

## PROGRESS REPORT & PRELIMINARY DATA:

### Qualitative comparison of aquatic habitats and fish species diversity, today and 50 years ago, in the Platte and North Platte rivers of Nebraska

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The Platte River Trust is studying temporal changes in the aquatic habitats and fish species composition of the Platte and North Platte rivers in Nebraska. More than 50 years ago, Johnson conducted a study of the distribution of fishes in Nebraska.<sup>1</sup> The Trust has returned to sites sampled by Johnson and has repeated fish collections there. For both fish species and aquatic habitats, we are comparing our data, reflecting current conditions, with Johnson's historic information.

For the habitats, we are comparing both qualitative descriptions and photographic records of the sites in this study. For the fish fauna, we are examining changes in species diversity and species composition at the selected sites. Johnson sampled fish by seining; the Trust has combined seining with electroshocking in its sampling.

Between 1992 and 1994, the Trust revisited and sampled six of Johnson's sites on the North Platte and Platte rivers between Sutherland and Grand Island. At three of those sites, we have also conducted sampling repeatedly in successive years.

The most dramatic changes in the riverine habitat have occurred at the westernmost sites, between Sutherland and Lexington. Further downstream, from Kearney to Grand Island, the habitat retains more of its historic character (Figures 1 and 2).

Fish species composition has apparently changed at all the study sites (Tables 1-6). Some changes are due to introductions of exotic species that have occurred since Johnson's study (e.g., western mosquitofish and brook silverside at the Grand Island site; Table 5). In other cases, species have disappeared from the Trust's more recent collections (e.g., all the *Hybognathus* and *Carpoides* species at the Lexington site; Table 3).

Species richness declined at the three most upstream study sites, between Sutherland and Lexington (Tables 1-3). Richness increased at one site (Kearney; Table 4) and remained constant at two sites (near Grand Island; Tables 5-6). The most dramatic change occurred at Lexington, where species richness in the Trust's sample was only 59% of what Johnson found (10 versus 17 species; Table 3).

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<sup>1</sup> Johnson, R. E. 1942. The distribution of Nebraska fishes. Dissertation, University of Michigan. 152+ pp.

Figure 1. North Platte River north of Sutherland, Nebraska. Top photograph taken on 22 July 1939. Bottom photograph taken on 8 November 1993.

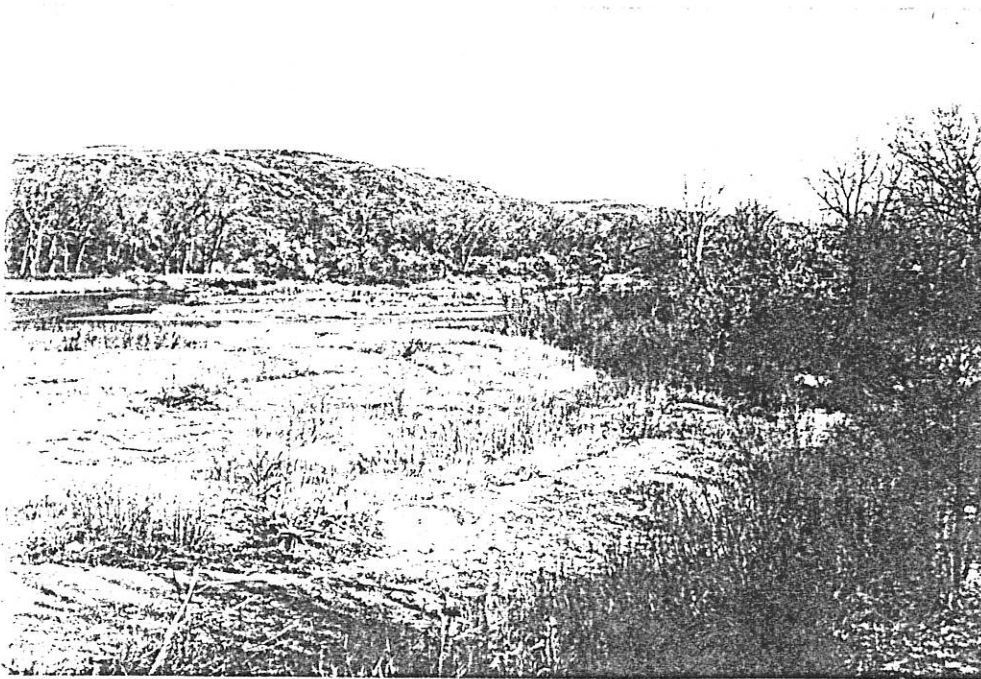
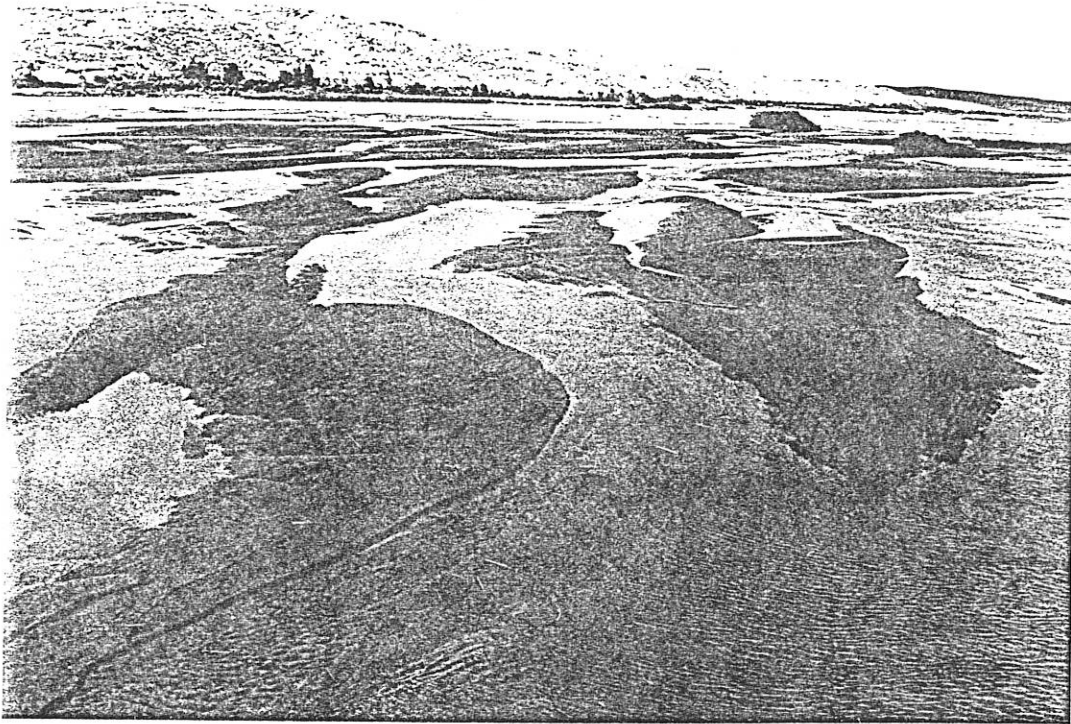


Figure 2. Platte River near the Highway 34 bridge, east of Grand Island, Nebraska. Top photograph taken on 18 July 1939; note that there was no flow in the river on that day. Bottom photograph taken on 17 November 1993.



Table 1. Fish species observed in the North Platte River north of Sutherland. Comparison of species composition and species richness of collections by Johnson, in 1939, and the Platte River Trust, in 1993.

family	common name	scientific name	Johnson 1939	Trust 1993
Cyprinidae	central stoneroller	<i>Campostoma anomalum</i>		•
	red shiner	<i>Cyprinella lutrensis</i>	•	•
	common carp	<i>Cyprinus carpio</i>		
	western silvery minnow	<i>Hybognathus argyritis</i>		
	brassy minnow	<i>H. hankinsoni</i>	•	
	plains minnow	<i>H. placitus</i>		•
	speckled chub	<i>Macrhybopsis aestivalis</i>		
	golden shiner	<i>Notemigonus crysoleucas</i>		
	emerald shiner	<i>Notropis atherinoides</i>		
	river shiner	<i>N. blennioides</i>		
	bigmouth shiner	<i>N. dorsalis</i>	•	•
	sand shiner	<i>N. stramineus</i>	•	•
	suckermouth minnow	<i>Phenacobius mirabilis</i>		
	fathead minnow	<i>Pimephales promelas</i>	•	•
	flathead chub	<i>Platygobio gracilis</i>		
	creek chub	<i>Semotilus atromaculatus</i>	•	
Catostomidae	river carpsucker	<i>Carpiodes carpio</i>		
	quillback	<i>C. cyprinus</i>	•	
	white sucker	<i>Catostomus commersoni</i>	•	
	golden redhorse	<i>Moxostoma erythrurum</i>	•	
Ictaluridae	channel catfish	<i>Ictalurus punctatus</i>		
Cyprinodontidae	plains killifish	<i>Fundulus zebrinus</i>	•	•
Poeciliidae	western mosquitofish	<i>Gambusia affinis</i>		
Atherinidae	brook silverside	<i>Labidesthes sicculus</i>		
Gasterosteidae	brook stickleback	<i>Culaea inconstans</i>		
Centrarchidae	green sunfish	<i>Lepomis cyanellus</i>		
	orangespotted sunfish	<i>L. humilis</i>		
	bluegill	<i>L. macrochirus</i>		
	largemouth bass	<i>Micropterus salmoides</i>		
	white crappie	<i>Pomoxis annularis</i>	•	
Percidae	black crappie	<i>P. nigromaculatus</i>		
	Iowa darter	<i>Etheostoma exile</i>		
	yellow perch	<i>Perca flavescens</i>		
TOTAL NUMBER OF SPECIES COLLECTED			11 species	7 species

Table 2. Fish species observed in the Platte River at Brady. Comparison of species composition and species richness of collections by Johnson, in 1939, and the Platte River Trust, in 1993.

family	common name	scientific name	Johnson 1939	Trust 1993
Cyprinidae	central stoneroller	<i>Campostoma anomalum</i>		
	red shiner	<i>Cyprinella lutrensis</i>	•	•
	common carp	<i>Cyprinus carpio</i>		
	western silvery minnow	<i>Hybognathus argyritis</i>		
	brassy minnow	<i>H. hankinsoni</i>	•	
	plains minnow	<i>H. placitus</i>		
	speckled chub	<i>Macrhybopsis aestivalis</i>		
	golden shiner	<i>Notemigonus crysoleucas</i>		
	emerald shiner	<i>Notropis atherinoides</i>		
	river shiner	<i>N. blennioides</i>		
	bigmouth shiner	<i>N. dorsalis</i>	•	•
	sand shiner	<i>N. stramineus</i>	•	•
	suckermouth minnow	<i>Phenacobius mirabilis</i>		
	fathead minnow	<i>Pimephales promelas</i>		•
	flathead chub	<i>Platygobio gracilis</i>		
creek chub	<i>Semotilus atromaculatus</i>			
Catostomidae	river carpsucker	<i>Carpionodes carpio</i>		
	quillback	<i>C. cyprinus</i>		
	white sucker	<i>Catostomus commersoni</i>	•	
	golden redhorse	<i>Moxostoma erythrurum</i>		
Ictaluridae	channel catfish	<i>Ictalurus punctatus</i>		
Cyprinodontidae	plains killifish	<i>Fundulus zebrinus</i>	•	•
Poeciliidae	western mosquitofish	<i>Gambusia affinis</i>		
Atherinidae	brook silverside	<i>Labidesthes sicculus</i>		
Gasterosteidae	brook stickleback	<i>Culaea inconstans</i>		
Centrarchidae	green sunfish	<i>Lepomis cyanellus</i>		
	orangespotted sunfish	<i>L. humilis</i>		
	bluegill	<i>L. macrochirus</i>		
	largemouth bass	<i>Micropterus salmoides</i>	•	
	white crappie	<i>Pomoxis annularis</i>		
	black crappie	<i>P. nigromaculatus</i>		
Percidae	Iowa darter	<i>Etheostoma exile</i>		
	yellow perch	<i>Perca flavescens</i>		
TOTAL NUMBER OF SPECIES COLLECTED			7 species	5 species

Table 3. Fish species observed in the **Platte River south of Lexington**. Comparison of species composition and species richness of collections by Johnson, in 1940, and the Platte River Trust, in 1993.

family	common name	scientific name	Johnson 1940	Trust 1993
Cyprinidae	central stoneroller	<i>Campostoma anomalum</i>	•	
	red shiner	<i>Cyprinella lutrensis</i>	•	•
	common carp	<i>Cyprinus carpio</i>	•	•
	western silvery minnow	<i>Hybognathus argyritis</i>	•	
	brassy minnow	<i>H. hankinsoni</i>	•	
	plains minnow	<i>H. placitus</i>	•	
	speckled chub	<i>Macrhybopsis aestivalis</i>		
	golden shiner	<i>Notemigonus crysoleucas</i>		
	emerald shiner	<i>Notropis atherinoides</i>		
	river shiner	<i>N. bleenni</i>	•	
	bigmouth shiner	<i>N. dorsalis</i>	•	•
	sand shiner	<i>N. stramineus</i>	•	•
	suckermouth minnow	<i>Phenacobius mirabilis</i>	•	
	fathead minnow	<i>Pimephales promelas</i>	•	•
	flathead chub	<i>Platygobio gracilis</i>		
	creek chub	<i>Semotilus atromaculatus</i>	•	•
Catostomidae	river carpsucker	<i>Carpionodes carpio</i>	•	
	quillback	<i>C. cyprinus</i>	•	
	white sucker	<i>Catostomus commersoni</i>	•	•
	golden redhorse	<i>Moxostoma erythrurum</i>		
Ictaluridae	channel catfish	<i>Ictalurus punctatus</i>		
Cyprinodontidae	plains killifish	<i>Fundulus zebrinus</i>	•	•
Poeciliidae	western mosquitofish	<i>Gambusia affinis</i>		
Atherinidae	brook silverside	<i>Labidesthes sicculus</i>		
Gasterosteidae	brook stickleback	<i>Culaea inconstans</i>		
Centrarchidae	green sunfish	<i>Lepomis cyanellus</i>		
	orangespotted sunfish	<i>L. humilis</i>		
	bluegill	<i>L. macrochirus</i>		•
	largemouth bass	<i>Micropterus salmoides</i>		•
	white crappie	<i>Pomoxis annularis</i>		
	black crappie	<i>P. nigromaculatus</i>		
Percidae	Iowa darter	<i>Etheostoma exile</i>		
	yellow perch	<i>Perca flavescens</i>	•	
TOTAL NUMBER OF SPECIES COLLECTED			17 species	10 species

Table 4. Fish species observed in the Platte River south of Kearney. Comparison of species composition and species richness of collections by Johnson, in 1939, and the Platte River Trust, in 1992 and 1993.

family	common name	scientific name	Johnson 1939	Trust 1992	Trust 1993
Cyprinidae	central stoneroller	<i>Campostoma anomalum</i>			
	red shiner	<i>Cyprinella lutrensis</i>	•	•	•
	common carp	<i>Cyprinus carpio</i>		•	
	western silvery minnow	<i>Hybognathus argyritis</i>			
	brassy minnow	<i>H. hankinsoni</i>			
	plains minnow	<i>H. placitus</i>	•		•
	speckled chub	<i>Macrhybopsis aestivalis</i>			
	golden shiner	<i>Notemigonus crysoleucas</i>			
	emerald shiner	<i>Notropis atherinoides</i>			
	river shiner	<i>N. blennioides</i>	•	•	•
	bigmouth shiner	<i>N. dorsalis</i>		•	
	sand shiner	<i>N. stramineus</i>	•	•	•
	suckermouth minnow	<i>Phenacobius mirabilis</i>			
	fathead minnow	<i>Pimephales promelas</i>	•	•	•
	flathead chub	<i>Platygobio gracilis</i>			
creek chub	<i>Semotilus atromaculatus</i>				
Catostomidae	river carpsucker	<i>Carpionodes carpio</i>	•		
	quillback	<i>C. cyprinus</i>			
	white sucker	<i>Catostomus commersoni</i>		•	
	golden redhorse	<i>Moxostoma erythrurum</i>			
Ictaluridae	channel catfish	<i>Ictalurus punctatus</i>		•	•
Cyprinodontidae	plains killifish	<i>Fundulus zebrinus</i>	•	•	•
Poeciliidae	western mosquitofish	<i>Gambusia affinis</i>		•	•
Atherinidae	brook silverside	<i>Labidesthes sicculus</i>			
Gasterosteidae	brook stickleback	<i>Culaea inconstans</i>			
Centrarchidae	green sunfish	<i>Lepomis cyanellus</i>			
	orangespotted sunfish	<i>L. humilis</i>			
	bluegill	<i>L. macrochirus</i>			•
	largemouth bass	<i>Micropterus salmoides</i>			
	white crappie	<i>Pomoxis annularis</i>			
	black crappie	<i>P. nigromaculatus</i>			•
Percidae	iowa darter	<i>Etheostoma exile</i>			•
	yellow perch	<i>Perca flavescens</i>			
TOTAL NUMBER OF SPECIES COLLECTED			7 spp	10 spp	11 spp

Table 5. Fish species observed in the Platte River near Grand Island. Comparison of species composition and species richness of collections by Johnson, in 1939 and 1940, and the Platte River Trust, in 1991–1994.

family	common name	scientific name	Johnson 1939	Johnson 1940	Trust 1991	Trust 1992	Trust 1993	Trust 1994
Cyprinidae	central stoneroller	<i>Campostoma anomalum</i>				•		•
	red shiner	<i>Cyprinella lutrensis</i>	•	•	•	•	•	•
	common carp	<i>Cyprinus carpio</i>	•	•	•	•		
	western silvery minnow	<i>Hybognathus argyritis</i>		•				
	brassy minnow	<i>H. hankinsoni</i>	•	•	•			
	plains minnow	<i>H. placitus</i>	•	•	•			
	speckled chub	<i>Macrhybopsis aestivalis</i>	•		•			
	golden shiner	<i>Notemigonus crysoleucas</i>						
	emerald shiner	<i>Notropis atherinoides</i>	•					
	river shiner	<i>N. blennioides</i>	•	•	•		•	•
	bigmouth shiner	<i>N. dorsalis</i>	•	•	•	•	•	•
	sand shiner	<i>N. stramineus</i>	•	•	•	•	•	•
	suckermouth minnow	<i>Phenacobius mirabilis</i>						
	fathead minnow	<i>Pimephales promelas</i>		•	•	•	•	•
	flathead chub	<i>Platygobio gracilis</i>	•					
	creek chub	<i>Semotilus atromaculatus</i>	•					
Catostomidae	river carpsucker	<i>Carpionodes carpio</i>	•		•		•	•
	quillback	<i>C. cyprinus</i>	•					
	white sucker	<i>Catostomus commersoni</i>		•				•
	golden redhorse	<i>Moxostoma erythrurum</i>						
Ictaluridae	channel catfish	<i>Ictalurus punctatus</i>				•	•	•
Cyprinodontidae	plains killifish	<i>Fundulus zebrinus</i>	•	•	•	•	•	•
Poeciliidae	western mosquitofish	<i>Gambusia affinis</i>			•	•	•	
Atherinidae	brook silverside	<i>Labidesthes sicculus</i>				•		•
Gasterosteidae	brook stickleback	<i>Culaea inconstans</i>					•	
Centrarchidae	green sunfish	<i>Lepomis cyanellus</i>			•	•		•
	orangespotted sunfish	<i>L. humilis</i>						
	bluegill	<i>L. macrochirus</i>				•	•	•
	largemouth bass	<i>Micropterus salmoides</i>		•	•		•	•
	white crappie	<i>Pomoxis annularis</i>						
	black crappie	<i>P. nigromaculatus</i>						
Percidae	Iowa darter	<i>Etheostoma exile</i>		•				
	yellow perch	<i>Perca flavescens</i>						
TOTAL NUMBER OF SPECIES COLLECTED			14 spp	13 spp	14 spp	12 spp	10 spp	13 spp



Table 6. Fish species observed in sand pits along the Platte River near Grand Island. Comparison of species composition and species richness of collections by Johnson, in 1939, and the Platte River Trust, in 1993 and 1994. Numbers in column heads (e.g., Trust 1, 2, and 3) refer to individual sand pits that were sampled.

family	common name	scientific name	John. 1 1939	John. 2 1939	Trust 1 1993	Trust 1 1994	Trust 2 1993	Trust 2 1994
Cyprinidae	central stoneroller	<i>Camptostoma anomalum</i>						
	red shiner	<i>Cyprinella lutrensis</i>						
	common carp	<i>Cyprinus carpio</i>						
	western silvery minnow	<i>Hybognathus argyritis</i>						
	brassy minnow	<i>H. hankinsoni</i>						
	plains minnow	<i>H. placitus</i>						
	speckled chub	<i>Macrhybopsis aestivalis</i>						
	golden shiner	<i>Notemigonus crysoleucas</i>		•				
	emerald shiner	<i>Notropis atherinoides</i>						
	river shiner	<i>N. blennioides</i>						
	bigmouth shiner	<i>N. dorsalis</i>						
	sand shiner	<i>N. stramineus</i>						
	suckermouth minnow	<i>Phenacobius mirabilis</i>						
	fathead minnow	<i>Pimephales promelas</i>						
	flathead chub	<i>Platygobio gracilis</i>						
creek chub	<i>Semotilus atromaculatus</i>							
Catostomidae	river carpsucker	<i>Carpionodes carpio</i>						
	quillback	<i>C. cyprinus</i>						
	white sucker	<i>Catostomus commersoni</i>						
	golden redhorse	<i>Moxostoma erythrurum</i>						
Ictaluridae	channel catfish	<i>Ictalurus punctatus</i>						
Cyprinodontidae	plains killifish	<i>Fundulus zebrinus</i>						
Poeciliidae	western mosquitofish	<i>Gambusia affinis</i>						
Atherinidae	brook silverside	<i>Labidesthes sicculus</i>					•	•
Gasterosteidae	brook stickleback	<i>Culaea inconstans</i>						
Centrarchidae	green sunfish	<i>Lepomis cyanellus</i>		•				
	orangespotted sunfish	<i>L. humilis</i>	•	•				
	bluegill	<i>L. macrochirus</i>			•	•	•	•
	largemouth bass	<i>Micropterus salmoides</i>			•	•	•	•
	white crappie	<i>Pomoxis annularis</i>		•				
	black crappie	<i>P. nigromaculatus</i>	•				•	•
Percidae	Iowa darter	<i>Etheostoma exile</i>						
	yellow perch	<i>Perca flavescens</i>						
TOTAL NUMBER OF SPECIES COLLECTED			2 spp	4 spp	2 spp	2 spp	4 spp	4 spp