

Supplement: Predictor Variable Selection and Modeled Partial Responses of Michigan Game Fish Biomass

Supplementary Table S.1. Local habitat constraints on each Michigan fishery reported in the literature (reported habitat parameter), local proxies for reported variables in the Michigan Rivers Inventory dataset (local proxy), and the landscape proxies matched to the local proxies (landscape [or modeled] proxy). Pearson correlation strengths (*R*) are listed for local versus landscape variable correlations.

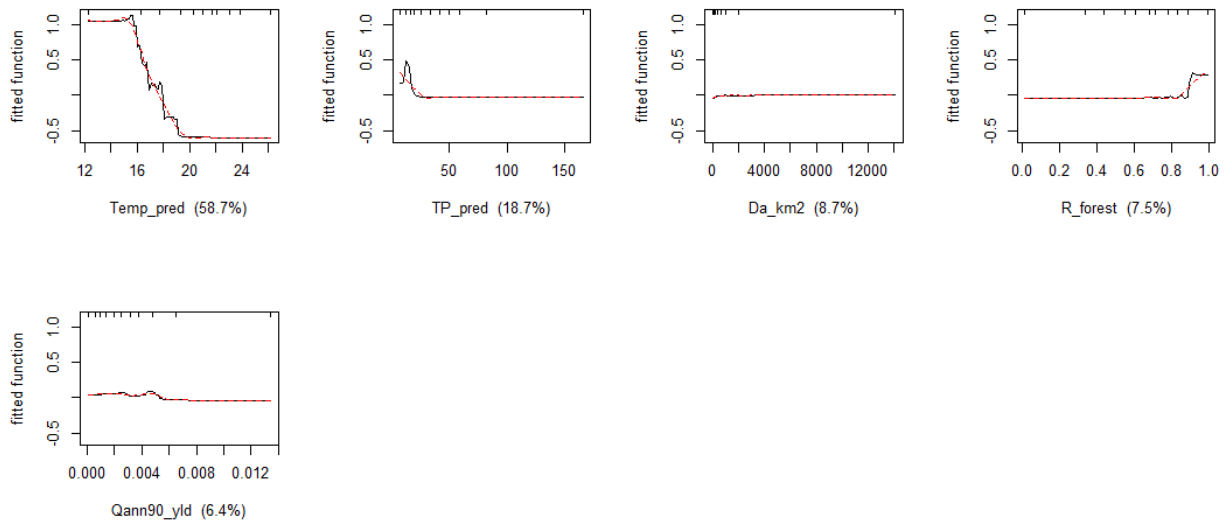
Species	Reported habitat parameter	Local proxy	Landscape (or modeled) proxy	Notes	Reference(s)
Brook Trout	% gravel	% gravel	No strong correlates to gravel	<i>R</i> = 0.30	Zorn et al. 2004
	% sand	% sand	% forest in local riparian zone		Zorn et al. 2004
	Brown Trout abundance		Brown Trout biomass		Zorn et al. 2004
	Cover		% forest in local riparian zone		Raleigh 1982
	Electrical conductance		Predicted total phosphorus		Raleigh 1982
	July temperature		Predicted water temperature		Zorn et al. 2004
	Stable banks	Bank stability	% forest in local riparian zone		Raleigh 1982
	Stable base flow		90% exceedance annual yield		Raleigh 1982
	Water depth	Depth	Upstream drainage area; 90% exceedance annual yield	<i>R</i> = 0.61	Zorn et al. 2004
Brown Trout	% gravel	% gravel	No strong correlates to gravel	<i>R</i> = 0.30	Zorn et al. 2004
	% sand	% sand	% forest in local riparian zone		Zorn et al. 2004
	Cover		% forest in local riparian zone		Raleigh et al. 1986
	Fish cover		% forest in local riparian zone		Raleigh et al. 1986
	High flows in winter/spring		10% exceedance annual discharge		Raleigh et al. 1986
	Low to moderate gradient		Gradient		Raleigh et al. 1986
	Nutrients increase production		Predicted total phosphorus		Merron 1982

Species	Reported habitat parameter	Local proxy	Landscape (or modeled) proxy	Notes	Reference(s)
Panfishes	Stable banks	Bank stability	% forest in local riparian zone		Raleigh et al. 1986
	Stable base flow		90% exceedance annual yield		Raleigh et al. 1986
	Summer temperature		Predicted water temperature		Zorn et al. 2004
	Water depth	Depth	Upstream drainage area; 90% exceedance annual yield	$R = 0.61$	Zorn et al. 2004
	% cobble	% cobble	% medium-textured geology in upstream riparian zone	$R = 0.29$	Page and Burr 1991
	Depth	Depth	Upstream drainage area	$R = 0.61$	Page and Burr 1991
	Forage availability		Predicted total phosphorus		Page and Burr 1991
	Low gradient	Gradient	Gradient		Page and Burr 1991
	Silt-free areas	% silt	Upstream drainage area	$R = 0.61$; $R = -0.35$	Page and Burr 1991
	Temperature		Predicted water temperature		Page and Burr 1991
	Vegetated stream margin		% nonforested wetland in local riparian zone		Page and Burr 1991
	Fine gravel or sand for spawning	% sand, % gravel	% forest in local riparian zone	$R = 0.30$ for correlation with sand; gravel not well correlated with landscape variables	Stuber et al. 1982
	Forage availability		Predicted total phosphorus		Stuber et al. 1982
	Smallmouth Bass	Low average water velocity		Median annual discharge	
Low gradient		Gradient	Gradient		Stuber et al. 1982
Percent fish cover					Stuber et al. 1982
Pool habitats		% pool habitat	Upstream drainage area		Stuber et al. 1982
Temperature			Predicted water temperature		Stuber et al. 1982
% bedrock		% bedrock	Upstream drainage area	$R = 0.19$	Zorn et al. 2004
% cobble		% cobble	% medium-textured geology in upstream riparian zone	$R = 0.29$	Zorn et al. 2004
% silt		% silt	Upstream drainage area; % upland forest in local riparian	$R = 0.61$; $R = -0.35$	Zorn et al. 2004

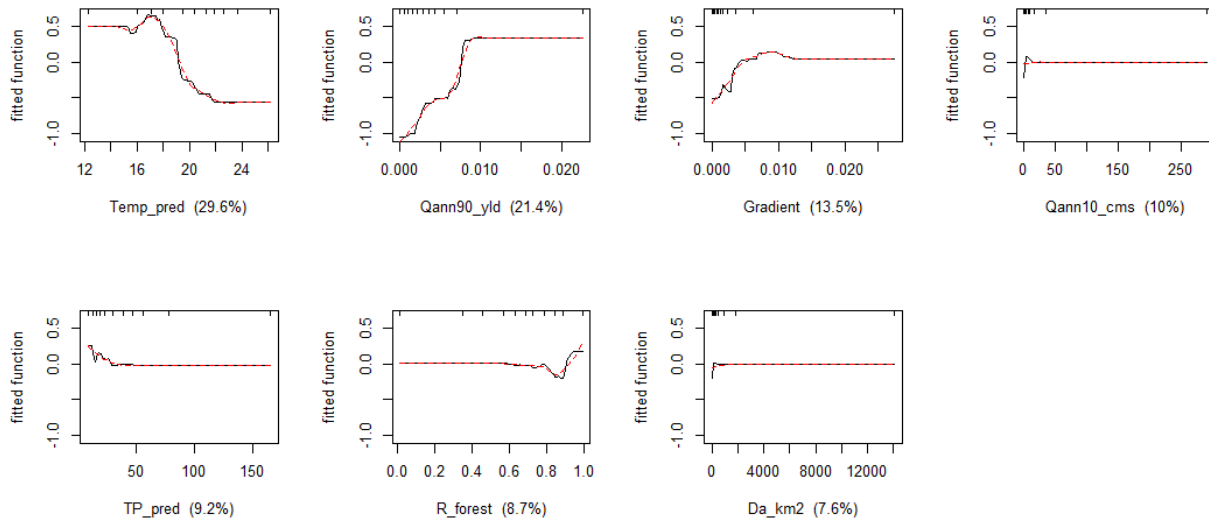
Species	Reported habitat parameter	Local proxy	Landscape (or modeled) proxy	Notes	Reference(s)
Walleye	Depth	Depth	zone Upstream drainage area; 90% exceedance annual yield	$R = 0.61$	Zorn et al. 2004
	July temperature		Predicted water temperature		Zorn et al. 2004
	Total phosphorus		Predicted total phosphorus		Zorn et al. 2004
	Aquatic vegetation, trees, logs, boulders		% forest in local riparian zone		Kerr et al. 1997
	Flooded marshes		% nonforested wetland in local riparian zone		Kerr et al. 1997
	Gravel/cobble	% gravel, % cobble	% medium-textured geology in upstream riparian zone		Kerr et al. 1997
	Presence of dams		Dam downstream		Kerr et al. 1997
	Sandy substrate	% sand	% forest in local riparian zone	$R = 0.30$	Kerr et al. 1997
	Spring flow velocity		Median discharge in April		Kerr et al. 1997
	Spring water temperature				Kerr et al. 1997
	Trophic state		Predicted total phosphorus		Kerr et al. 1997
	Water depth	Depth	Upstream drainage area	$R = 0.61$	Kerr et al. 1997

Supplementary Figure S.1. Partial response curves for each predictor in each model for standing crops of Michigan game fishes. The y-axes are presented in $\log_e(\text{kg/ha})$ and are centered around the mean response across the entire range of each x-axis. The relative importance value (Table 3) of each predictor is given in parentheses. The black line represents the mean response; the red line is a smoothed version of that response using LOESS (locally weighted scatter plot smoothing) regression (Temp_pred = predicted July mean temperature; TP_pred = predicted base flow total phosphorus; Da_km2 = upstream drainage area; R_forest = forest land cover in the local riparian zone; Qann90_yld = 90% exceedance flow yield; Qann10_cms = 10% annual exceedance flow; Qann50_cms = 50% annual exceedance flow; R_nonfor_wet = nonforested wetlands in the local riparian zone; Rt_medium = medium-grain surficial geology in the upstream riparian buffer; R_forest_upland = upland forest cover in the local riparian zone; Damupst_length = distance to the nearest upstream dam; Wt_crs_outw = coarse and outwash geology in the upstream catchment; Damdnt = presence or absence of a dam downstream).

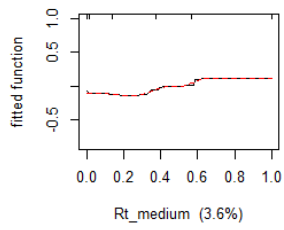
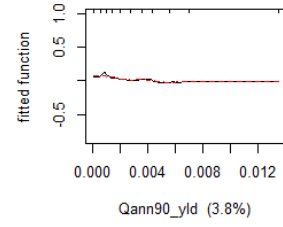
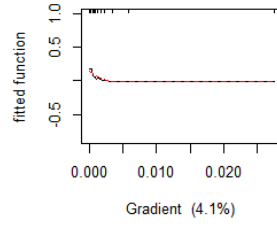
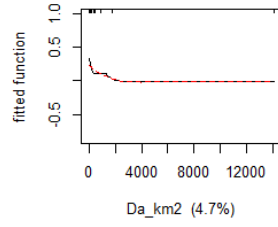
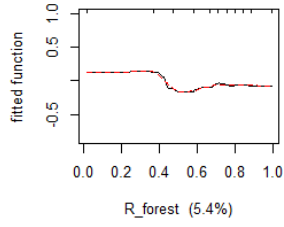
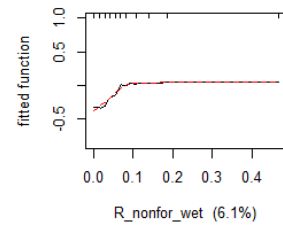
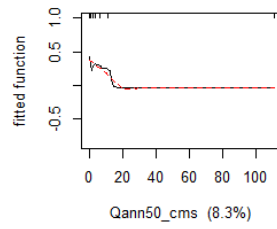
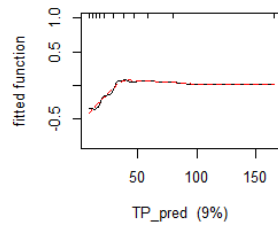
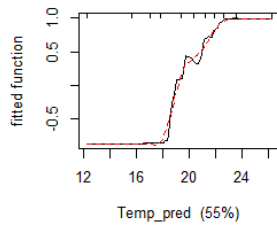
Brook Trout



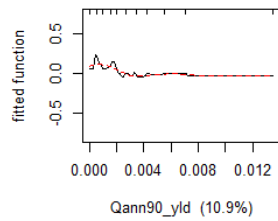
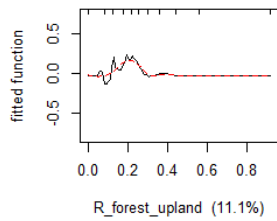
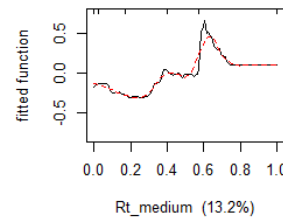
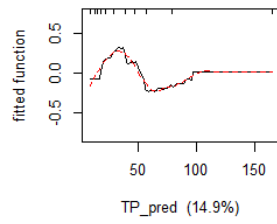
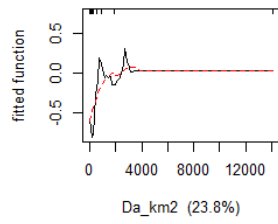
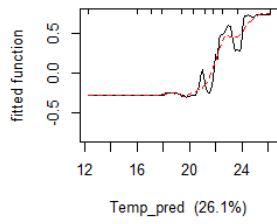
Brown Trout



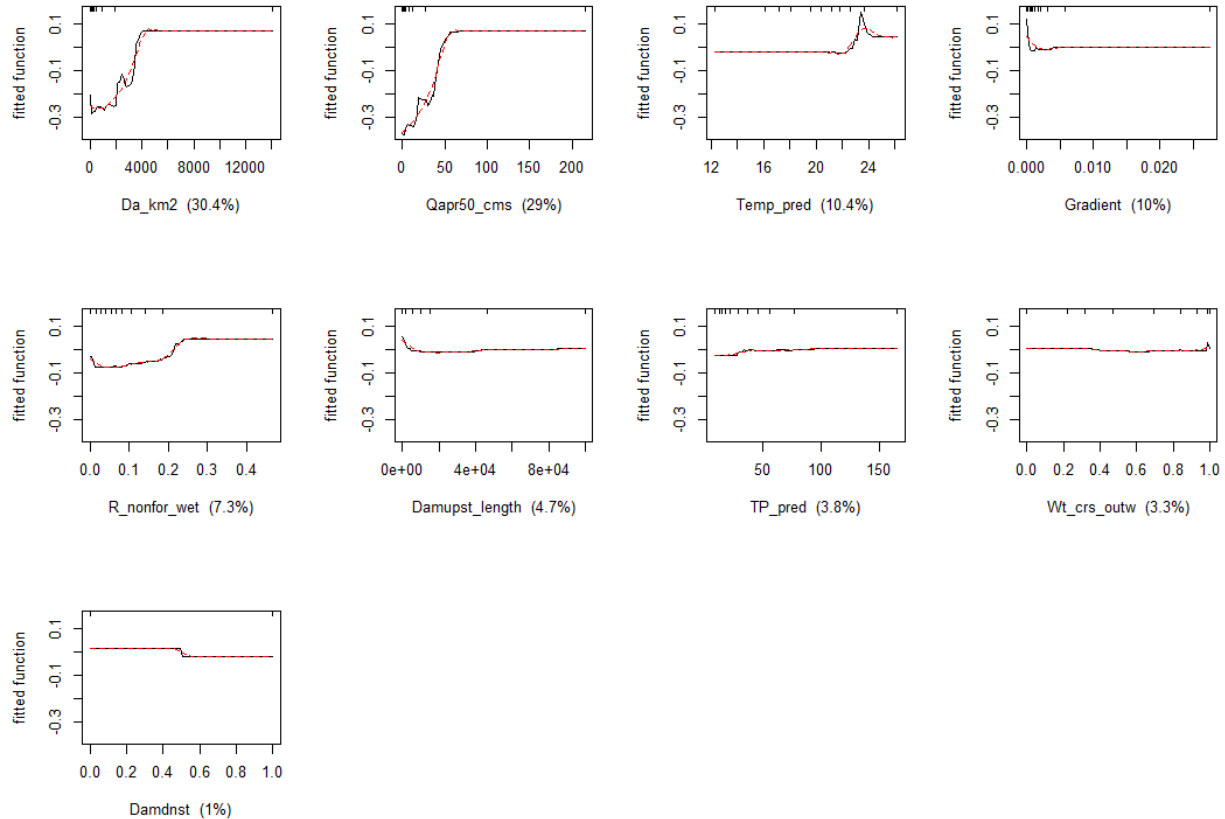
Panfishes



Smallmouth Bass



Walleye



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