Report on the Fish Sampling Event
as compiled for
"A Day in the Life of the Bronx River"
held at
Soundview Park, Bronx, NY
Saturday, August 13th 2016
filed by
Carl Alderson
NOAA National Marine Fisheries Service
JJ Howard Marine Lab
Highlands NJ

EVENT GOALS.
The fish sampling event planned for August 13, 2016 as part of "A Day in the Life of the Bronx River" is a comparison of existing fishing methods and one experimental lift trap. My interest is in gear bias, both in the gear itself and in the humans who deploy it. We will demonstrate the different techniques and discuss the inherent bias is in each and record our results. The idea of the remote lift trap is to take both gear and human bias out of shallow water fish capture. The fish lift is a method that should not be preferential to any particular species, can measure species composition and provide a rough measure of density.

Planned Activities
Our team of volunteers will compare results of four types of fish capture devices at Soundview Park, Bronx NY. Soundview Park is owned by the City of New York and operated and maintained by the NYC Dept. of Parks and Recreation.

Gear to be tested
Remote Lift Trap
Seine
Bi-conical minnow traps
Cast net

Planned Itinerary
9AM - introduce ourselves, describe the process
9:30 - set bi-conical traps
10AM - set fish lift
10:15AM - 11:00AM - run several seines and cast nets, providing each team member an opportunity to seine or cast and record catch.
11:00AM - spring fish lift and record catch
11:30noon - lift bi-conical and record catch
12:00noon - spring fish lift and record catch

An eight member Volunteer Team has agreed to participate

The figure below indicates the suspected bias that will be encountered in select gear types.

SUPECTED BIAS IN SHALLOW WATER FISHING GEAR.
X indicates a bias has been determined or suspected

METHOD	LOCATION BIAS	HUMAN COMPETENCE BIAS	SPECIES BIAS	SIZE CLASS BIAS	DAMAGE to FISH AND POTENTIAL MORTALITY	DESCRIPTION
SEINE NET	X	X		X		Casted trap made of small aperture netting used to capture near shore fish with a two person sweep toward land. Straight seine 4' height by varying length is common. Net is weighted on bottom.
BI_CONNICAL MINNOW TRAP/POT TRAPS	X		X	X		Stationary trap made of strong materials, usually steel. Baited or un-baited and set for a designated amount of time through a tide cycle. Designed to lure small fish into trap through cone with low chance of exit.
MANUAL LIFT TRAP		X				Stationary trap consisting of frameless strong netting set at bottom. The net is lifted manually in a rapid upward manner so to trap fish in the water column above.
REMOTE SPRUNG LIFT TRAP	X			X		Stationary trap with upright box frame is made from strong lite weight flexible materials combined with netting. The net is lifted from the bottom remotely in a rapid upward manner so to trap fish in the water column above.
THROW TRAP	X	X		X		Casted trap made of aluminum or steel ring or drum of varying diameter and height. Requires skill to cast …usually from a boat. Technique must be perfected to avoid casting on its side.
CAST NET		X				Casted trap of small aperture netting in a circular pattern with "lead" weights. Cast manually in a throwing position from boat or land.

FYKE NET	X					Stationary trap consisting of a stick frame draped with netting to create a wide entry opening leading to successively smaller chambers leading fish to the "cod end".
LINE AND POLE		X	X	X	X	Casted fish lure consisting of pole rigged with a casting line - usually a monofilament line tied with weights, floats and a lure in some combination.
ELECTRO SHOCKING	X		X		X	Stationary or mobile technique consisting of a battery backpack, wand and "tail". Can be employed from boat or standing in shallow water. Electro shocking has limited application in deep water. Fish are usually only temporarily stunned but mortality can occur.
GILL NET			X	X	X	Casted or stationary net designed to snag fish by the gills as they poke through the netting. Net aperture is dependent of the type and size class of fish desired.

LOCATION BIAS	Location bias is defined as the limitation of locals where the technique can be used. For example, line and pole can be used in any condition or location, whereas fyke nets and remote control lift traps can only be used in varying shallow depths of water.
HUMAN COMPETEN CE BIAS	Human bias is defined as the limits of the skill and ability of the individual or team members operating the gear and can be greatly affected positively or negatively by weather conditions.
SPECIES BIAS	Species bias is defined as the limitation of the gear to catch any species, size class as well as the limit of its ability to determine accurately the species composition of the area and biomass/area unit. Some traps are preferential towards particular species and so are considered beneficial when the goal is to capture the particular species. Example: minnow traps.
SIZE CLASS BIAS	Size class bias is the range limitation of the gear and or human caster to catch fish beyond or below a limited range of size.
DAMAGE to FISH AND POTENTIAL MORTALITY	Gear that is used improperly can lead to damage to the fish. Example, minnow traps left high and dry at low tide. However, some traps are designed to trap fish at all cost regardless of damage that may occur, such as gill netting and hooking.

FISH DAY RESULTS
On Saturday August 13, 2016 six volunteers gathered at Soundview Park in Bronx NY. They included:

Team Members
Carl Alderson, Team Lead
Alison Cucco
Jeffrey Lazar
Anton Yupangco
Andy Rafter
David Rafter (Andy's three year old son)

Conditions
Weather for today's event was 94 degrees F and humidity exceeded 80%. A canopy is set up at the staging area along with a cooler of ice water and Gatorade. The heat is expected to have an effect on the results - both human performance and likely species captured.

Tide Heights for this location. Tide is going out during the event. The reverse would be ideal for this type of gear.
HT 8:51 AM - 6.3ft
LT 2:05 PM -1.6ft
Dissolved Oxygen 7.0
Water Temperature: undetermined

Trap Types Employed
Remote Lift Trap
Seine
Bi-conical minnow traps
Eel Mop
(Cast Nets were not available on this date)

Recorded Tasks
9:04 AM Meet Up (Slight Traffic and Transit Delays)
9:30 AM Staging Area Set – Team Introductions
10:00AM we set out six bi-conical minnow traps at the edge of the low marsh as the tide receded. We also set out one eel mop at the marsh edge. Water elevation varies. Estimated Average depth at start is 18.0 inches. Traps 1,2,5,6 set in mud bottom. Traps 3,4 set on sand bottom (outwash of constructed salt marsh)
10:30AM With some initial difficulty we reassemble the fish lift. During Staging we discover that the remote control unit was left behind. We rig a line to set the trap manually so that the release system and weights can be assessed.
11:00AM We split the team into two Seine net Teams. A brief in-water instruction is given. Team A is Jeffrey and Anton. Team B is Carl and Alison. Three of the four have never seined. Results are recorded by Andy.
12:00noon. Bi-conical traps and Eel Mop are lifted and data recorded.
12:10PM Fish lift is manually sprung from a distance of 20 feet. One of the net guide wires snags causing the trap to malfunction. No data is recorded. Water height at time of trap closing is less than 2 inches.

Results

Technique	Mummichog	Size Range	Striped killi	Size Range	Bay anchovy	Size Range	Atlantic Silverside	Size Range	Shore Shrimp	Size Range	Mud Dog Whelk	Size Range	American Eel	Size Range
Eel Mop	0		0		0		0		0		0		0	
Bi-conical Minnow Trap 1	0		0		0		0		0		0		0	
Bi-conical Minnow Trap 2	0		0		0		0		0		0		0	
Bi-conical Minnow Trap 3	22	1-5cm	3	1-5cm	0		0		0		0		0	
Bi-conical Minnow Trap 4	2	1-5cm	0		0		0		0		0		0	
Bi-conical Minnow Trap 5	0		1	1-5cm	0		0		0		0		0	
Bi-conical Minnow Trap 6	34	1-5cm	13	1-5cm	0		0		0		0		0	
Seine Net Team A	57	1-5cm	55	1-5cm	2	1-2cm	0		3	2-4cm	0		0	
Seine Net Team B	31	1-5cm	0		0		0		23	2-4cm	100	.5-2cm	0	
Fish Lift*	x		x		x		x		x		x		x	

*Test malfunction

Conclusion

Due to the combination of extreme heat and high humidity effect on humans; the short tide duration; abbreviated catch time and; the absence of remote control device for the fish lift - the tests were declared inclusive for the stated purpose of demonstrating the fish lift as a method that would likely show little or no preference to any particular species, provide a measure species composition and rough measure of density.

The factors described minus the missing remote control device for the fish lift, increased the chance of poor fishing performance for the other gear types. Prior to the event it was considered that human bias would have effect on seine results between two teams with varying degree of skill. This may have affected performance but it could not be determined from the low number of replicate trials (1). The effect of variation in human performance could not be separated from other possible influencing conditions such as the onsite landscape variations between the site selected by Team A and Team B, where one team encountered tripping hazards in the form of rock and debris and the other team did not encounter these conditions. High temperature and humidity and low water level most likely had a negative effect on both teams resulted in poorer performance and early end to trials. Due to these influencing conditions the test of human ability as an influence on catch was inconclusive.

We noted a difference in species composition where Seine Team A caught more total fish (117 for Team A and 54 for Team B, not counting shellfish) and a higher number of striped killi's (55 for Team A and zero for Team B). This test demonstrates a commonly regarded problem that within a small area (tests 50 feet apart) there can be small to great differences in micro-topography that can effect fish capture. A decision by both teams just prior to sampling may have played a role where Team A chose a parallel "net to shore" pattern while Team B chose a "pivot and swing pattern".

Prior to sampling it was considered that bi-conical minnow traps would capture fewer species than either seine netting or the fish lift. This was found to be true for the minnow trap versus seine net. Seine netting resulted in the capture of 5 species and minnow traps yielded 2. Two sample catches by seine net resulted in a total of 171 fish for an average of 85 per sample catch. Minnow traps resulted in 28 total fish for an average of 4.6 per sample catch. The relative size of the bi-conical trap to that of the sweep area of a seine net makes a comparison of catch size difficult. The two techniques also work very differently from one another whereas minnow traps work to catch fish by attraction and seine nets work to capture fish by herding. Other factors that likely had an effect on overall numbers were an ebbing tide and short duration of set time for the minnow traps. The total minnow trap was expected to be higher.

Other goals reached. We were concerned that travel, shipping and set up would have a negative effect on the newly fabricated fish lift. As a result of the trials it was determined that the fish lift was of sturdy construction to endure partial disassembly, loading, unloading, travel over 150 miles, carrying by two people 630 feet to the site, placement in the mudflat and 630 feet back to vehicle feet without damage. The outer frame constructed of vinyl covered steel tube garden stakes is not expected to have great endurance but did survive the trial run. The next trial takes place on August 23rd at Spermacetti Cove at the Sandy Hook Unit of the Gateway Nat'l Recreation Area in Highlands, NJ.