

Supporting information for:

Pintar, M.R., J. L. Kline, and J.C. Trexler. 2021. The aquatic Heteroptera (Hemiptera) of marshes in the Florida Everglades. *Florida Entomologist* 104(4): 307–319.

List of abbreviations:

CERP = Comprehensive Everglades Restoration Plan

ENP = Everglades National Park

LM = Lostman's Slough

LOX = Loxahatchee National Wildlife Refuge

LSU = CERP Landscape Sampling Unit

MWD = Modified Water Deliveries to Everglades National Park

OLIGO = Oligohaline Regions

PENN = Pennsocco

PHD = Eastern Panhandle of Everglades National Park

PSU = CERP Primary Sampling Unit

SMP = Southern Marl Prairie

SRS = Shark River Slough

TSL = Taylor Slough

UTS = Upper Taylor Slough

WCA = Water Conservation Areas (2A, 2B, 3A, 3B)

Table S1: Abundances of species of Heteroptera by MWD region. Data for PHD, SRS, TSL, and WCA are only for water year 2017; UTS data are for November 2017 through November 2019. Taxa are adults unless otherwise noted.

Region	Throws	<i>Abedus immaculatus</i>	<i>Belostoma lutarium</i>	Belostomatinae nymphs	Belostomatinae exuviae	<i>Benacus griseus</i> nymphs	<i>Limnogonus franciscanus</i>	<i>Microvelia</i> nymph	<i>Neogerris hesione</i> (adults + larvae)	<i>Neogerris hesione</i> exuvia	<i>Pelocoris baltus</i> (all)	<i>Pelocoris femoratus</i> (all)	<i>Platyvelia brachialis</i>	<i>Trichocorixa minima</i>
PHD	262	68	22	59	0	2	0	0	38	1	93	1051	0	0
SRS	269	31	57	70	1	0	0	1	91	1	11	1771	1	1
TSL	393	0	9	25	0	0	0	0	90	0	0	1077	2	6
WCA 3	684	0	59	95	1	0	0	0	37	0	0	1036	0	7
UTS	523	23	35	223	0	0	3	0	59	0	1	834	1	1

Table S2: Densities (# individuals/m²) of common species of Heteroptera by MWD region. Data are only for water year 2017, with the exception of UTS, which are for November 2017 through November 2019. Table includes totals for all Heteroptera, Belostomatidae, and *Pelocoris* spp. Species with all densities <0.01 are excluded from this table. Throws are the number of throw trap samples collected in that region during a given water year. a = adults

Region	Throws	Heteroptera	Belostomatidae	<i>Abedus immaculatus</i> (a)	<i>Belostoma lutarium</i> (a)	Belostomatinae nymphs	<i>Neogerris hesione</i>	All <i>Pelocoris</i>	<i>Pelocoris baltius</i>	<i>Pelocoris femoratus</i>	<i>Platyvelia brachialis</i>	<i>Trichocorixa minima</i>
PHD	262	5.09	0.58	0.26	0.08	0.23	0.15	4.37	0.35	4.01	0	0
SRS	269	7.57	0.59	0.12	0.21	0.26	0.34	6.62	0.04	6.58	0	0
TSL	393	3.08	0.09	0	0.02	0.06	0.23	2.74	0	2.74	0.01	0.02
WCA 3	684	1.81	0.23	0	0.09	0.14	0.05	1.51	0	1.51	0	0.01
UTS	523	2.26	0.54	0.04	0.07	0.23	0.17	1.60	0	1.59	0	0

Table S3: Relative abundances of common species of Heteroptera as a proportion of the total abundance of all invertebrates collected by MWD region and year (# individuals/total # invertebrates). Data are only for water year 2017, with the exception of UTS, which are for November 2017 through November 2019. Table includes totals for all Heteroptera, Belostomatidae, and *Pelocoris* spp. Values <0.01 are rounded down to 0; species with all densities <0.01 are excluded from this table. a = adults.

Region	Invert abundance	Heteroptera	Belostomatidae	<i>Abedus immaculatus</i> (a)	<i>Belostoma lutarium</i> (a)	Belostomatinae nymphs	<i>Neogerris hesione</i>	All <i>Pelocoris</i>	<i>Pelocoris baltius</i>	<i>Pelocoris femoratus</i>
PHD	3171	0.42	0.05	0.02	0.01	0.02	0.01	0.36	0.03	0.33
SRS	9672	0.21	0.02	0	0.01	0.01	0.01	0.18	0	0.18
TSL	7250	0.17	0	0	0	0	0.01	0.15	0	0.15
WCA 3	8417	0.15	0.02	0	0.01	0.01	0	0.12	0	0.12
UTS	1898	0.62	0.15	0.01	0.02	0.12	0.03	0.44	0	0.44

Table S4: Abundances of species of Heteroptera by CERP region and water year.

Region	<i>Abedus immaculatus</i>	<i>Belostoma lutarium</i>	Belostomatinae nymphs	<i>Limnogonus franciscanus</i>	<i>Neogerris hesione</i>	<i>Pelocoris balius</i>	<i>Pelocoris carolinensis</i> adults	<i>Pelocoris femoratus</i> adults	<i>Pelocoris</i> nymphs	<i>Trepobates floridensis</i>	<i>Trichocorixa minima</i>
Water year 2016											
WCA 2A	0	6	0	0	1	0	0	49	13	0	1
WCA 2B	0	3	0	0	3	0	0	11	2	0	3
WCA 3A	1	13	1	0	16	8	2	106	88	0	6
WCA 3B	0	4	0	0	0	0	0	19	9	0	0
LM	0	0	0	0	3	0	0	6	14	0	0
LOX	0	3	3	0	2	2	20	62	53	0	0
OLIGO	0	0	0	1	0	0	0	6	2	0	0
PENN	0	0	0	0	1	0	0	1	2	0	1
SMP	0	1	0	0	10	0	0	15	15	1	0
SRS	2	15	1	0	12	3	0	138	93	0	1
TSL	3	0	1	0	0	0	0	7	7	0	0
Water year 2017											
WCA 2A	0	0	0	0	0	0	0	1	0	0	0
WCA 2B	0	0	0	0	0	0	0	6	11	0	0
WCA 3A	0	2	0	0	0	1	0	8	15	0	0
WCA 3B	0	0	0	0	0	0	0	11	11	0	0
LM	0	1	0	0	0	0	0	2	0	0	0
LOX	0	6	2	0	0	0	17	34	27	0	1
OLIGO	0	0	0	0	0	1	0	13	8	0	0
PENN	0	0	0	0	0	0	0	6	1	0	0
SMP	0	2	0	0	0	0	0	4	6	0	0
SRS	2	6	0	0	0	1	0	32	21	0	0
TSL	3	1	0	0	0	0	0	16	7	0	0

Table S5: Densities (# individuals/m²) of species of Heteroptera by CERP region and water year. Table includes totals for all Heteroptera, Belostomatidae, and *Pelocoris* spp. Nymphs are excluded from individual species, but included in aggregate groups. Values <0.01 are rounded down to 0. Throws are the number of throw trap samples collected in that region during a given water year.

Region	Throws	Heteroptera	Belostomatidae	<i>Abedus immaculatus</i>	<i>Belostoma lutarium</i>	<i>Limnogonus franciscanus</i>	<i>Neogerris hesione</i>	<i>Pelocoris</i> (all)	<i>Pelocoris balius</i>	<i>Pelocoris carolinensis</i>	<i>Pelocoris femoratus</i>	<i>Trepobates floridensis</i>	<i>Trichocorixa minima</i>
Water year 2016													
WCA 2A	90	0.78	0.07	0	0.07	0	0.01	0.69	0	0	0.54	0	0.01
WCA 2B	32	0.69	0.09	0	0.09	0	0.09	0.41	0	0	0.34	0	0.09
WCA 3A	461	0.52	0.03	0	0.03	0	0.03	0.44	0.02	0	0.23	0	0.01
WCA 3B	49	0.65	0.08	0	0.08	0	0	0.57	0	0	0.39	0	0
LM	14	1.64	0	0	0	0	0.21	1.43	0	0	0.43	0	0
LOX	158	0.92	0.04	0	0.02	0	0.01	0.87	0.01	0.13	0.39	0	0
OLIGO	15	0.60	0	0	0	0.07	0	0.53	0	0	0.40	0	0
PENN	12	0.42	0	0	0	0	0.08	0.25	0	0	0.08	0	0.08
SMP	46	0.91	0.02	0	0.02	0	0.22	0.65	0	0	0.33	0.02	0
SRS	248	1.07	0.07	0.01	0.06	0	0.05	0.95	0.01	0	0.56	0	0
TSL	30	0.60	0.13	0.10	0	0	0	0.47	0	0	0.23	0	0
Water year 2017													
WCA 2A	30	0.03	0	0	0	0	0	0.03	0	0	0.03	0	0
WCA 2B	36	0.85	0	0	0	0	0	0.85	0	0	0.30	0	0
WCA 3A	20	0.08	0.01	0	0.01	0	0	0.08	0	0.01	0.02	0	0
WCA 3B	339	0.37	0	0	0	0	0	0.37	0	0	0.18	0	0
LM	7	0.43	0.14	0	0.14	0	0	0.29	0	0	0.29	0	0
LOX	155	0.55	0.05	0	0.04	0	0	0.50	0	0.11	0.22	0	0.01
OLIGO	23	1.00	0	0	0	0	0	1.00	0.04	0	0.57	0	0
PENN	9	0.78	0	0	0	0	0	0.78	0	0	0.67	0	0
SMP	34	0.35	0.06	0	0.06	0	0	0.29	0	0	0.12	0	0
SRS	175	0.35	0.05	0.01	0.03	0	0	0.31	0.01	0	0.18	0	0
TSL	37	1.23	0.18	0.14	0.05	0	0	1.05	0	0	0.73	0	0

Table S6: Relative abundances of species of Heteroptera as a proportion of the total abundance of all invertebrates collected by region and year (# individuals/total #invertebrates). Table includes totals for all Heteroptera, Belostomatidae, and *Pelocoris* spp. Nymphs are excluded from individual species, but included in aggregate groups. Values <0.01 are rounded down to 0.

Region	Abundance	Heteroptera	Belostomatidae	<i>Abedus immaculatus</i>	<i>Belostoma lutarium</i>	<i>Limnogonus franciscanus</i>	<i>Neogerris hestone</i>	<i>Pelocoris</i> (all)	<i>Pelocoris balius</i>	<i>Pelocoris carolinensis</i>	<i>Pelocoris femoratus</i>	<i>Trepobates floridensis</i>	<i>Trichocorixa minima</i>
Water year 2016													
WCA 2A	324	0.22	0.02	0	0.02	0	0	0.19	0	0	0.15	0	0
WCA 2B	177	0.12	0.02	0	0.02	0	0.02	0.07	0	0	0.06	0	0.02
WCA 3A	1673	0.14	0.01	0	0.01	0	0.01	0.12	0	0	0.06	0	0
WCA 3B	100	0.32	0.04	0	0.04	0	0	0.28	0	0	0.19	0	0
LM	33	0.70	0	0	0	0	0.09	0.61	0	0	0.18	0	0
LOX	454	0.32	0.01	0	0.01	0	0	0.30	0	0.04	0.14	0	0
OLIGO	12	0.75	0	0	0	0.08	0	0.67	0	0	0.50	0	0
PENN	76	0.07	0	0	0	0	0.01	0.04	0	0	0.01	0	0.01
SMP	119	0.35	0.01	0	0.01	0	0.08	0.25	0	0	0.13	0.01	0
SRS	823	0.32	0.02	0	0.02	0	0.01	0.29	0	0	0.17	0	0
TSL	34	0.53	0.12	0.09	0	0	0	0.41	0	0	0.21	0	0
Water year 2017													
WCA 2A	89	0.01	0	0	0	0	0	0.01	0	0	0.01	0	0
WCA 2B	50	0.34	0	0	0	0	0	0.34	0	0	0.12	0	0
WCA 3A	1231	0.02	0	0	0	0	0	0.02	0	0	0.01	0	0
WCA 3B	252	0.09	0	0	0	0	0	0.09	0	0	0.04	0	0
LM	6	0.50	0.17	0	0.17	0	0	0.33	0	0	0.33	0	0
LOX	481	0.18	0.02	0	0.01	0	0	0.16	0	0.04	0.07	0	0
OLIGO	43	0.53	0	0	0	0	0	0.53	0.02	0	0.30	0	0
PENN	38	0.18	0	0	0	0	0	0.18	0	0	0.16	0	0
SMP	29	0.41	0.07	0	0.07	0	0	0.34	0	0	0.14	0	0
SRS	349	0.18	0.02	0.01	0.02	0	0	0.15	0	0	0.09	0	0
TSL	37	0.73	0.11	0.08	0.03	0	0	0.62	0	0	0.43	0	0

Table S7: List of species by family of aquatic and semiaquatic Heteroptera with pinned specimens from Everglades National Park in the South Florida Collections Management Center (SFCMC), Homestead, Florida, USA. Species are listed as identified by MRP.

Taxon	Author	# of specimens
Belostomatidae		
<i>Abedus immaculatus</i>	(Say)	6
<i>Belostoma lutarium</i>	(Stål)	12
<i>Benacus griseus</i>	(Say)	11
<i>Lethocerus uhleri</i>	(Montandon)	1
Corixidae		
<i>Trichocorixa louisiana</i>	Jaczewski	2
<i>Trichocorixa minima</i>	(Abbott)	2
<i>Trichocorixa verticalis</i>	(Fieber)	1
Gelastocoridae		
<i>Gelastocoris oculatus</i>	(Fabricius)	6
Gelastocoridae nymph ^a		1
Gerridae		
<i>Neogerris hesione</i>	(Kirkaldy)	3
Hebridae		
<i>Hebrus consolidus</i>	Uhler	5
<i>Hebrus</i> sp. ^b	Curtis	3
Hydrometridae		
<i>Hydrometra australis</i>	Say	3
<i>Hydrometra</i> sp. ^c	Latreille	1
Micronectidae		
<i>Micronecta ludibunda</i> ^d	Bredden	7
Naucoridae		
<i>Pelocoris balius</i>	La Rivers	5
<i>Pelocoris femoratus</i>	(Palisot de Beauvois)	7
Nepidae		
<i>Ranatra australis</i>	Hungerford	1
<i>Ranatra buenoi</i>	Hungerford	3
Notonectidae		
<i>Buenoa</i> sp. ^e	Kirkaldy	5
Saldidae		
<i>Saldula lomata</i>	J. Polhemus	7

^a Very early instar

^b Likely *Hebrus concinnus* Uhler, but not all were males and those that were could not be dissected to verify species

^c One specimen in poor condition

^d All were previously identified as *Tenagobia* Bergroth; *Tenagobia* are not known from Florida, but may eventually be found in the state

^e Multiple species are likely present in the collection, but they could not be identified without damaging specimens (removing front legs)

Figure S1: Maps displaying the proportions of adult (a) species of Belostomatinae and (b) species of *Pelocoris* within Modified Water Delivery (MWD) regions for water year 2016. Circles are scaled within each region relative to the density of individuals per square meter; scaling of circles is not consistent among panels.

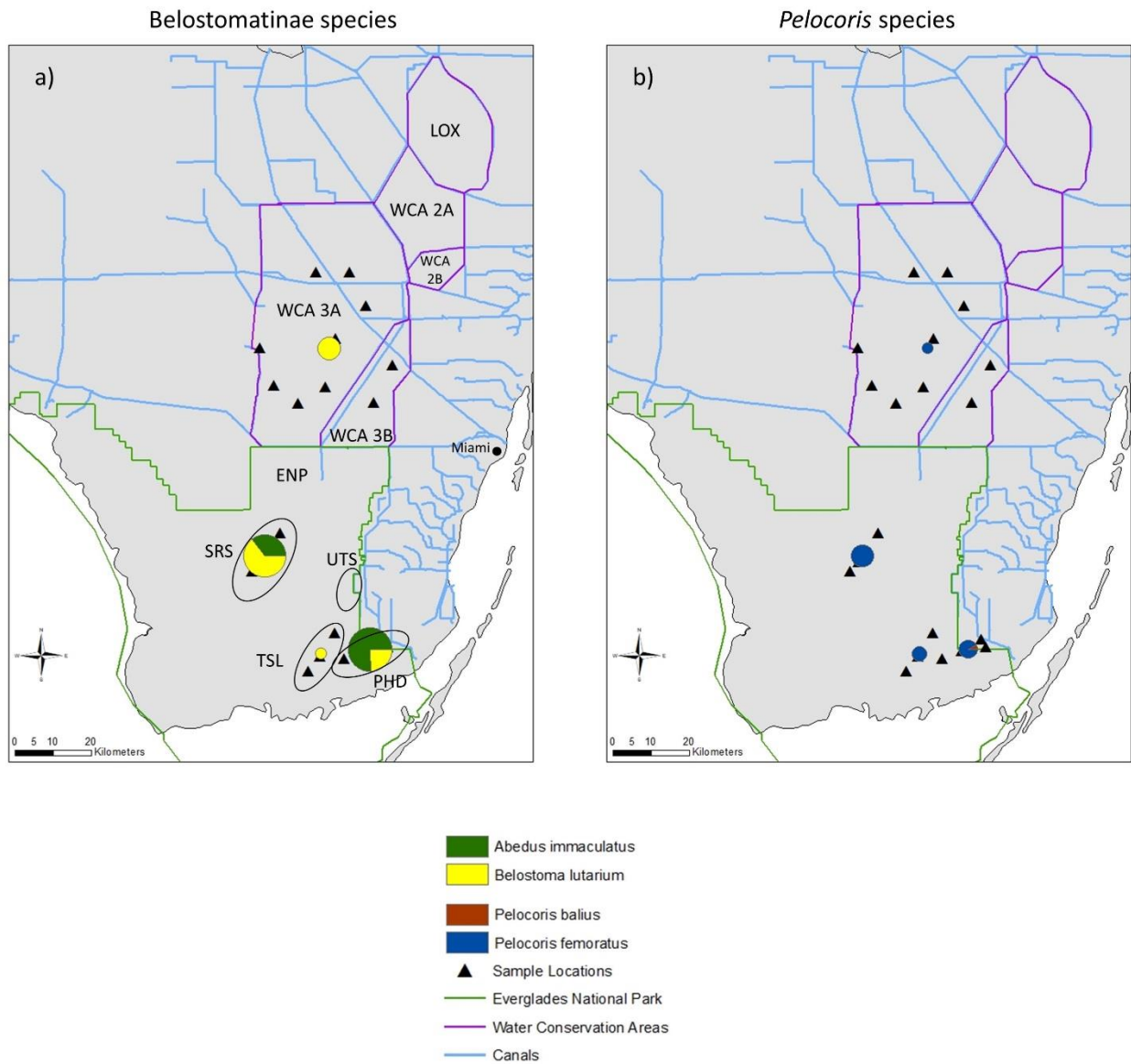


Figure S2: Maps displaying the proportions of adult (a–c) species of Belostomatinae and (d–f) species of *Pelocoris* within CERP LSUs for water year 2016 (left column), water year 2017 (center column) and both years combined (right column). Circles are scaled within each region relative to the density of individuals per square meter; scaling of circles is not consistent among panels.

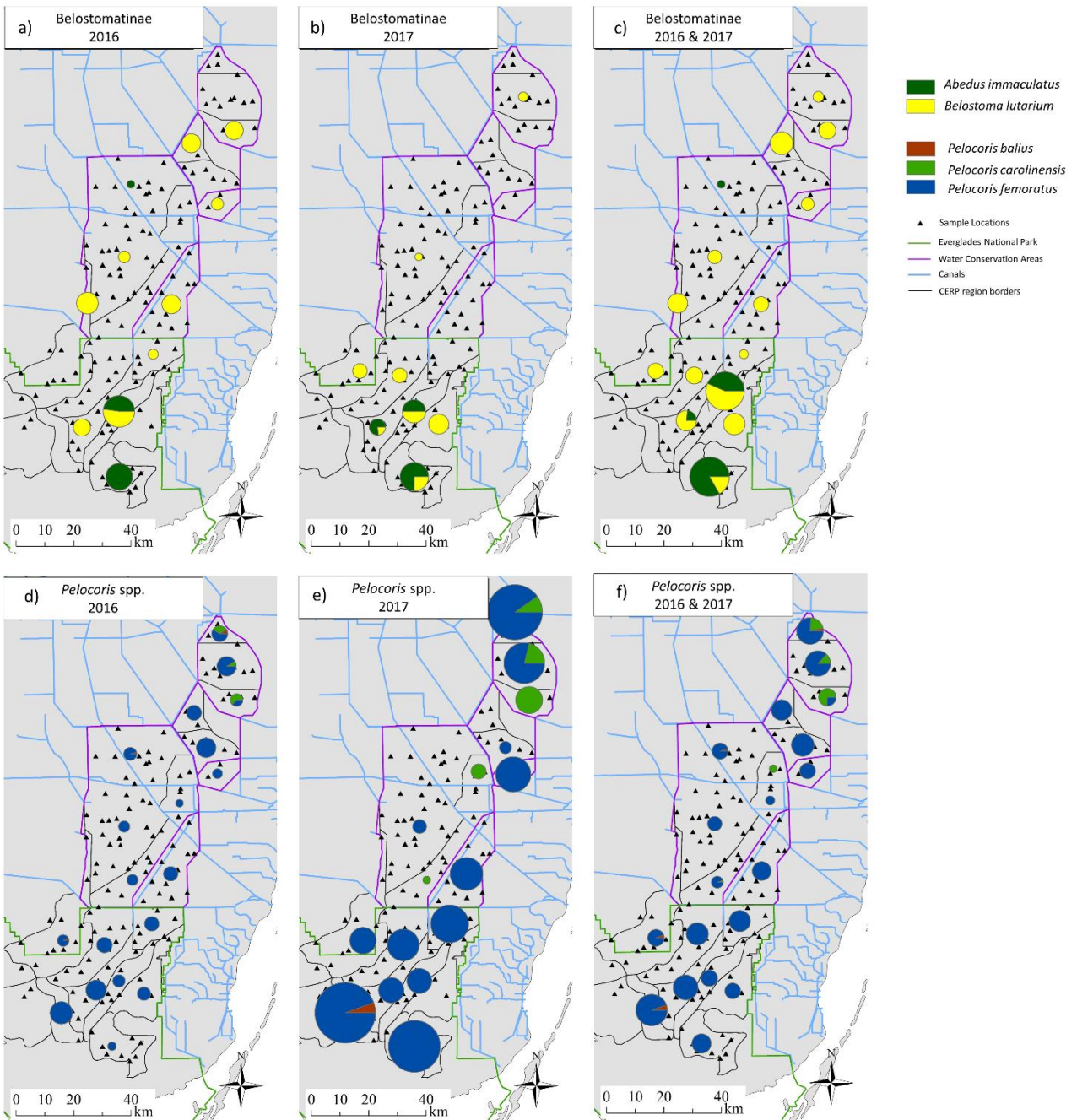


Figure S3: Adult densities (# individuals/m²) of all three species of *Pelocoris* at CERP sites during water years 2016 (left column) and 2017 (right column). Each point represents one primary sampling unit (PSU), with three throw traps collected at each PSU. Scaling of point sizes is consistent within species, but not among species.

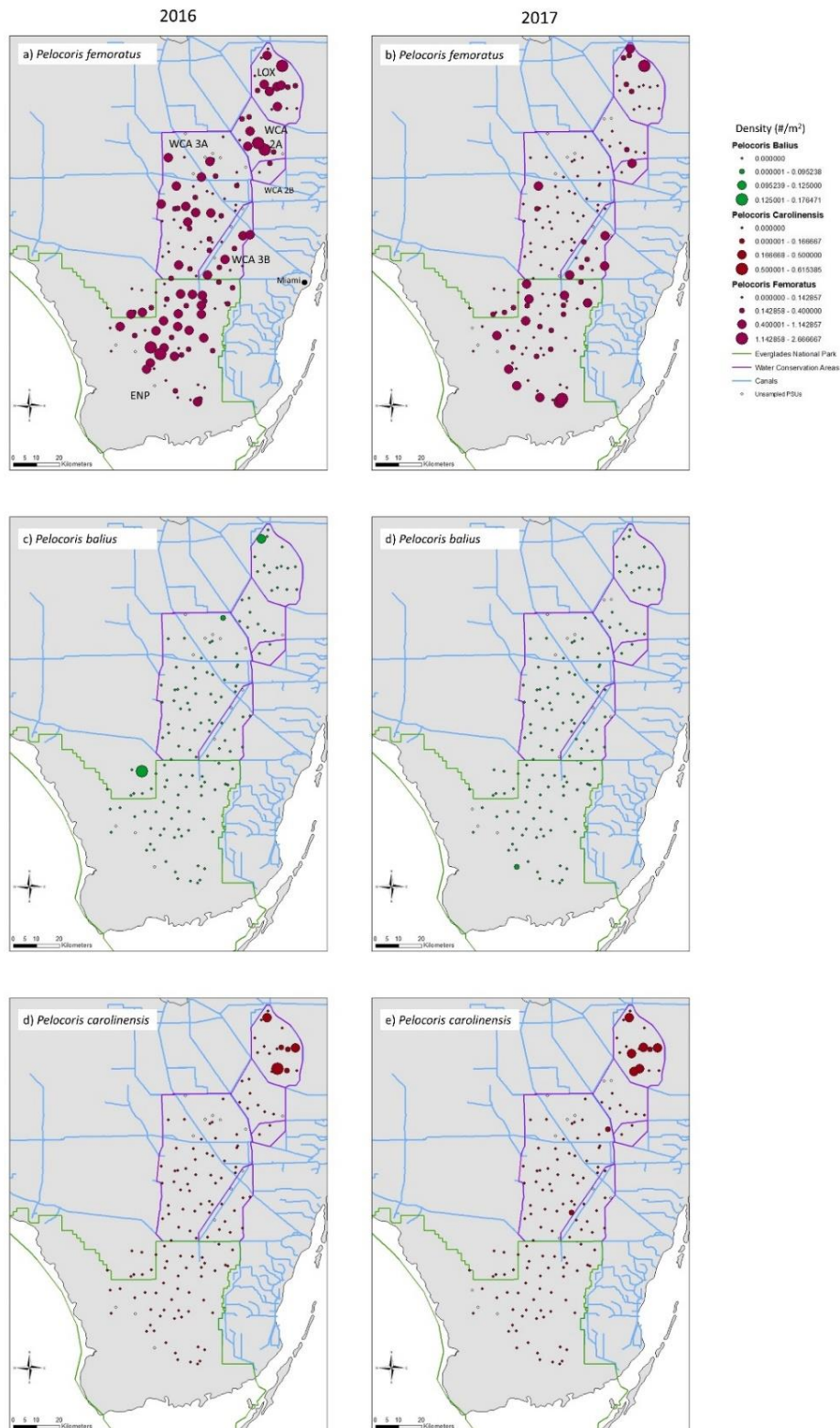


Figure S4: Adult density (# individuals/m²) maps of the two species of Belostomatinae collected in CERP samples during water years 2016 (left column) and 2017 (right column). Each point represents one primary sampling unit (PSU), with three throw traps collected at each PSU. Scaling of point sizes is consistent within species, but not among species.

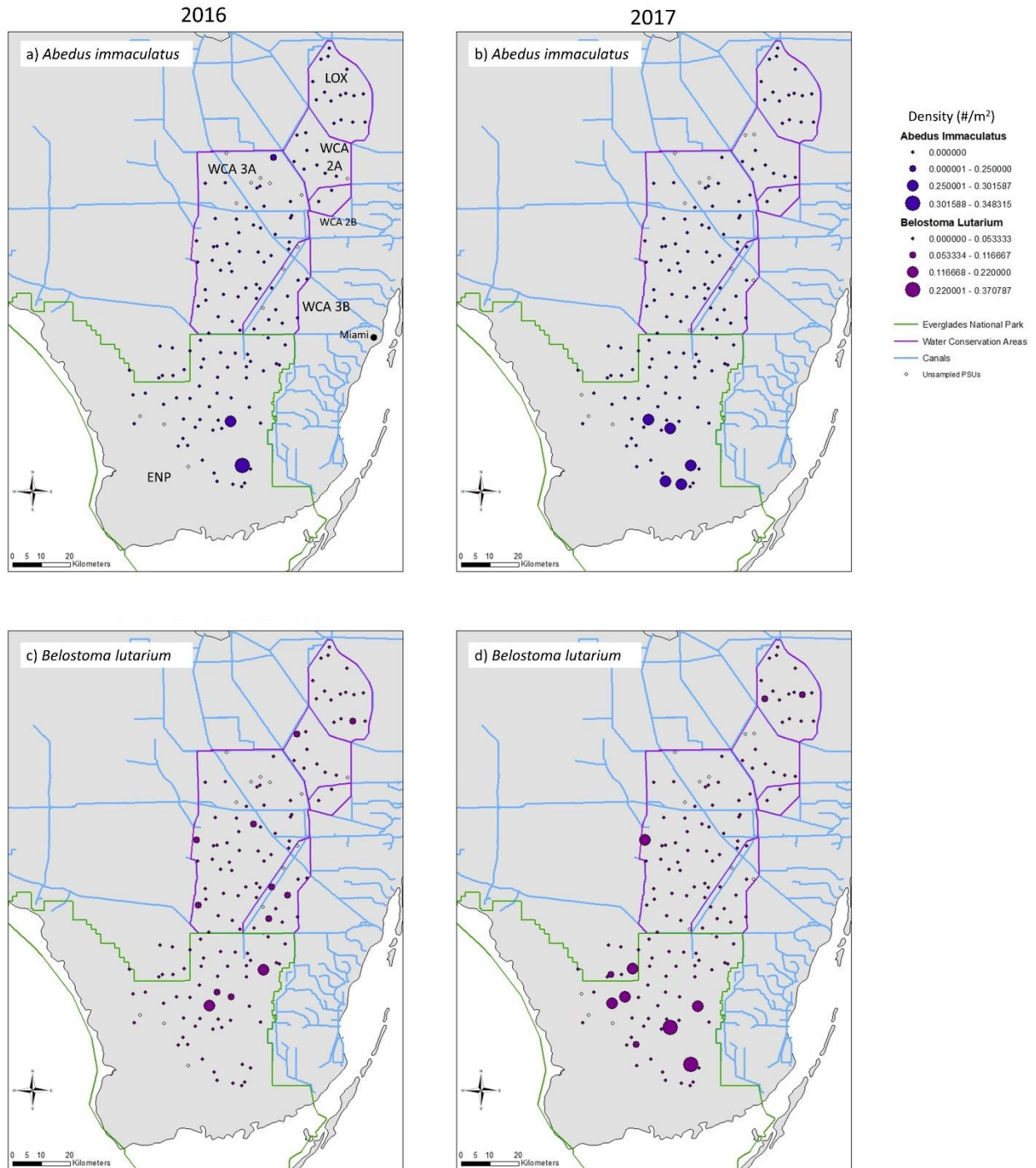


Figure S5: Dorsal photos of the to two adult female individuals of *Trepobates floridensis* we found in Everglades marsh samples. Both photos, but especially (b), illustrate the lighter coloration of this species in the Everglades than often observed elsewhere in Florida. (a) An individual collected from the Panhandle (PHD) region on 5 July 2017. (b) An individual collected from northeastern Everglades National Park 188 on 19 September 2016.



Figure S6: Lateral photos of the two adult female individuals of *Trepobates floridensis* individuals we found in Everglades marsh samples. Arrows point to mesopleural spots (MSP). (a) An individual collected from the Panhandle (PHD) region on 5 July 2017. (b) An individual collected from northeastern Everglades National Park on 19 September 2016.

