Supporting information Materials and Methods

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Estimating watershed-level shifts in water chemistry, biological diversity, and fish abundance.

Dissolved oxygen

To quantify the impact of *Hippopotamus amphibius* on dissolved oxygen (DO) concentration at the watershed scale, we used a two-step process. The first step involved estimating the DO concentration across the Greater Ruaha watershed under the observed *H. amphibius* densities (obtained from the 2015 dry season *H. amphibius* aerial census of the Greater Ruaha watershed conducted during our study). To do this, we calculated *H. amphibius* density for all river pools identified from the *H. amphibius* aerial census (n = 60 pools). This census identified all river pools that we deemed suitable for *H. amphibius* habitat and that were large enough to sustain aquatic biological diversity during the dry season. We calculated the volume for all focal pools on the ground as described previously. We then calculated pool volume for non-focal pools from satellite imagery and used an average pool depth that we calculated from field measurements of our focal *H. amphibius* pools.

To incorporate both *H. amphibius* density and pool volume, we categorized all *H. amphibius* pools into high- and low-density *H. amphibius* pools. This categorization was based on the 50% percentile for *H. amphibius* density (any pool that fell below the 50% percentile was deemed a low-density *H. amphibius* pool and any pool above the 50% percentile was termed high-density). Because there was no field observed relationship between pool volume and DO concentration in our focal pools, we plotted DO concentration against *H. amphibius* density for

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all our focal *H. amphibius* pools in the 2015 dry season (n = 6 high-density *H. amphibius* pools, n = 6 low-density *H. amphibius* pools). We fitted a trendline to these data ($P<0.001$; $r^2= 0.87$; Figure S4) and used the corresponding equation to estimate the DO concentration for non-focal *H. amphibius* pools of a given *H. amphibius* density. After assigning these values to all documented pools in the Greater Ruaha watershed, we estimated a grand mean value for the watershed by averaging across all 60 pools in the watershed

The second step involved estimating DO concentrations at the watershed scale in a hypothetical scenario in which all *H. amphibius* were absent from the Greater Ruaha watershed. To do this, we plotted *H. amphibius* density against DO concentration using only the data from our focal low-density *H. amphibius* pools for the 2015 dry season (n = 6 low-density *H. amphibius* pools). However, here we found no relationship between plotted *H. amphibius* density against DO concentration in this sub-set of pools. As such, we estimated the DO concentration of all pools across the Greater Ruaha watershed in this *H. amphibius* absent scenario using the average DO concentration of our low-density *H. amphibius* pools. After assigning these values to all documented pools in the Greater Ruaha watershed, we estimated a grand mean value for the watershed by averaging across all 60 pools in the watershed. Comparisons of the outputs generated from the two different scenarios were used to assess the net impact of *H. amphibius* on DO concentration of the Greater Ruaha watershed.

Fish and aquatic invertebrate diversity

We largely repeated a slightly modified version of the above described two-step approach to calculate the net impact of *H. amphibius* on fish diversity, aquatic invertebrate diversity, total fish abundance, and tilapia abundance in the Greater Ruaha watershed using data from the 2015 dry season. Fish and aquatic invertebrate diversity was measured using the integrative Hill number index and species richness.

To estimate the watershed-level Hill number fish diversity (i.e. gamma diversity) under the observed 2015 dry season *H. amphibius* densities, we combined data on field measured fish species composition and abundance from all focal *H. amphibius* pools (n = 6 high-density *H. amphibius* pools, n = 6 low-density *H. amphibius* pools). Because our 2015 dry season *H. amphibius* aerial surveys revealed that high- and low-density *H. amphibius* pools were not evenly distributed across the Greater Ruaha watershed (33 high-density *H. amphibius* pools and 27 low-density *H. amphibius* pools), we weighted the fish abundance values obtained from focal high- and low-density sampling by the observed availability of high- and low-density *H. amphibius* pools across the watershed. From this, we summed the resultant weighted fish data for both the high- and low-density *H. amphibius* pools to calculate a single Hill number estimate of fish diversity for the Greater Ruaha watershed (i.e. gamma diversity). To calculate the diversity of fish species in respect to species richness across the Greater Ruaha watershed, we summed the total number of unique fish species detected in focal sampling of both high- and low-density *H. amphibius* pools (see Table S5). We repeated the same process to calculate Hill number diversity and species richness for aquatic invertebrate diversity for the Greater Ruaha watershed.

Secondly, we estimated Hill number measured fish diversity (i.e. gamma diversity) across the Greater Ruaha watershed in the absence of *H. amphibius.* For analyses in this second scenario, we only used fish species composition and abundance from field sampling of focal low-density *H. amphibius* pools (n = 6 low-density *H. amphibius* pools). We summed fish abundance for each species across all low-density focal *H. amphibius* pools to calculate an aggregate Hill number fish diversity for the Greater Ruaha watershed largely lacking *H.*

amphibius. To estimate fish species richness in this scenario, we simply summed the total number of unique fish species found in each focal low-density *H. amphibius* pool (see Table S5). We repeated the same process to calculate Hill number diversity and special richness of aquatic invertebrate diversity for the Greater Ruaha watershed in a scenario largely lacking *H. amphibius*.

We estimated the net impact of *H. amphibius* abundance on fish diversity in the Greater Ruaha watershed by subtracting Hill number and species richness defined measures of fish diversity obtained in the scenario with *H. amphibius* from corresponding fish diversity measures obtained when *H. amphibius* were absent. The same calculation was applied to calculate the net impact of *H. amphibius* on aquatic invertebrate diversity.

Distribution of fish diversity across pools in the Greater Ruaha watershed.

For graphical representation of the distribution of Hill number fish diversity at the pool scale (i.e. alpha diversity) in the Greater Ruaha watershed, we estimated fish diversity under the observed *H. amphibius* densities during the 2015 dry season. To incorporate both *H. amphibius* density and pool volume, we categorized all *H. amphibius* pools into high and low-density *H. amphibius* pools using the same steps outlined above. For the 2015 dry season focal high-density pools, we found no relationship between fish diversity and pool volume. Furthermore, we found no relationship between *H. amphibius* density and fish diversity. Thus, we used the mean fish diversity calculated from our focal high-density *H. amphibius* pools as the estimate of fish diversity across all high-density *H. amphibius* pools in the Greater Ruaha watershed. However, for low-density *H. amphibius pools*, we found a significant linear relationship ($P=0.0005$) between pool volume and fish diversity. We plotted the trendline ($r^2= 0.96$; Figure S5) and used the resulting equation to calculate fish diversity for non-focal *H. amphibius* pools. This approach allowed us to assign alpha-level Hill number derived fish diversity values to all documented pools in the Greater Ruaha watershed (see Figure 6 in the main text).

Distribution of aquatic invertebrate diversity across pools in the Greater Ruaha watershed.

For graphical representation of the distribution of Hill number aquatic invertebrate diversity at the pool scale (i.e. alpha diversity) in the Greater Ruaha watershed, we estimated aquatic invertebrate diversity under the observed *H. amphibius* densities during the 2015 dry season. To incorporate both *H. amphibius* density and pool volume, we categorized all *H. amphibius* pools into high and low-density *H. amphibius* pools using the same steps outlined above. We found no relationship between aquatic invertebrate diversity and pool volume for both high-and low-density *H. amphibius* pools. As a result, we plotted *H. amphibius* density against aquatic invertebrate diversity using data from all focal *H. amphibius* pools (n = 6 high-density *H. amphibius* pools, n = 6 low-density *H. amphibius* pools). We fitted a trendline to these data (P = 0.002; r^2= 0.68; Figure S6) and used the corresponding equation to estimate the aquatic invertebrate diversity for non-focal *H. amphibius* pools of a given *H. amphibius* density. This approach allowed us to assign alpha-level Hill number derived aquatic invertebrate diversity values to all documented pools in the Greater Ruaha watershed (see Figure 6 in the main text).

Fish abundance

To estimate the relative changes in watershed-level fish abundance (the sum of all fish species) under the observed *H. amphibius* densities during the 2015 dry season, we categorized all *H. amphibius* pools into high and low-density *H. amphibius* pools as described above. For high-density *H. amphibius* we removed a single outlier pool that had ~14 times as many fish compared to other high-density *H. amphibius* pools. We found no relationship between fish abundance and pool volume for both high-and low-density *H. amphibius* pools. As a result, we plotted *H. amphibius* density against fish abundance using data from all focal *H. amphibius* pools (n = 5 high-density *H. amphibius* pools, n = 6 low-density *H. amphibius* pools). We used the fitted trendline ($P = 0.03$, $r^2 = 0.54$; Figure S7) to calculate relative fish abundance for all non-focal pools in the watershed. After assigning these values to each pool, we then summed these values across all pools to calculate the relative fish abundance in the Greater Ruaha watershed.

Secondly, we estimated total fish abundance in the absence of *H. amphibius*. As outlined in step one, we found no relationship between total fish abundance and pool volume, nor a relationship between total fish abundance and *H. amphibius* density using data only from low-density *H. amphibius* pools (n = 6 low-density *H. amphibius* pools). Consequently, we used the average fish abundance calculated from our focal low-density *H. amphibius* pools as an estimate of the total fish abundance in all low-density *H. amphibius* pools. After assigning each pool their value, we summed these data to calculate the total fish abundance for the Greater Ruaha watershed. The net impact of *H. amphibius* on total fish abundance of the Greater Ruaha watershed was calculated by subtracting total fish abundance obtained when *H. amphibius* were present from the total fish abundance obtained in the scenario without *H. amphibius* from the

Tilapia abundance

Potential impacts upon the relative changes in watershed-level tilapia abundance were examined separately owing to the nutritional and socio-economic importance of these fish. For these analyses, we only used data for the dominant tilapia species in our field count data (*Oreochromis urolepis*). As above, we first estimated relative tilapia abundance under the observed *H. amphibius* densities. Because of the relationship between fish abundance, pool volume, and *H.*

amphibius density, we split all the pools into high-and low-density *H. amphibius* pools, using the steps outline above. For our focal high-density *H. amphibius* pools (n = 6 high-density *H. amphibius* pools), we found a significant relationship between tilapia abundance and pool volume. We used the fitted trendline ($P = 0.05$; $r^2 = 0.76$; Figure S8) to estimate relative tilapia abundance for all high-density *H. amphibius* pools in the Greater Ruaha watershed. By contrast, we found no relationship between tilapia abundance and pool volume for our focal low-density *H. amphibius* pools (n = 6 low-density *H. amphibius* pools). Furthermore, we found no relationship between tilapia abundance and *H. amphibius* density for low-density *H. amphibius* pools. As such, we used the average tilapia abundance calculated from our focal low-density *H. amphibius* pools as an estimate of the relative tilapia abundance in all low-density *H. amphibius* pools. After assigning these values to each pool, we then summed these values across all pools to calculate the relative tilapia abundance in the Greater Ruaha watershed.

To estimate tilapia abundance in the absence of *H. amphibius*, we only used data from low-density *H. amphibius* pools (n = 6 low-density *H. amphibius* pools). As stated above, we found no relationship between tilapia abundance and pool volume, nor a relationship between tilapia abundance and *H. amphibius* density using data only from low-density *H. amphibius* pools (n = 6 low-density *H. amphibius* pools). Consequently, we used the average tilapia abundance calculated from our focal low-density *H. amphibius* pools as an estimate of the tilapia abundance in all low-density *H. amphibius* pools. After assigning each pool their value, we summed these data to calculate relative tilapia abundance for the Greater Ruaha watershed. The net impact of *H. amphibius* on relative tilapia abundance of the Greater Ruaha watershed was calculated by subtracting tilapia abundance obtained when *H. amphibius* were present from the tilapia abundance obtained in the scenario without *H. amphibius*.

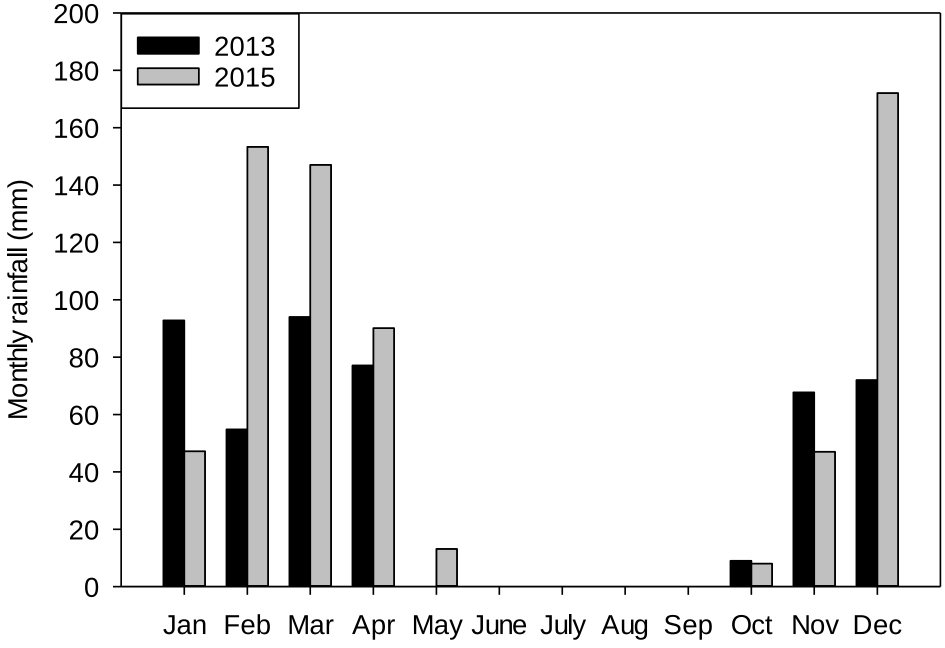

Figure S1: Monthly rainfall (mm) for Ruaha National Park, Tanzania, during 2013 and 2015. The hydrology of the Great Ruaha River tracked monthly rainfall. Although rainfall ceased in April and May, the Great Ruaha River maintained flow until mid-October. The river did not flow from mid-October until the rains arrived in late November. The rainfall in October did not result in significant increases in river flow at our study pools.

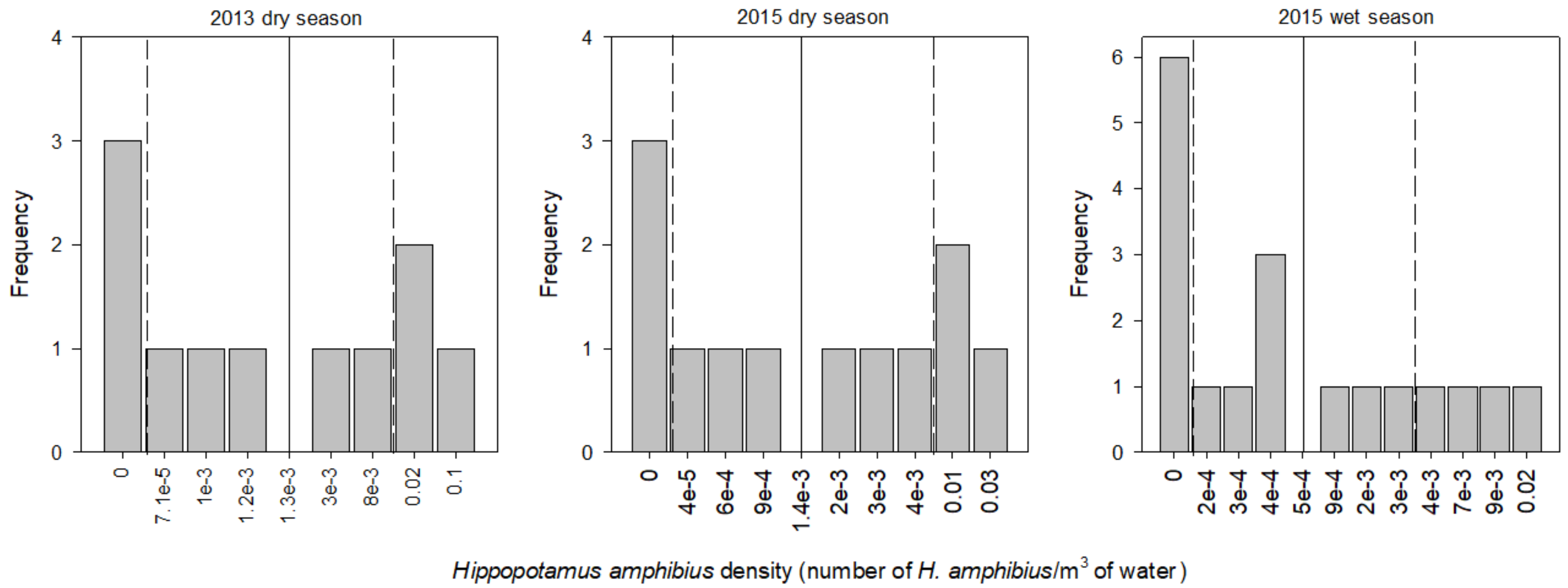

Figure S2: Frequency distribution of *Hippopotamus amphibius* density in river pools in the dry seasons of 2013 and 2015 as well as the wet season of 2015. We used the 50% quartile value (solid line) for each sampling period to differentiate between low- and high-density *H. amphibius* pools. In addition, we included the 25% and 75% percentile (dashed lines) and in most cases more pools were either below or above these percentiles, indicating good separation between treatments. Although a number of pools fell between the 25% and 50% percentile, the magnitude in difference between the highest density value below the 50% quartile and the lowest density above the 50% quartile was bigger than the magnitude in difference between the different densities below the 50% quartile. Thus, we are confident in using the 50% quartile value as a means of differentiating between low- and high-density *H. amphibius* pools.

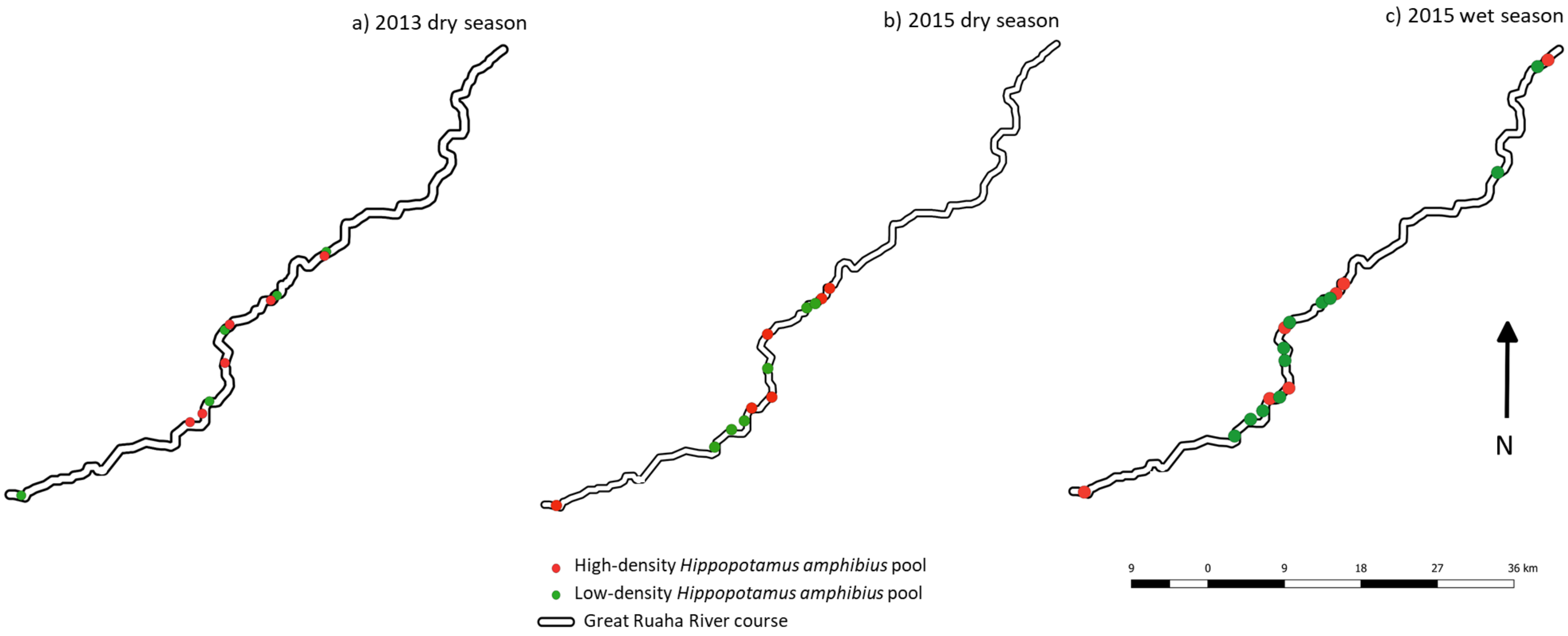

Figure S3: Map of study sites. High-and low-density *Hippopotamus amphibius* pools were interspersed across the study area of the Great Ruaha River for each of the three sampling periods: a) 2013 dry season, b) 2015 dry season, and c) 2015 wet season.

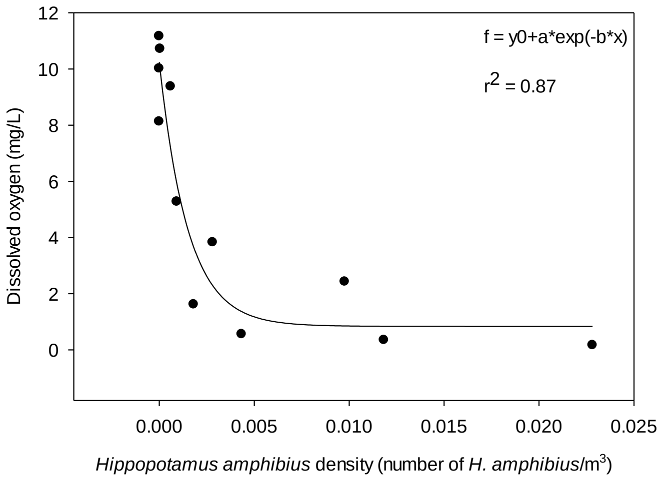

Figure S4: Relationship between dissolved oxygen (DO, mg/L) and *Hippopotamus amphibius* density plotted using data from all focal *H. amphibius* pools during the dry season of 2015. These data were used to estimate the DO concentration of all pools in the Greater Ruaha watershed.

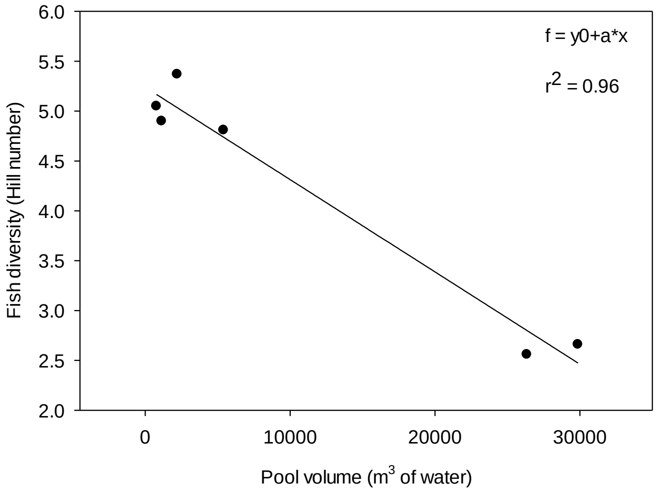

Figure S5: Relationship between fish diversity and pool volume plotted using data from low-density *H. amphibius* pools during the dry season of 2015. These data were used to estimate the fish diversity of all pools in the Greater Ruaha watershed.

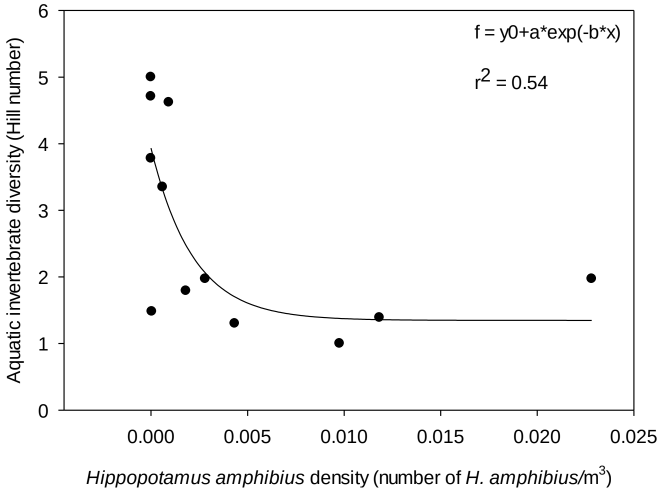

Figure S6: Relationship between aquatic invertebrate diversity and *Hippopotamus amphibius* density plotted using data from all focal *H. amphibius* pools during the dry season of 2015. These data were used to estimate the aquatic invertebrate diversity of all pools in the Greater Ruaha watershed.

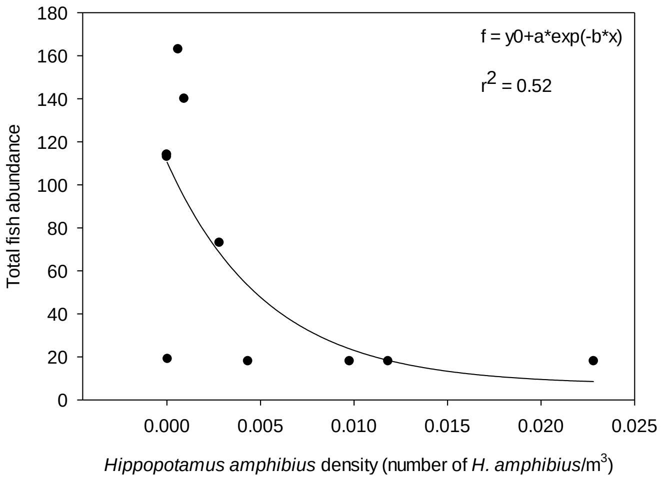

Figure S7: Relationship between total fish abundance and *Hippopotamus amphibius* density plotted using data from all focal *H. amphibius* pools during the dry season of 2015. These data were used to estimate the total fish abundance of all pools in the Greater Ruaha watershed.

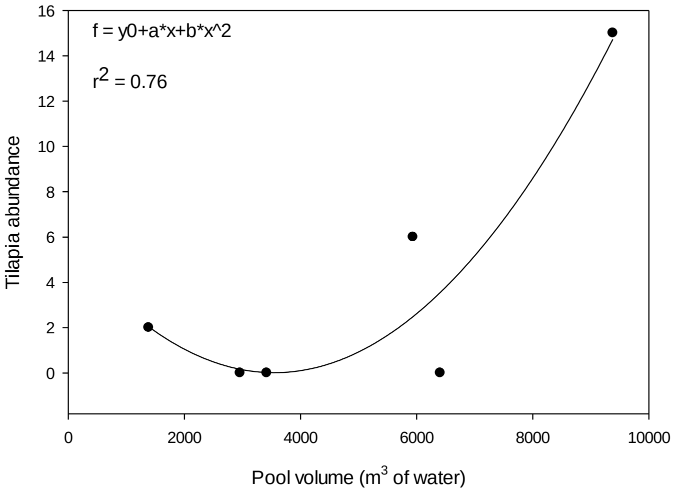

Figure S8: Relationship between tilapia abundance and pool volume plotted using data from high-density *H. amphibius* pools during the dry season of 2015. These data were used to estimate tilapia abundance of pools that were categorized as high-density *H. amphibius* pools in the Greater Ruaha watershed.

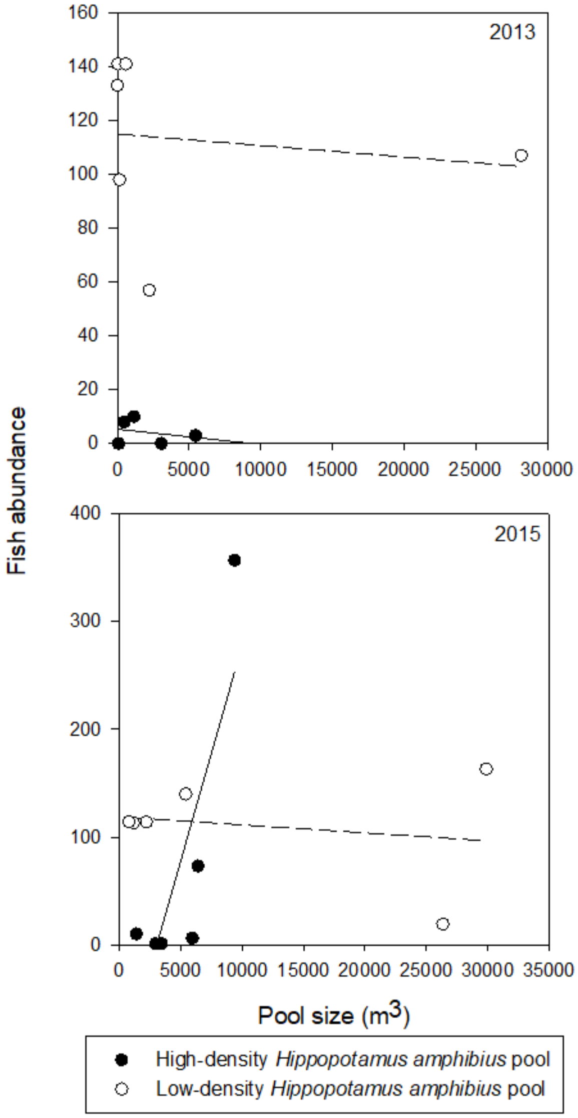

Figure S9: Comparison of fish abundance between low- and high-density *Hippopotamus amphibius* pools during the dry season of 2013 (top panel) and 2015 (bottom panel). Significant differences were observed between low- and high-density *H. amphibius* pools in 2013, with pool size not influencing abundance. However, in 2015, there was a significant interaction between pool size and abundance in low-and high-density pools. At smaller pool sizes, low-density *H. amphibius* pools had higher abundance of fishes. As the size of high-density *H. amphibius* pools increased, so did the abundance. In contrast, the abundance of fish remained relatively constant in low-density *H. amphibius* pools across all pool sizes.

Table S1: Pearson's correlation coefficient matrix for the nine water chemistry variables during the dry season of 2013. Statistically significantly correlations are in bold. P values are adjusted using Holm's (1979) correction of α for sequential analysis of the same null hypothesis

	DO	DOC	TDN	TDP	CHLA	PH	PP	PC	PN
DO	1	**-0.722**	**-0.718**	**-0.779**	**-0.697**	**0.991**	**-0.777**	**-0.711**	**-0.714**
DOC	**-0.722**	1	**0.805**	0.613	**0.919**	**-0.729**	**0.936**	**0.985**	**0.980**
TDN	**-0.718**	**0.805**	1	**0.878**	**0.732**	**-0.741**	**0.769**	**0.742**	**0.743**
TDP	**-0.779**	0.613	**0.878**	1	0.485	**-0.796**	0.569	0.534	0.533
CHLA	**-.0697**	**0.919**	**0.732**	0.485	1	**-0.711**	**0.976**	**0.952**	**0.966**
PH	**0.991**	**-0.729**	**-0.741**	**-0.796**	**-0.711**	1	**-0.786**	**-0.709**	**-0.714**
PP	**-0.777**	**0.936**	**0.769**	0.569	**0.976**	**-0.786**	1	**0.959**	**0.966**
PC	**-0.711**	**0.985**	**0.742**	0.534	**0.952**	**-0.709**	**0.959**	1	**0.998**
PN	**-0.714**	**0.980**	**0.743**	0.533	**0.966**	**-0.714**	**0.966**	**0.998**	1

Table S2: Pearson's correlation coefficient matrix for the nine water chemistry variables during the dry season of 2015. Statistically significantly correlations are in bold. P values are adjusted using Holm's (1979) correction of α for sequential analysis of the same null hypothesis

	DO	DOC	TDN	TDP	CHLA	pH	PP	PC	PN
DO	1	**-0.726**	**-0.8**	**-0.757**	0.080	**0.781**	**-0.775**	**-0.738**	**-0.742**
DOC	**-0.726**	1	**0.648**	**0.726**	0.001	**-0.704**	**0.888**	**0.945**	**0.940**
TDN	**-0.800**	**0.648**	1	**0.898**	-0.183	**-0.722**	**0.539**	**0.540**	**0.520**
TDP	**-0.757**	**0.726**	**0.898**	1	0.108	**-0.634**	**0.534**	**0.588**	**0.593**
CHLA	0.080	0.001	-0.183	0.108	1	0.042	-0.170	-0.108	-0.040
pH	**0.781**	**-0.704**	**-0.722**	**-0.634**	0.042	1	**-0.804**	**-0.762**	**-0.763**
PP	**-0.775**	**0.888**	0.539	0.534	-0.170	**-0.804**	1	**0.982**	**0.976**
PC	**-0.738**	**0.945**	0.540	0.588	-0.108	**-0.762**	**0.982**	1	**0.996**
PN	**-0.742**	**0.940**	0.520	0.593	-0.040	**-0.763**	**0.976**	**0.996**	1

Table S3: Pearson's correlation coefficient (r) between *Hippopotamus amphibius* pool water chemistry and fish and aquatic invertebrate diversity during the dry season of 2013 and 2015. Statistically significantly correlations are in bold. P values are adjusted using Holm's (1979) correction of α for sequential analysis of the same null hypothesis**.** DO = dissolved oxygen, CHL-a = chlorophyll a, DOC = dissolved organic carbon, TDN = total dissolved nitrogen, TDP = total dissolved phosphorus, PP = particulate phosphorus, PC = particulate carbon, PN = particulate nitrogen.

	DO	CHL-a	DOC	TDN	TDP	PP	PC	PN	pH
2013									
Fish diversity	0.47	-0.504	**-0.543**	**-0.605**	**-0.562**	**-0.580**	**-0.523**	-0.519	0.508
Aquatic invertebrate diversity	**0.775**	-0.451	-0.499	-0.476	**-0.575**	-0.554	-0.501	-0.500	**0.777**
2015									
Fish diversity	**0.753**	-0.094	-0.562	**-0.653**	**-0.694**	**-0.626**	**-0.620**	**-0.632**	**0.818**
Aquatic invertebrate diversity	**0.622**	-0.122	-0.412	-0.519	**-0.540**	**-0.547**	-0.510	-0.519	**0.752**

Table S4: Relative contribution of fish and aquatic invertebrate species to the overall species composition based on the Bray–Curtis similarity between high- and low-density *H. amphibius* pools during the 2013 dry season (from SIMPER analysis). The Dissimilarity/SD is an indicator for discriminating between preference groups because it incorporates a measure of variation across samples. Larger Dissimilarity/SD values indicate a larger percent dissimilarity across groups while having a smaller standard deviation. Finally, % contribution is the overall percentage of dissimilarity each species contributes to the overall dissimilarity between treatments. Information about the behavior, ecology, and DO tolerances is unfortunately lacking for many of these groups of less well studied East African fish and invertebrate lineages. Some of the species that persisted in high-density *H. amphibius* pools are known to have capacity to tolerate low DO conditions (e.g. *Oreochromis urolepis* and *Clarias gariepinus*).

	Relative contribution of species in low-density *H. amphibius* pools	Relative contribution of species in high-density *H. amphibius* pools	Diss/SD	% Contribution
Fish species				
Oreochromis urolepis	5.92	3.41	1.09	27.51
Brycinus affinis	4.07	1.34	1.09	18.60
Labeo cylindricus	3.51	0	1.69	17.60
Astatotilapia bloyeti	2.43	0	1.12	12.44
Clarias gariepinus	0	2.89	0.68	12.30
Labeo coubie	1	0.71	1.03	5.94
Labeo congoro	0.40	0	0.66	1.75
Hydrocynus vittatus	0.38	0	0.64	1.75
Enteromius radiates	0.20	0	0.42	1.14
Distichodus petersi	0.23	0	0.42	0.97
Invertebrate Order or Class				
Adult Coleoptera morphotype 1	6.01	7.53	1.42	21.42
Gastropoda morphotype 1	1.93	2.25	1.05	15.83
Larval Diptera morphotype 1	1.91	0	1.12	10.06
Adult Coleoptera morphotype 2	1.01	1.84	1.16	9.43
Larval Odonata	1.64	0	0.69	8.72
Adult Coleoptera morphotype 3	0	1.58	0.75	8.3
Decapod	1.45	0	0.44	8.27
Adult Hemiptera	1.21	0	0.44	6.58
Larval Diptera morphotype 2	0.91	0	0.44	5.08
Unionoida	0.63	0	0.44	3.28
Gastropoda morphotype 2	0.29	0	0.44	1.52
Arhynchobdellida	0.29	0	0.44	1.52

Table S5: Relative contribution of fish and aquatic invertebrate species to the overall species composition based on the Bray–Curtis similarity between high- and low-density *H. amphibius* pools during the 2015 dry season (from SIMPER analysis). The Dissimilarity/SD is an indicator for discriminating between preference groups because it incorporates a measure of variation across samples. Larger Dissimilarity/SD values indicate a larger percent dissimilarity across groups while having a smaller standard deviation. Finally, % contribution is the overall percentage of dissimilarity each species contributes to the overall dissimilarity between treatments. Information about the behavior, ecology, and DO tolerances is unfortunately lacking for many of these groups of less well studied East African fish and invertebrate lineages. Some of the species that persisted in high-density *H. amphibius* pools are known to have capacity to tolerate low DO conditions (e.g. *Oreochromis urolepis* and *Clarias gariepinus*).

	Relative contribution of species in low-density *H. amphibius* pools	Relative contribution of species in high-density *H. amphibius* pools	Diss/SD	% Contribution
Fish species				
Oreochromis urolepis	4.11	2.75	1.23	15.65
Brycinus affinis	1.8	3.24	0.91	14.6
Labeo cylindricus	3.4	0	1.95	13.15
Enteromius radiatus	2.69	0	1.04	9.99
Enteromius lineomaculatus	2.74	0.2	1.16	9.96
Schilbe intermedius	2.55	0	1.21	9.38
Labeo coubie	2.12	0	0.89	9.31
Labeo congoro	1.8	0	1.78	6.77
Synodontis matthesi	0	1.92	0.59	6.26
Distichodus petersi	0.89	0	0.95	3.77
Clarias gariepinus	0	0.2	0.44	0.63
Astatotilapia bloyeti	0.14	0	0.43	0.53
Invertebrate Order or Class				
Decapod	2.81	2.92	0.9	16.13
Adult Coleoptera morphotype 1	2.84	3.7	1.21	14.43
Adult Coleoptera morphotype 2	0.9	3.24	0.91	13.28
Gastropoda morphotype 1	3.20	0	1.30	12.39
Larval Odonata	3.04	0	1.07	11.91
Adult Coleoptera morphotype 3	0	2.85	0.78	11.24
Larval Diptera morphotype 1	2.09	0	1.11	7.99
Larval Diptera morphotype 2	1.54	0	0.69	6.06
Gastropoda morphotype 2	0.83	0	0.44	3.37
Gastropoda morphotype 3	0.36	0	0.44	1.65
Unionoida	0.31	0	0.44	1.20
Adult Hemiptera	0.07	0	0.44	0.34

Table S6: Relative contribution of fish and aquatic invertebrates to the overall species composition based on the Bray–Curtis similarity between high- and low-density *H. amphibius* pools during the 2015 wet season (from SIMPER analysis). The Dissimilarity/SD is an indicator for discriminating between preference groups because it incorporates a measure of variation across samples. Larger Dissimilarity/SD values indicate a larger percent dissimilarity across groups while having a smaller standard deviation. Finally, % contribution is the overall percentage of dissimilarity each species contributes to the overall dissimilarity between treatments. Information about the behavior, ecology, and DO tolerances is unfortunately lacking for many of these groups of less well studied East African fish and invertebrate lineages. Some of the species that persisted in high-density *H. amphibius* pools are known to have capacity to tolerate low DO conditions (e.g. *Oreochromis urolepis* and *Clarias gariepinus*).

	Relative contribution of species in low-density *H. amphibius* pools	Relative contribution of species in high-density *H. amphibius* pools	Diss/SD	% Contribution
Fish species				
Oreochromis urolepis	5.27	2.74	1.38	16.98
Brycinus affinis	3.21	3.45	1.28	16.15
Labeo congoro	0.63	3.25	1.21	12.32
Labeo coubie	2.98	2.91	1.45	12.24
Labeo cylindricus	1.76	2.57	1.13	10.88
Distichodus petersi	0.56	1.93	1.06	8.04
Astatotilapia bloyeti	1.16	0.89	0.88	5.67
Enteromius radiatus	1.18	0.54	1.11	5.43
Enteromius lineomaculatus	0.9	0.98	1.06	4.9
Schilbe intermedius	0.23	0.7	0.5	3.01
Clarias gariepinus	0	0.59	0.61	2.36
Synodontis matthesi	0	0.49	0.58	2.02
Invertebrate Order or Class				
Adult Gastropoda morphotype 1	5.31	2.45	1.29	24.84
Larval Odonata	5.17	6.05	1.28	17.73
Adult Coleoptera morphotype 1	3.38	1.69	1.32	17.27
Decapod	0.65	1.72	0.97	8.95
Larval Diptera morphotype 1	1.32	1.11	1.21	8.4
Adult Coleoptera morphotype 2	0.76	1.25	1.01	7.27
Larval Diptera morphotype 2	1.24	0.74	1.39	6.48
Adult Hemiptera	0.43	1.19	0.89	6.3
Unionoida	0.1	0.38	0.5	1.99
Gastropoda morphotype 2	0.17	0	0.31	0.76

Table S7: The current and predicted status of flow regimes in African freshwater bodies inhabited by *Hippopotamus amphibius*.

Country*	Hippo abundance**	Water source	Status	Anthropogenic threat	Reference
Botswana	2,000-4,000	Okavango Delta	Current and projected decrease in water flow	Climate change and water abstraction for agriculture, mining, and industry.	1, 2
		Chobe River	Current decrease in annual flood area	Climate change and water abstraction	3
		Linyati River	Data Deficient		
Burkina-Faso	1,500-2,000	Comoé-Léraba River	Current and projected decrease in water flow	Climate change and water abstraction	4
		Mékrou River	Increase in discharge	Land cover change surrounding the river results in increased runoff and river discharge	5
		Sourou River	Current and projected decrease in water flow	Climate change and water abstraction	4
		Black Volta River	Increase in dry season discharge and decrease in wet season discharge	Land cover change around the river causes an increase in dry season base flow	6
		Bougouriba River	Current and projected decrease in water flow	Climate change and water abstraction	4
		Arli River	Current and projected decrease in water flow	Climate change and water abstraction	4

Table S7 continued

Country*	Hippo abundance**	Water source	Status	Anthropogenic threat	Reference
Cameroon	1,500-2,000	Bénoué River	Current and projected decrease in water flow	Climate change and water abstraction	4
		Chari River	Current and projected decrease in water flow	Climate change and water abstraction	4
		Faro River	Current and projected decrease in water flow	Climate change and water abstraction	4
		Deo River	Current and projected decrease in water flow	Climate change and water abstraction	4
Democratic Republic of the Congo	5,000	Congo River	Current and projected decrease in water flow	Climate induced reduction in rainfall	7
		Bome River	Data Deficient		
		Rusizi River	Data Deficient		
		Aka River	Data Deficient		
		Dungu River	Data Deficient		
		Garamba River	Data Deficient		
Ethiopia	2,500	Omo River	Projected decrease in water flow	Water abstraction to meet water demands	8
		Awash River	Increased drought frequency and severity	Climate change	9

Table S7 continued

Country*	**Hippo abundance****	**Water source**	**Status**	**Anthropogenic threat**	**Reference**
Ethiopia	2,500	Great Abbi River	Data Deficient		
		Gibe River	Data Deficient		
		Lake Abaya	Current and projected further decrease in lake size	Climate change and increased sedimentation from misuse of land and resources around the river	10
		Lake Hawassa	Increase in lake size	Increased runoff from land use change	11
		Lake Langano	Decrease in lake size		12
		Lake Ziway	Decrease in lake size		13
		Lake Chamo	Current and projected further decrease in lake size	Climate change and increased sedimentation from misuse of land and resources around the river	10
Kenya	5,000-7,000	Lake Victoria	Data Deficient		
		Mara Basin	Current and projected decrease in water flow	Reduced flow from water abstraction for irrigation, livestock, human uses, and other industries	14, 15
Malawi		3,000	Lake Malawi	Data Deficient	

Table S7 continued

Country*	Hippo abundance**	Water source	Status	Anthropogenic threat	Reference
Malawi	3,000	Shire River	Current increased variability in river flow	Land cover change surrounding the river create greater variability in flow resulting in reduced base flows	16
Mozambique	3,000	Lake Cabora Bassa	Data Deficient		
		Zambezi River	Current and projected decrease in water flow	Climate change and decreased flow from the construction of dams and increased agriculture	17, 18
		Maputo River	Data Deficient		
		Save River	Data Deficient		
		Pungwe River	Projected decrease in water flow	Climate change creating greater variability in dry season flow	19
		Ruvuma River	Seasonal variation in natural flow	None documented	
Namibia	3,500	Linyati River	Data Deficient		
		Zambezi River	Current and projected decrease in water flow	Climate change and decreased flow from the construction of dams and increased agriculture	17
		Chobe River	Current decrease in annual flood area	Climate change and water abstraction	3
		Kwando River	Data Deficient		

Table S7 continued

Country*	**Hippo abundance****	**Water source**	**Status**	**Anthropogenic threat**	**Reference**
Namibia	3,500	Okavango River	Data Deficient		
South Africa	7,000	Pongola river	Current decrease in water flow	Construction of dams reduced overall river flow	20
		Lake St. Lucia	Current loss of inflow into the lake, reducing the size of the lake	Redirection of river flowing in to the lake as well as water abstraction from rivers flowing into the lake	21
		Kosi Bay	Data Deficient		
		Crocodile River	Current decrease in water flow	Water abstractions for agriculture, domestic consumption, inter-basin transfers, industry, and mining	22
		Olifants River	Current decrease in water flow	Water abstractions for agriculture, domestic consumption, inter-basin transfers, industry, and mining	22
		Letaba River	Current decrease in water flow	Water abstractions for agriculture, domestic consumption, inter-basin transfers, industry, and mining	22
		Shingwedzi River	Data Deficient		

Table S7 continued

Country*	Hippo abundance**	Water source	Status	Anthropogenic threat	Reference
South Africa	7,000	Sabie River	Current decrease in water flow	Water abstractions for agriculture, domestic consumption, industry, and mining	22
		Limpopo River	Current decrease in water flow	Reduced flow from water abstraction from weirs and dams	23
South Sudan	2,000-3,000	White Nile River	Data Deficient		
		Tonj River	Data Deficient		
		Jur (Sue) River	Data Deficient		
Tanzania	20,000	Kilombero River	Current and projected decrease in water flow	Climate change and water abstraction for irrigation	24
		Rufiji River	Current and projected decrease in water flow	Climate change and water abstraction for agriculture, livestock, and growing human population	24
		Ugalla River	Current and projected decrease in water flow	Climate change and water abstraction for agriculture and livestock	25, 26
		Great Ruaha River	Current and projected decrease in water flow	Climate change and water abstraction for agriculture	27

Table S7 continued

Country*	**Hippo abundance****	**Water source**	**Status**	**Anthropogenic threat**	**Reference**
Tanzania	20,000	Malagarassi River	Current and projected decrease in water flow	Climate change and reduced flow competing and unsustainable uses of land-based resources in upper catchments	28
		Mara Basin	Current and projected decrease in water flow	Climate change and water abstraction for irrigation, livestock, human uses, and other industries	14, 15, 29
Uganda	7,000-10,000	Lake Victoria	Data Deficient		
		Lake Kyoga	Data Deficient		
		Semliki River	Data Deficient		
		Kazinga channel	Data Deficient		
		White Nile	Data Deficient		
Zambia	40,000-45,000	Luangwa River	Data Deficient		
		Zambezi River	Current and projected decrease in water flow	Climate change and decreased flow from dam construction and increased agriculture	17
		Kafue River	Current	Dams for hydroelectric power altered natural flooding regimes	30
			Lufupa River	Data Deficient	

Table S7 continued

Country*	**Hippo abundance****	**Water source**	**Status**	**Anthropogenic threat**	**Reference**
Zimbabwe	5,000	Zambezi River	Current and projected decrease in water flow	Climate change and decreased flow from the construction of dams and increased agriculture	17
		Limpopo River	Current decrease in water flow	Reduced flow from water abstraction from weirs and dams	23

*Only countries with *Hippopotamus amphibius* populations >1000 individuals were used for this assessment

***Hippopotamus amphibius* abundance estimates obtained from the IUCN for *H. amphibius* (31)

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