Low Frequency Electroshock Fishing Invasive Catfish in Chesapeake Bay Tributaries

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Reviewers and Ches Bay Program's Scientific and Technical Advisory Committee (STAC):

Scientific gaps exist:

-need a better understanding of pop size/distribution, removal rates to elicit response from system, **harvesting gear effectiveness,** fish contamination levels, impact to native species (trophic ecology)

FGR Funding support.... Virginia Fishery Resource Grant Program

Gear testing for catfish harvest/removal efficiency:

Electroshock Fishing

Electroshock fishing is widely used by fishery managers to sample fish populations, mainly in fresh low salinity waters.

Fish become stunned when subjected to an electric current generated between a positive (anode) and negative (cathode) submerged in the water

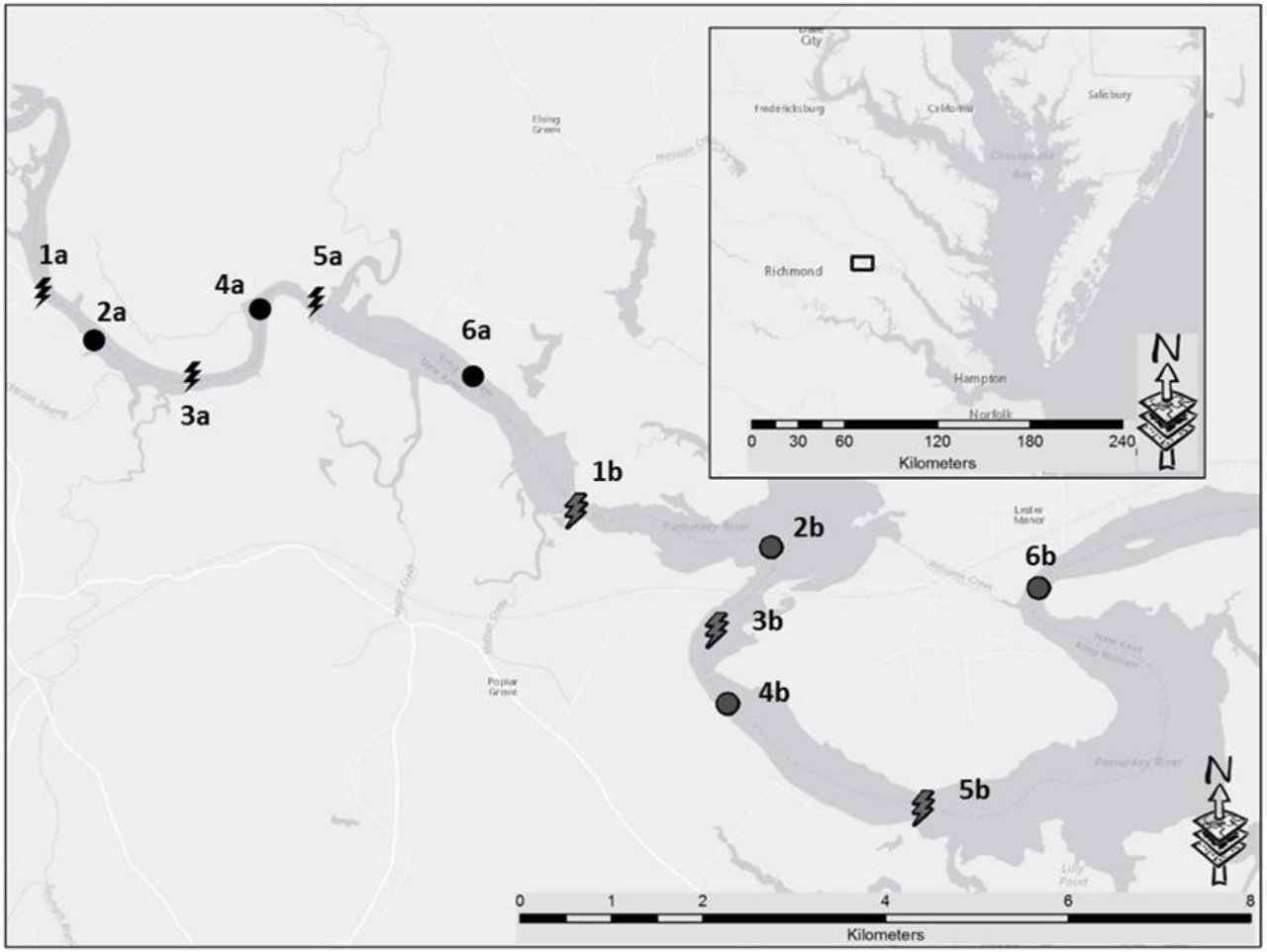
Conductivity, Temperature, Fish Size, Substrate.... ALL affect E-fishing

Fishery Resource Grant 2016

Gear Conflict Question:
E-fishing v hoop-net

Watermen....“e-fishing causes catfish to not go to bait.... and they shock over our nets and take all the fish”

Collaborative study involving e-fishermen, commercial hoop-net fishermen, and commercial seafood off-loading dock



Location of hoop-nets fished in the Pamunkey River over the course of the study. Nets 1a-6a fished June 9-July 20, 2017. Nets 1b-6b fished July 22-August 17, 2017. Nets with lightning bolts are those which were electroshocked over.

Hoop-nets: 3' hoops, 2 ½" stretched mesh set ~1/4-1/2 mile apart

Soak period 2-3 days (fished Monday-Wednesday-Friday)

Shocking was done for 200-220 second durations covering a stretch of river extending up- and downstream from set hoop-net, with shocking directly over top of net being approximately half way through shocking duration.

Assuming fish removed by e-fishing at each location were not part of captured fish within nets

Fish harvested from each hoop-net and by e-fishing over nets were kept separate (colored coded totes) through dock grading by size and total poundage.

Table 1. Total catch (lbs) of catfish by hoop-nets (Nets1-6) and e-fishing over hoop-nets (Nets 1,3,5). (Electroshock unit not operated June13-July 8, 2016)

	Net 1	Net 2	Net 3	Net 4	Net 5	Net 6	Shock Net 1	Shock Net 3	Shock Net 5
9-Jun	348	103	495	18	168	74	90	0	6
6/13/2016	300	80	200	80	130	125	0	0	0
6/15/2016	300	40	120	300	300	200	0	0	0
6/20/2016	300	130	375	250	200	180	0	0	0
6/22/2016	100	30	120	175	175	100	0	0	0
6/24/2016	200	100	110	300	140	210	0	0	0
6/27/2016	210	120	170	200	180	150	0	0	0
6/29/2016	40	80	50	80	120	15	0	0	0
7/1/2016	98	148	92	182	128	221	15	0	0
7/4/2016	200	110	100	220	150	120	0	0	0
7/6/2016	134	41	95	183	66	57	0	0	0
7/8/2016	74	81	84	179	63	67	0	0	0
7/11/2016	61	42	51	141	65	178	13	2	10
7/13/2016	77	39	43	135	171	82	4	8	60
7/15/2016	91	34	35	43	50	40	8	0	42
7/18/2016	114	92	117	149	197	39	10	0	14
7/20/2016	58	8	14	120	85	65	4	2	2
7/22/2016	85	5	36	65	52	5	10	2	39
7/25/2016	415	27	54	564	148	342	80	61	6
7/27/2016	*0	175	309	289	284	275	61	45	0
7/29/2016	153	201	200	120	159	184	95	24	5
8/1/2016	63	87	121	109	172	191	**0	17	2
8/3/2016	64	91	61	159	172	228	32	8	13
8/5/2016	207	50	125	242	77	293	10	8	0
8/8/2016	223	96	88	190	57	162	23	16	5
8/10/2016	167	197	162	125	56	147	40	20	0
8/12/2016	***76	97	143	200	86	174	47	5	0
8/15/2016	98	92	96	220	98	130	30	8	0
8/17/2016	92	81	123	62	116	97	0	0	0

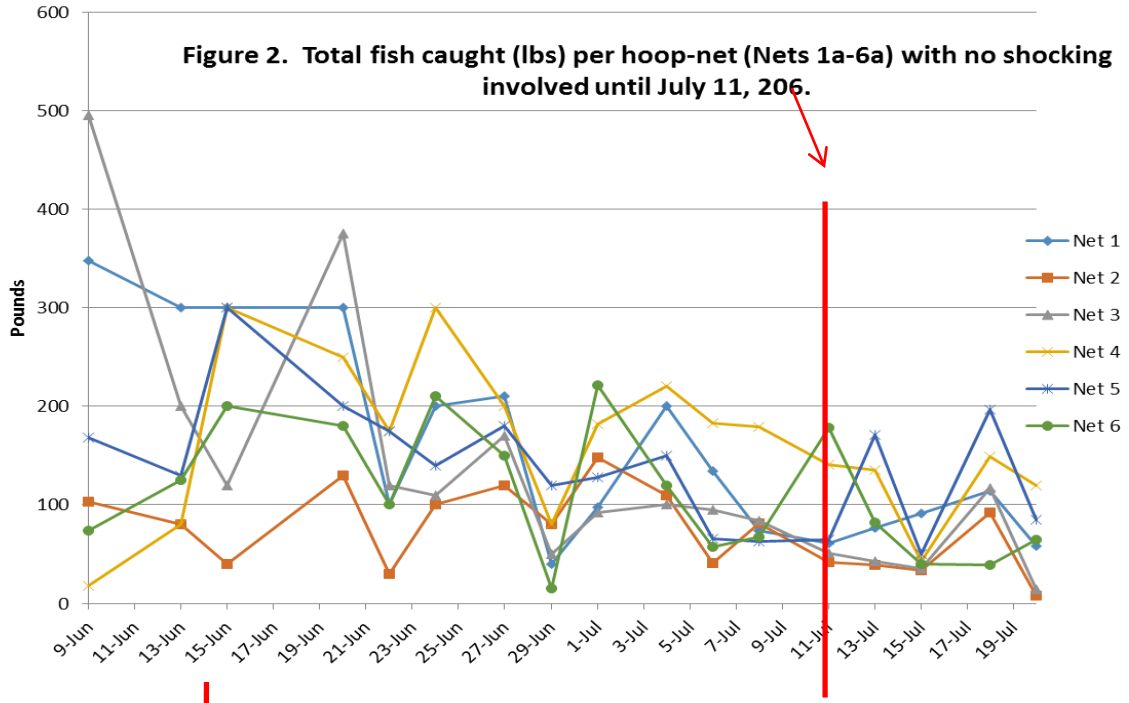
*6 inch hole in net, fish escaped

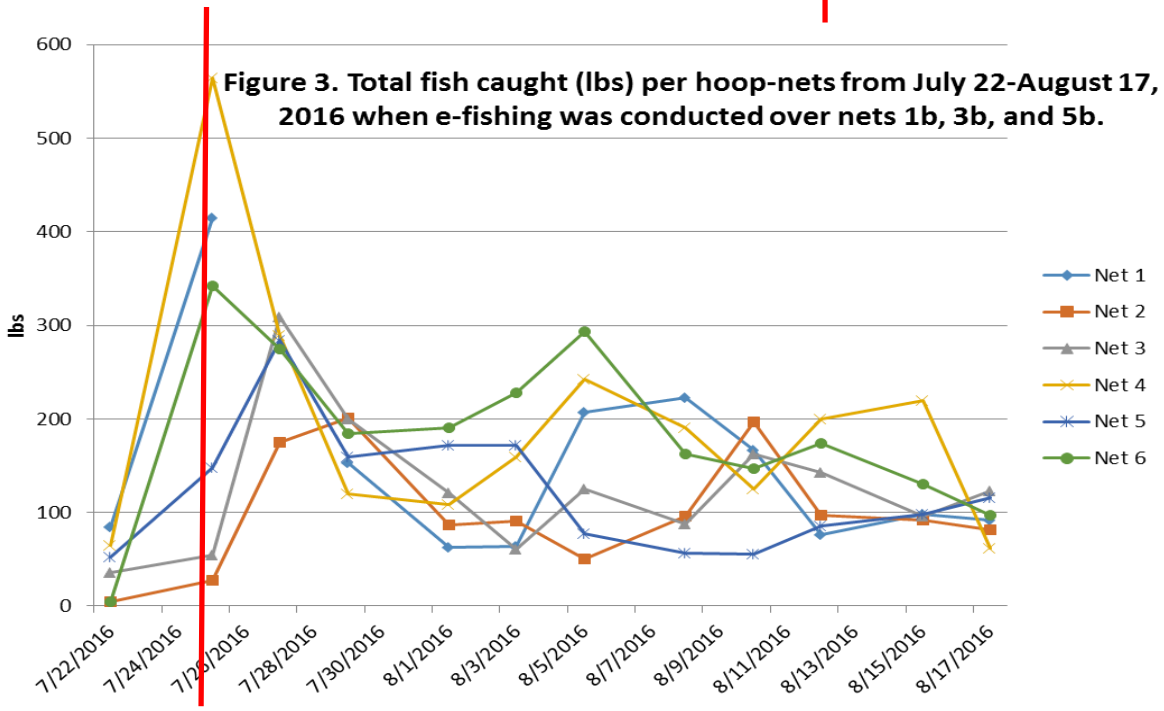
**Did not shock due to recreational fishermen on site

***Collapsed net, did not fish correctly

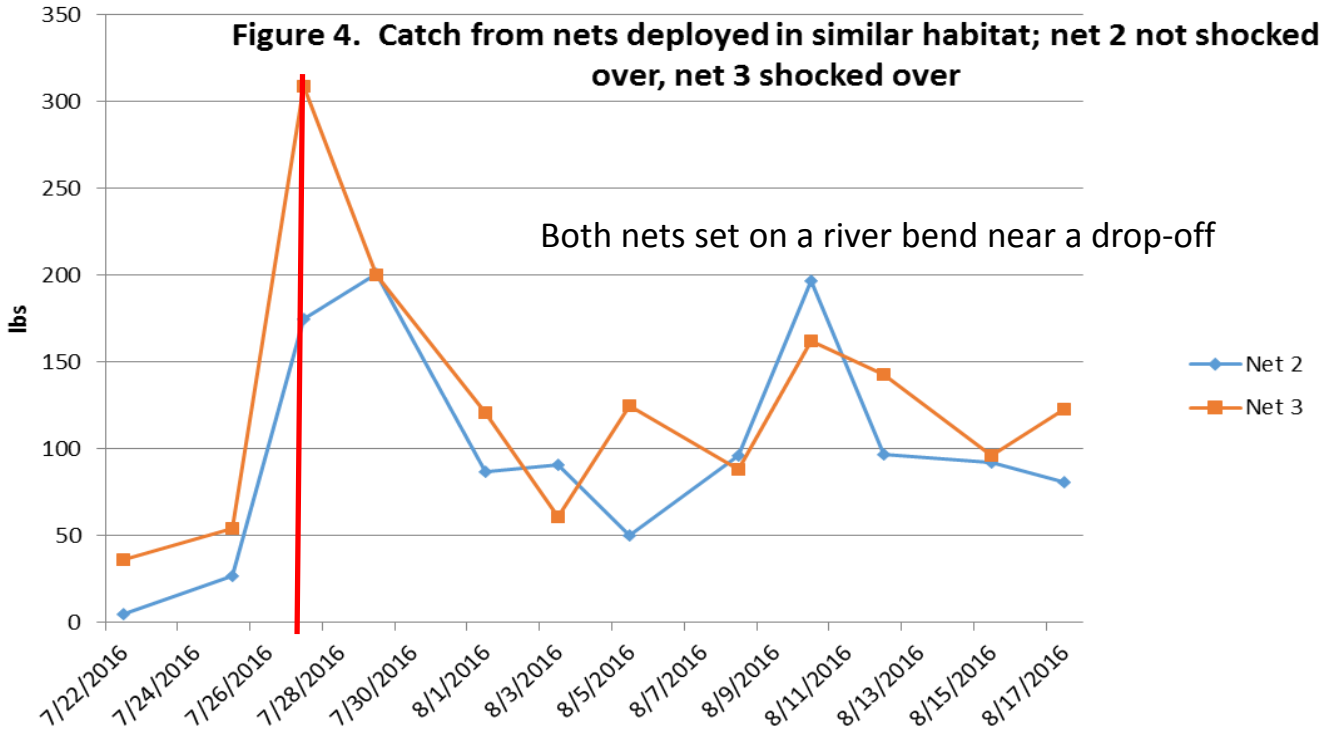
Started LFE fishing 7/11

Fished nets then moved them 7/22, no shocking at new area until 7/25





After the initial removal of resident fish by both gear types, fish recruited into those habitats were observed to be removed upon subsequent fishing at decreasing, but similar levels.



Both linear and log-linear models were estimated to determine if LFE harvest gear had an impact on hoop net harvest levels. A comparison of hoop-net harvest levels with and without LFE indicated no statistically significant difference in hoop-net harvest levels. An analysis of variance indicates that the best fit log-linear model with an r-square of 0.085 was not statistically significant at the alpha = 0.05 percent level.

Management and Market Implications from gear conflict study:

Seasonality

Late spring through early fall (May-October); highly dependent on rainfall (conductivity) and water temperature (>23^0C, 73.4^0F).

Catfish become desensitized with repeated shocking

While smaller catfish (>1-2 lbs) were consistently raised with repeated shocking and available for capture it was observed that medium sized catfish (3-8 lbs) were less effected, routinely seen erratically moving just under the water surface (in-between a “flight response” and “taxis”) but not becoming immobilized and surfacing, and therefore escaped capture. The larger the fish the longer you must wait between shocking episodes before they will react to LFE fishing gear.

Different habitats targeted

Hoop-nets fished on shallower habitats with flatter bottom contours and lower current/tidal velocity (less gear fouling), while shocking works best in deeper water habitats with structure and faster current/tidal flow. Higher water current needed to help draw fish into electric field.

Fish quality

LFE captured fish of good visible quality. Fish from nets physically marred, stressed, and with longer soaks (3 days) more mortalities observed.

This study indicates that LFE does not significantly reduce the catch of catfish by commercial hoop-net gear, and it is possible to minimize conflict between LFE and hoop-net gear types in the blue catfish fishery by seasonality and targeted habitat.