

What Does the River Remember?

A beginning to a history of aquatic life



Decorative fish imagery supplied by T. P. Calhoun from a ceramic plate. It is included for its place in the story and is not offered as a taxonomic reconstruction of native Upper Ohio fishes.

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Researched, conceived, directed, and edited by T. P. Calhoun

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East Liverpool, Ohio

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A note before I start

This is a first pass at a much larger river history. I have cited what I could verify and said where the evidence thins out. The numbered citations lead to the references at the back, and those references link to the scans, reports, databases, and institutional records themselves.

I began with a muddy memory

It started with a small memory. Somewhere between the upstream end of Babbs Island and the Ohio shore, near Ohio Avenue, I believe my great uncle Lester Stewart showed me how to poke holes in the river mud and plant corn. I can see the act more clearly than I can place the exact patch of ground. That uncertainty led to more questions. What kind of river made the patch possible? Who used those edges before us? What was alive in the water? How much had the river already changed by the time I stood there?

By the time I knew it, the Ohio was already a managed pool. High-lift dams held it up, the navigation channel had been deepened, and mill towns, railroads, sewer systems, and industries crowded its banks. George Washington had traveled a freer-running river in 1770. Panhandle Archaic families had gathered mussels from an earlier river still. My mudflat belonged to the engineered river, but it remained part of a living system. Island margin, tributary mouth, lock chamber, buried shell, and corn patch all connect to it.

For now I am staying close to East Liverpool, Little Beaver Creek, Babbs Island, New Cumberland, and the nearby Crockery Valley landscape. That still carries the research across Ohio, Pennsylvania, and West Virginia. The nearest evidence is often on the opposite bank, and a pattern missing here may survive in records from farther downriver.

How I am putting this together

No single record contains this river. I have to work across terraces, archaeological bone and shell, early journals, natural-history books, navigation surveys, pollution studies, fisheries catches, tissue samples, and living memory. Each supplies a different piece, and each has its own limits.

A river older than its present course

One of the first things I had to get straight was the age of the river itself. The Upper Ohio, in its present arrangement, is geologically young, while high terraces above the modern valleys preserve an older drainage history. The strongest synthesis connects the modern river with repeated glacial ponding and the breaching or reversal of former divides. Some of the highest preserved lake deposits have reversed magnetic polarity. That places the first well-preserved ice-damming event before about 788,000 years ago. [1] There is no single birthday for the Ohio. Blockages, temporary lakes, spillways, incision, and capture rearranged the country over a long time.

Every rearrangement opened some aquatic routes and closed others. Fish, mussels, snails, crayfish, insects, and plants gained or lost pathways as channels joined once-separate basins. Old habitats became terraces. New pools, riffles, shoals, tributary mouths, and island chutes appeared and changed again. Before we can ask for a species list, we have to understand how water moved through the country.

The terraces also change how I look at a riverbank. Flat ground may be an abandoned channel, a flood deposit, an island joined to the shore, or a surface buried and opened again many times. A remembered corn patch in river mud belongs in that history because it points to the seasonal behavior of the river margin.

Before anybody kept surveys: what people left behind

Archaeology gives us the earliest detailed evidence for the river as a place where people lived. A midden is not a census of everything that was in the water. People chose particular foods, prepared them in particular ways, and left some materials that survived better than others. Even with those limits, shell and fish bone can tell us which animals people gathered, where they gathered them, and sometimes in what season.

Meadowcroft and the long human presence

Meadowcroft Rockshelter lies on Cross Creek, a tributary of the Ohio in Washington County, Pennsylvania. The site records human presence reaching back at least many thousands of years; the Heinz History Center presently interprets the occupation as roughly 19,000 years old. Its deposits include enormous quantities of plant and animal material as well as tools and hearths. A freshwater mollusk shell survived in a firepit, but most of Meadowcroft's ecological value lies in the larger record: people were repeatedly using a tributary landscape connected to the Upper Ohio long before anyone kept a fish ledger. [2] [3]

Meadowcroft cannot tell me that a particular fish lived at Babbs Island 19,000 years ago. It does establish the larger setting: people have been using this watershed for a very long time, and tributary valleys were part of that use from the beginning.

East Steubenville: the river carried up the hill

The East Steubenville site, 46BR31, gives us much more direct river evidence. It sits on the West Virginia side of the Ohio, across from Steubenville and roughly thirty river miles below East Liverpool. That is close enough to belong to the same Upper Ohio river system while still being its own locality. Geoarchaeological work places the site's Panhandle Archaic use broadly between about 6,090 and 3,400 years before present. [4]

The quantities get my attention. More than 15,000 freshwater mussel valves or fragments representing 26 species were reported. People carried the shell from the river approximately 300 feet up to a ridge. Archaeologists found midden deposits and pits that may have been used to steam mussels. [5] [6] [7]

Fish mattered too. The watershed synthesis reports eight fish taxa, with fish making up about 38 percent of the analyzed faunal assemblage. Channel catfish were the most common identified fish. Redhorse, other suckers, herring, and sauger were also reported. The seasonal interpretation is especially useful: catfish were likely taken in middle and late spring, while many mussels were gathered during summer low water. Most of the mussel species pointed to shallow, large-river settings - likely shoals or similar firm-bottom habitat. [6]

People were working productive shallow places, and the mussel beds supported repeated collecting. The fish and shell evidence also belongs together. Mussel larvae depend on fish hosts, while both fish and mussels

respond to current, depth, bottom material, oxygen, and an open channel. The shell on the ridge preserves part of a shallow-water river habitat that is hard to see in the present navigation pool.

A caution about archaeological evidence

People selected what went into a midden. Fine screens recover small fish bones that older excavations may have missed. Acidic soil can dissolve bone, and shell dates can require reservoir corrections. If eel, sturgeon, or paddlefish bone is missing, that alone does not prove the animal was absent. Every claim needs to retain the steps between the object and the interpretation.

Globe Hill and New Cumberland

Closer to East Liverpool is Globe Hill, site 46HK34-1, about three miles north of New Cumberland. Carnegie Museum excavated it in 1953 under William J. Mayer-Oakes and published the work in 1955. The site included a shell heap, animal remains, and bone tools associated with an Archaic occupation. New Cumberland Heights was another shell-midden locality in the same neighborhood. [8] [9]

One often-cited Globe Hill object is a fisher mandible dated typologically to about 2000-1000 BCE. The fisher in that sentence is the forest mammal, not a person who catches fish. The little note is valuable anyway because it gives the site number, location, terrace elevation, excavation year, and cultural date. [10] I want the full Globe Hill report and the surviving Carnegie collections. They may hold the closest archaeological ecology to the Babbs Island-New Cumberland landscape.

Farther downriver, Beverly Spurlock's study of prehistoric mussel middens in Mason County shows what a careful comparison can recover. She identified 1,599 valves and fragments representing 29 species. Nine were already endangered by 1981 and one was extinct; she attributed much of the change to stream modification, especially impoundment. [11] Her method is the useful part for us: set ancient shell beside the early naturalists and modern surveys, reach by reach.

The river people described before industry took hold

The earliest written descriptions were made for travel, land speculation, diplomacy, and natural history. None was designed as a modern field survey. That is why small details matter: how the water moved, where shoals interrupted a canoe, how easily somebody caught a catfish, and what local people expected to find in the river.

Christopher Gist: abundance reported, not observed

In his 1750-1751 journal for the Ohio Company, Christopher Gist wrote that the Ohio and its large branches were said to be full of fine fish, including catfish of prodigious size. [12] The wording matters. Gist was repeating contemporary knowledge and acknowledged that the season kept him from seeing the fish himself. I label the entry contemporary hearsay. It still records what people familiar with the river considered ordinary enough to report.

George Washington: rifts, shoals, birds, and one catfish

George Washington's 1770 river journal is a direct travel record. On November 21 he passed Big Beaver, Raccoon Creek, and Little Beaver Creek and camped several miles below. He described the water from Logstown to Little Beaver as a mixture of rapid reaches, gentle glides, and still water, with rifts and shoals that could be difficult to pass. Below Little Beaver the current was generally faster. He noticed islands, steep rocky hills, wild geese, several kinds of ducks, and a mostly stony riverbed that became muddier along some shores. [13]

Farther downstream, Washington left lines out overnight and caught a catfish. He was told it was one of the smaller kinds found there. One fish cannot give us a population estimate, but it belongs beside his description of shoals, fast water, deep threads, still places, islands, flooded bottoms, and fallen trees. All of that variation gave animals places to live.

Washington traveled a river already hunted, crossed, claimed, contested, and mapped. It still had rifts and shoals and changes in speed that later navigation pools reduced. That hydraulic variety is one of the large ecological differences between his river and ours.

When the river became a scientific subject

Rafinesque's first great fish book

Constantine Samuel Rafinesque's *Ichthyologia Ohiensis*, published in 1820, is the first extensive scientific attempt to describe the fishes of the Ohio and its tributaries. He wrote that he identified nearly eighty species in his first year and added about twenty more in the second. [14] [15] This is where a straight modern species count becomes dangerous. Later workers revised some names, some specimens were not preserved, and Rafinesque's work has famous complications. For all of that, the book remains our early benchmark: one naturalist looking across the fish community before the worst industrial damage.

David Starr Jordan's 1882 Report on the Fishes of Ohio brought a later generation of taxonomic and distributional work into a state geological survey. [16] Between Rafinesque and Jordan lie scattered state reports, museum collections, market records, and the publications of the United States Fish Commission. The federal Fish Commission series is the likely regular run the earlier question had in mind. Its Bulletins and annual reports extend back into the nineteenth century and are now routed through NOAA's legacy publication archive. [18] [19]

A practical warning about old fish names

For each historical name I want the wording exactly as printed, the description, the collection place if one was given, and the modern identification proposed by later ichthyologists. Without that crosswalk, a change in names can look like a disappearance or a new arrival.

Navigation surveys are habitat surveys in disguise

The 1871 federal Survey of the Ohio River had an engineering purpose. Its maps and measurements nevertheless preserve islands, bars, shoals, depths, crossings, banks, and obstructions before later canalization. [17] I want to read every pre-dam navigation chart as a habitat map. They can show where gravel and cobble broke the channel, where side chutes carried current, and where low-water margins opened for people, birds, fish, and mussels.

The river as a casualty and a laboratory

By the early twentieth century the scientific record had turned from description toward damage. Arnold Ortmann's 1909 essay, *The Destruction of the Fresh-Water Fauna in Western Pennsylvania*, is blunt in both title and argument. He connected losses in freshwater life to sewage, industrial wastes, silt, and other changes in streams of the Upper Ohio basin. [20]

In 1913 the U.S. Public Health Service established its Stream Pollution Investigations Station in Cincinnati to study the Ohio River and its tributaries. [21] The station sits between the old natural-history tradition and the later monitoring system. Researchers increasingly measured chemistry, bacteria, sewage treatment, industrial discharge, and aquatic biology together.

The 1959 steel strike gave researchers an accidental experiment. Industrial discharges dropped abruptly. Within eleven days, a Montgomery Lock and Dam sample contained more than twice as many kinds of fish and more than five times as many individuals as comparable samples taken before the shutdown. Clean-water fishes apparently moved in from tributaries or other less-polluted refuges. [22]

Eleven days: more than twice the kinds of fish and more than five times the individuals.

The speed of the response puts the tributaries in a different light. They served as refuges and as routes back into the main stem. Little Beaver Creek, Yellow Creek, Raccoon Creek, and the smaller runs around East Liverpool belong inside the recovery story.

The long survey record begins

With the Ohio River Valley Water Sanitation Commission, ORSANCO, the evidence changes. Its annual reports run online from 1948-1949 through the present. [23] In 1957, ORSANCO and cooperating state and federal agencies began routine fish sampling in navigation lock chambers. Lock size, location, and method stayed similar enough for more than thirty years to create one of the largest long-term river fish datasets in existence. [24]

The downloadable records now include main-stem fish data from 1957 onward, tributary data, habitat attributes, lock-chamber rotenone surveys through 2005, and boat electrofishing from 1991 forward. ORSANCO also

maintains macroinvertebrate records extending back to 1964 and fish-tissue data reaching into the 1970s and 1980s. [25] [31] [32]

For East Liverpool, this gets interesting. The long-term lock survey table includes old Lock and Dam 8 at river mile 46.4 in 1958 and repeated New Cumberland samples at river mile 54.4 from 1968 through 2000. ORSANCO electrofishing data also include East Liverpool-area events in the 1990s. [27] These sites are close enough to the remembered Babbs Island shore to support a local chronology once the raw records are checked event by event.

I do not want to combine unlike samples just because they all contain fish names. A rotenone sample inside a lock chamber, a nighttime electrofishing run along the bank, a benthic trawl, and a tissue sample answer different questions. Each count needs to retain its method, season, water level, effort, and exact river mile.

What the long record says

The lock-chamber synthesis for 1957-2001 covered 377 sampling events and nearly three million fish representing 116 taxa. Forty taxa showed statistically significant change through time. Measures of assemblage condition generally improved: several pollution-tolerant fishes declined, while some less-tolerant species increased. The authors linked the broad recovery to improved water quality, especially in the decades following the Clean Water Act, while warning that the replacement of old wicket dams by high-lift dams also changed the habitat being sampled. [27]

Later analyses using 57 years of ORSANCO data found rising annual species richness and changes in taxonomic and feeding structure. Water quality was part of it; altered hydrology and land use were part of it too. [28] [29] The river grew cleaner without returning to its earlier form. The present community developed inside a heavily engineered river.

What the dams changed

The Ohio was canalized in stages. The early wicket dams created navigation pools but could be lowered or passed differently. In the mid-twentieth century, fewer high-lift dams replaced many of those structures. New Cumberland opened during the period when the old Dam 8 and neighboring low-lift structures were being retired. The result was a more continuously deep, stable pool through the East Liverpool reach.

The effects ran in several directions. Deeper water drowned or reduced shallow shoals and changed the current over coarse bottom. Slower water allowed more fine sediment to settle. Islands and side channels changed. Dams delayed or interrupted long fish movements and could separate mussel populations from the fish hosts their larvae need. Paddlefish make the passage problem concrete. A 2023 telemetry study in the Ohio and Kanawha documented downstream passage for one tagged paddlefish and no observed upstream passage at two locks during the study. [34]

Stable pools also expanded shoreline and quiet-water habitat. Some sunfishes, minnows, catfishes, and suckers could benefit from the pool-like setting or from changing food supplies. Benjamin Lowman's analysis found gradual increases associated with cleaner water as well as abundance peaks that tracked high-lift dam construction. [30] A single verdict on the dams will not do. We need to follow the gains and losses species by species and habitat by habitat.

The losses are still visible in species stories. Shovelnose sturgeon are now rare in West Virginia waters, and paddlefish restoration depends on stocking and on understanding passage through the navigation system. [35] [36]

Freshwater mussels remain among the most imperiled animals in the basin, affected by dams, sedimentation, water quality, invasive species, and the loss or isolation of host fish. [33]

What I want to ask about the dams

Which habitat disappeared, and which habitat appeared? Which species gained? Which lost access to spawning routes or host fish? What happened to current, depth, sediment, temperature, oxygen, islands, tributary mouths, and seasonal mudflats in this exact pool?

Mussels may remember more than fish bones do

Fish bones are precious, but freshwater mussel shells may preserve a longer and fuller record. Species differ in their tolerance for current, depth, substrate, oxygen, and turbidity, so a midden can hold a rough map of nearby habitat. Most unionid mussels also spend a larval stage attached to a fish host. A mussel bed therefore carries information about fish connections as well as shellfish.

At East Steubenville, the predominance of large-river, shallow-water mussels points toward productive shoal habitat. In the Mason County middens, ancient diversity exceeded what survived into the twentieth century, and impoundment was named as a major cause. [11] Modern Pennsylvania planning now draws together mussel data from 1838 through 2024 and identifies dams, sedimentation, water quality, invasive species, and land use as continuing pressures. [33]

The East Liverpool project needs a mussel ledger beside the fish ledger. Every archaeological identification, museum lot, Ortmann locality, state survey, rescue relocation, and modern observation should be tied to river mile and habitat. The comparison may show changes that fish counts miss.

A working evidence ladder

I need a way to keep unlike evidence from sliding together. The following labels will travel with each item in the RHKMI river project:

1. Direct local specimen	A museum fish, shell lot, bone, or tissue sample with a reliable locality and date.
2. Local archaeological inference	Material recovered near the reach, interpreted through context, dating, preservation, and human selection.
3. Direct eyewitness	A person records what was seen, caught, heard, or navigated at the time.
4. Contemporary hearsay	A period observer records what knowledgeable people said, while not claiming to have seen it.
5. Scientific collection	A documented survey using a stated method, effort, season, and location.
6. Market or harvest record	Evidence of capture and use, but often detached from the exact catch location.
7. Habitat proxy	A chart, sediment, terrace, shell community, water-quality measure, or dam record that describes conditions rather than animals directly.

8. Regional comparison

Evidence from another Ohio River reach used carefully to suggest a pattern, never to replace missing local data.

The ladder does not rank truth. It keeps a Washington eyewitness entry separate from an ORSANCO electrofishing run and keeps both separate from a remembered place. All three can move the research forward without being made to answer the same question.

What I think we can say now

- 1 The Upper Ohio has a deep ecological history shaped first by drainage rearrangement and later by human engineering.
- 2 People have used the tributaries and river margins for many thousands of years; archaeology preserves direct evidence of fish and mussel use in the Upper Ohio.
- 3 The East Steubenville and New Cumberland-area shell sites show that shallow large-river habitat was once productive enough to support repeated gathering and seasonal occupation.
- 4 Eighteenth-century accounts describe a river with rifts, shoals, variable current, islands, stony bottom, waterfowl, and large catfish - a more hydraulically varied system than today's pooled reach.
- 5 Rafinesque, Jordan, the U.S. Fish Commission, early federal pollution researchers, and Ortmann provide a path backward from modern surveys into nineteenth- and early twentieth-century science.
- 6 Pollution severely constrained the Upper Ohio fish community by the mid-twentieth century. The 1959 steel strike showed how quickly fish could return when discharge stopped.
- 7 ORSANCO's record documents broad biological recovery with cleaner water, while also showing that the community changed under high-lift dams, altered flow, and changing land use.
- 8 Today's river is a new ecological arrangement. Some species returned, some remain absent, and others found favorable habitat in the navigation pools.

This is just the beginning

What comes next is a local evidence book built reach by reach. I want to start with Little Beaver Creek through Babbs Island to New Cumberland, then widen upstream to Raccoon Creek and downstream to Yellow Creek and Steubenville.

The next records to pursue

- Obtain the complete Phase III report and specialist appendices for 46BR31, especially the fish, mussel, botanical, radiocarbon, and feature analyses.
- Locate the Globe Hill and New Cumberland Heights collections and field records at Carnegie Museum and any West Virginia repositories; inventory every aquatic remain by catalog number.
- Download ORSANCO's raw fish events for old Dam 8, New Cumberland, and the East Liverpool electrofishing reaches; preserve method, date, river mile, effort, and taxonomic resolution.
- Build a crosswalk from Rafinesque, Jordan, later state lists, and modern names, with a separate column for uncertain identifications.
- Georeference the 1871 Corps survey and later pre-impoundment navigation charts to reconstruct islands, shoals, side channels, and shallow margins now submerged or altered.
- Search the U.S. Fish Commission Bulletins and annual reports, Ohio geological and fish commission reports, U.S. Public Health Service investigations, and local newspapers for East Liverpool, New Cumberland, and named tributaries.
- Treat mussels as a full line of inquiry, not an appendix to fish: archaeological shell, Ortmann records, museum lots, modern surveys, and host-fish relationships.
- Record oral histories from people who fished, gathered bait, boated, worked the locks, lived on islands, or planted seasonal river margins before those memories disappear.

I also want to return to the family memory that started this. Property maps, aerial photographs, dam pool elevations, and interviews may never prove the exact corn patch. They may show when a mudflat opened at the head of Babbs Island, whether it belonged to a parcel, and whether other families used it. The memory can guide the search without being asked to prove more than I remember.

Source note and research cautions

I drew this first pass from institutional web pages, digitized primary accounts, bibliographic records, peer-reviewed articles, theses, long-term monitoring summaries, and preliminary archaeological summaries. The references link to original reports, book scans, data portals, and agency pages when they are available. Where an archaeological report was cataloged but not openly readable, I relied cautiously on the available synthesis and marked the full report for follow-up.

A few cautions need to stay with the record. Archaeological 'years before present' should not be mixed casually with calendar BCE dates. Shell radiocarbon dates may require reservoir correction. Historical fish names need a taxonomic crosswalk. Survey methods differ sharply across time. Regional evidence can suggest a pattern, but it cannot fill a local gap by itself.

Production note

Researched, conceived, directed, and edited by T. P. Calhoun for River Hills Kilns Mills Institute. AI was used as a collaborative research and production assistant. This August 2026 edition is intentionally a beginning and should be revised as local collections and raw survey records are examined.

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