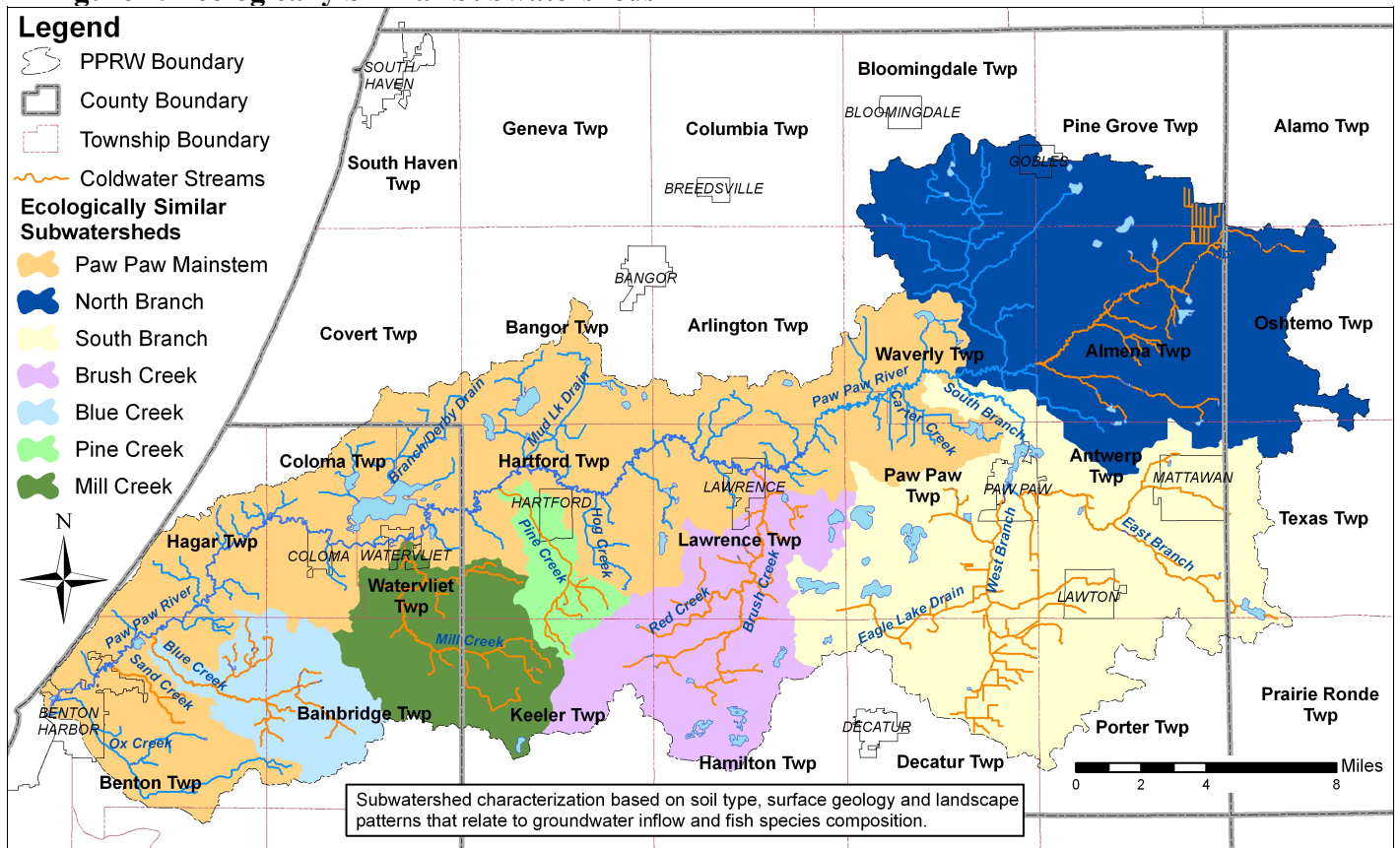


Ecologically Similar Subwatersheds of the Paw Paw River

The Paw Paw River and its tributaries can be characterized in terms of ecologically similar subwatersheds. Similarities within each subwatershed include soil types, surface geology, and landscape patterns that relate to groundwater inflow and fish species composition. These subwatersheds are illustrated in Figure 1 and described below:

- ***Paw Paw Mainstem*** - this system originates at the confluence of the North and South Branch and flows centrally through the watershed in a southwest direction to the Saint Joseph River.
- ***North Branch*** - this system consists of Campbell Creek, outlet of Wolf Lake, Hayden Creek, Brandywine Creek, and several other small lake outlets.
- ***South Branch*** - this system consists of the East Branch, main South Branch, and several drains.
- ***Brush Creek*** - this system consists of Red Creek, White Creek, and main Brush Creek.
- ***Blue Creek*** - this system consists of Yellow Creek, main Blue Creek, and several unnamed streams.
- ***Pine Creek*** - this system consists of Pine Creek and several drains.
- ***Mill Creek*** - this system consists of Mill Creek and several drains.

Figure 1. Ecologically Similar Subwatersheds



Habitat Variables

Fish distribution and abundance in glaciated Midwestern streams can largely be accounted for by relatively few habitat variables. Data related to these variables has been collected in the Paw Paw River Watershed. The results are summarized in Table 1 to illustrate the classification by subwatershed conditions. The habitat parameters are described below:

- The importance of stream size, measured as **catchment area**, is both well known and documented (Zorn et al. 2002).
- **Low flow yield**, defined as 90% exceedence flow divided by catchment area, is a measure of groundwater contribution to streams and an index of important parameters such as stream temperature, hydrologic stability, and current velocity.
- **Summer temperature** (July monthly average) is one of the major factors affecting growth, survival, and distribution of fish.

Table 1. PPRW Habitat Parameters

Subwatershed	Stream	Location	Catchment Area (SqMi)	Low Flow Yield	Summer Temperature
Mainstem	Paw Paw River	Lawrence	267.2	.6772	69.5
Mainstem	Paw Paw River	59 ½ Street	283.4	.8649	67.6
Mainstem	Paw Paw River	County Line Rd	325.5	.5559	70.0
Mainstem	Paw Paw River	Watervliet Dam	373.4	.6147	71.8
Mainstem	Paw Paw River	Colfax Ave	430.5	.424	72.2
North Branch	North Branch	35 th Ave	63.3	.8033	67.1
North Branch	Brandywine Creek	38 th Ave	30.8	N/A*	64.0
North Branch	Hayden Creek	Almena Rd	18.2	.7437	63.4
North Branch	Campbell Creek	South of 28 th	4.6	.9161	54.9
South Branch	South Branch	CR 665	100	.6383	73.2
South Branch	East Branch	CR 653	33.8	N/A*	62.7
Brush Creek	Brush Creek	CR 360	8.9	.466	62.2
Blue Creek	Blue Creek	Red Arrow Hwy	32.4	N/A*	66.8

* Data not yet collected

Species Composition

Species richness is typically higher in southern Michigan streams, like the Paw Paw River, as a result of an overlap in regions that support intolerant coldwater species and tolerant warm water species. The most common species found in each subwatershed are described below:

- **Paw Paw Mainstem** - A diverse fish assemblage exists in the mainstem of the Paw Paw River where lacustrine sand and gravel geology and abundant floodplain forests provide diverse habitats. Common fish species consist of hornyhead chub, common shiner, Johnny darter, smallmouth bass, and burbot (Dexter 1991). Floodplain forest and wetlands along the mainstem provide excellent habitat for northern pike. The fish community near the mouth of

the river is influenced by the Lake Michigan fish assemblage, where salmonines have access to most of the river. Common fish assemblages of the lower Paw Paw River include flathead and channel catfish, freshwater drum, and several redhorse and longnose suckers. There is one fish, lake sturgeon, found in this river reach that is listed state threatened and uses the river for seasonal spawning and juvenile habitat. Several smaller low gradient, low groundwater input, and warm tributaries within this subwatershed drain wetlands or lakes and support tolerant cyprinids.

- **North Branch** - This subwatershed drains areas of moderate groundwater inflow. These waters support coldwater species including mottled sculpin, blacknose dace, brown, rainbow, and brook trout, creek and hornyhead chub, white sucker, Johnny and rainbow darter, and common shiner.
- **South Branch** - This subwatershed drains areas of large groundwater inflow. The South Branch Paw Paw River historically supported coldwater species of fish, but currently supports species commonly grouped with tolerant coolwater species. The East Branch has the highest groundwater inflow in the watershed and therefore is more stable and less affected by major precipitation events. The East Branch supports coldwater species with dominant species indicative of transitional water temperatures in the lower impounded areas.
- **Brush Creek** - This stream supports coolwater fish in the lower segments and coldwater species in the headwaters.
- **Blue Creek** - This stream supports coolwater species including burbot, pirate perch, central mudminnow, and additional intolerant coldwater fish.
- **Pine Creek** - This stream supports coolwater species and warmwater species including smallmouth bass, grass pickerel, and rockbass.
- **Mill Creek** - This stream supports coolwater species and warmwater species including smallmouth bass, grass pickerel, and rockbass.