

Chronology of Important Fishery and Water Quality Events in the Pigeon River Watershed (primarily for Haywood County, NC)

Decade	Year/Event
1870	Jordan's fish survey (1877)
1880	
1890	
1900	1906 – Champion opens in 1906 in Canton as a fibre supply company for coated paper mill in Hamilton, OH 1907 -- Smith's book on Fishes of North Carolina 1908 – Champion begins discharging to the Pigeon River; the discharge affects the Pigeon, French Broad, and Tennessee River all the way to Knoxville; 1 st major fish kill occurs immediately 1909 – 1 st threat of lawsuit by Tennessee
1910	1918 – Everman fish survey
1920	1923/1924 – large fish kill in the Pigeon River all the way to Newport, TN 1929 -- Walters Lake impounds the Pigeon River 20.7 miles below the mill
1930	
1940	1940 – Hubbs fish collections from tributaries and the Pigeon River above the mill 1941 – Hess and Tarzwell Study (first significant study of the impacts of the mill on aquatic life) 1940s – 1980s – where found, fish community in the Pigeon River dominated by pollution tolerant common carp and gold fish; many reaches are devoid of fish
1950	Continue local protests and letters to the editors from Tennessee citizens regarding pollution of the river by the mill
1960	1960 -- Primary treatment to remove settleable solids installed; from 1908 – 1960 no treatment of discharged wastes 1963 – Messer (NCWRC) survey of the fishes of the Pigeon River system 1966 – Keup and Stewart pollution study 1968 – Runas, Keup, and Stewart pollution study
1970	1970 – Secondary treatment with activated sludge; mill discharges 48 MGD (million gallons per day) of effluent into river; at low flow 100 percent of the river is drawn into the mill and 100 percent of the river below the mill is treated effluent 1970 – Federal Water and Environmental Quality Improvement Act 1971 – North Carolina Environmental Policy Act 1972 – Federal Water Pollution Control Act (Clean Water Act) 1973 – EPA water quality survey of Pigeon River in Cocke county, TN 1973 – UNC-Asheville water quality study of the Pigeon River 1977 – Federal Clean Water Act revised 1978 – TNDHEC bioassessment study of the Pigeon River 1979 – NC DWQ's Pigeon River investigation study
1980	1980s -- TN gets serious about the Pigeon River water quality problems 1980 -- NC DWQ's Pigeon River investigation study 1980 – TNDHEC bioassessment studies 1980 – Wingate and Davies (NCWRC) study 1980 – TVA's water quality studies of TN rivers 1980s – Tennessee files lawsuits in earnest to force Champion to clean up the river 1980s – Institute of Paper Chemistry conducts water quality studies for Champion 1981 – Champion receives thermal variance in NPDES permit from NC DWQ 1984 – TVA study on sediment and biochemical oxygen demand 1984 – Gilmore's M.A. thesis (UNC-Chapel Hill) on economics and environmental quality of the Pigeon River 1985 – EPA takes control of the NPDES permit for the mill away from NC DWQ 1987 – Champion conducts bioassessment, temperature, and color studies 1987 – 1 st reports of dioxins in fish in Pigeon River 1987 – CP&L (Progress Energy) begins relicensing studies of the water quality and fisheries of the Pigeon River and Walters Lake 1988 – EPA dioxin study 1988 – April 1988, first dioxin contaminated fish consumption advisory issued by NC that advises no consumption of any fish of any species from the mill to the state line 1988 – EPA issues NPDES permit for the mill 1989 – Champion begins dioxin control program/modifications; modifications completed by 1992/1993 1989 – EPA issues NPDES permit for the mill with a three year limit for attaining color compliance
1990	Early 1990s – minimum flow study of the Pigeon River below Walters Lake conducted by CP&L 1990s – dioxin studies (fish tissue, sediment, and fate and transport) conducted by CP&L 1990 – Champion begins modernization project 1992 – Oakridge/TVA studies of Pigeon River fish abnormalities 1994 – NC dioxin fish consumption advisory for the Pigeon River is modified; no catfish species or common carp from the river may be eaten from the mill to the state line; all other species permissible 1994 – 40 year license to operate Walters Hydroelectric Plant issued by FERC to CP&L

	<p>1995 – Champion conducts biological assessment study of the Pigeon River 1994 – Troubled Waters (by R. A. Bartlett) is published 1998 – French Broad River basinwide assessment (including the Pigeon River watershed) conducted by NC DWQ</p>
2000	<p>2001 – NC dioxin fish consumption advisory for the Pigeon River is modified; no common carp may be eaten from Walters Lake; all other species permissible 2001 -- Balanced and Indigenous Study of the Pigeon River conducted by Champion 2001 – New NPDES permit for the mill reduces water discharged to the river to 29 MGD 2001 – Blue Ridge Paper (Champion) agrees to Pigeon River Reintroduction Project over the term of the 2001 NDPEs permit 2003 – Initial meeting of the North Carolina Reintroduction Steering Committee 2003 -- French Broad River basinwide assessment (including the Pigeon River watershed) conducted by NC DWQ 2004 – 1st reintroductions (April and August) of fish species in the North Carolina portion of the Pigeon River; species that had not been found in the river in almost 100 years below the mill were reintroduced into the river</p>

Pigeon River and Walters Lake Statistics

1. Pigeon River drainage area (NC and TN) – 1,792.4 km² (692 mi²)
2. Length – 111.8 km (69 mi) from confluence of the East Fork Pigeon River and West Fork Pigeon River to the French Broad River (Douglas Reservoir)
3. Length of river in NC – 43.1 miles
4. Length of river in TN – 25.9 miles
5. Distance from origin (at NC 110, Haywood county) of river to mill ~ 6.5 miles
6. Distance from mill to Walters Lake – 20.7 miles
7. Walters Dam
 - a. Height – 185 ft.
 - b. Width (at crest) – 902 ft.
 - c. Length of lake – 5.2 miles
 - d. Surface area of lake – 340 Ac
 - e. Length of hydroelectric tunnel – 6 miles
 - f. Length of bypass reach – 12.1 miles

Criteria that must be simultaneously met to trigger a petition for instream flow releases into the bypassed reach of the Pigeon River at the Walters Hydroelectric Project (From 1994 FERC License to CP&L)

1. Water quality – dissolved oxygen \geq 5 mg/L, annual mean concentration for three consecutive years upstream of Hepco Bridge at Pigeon River mile 42.5
2. Benthic invertebrates – NCDEM rapid bioassessment method -- Index score of at least "Good" or a higher score at the Hepco Bridge sampling location; three consecutive years upstream of Hepco Bridge at Pigeon River mile 42.5
3. Fish – modified Index of Biotic Integrity – IBI rating of \geq 50 (mid-range of "Good" or a higher score) at the Hepco Bridge sampling location; three consecutive years upstream of Hepco Bridge at Pigeon River mile 42.5
4. Fish -- consumption advisory – no partial or full fish consumption advisory; Pigeon River waters from Canton, NC to Walters Lake, including the lake
5. Fish – odor/palatability – no noxious odor or off taste of fish flesh in blind samples, comparison should be made to fish collected above Canton, NC; evaluation performed in the third consecutive year after the biotic indices criteria have been met for two consecutive years; fish will be collected upstream of Hepco Bridge at Pigeon River mile 42.6 and upstream of Canton, NC

Other Comments

1. Sections of the river below the mill have the potential to support a smallmouth bass and rock bass fishery in addition to many unique nongame species
2. Even with the mill, the Pigeon River could revive (with additional pollution controls at the mill and nonpoint watershed restoration efforts) like the Tuckasegee River below Sylva has done in the past 30 years

List of known species from the Pigeon River watershed (NC and TN) prior to reintroduction efforts.

Species	Common Name
<i>Ichthyomyzon bdellium</i>	Ohio lamprey
<i>Dorosoma cepedianum</i>	gizzard shad
<i>Oncorhynchus mykiss</i>	rainbow trout
<i>Salmo trutta</i>	brown trout
<i>Salvelinus fontinalis</i>	brook trout
<i>Esox masquinongy</i>	Muskellunge
<i>Campostoma anomalum</i>	central stoneroller
<i>Carassius auratus</i>	goldfish
<i>Cyprinus carpio</i>	common carp
<i>Hybopsis amblops</i>	bigeye chub
<i>Nocomis micropogon</i>	river chub
<i>Notemigonus crysoleucas</i>	golden shiner
<i>Luxilus coccogenis</i>	warpaint shiner
<i>Cyprinella galactura</i>	whitetail shiner
<i>Notropis rubellus</i>	rosyface shiner
<i>N. photogenis</i>	silver shiner
<i>N. rubricroceus</i>	saffron shiner
<i>N. spectrunculus</i>	mirror shiner
<i>N. telescopus</i>	telescope shiner
<i>Rhinichthys atratulus</i>	blacknose dace
<i>R. cataractae</i>	longnose dace
<i>Semotilus atromaculatus</i>	creek chub
<i>Catostomus commersoni</i>	white sucker
<i>Hypentelium nigricans</i>	northern hog sucker
<i>Ictiobus bubalus</i>	smallmouth buffalo
<i>Carpionodes carpio</i>	river carpsucker
<i>Moxostoma duquesnei</i>	black redhorse
<i>M. macrolepidotum</i> ("breviceps")	shorthead redhorse
<i>Ameiurus catus</i>	white catfish
<i>A. melas</i>	black bullhead
<i>A. nebulosus</i>	brown bullhead
<i>A. platycephalus</i>	flat bullhead
<i>Ictalurus punctatus</i>	channel catfish
<i>Pylodictis olivaris</i>	flathead catfish
<i>Ambloplites rupestris</i>	rock bass
<i>Lepomis auritus</i>	redbreast sunfish
<i>L. cyanellus</i>	green sunfish
<i>L. macrochirus</i>	bluegill
<i>L. megalotis</i>	longear sunfish
<i>L. microlophus</i>	reardear sunfish
<i>L. gulosus</i>	warmouth
<i>Micropterus dolomieu</i>	smallmouth bass
<i>M. punctulatus</i>	spotted bass
<i>M. salmoides</i>	largemouth bass
<i>Pomoxis annularis</i>	white crappie
<i>P. nigromaculatus</i>	black crappie
<i>Etheostoma blennioides</i> ssp.	"greenside darter"
<i>E. b. newmani</i>	greenside darter (newmani)
<i>E. b. gutselli</i>	Tuckasegee darter
<i>E. chlorbranchium</i>	greenfin darter
<i>Etheostoma kennicotti</i>	stripetail shiner
<i>E. rufilineatum</i>	redline darter

<i>E. simoterum</i>	snubnose darter
<i>E. swannanoa</i>	swannanoa darter
<i>E. vulneratum</i>	wounded darter
<i>E. zonale</i>	banded darter
<i>Perca flavescens</i>	yellow perch
<i>Percina aurantiaca</i>	tangerine darter
<i>P. caprodes</i>	logperch
<i>P. squamata</i>	olive darter
<i>Stizostedion canadense</i>	sauger
<i>S. vitreum</i>	walleye
<i>Cottus bairdi</i>	mottled sculpin
<i>C. carolinae</i>	banded sculpin
<i>Aplodinotus grunniens</i>	freshwater drum

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(a work in progress)

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