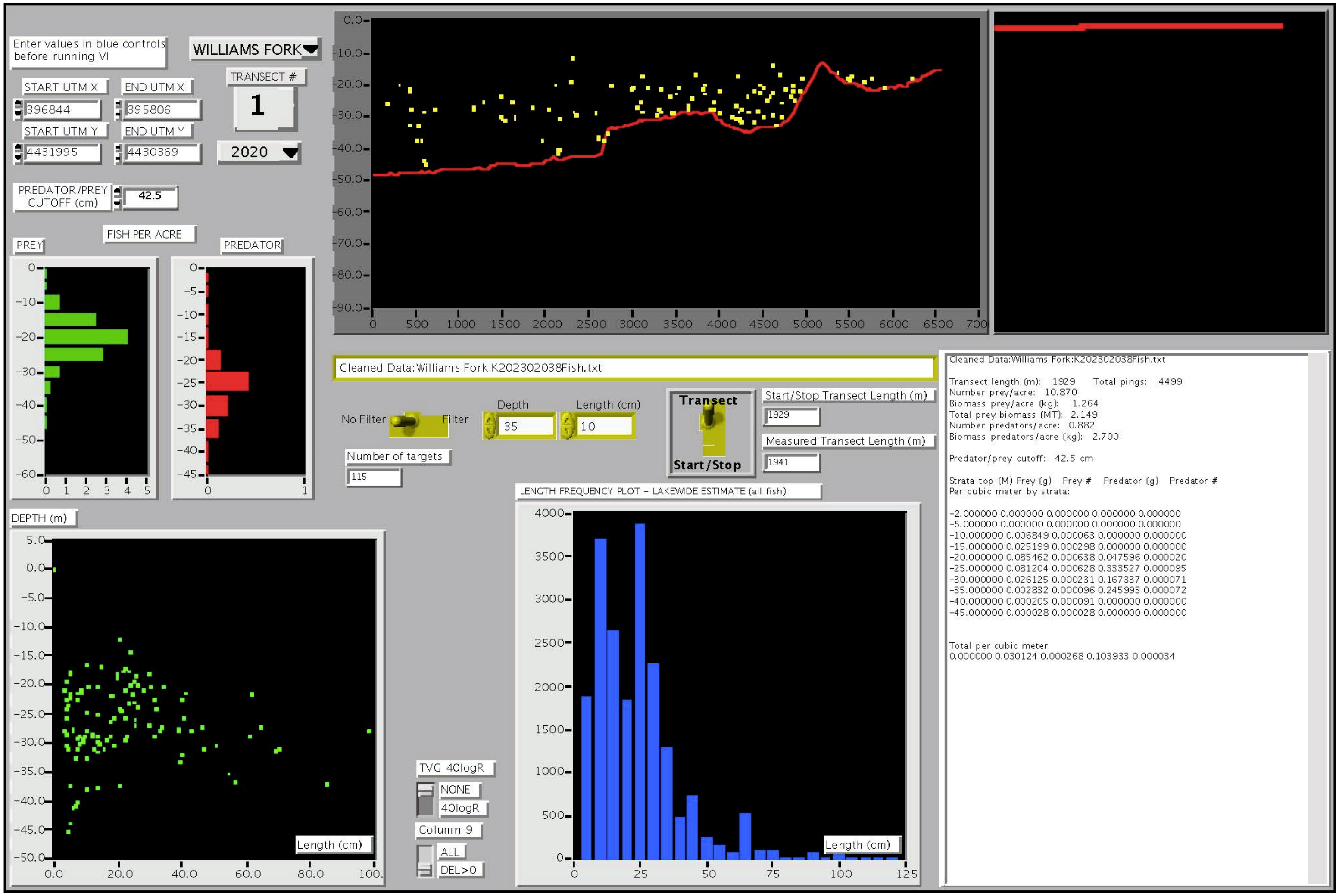
Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000325 0.000108 0.000000 0.000000
-10.000000 0.000000 0.000000 0.000000 0.000000
-15.000000 0.049971 0.001706 0.000000 0.000000
-20.000000 0.036063 0.001731 0.000000 0.000000
-25.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.022660 0.000916 0.000000 0.000000
```

Appendix E

Individual transect output files from the HydroAcoustic Kit (InterpretFish_2020.vi) for Williams Fork Reservoir surveyed on August 17, 2020.



Enter values in blue controls before running VI

WILLIAMS FORK

TRANSECT # 1

START UTM X 396844

END UTM X 395806

START UTM Y 4431995

END UTM Y 4430369

2020

PREDATOR/PREY CUTOFF (cm) 42.5

Cleaned Data:Williams Fork:K202302038Fish.txt

Depth 35

Length (cm) 10

Start/Stop Transect Length (m) 1929

Measured Transect Length (m) 1941

Number of targets 115

TVG 40logR

Column 9

```
Cleaned Data:Williams Fork:K202302038Fish.txt

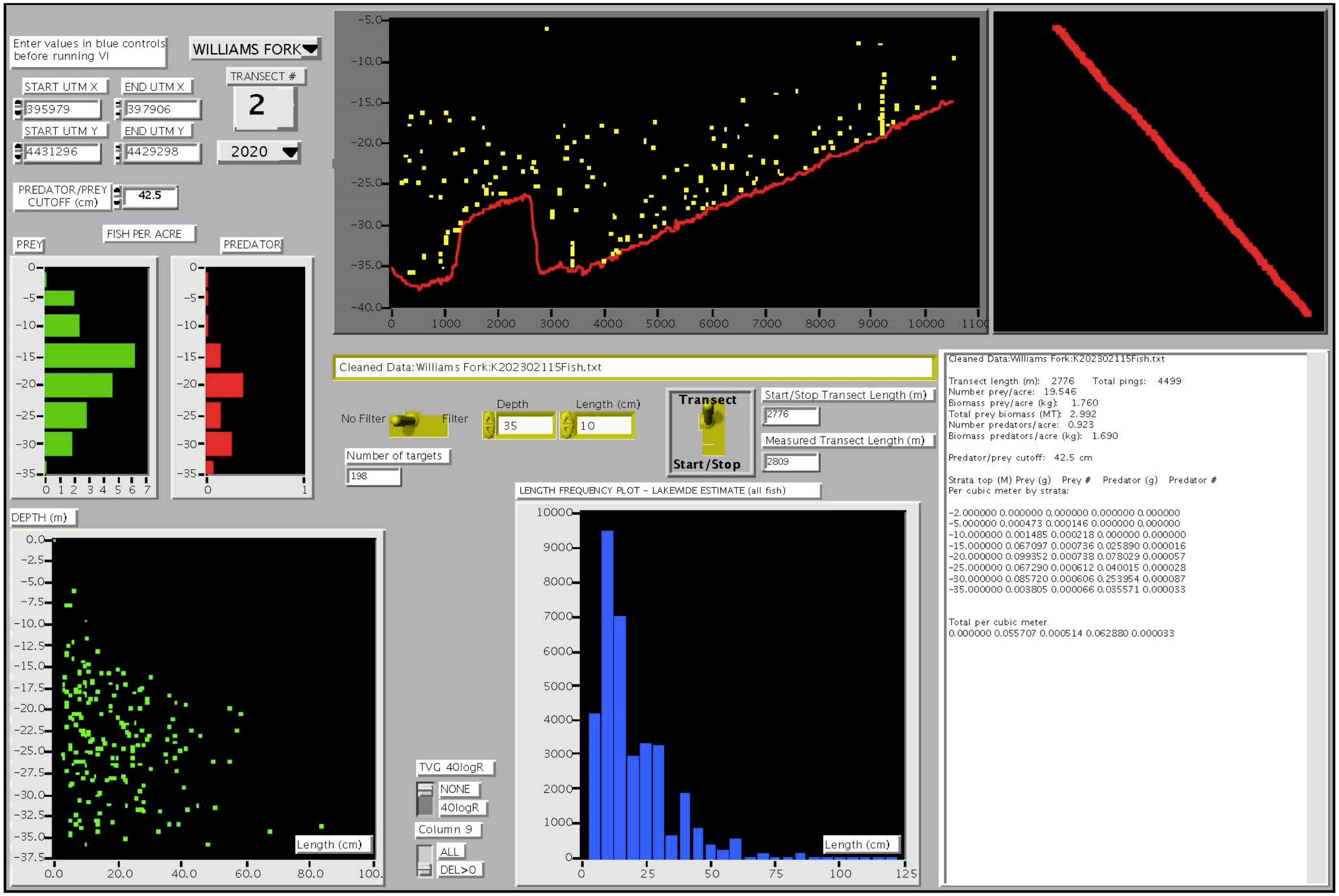
Transect length (m):   1929     Total pings:   4499
Number prey/acre:  10.870
Biomass prey/acre (kg):   1.264
Total prey biomass (MT):  2.149
Number predators/acre:  0.882
Biomass predators/acre (kg):  2.700

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000000 0.000000 0.000000 0.000000
-10.000000 0.006849 0.000063 0.000000 0.000000
-15.000000 0.025199 0.000298 0.000000 0.000000
-20.000000 0.085462 0.000638 0.047596 0.000020
-25.000000 0.081204 0.000628 0.333527 0.000095
-30.000000 0.026125 0.000231 0.167337 0.000071
-35.000000 0.002832 0.000096 0.245993 0.000072
-40.000000 0.000205 0.000091 0.000000 0.000000
-45.000000 0.000028 0.000028 0.000000 0.000000


Total per cubic meter
0.000000 0.030124 0.000268 0.103933 0.000034
```



Enter values in blue controls before running VI

WILLIAMS FORK

TRANSECT # 2

START UTM X 395979

END UTM X 397906

START UTM Y 4431296

END UTM Y 4429298

2020

PREDATOR/PREY CUTOFF (cm) 42.5

Cleaned Data:Williams Fork:K202302115Fish.txt

Depth 35

Length (cm) 10

Number of targets 198

Start/Stop Transect Length (m) 2776

Measured Transect Length (m) 2809

TVG 40logR: NONE / 40logR

Column 9: ALL / DEL>0

```
Cleaned Data:Williams Fork:K202302115Fish.txt

Transect length (m):   2776     Total pings:   4499
Number prey/acre:  19.546
Biomass prey/acre (kg):    1.760
Total prey biomass (MT):  2.992
Number predators/acre:  0.923
Biomass predators/acre (kg):  1.690

Predator/prey cutoff:  42.5 cm

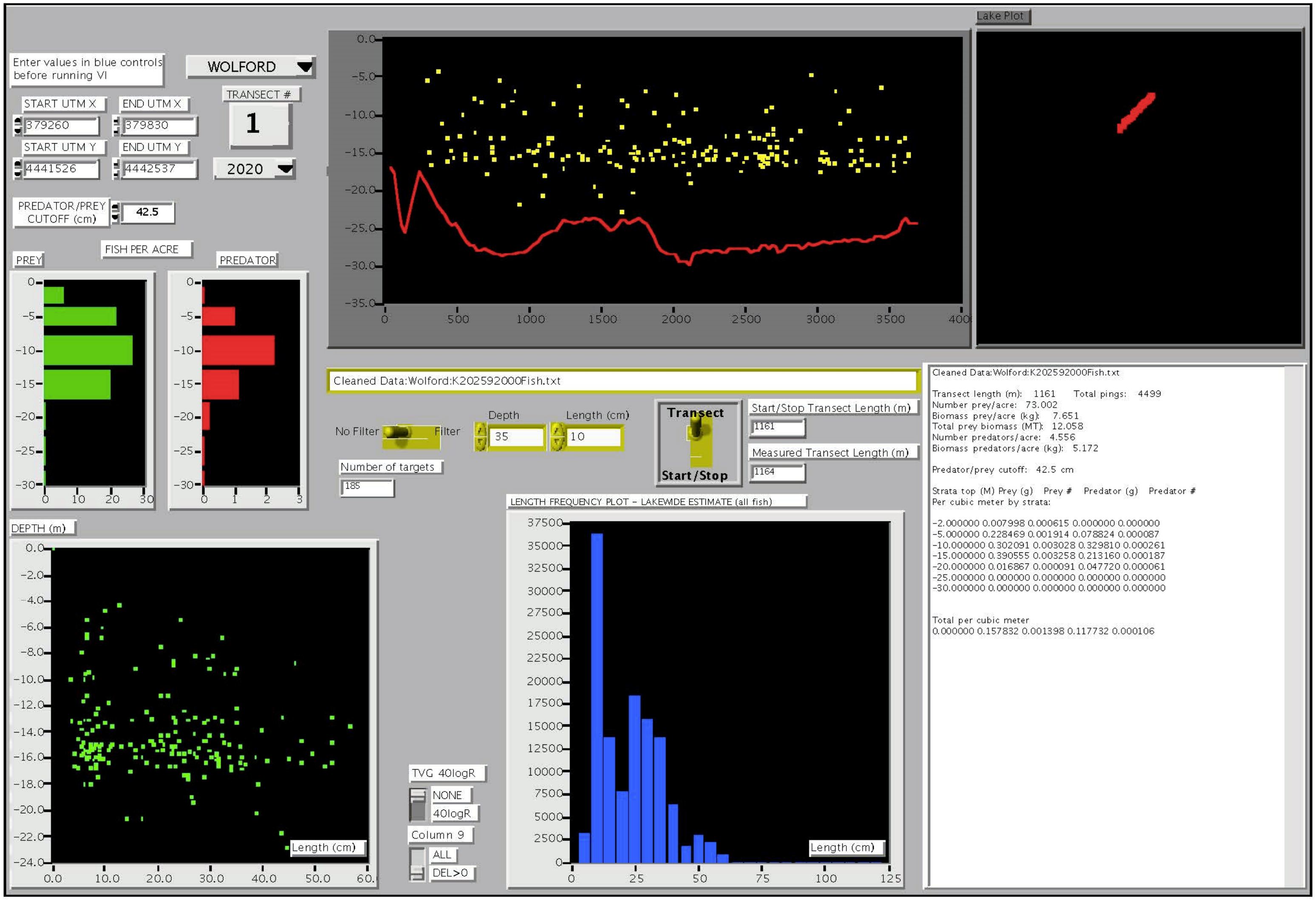
Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.000473 0.000146 0.000000 0.000000
-10.000000 0.001485 0.000218 0.000000 0.000000
-15.000000 0.067097 0.000736 0.025890 0.000016
-20.000000 0.099352 0.000738 0.078029 0.000057
-25.000000 0.067290 0.000612 0.040015 0.000028
-30.000000 0.085720 0.000606 0.253954 0.000087
-35.000000 0.003805 0.000066 0.035571 0.000033


Total per cubic meter
0.000000 0.055707 0.000514 0.062880 0.000033
```

Appendix F

Individual transect output files from the HydroAcoustic Kit (InterpretFish_2020.vi) for Wolford Mountain Reservoir surveyed on September 15, 2020.



Enter values in blue controls before running VI

WOLFORD

TRANSECT #: 1

2020

START UTM X: 379260

END UTM X: 379830

START UTM Y: 4441526

END UTM Y: 4442537

PREDATOR/PREY CUTOFF (cm): 42.5

Cleaned Data:Wolford:K202592000Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 185

Start/Stop Transect Length (m): 1161

Measured Transect Length (m): 1164

```
Cleaned Data:Wolford:K202592000Fish.txt

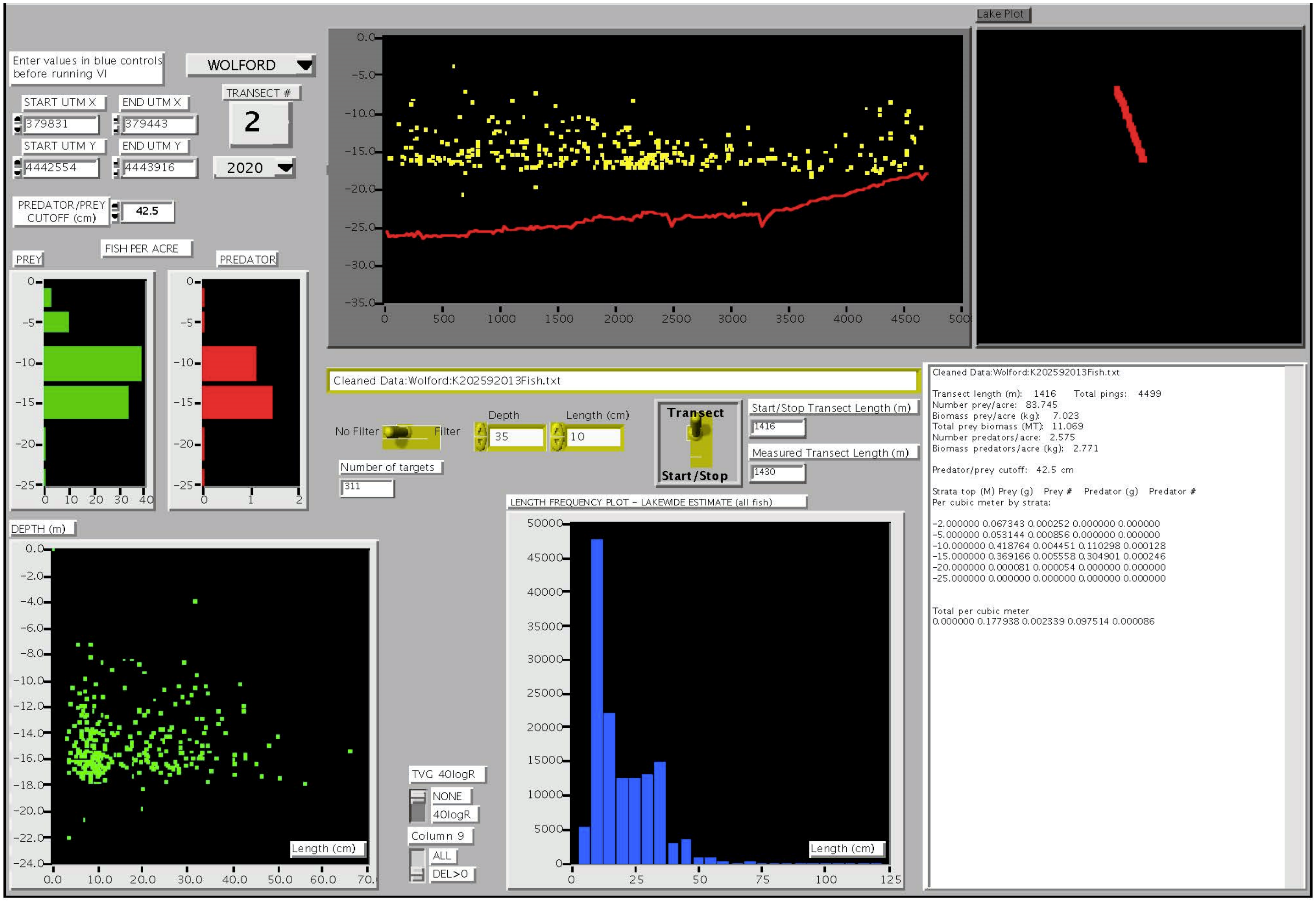
Transect length (m):   1161     Total pings:   4499
Number prey/acre:  73.002
Biomass prey/acre (kg):   7.651
Total prey biomass (MT):  12.058
Number predators/acre:  4.556
Biomass predators/acre (kg):  5.172

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.007998 0.000615 0.000000 0.000000
-5.000000 0.228469 0.001914 0.078824 0.000087
-10.000000 0.302091 0.003028 0.329810 0.000261
-15.000000 0.390555 0.003258 0.213160 0.000187
-20.000000 0.016867 0.000091 0.047720 0.000061
-25.000000 0.000000 0.000000 0.000000 0.000000
-30.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.157832 0.001398 0.117732 0.000106
```



WOLFORD

START UTM X: 379831

END UTM X: 379443

START UTM Y: 4442554

END UTM Y: 4443916

TRANSECT #: 2

2020

PREDATOR/PREY CUTOFF (cm): 42.5

Cleaned Data:Wolford:K202592013Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 311

Start/Stop Transect Length (m): 1416

Measured Transect Length (m): 1430

```
Cleaned Data:Wolford:K202592013Fish.txt

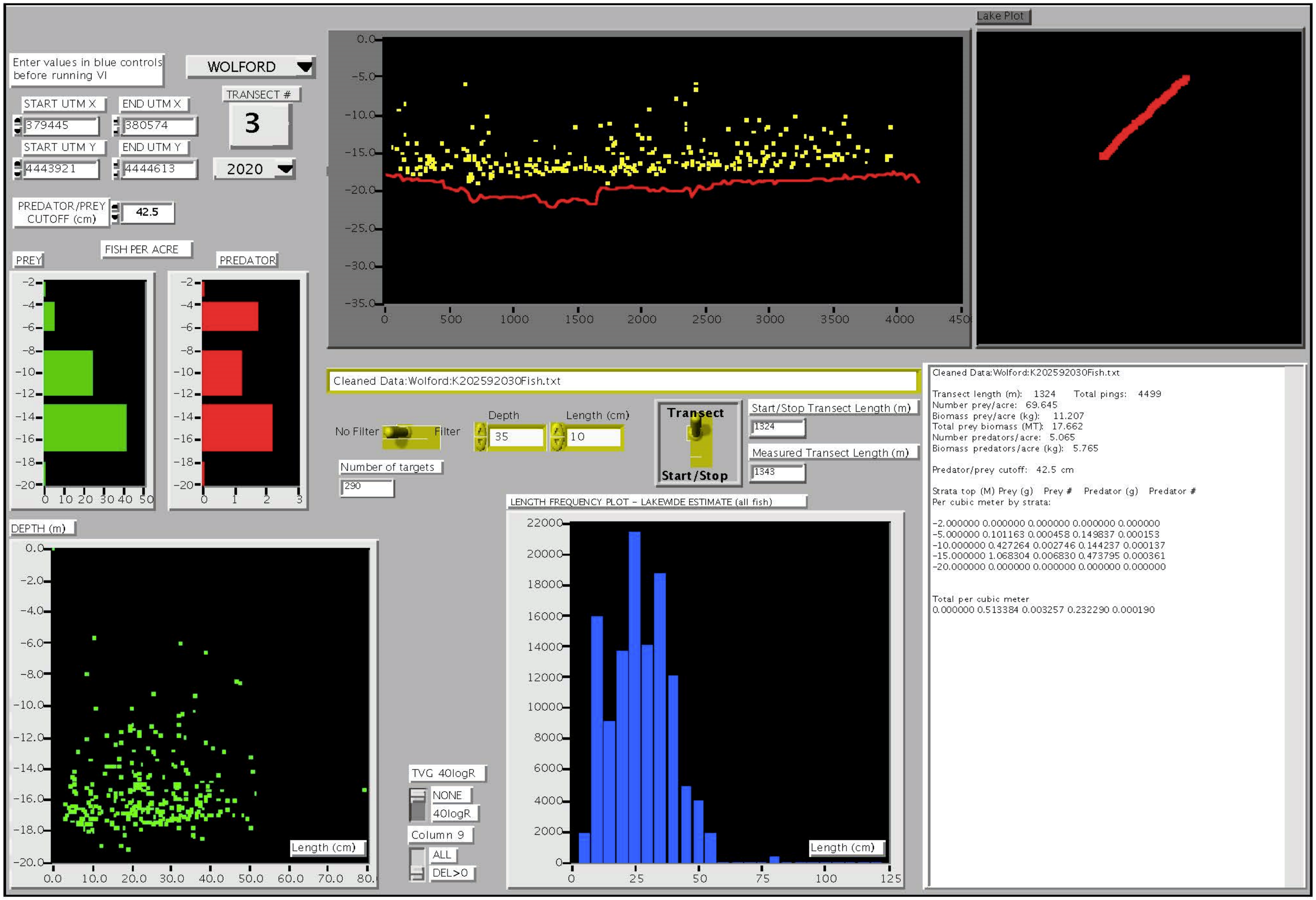
Transect length (m):   1416     Total pings:   4499
Number prey/acre:  83.745
Biomass prey/acre (kg):   7.023
Total prey biomass (MT):  11.069
Number predators/acre:  2.575
Biomass predators/acre (kg):  2.771

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.067343 0.000252 0.000000 0.000000
-5.000000 0.053144 0.000856 0.000000 0.000000
-10.000000 0.418764 0.004451 0.110298 0.000128
-15.000000 0.369166 0.005558 0.304901 0.000246
-20.000000 0.000081 0.000054 0.000000 0.000000
-25.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.177938 0.002339 0.097514 0.000086
```



WOLFORD

TRANSECT # 3

START UTM X 379445

END UTM X 380574

START UTM Y 4443921

END UTM Y 4444613

2020

PREDATOR/PREY CUTOFF (cm) 42.5

Cleaned Data:Wolford:K202592030Fish.txt

Depth 35

Length (cm) 10

Number of targets 290

Start/Stop Transect Length (m) 1324

Measured Transect Length (m) 1343

TVG 40logR: NONE / 40logR

Column 9: ALL / DEL>0

```
Cleaned Data:Wolford:K202592030Fish.txt

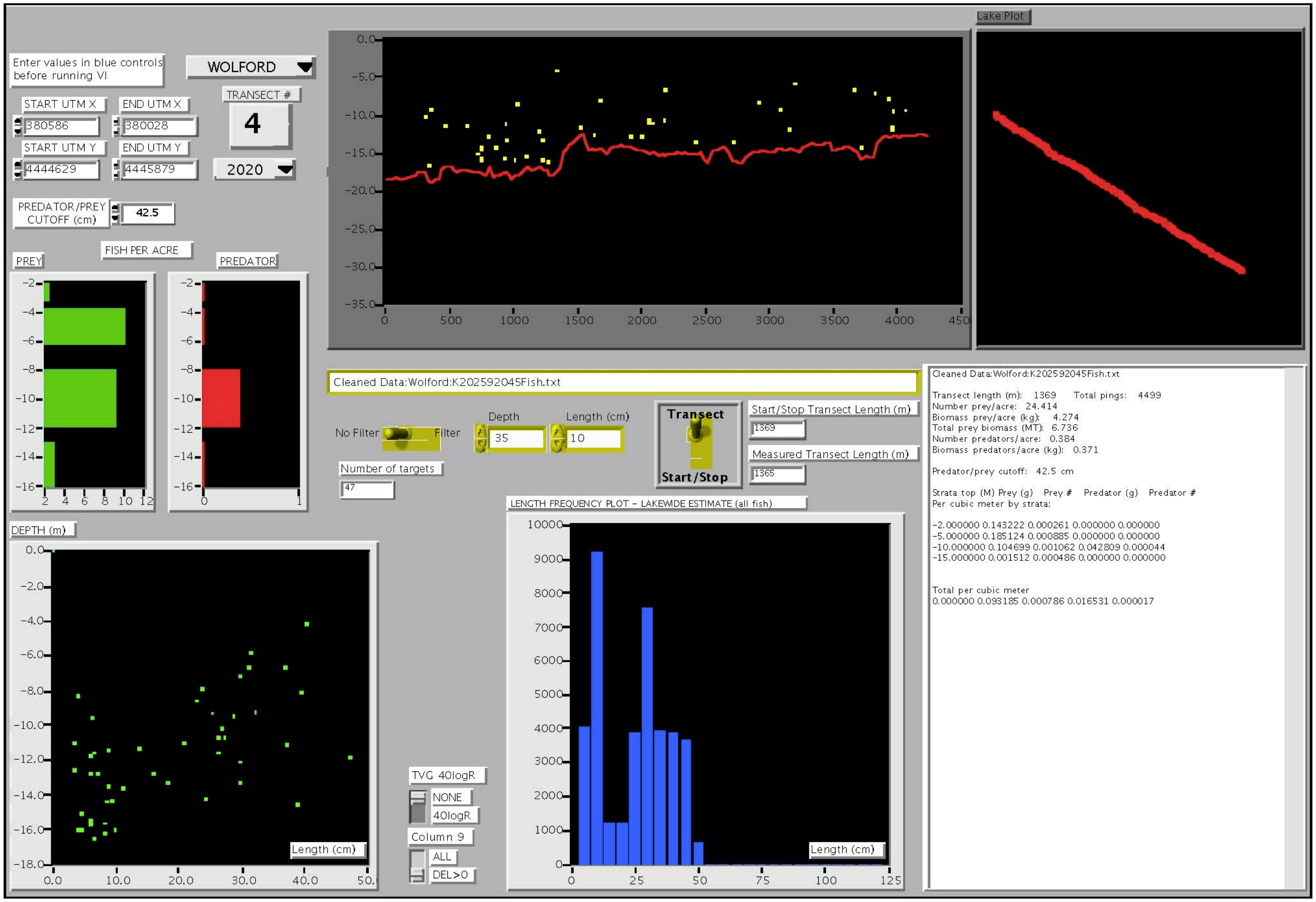
Transect length (m):   1324      Total pings:   4499
Number prey/acre:   69.645
Biomass prey/acre (kg):    11.207
Total prey biomass (MT):   17.662
Number predators/acre:   5.065
Biomass predators/acre (kg):   5.765

Predator/prey cutoff:   42.5  cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.101163 0.000458 0.149837 0.000153
-10.000000 0.427264 0.002746 0.144237 0.000137
-15.000000 1.068304 0.006830 0.473795 0.000361
-20.000000 0.000000 0.000000 0.000000 0.000000


Total per cubic meter
0.000000 0.513384 0.003257 0.232290 0.000190
```



WOLFORD

START UTM X: 380586

END UTM X: 380028

START UTM Y: 4444629

END UTM Y: 4445879

TRANSECT #: 4

2020

PREDATOR/PREY CUTOFF (cm): 42.5

Cleaned Data:Wolford:K202592045Fish.txt

Depth: 35

Length (cm): 10

Start/Stop Transect Length (m): 1369

Measured Transect Length (m): 1365

Number of targets: 47

TVG 40logR

Column 9

```
Cleaned Data:Wolford:K202592045Fish.txt

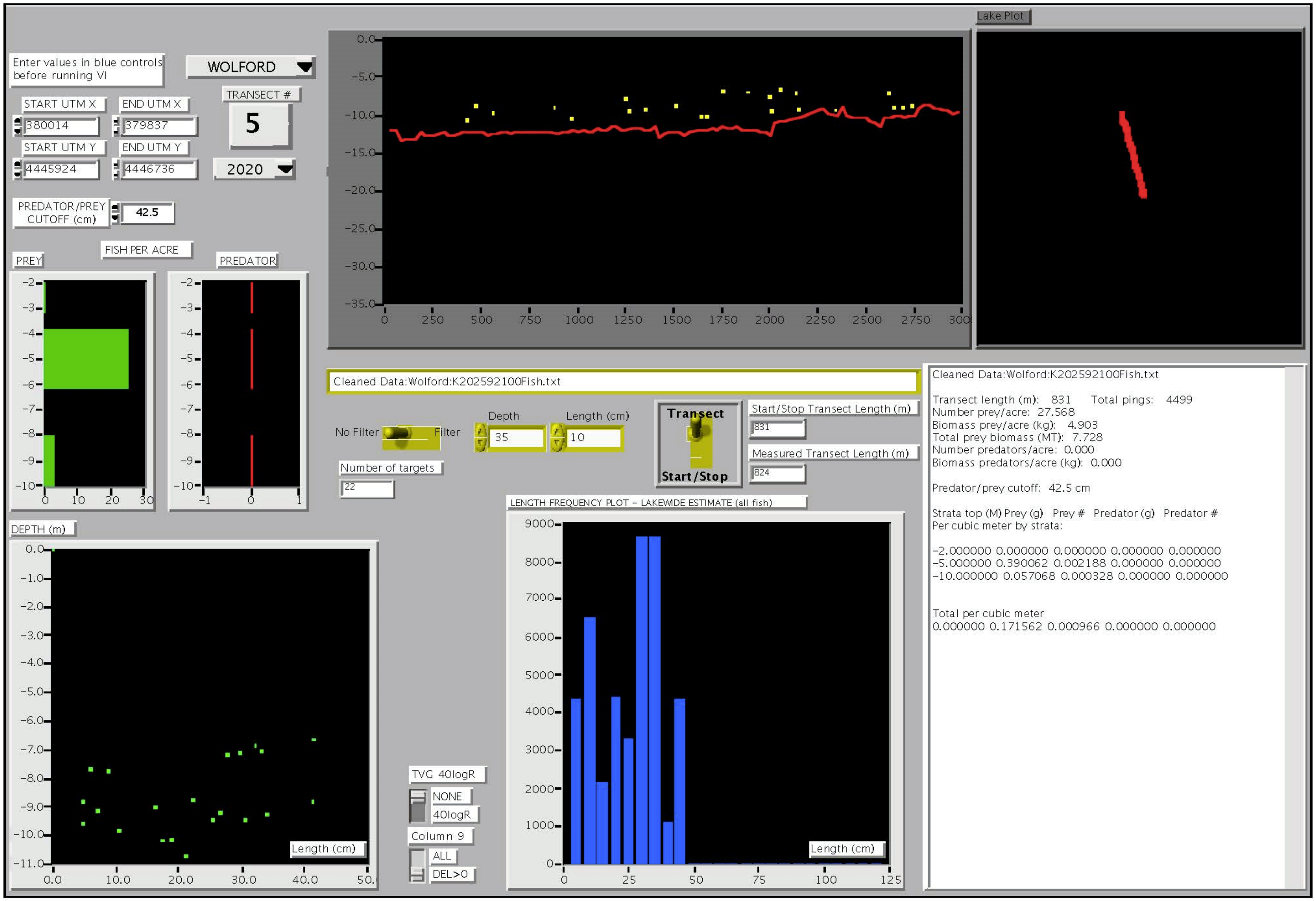
Transect length (m):   1369     Total pings:   4499
Number prey/acre:  24.414
Biomass prey/acre (kg):   4.274
Total prey biomass (MT):  6.736
Number predators/acre:  0.384
Biomass predators/acre (kg):  0.371

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.143222 0.000261 0.000000 0.000000
-5.000000 0.185124 0.000885 0.000000 0.000000
-10.000000 0.104699 0.001062 0.042809 0.000044
-15.000000 0.001512 0.000486 0.000000 0.000000


Total per cubic meter
0.000000 0.093185 0.000786 0.016531 0.000017
```



Enter values in blue controls before running VI

WOLFORD

START UTM X: 380014

END UTM X: 379837

START UTM Y: 4445924

END UTM Y: 4446736

TRANSECT #: 5

2020

PREDATOR/PREY CUTOFF (cm): 42.5

Cleaned Data:Wolford:K202592100Fish.txt

Depth: 35

Length (cm): 10

Number of targets: 22

Start/Stop Transect Length (m): 831

Measured Transect Length (m): 824

TVG: 40logR

Column: 9

```
Cleaned Data:Wolford:K202592100Fish.txt

Transect length (m):   831      Total pings:    4499
Number prey/acre:  27.568
Biomass prey/acre (kg):   4.903
Total prey biomass (MT):  7.728
Number predators/acre:  0.000
Biomass predators/acre (kg):  0.000

Predator/prey cutoff:  42.5 cm

Strata top (M) Prey (g)   Prey #   Predator (g)   Predator #
Per cubic meter by strata:

-2.000000 0.000000 0.000000 0.000000 0.000000
-5.000000 0.390062 0.002188 0.000000 0.000000
-10.000000 0.057068 0.000328 0.000000 0.000000


Total per cubic meter
0.000000 0.171562 0.000966 0.000000 0.000000
```