History

Where does it come from?

The **Wallkill comes from Lake Mohawk** in Sparta Township in New Jersey. It flows through two states, New Jersey and New York. Lake Mohawk is a man-made lake surrounded by a golf course and urban development.

Where does it go?

It then flows 27 miles through NJ and enters New York. In Orange County, NY the river drains 382 square miles, nearly half of the county, as it flows for 40 miles before reaching Ulster County. Twenty-two towns, villages and cities in Orange County drain wholly or partially to the Wallkill. In Ulster County, the river flows 26 miles before merging with Rondout Creek near Kingston, then flows out to the Hudson River.

What kind of environment does it interact with on its journey?

The watershed’s land use (including the New Jersey portion) is 60.3% undeveloped, 26.5% in active agriculture of some kind, and 13.2% urban/suburban development. The watershed includes both public and private wastewater treatment plants, and septic systems. There are 36 SPDES (State Pollutant Discharge Elimination System) permitted discharges (23 of which are wastewater facilities) and roughly 600 mapped MS4 (Municipal Separate Storm Sewer Systems) outfalls in the watershed. On the Wallkill River’s main stem, there are dams at Montgomery, two at Walden, Wallkill, Rifton and Sturgeon Pool. In Orange County’s Black Dirt region, the Wallkill River main channel and tributaries have also undergone considerable modification over the last 200 years. Municipal wastewater discharges enter the river at a number of locations; the largest of these inputs occur in Middletown, Wallkill, Montgomery, Walden, Shawangunk, Gardiner, and New Paltz. In New York State, the region historically known as the “black dirt” area (a truck-farming region whose primary crop is onions) extends from the New Jersey line to Pellets Island (Station 03), a distance of about 10 river miles. As the river flows north, there are several small dams, more agriculture, and a number of small towns.

How long is it?

**The total watershed is about 785 square miles in size**. There are 48 municipalities in the Wallkill watershed, including both New York State and New Jersey.

How many rivers connect to it?

In New York State, **the Wallkill River is fed by 69 tributaries**. Collectively the Wallkill and Rondout watersheds form the second largest tributary to the Hudson River Estuary, second only to the Mohawk River.

How can the health of a river be measured?

1. Species Richness: the total number of species or taxa found in a sample. For subsamples of 100-organisms each that are taken from kick samples, expected ranges in most New York State streams are: greater than 26, non-impacted; 19-26, slightly impacted; 11-18, moderately impacted, and less than 11, severely impacted.

2. EPT Richness: the total number of species of mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) found in an average 100-organisms subsample. These are considered to be cleanwater organisms, and their presence is generally correlated with good water quality (Lenat, 1987). Expected assessment ranges from most New York State streams are: greater than 10, non-impacted; 6-10, slightly impacted; 2-5, moderately impacted, and 0-1, severely impacted.

3. Hilsenhoff Biotic Index: a measure of the tolerance of organisms in a sample to organic pollution (sewage effluent, animal wastes) and low dissolved oxygen levels. It is calculated by multiplying the number of individuals of each species by its assigned tolerance value, summing these products, and dividing by the total number of individuals. On a 0-10 scale, tolerance values range from intolerant (0) to tolerant (10). For the purpose of characterizing species' tolerance, intolerant = 0-4, facultative = 5-7, and tolerant = 8-10. Tolerance values are listed in Hilsenhoff (1987). Additional values are assigned by the NYS Stream Biomonitoring Unit. The most recent values for each species are listed in Quality Assurance document, Bode et al. (2002). Impact ranges are: 0-4.50, non-impacted; 4.51-6.50, slightly impacted; 6.51- 8.50, moderately impacted, and 8.51-10.00, severely impacted.

4. Percent Model Affinity: a measure of similarity to a model, non-impacted community based on percent abundance in seven major macroinvertebrate groups (Novak and Bode, 1992). Percentage abundances in the model community are: 40% Ephemeroptera; 5% Plecoptera; 10% Trichoptera; 10% Coleoptera; 20% Chironomidae; 5% Oligochaeta; and 10% Other. Impact ranges are: greater than 64, non-impacted; 50-64, slightly impacted; 35-49, moderately impacted, and less than 35, severely impacted.

5. Nutrient Biotic Index: a measure of stream nutrient enrichment identified by macroinvertebrate taxa. It is calculated by multiplying the number of individuals of each species by its assigned tolerance value, summing these products, and dividing by the total number of individuals with assigned tolerance values. Tolerance values ranging from intolerant (0) to tolerant (10) are based on nutrient optima for Total Phosphorus (listed in Smith, 2005). Impact ranges are: 0-5.00, non-impacted; 5.01-6.00, slightly impacted; 6.01-7.00, moderately impacted, and 7.01-10.00, severely impacted.

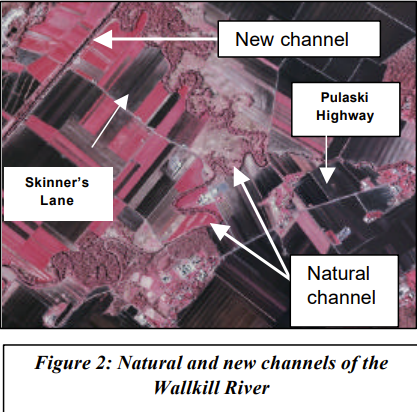
What are historical locations along this river?

Results of the 2008 SBU sampling found conditions of slightly impaired water quality at all seven sites (Figure 1). Impact Source Determination (ISD) identified possible municipal/industrial influences at Stations 03 and 05, as well as domestic wastes at Station 05. The Nutrient Biotic Index (NBI) (Smith et al. 2007) suggests conditions resulting from excess phosphorus (NBI-P) and nitrogen (NBI-N) (Figure 4) at all sites except for Stations 08 and 10.

* Station Locations:

1. Liberty Corners, NY, Oil City Road
2. Pelletts Island, NY, CR 37 bridge
3. Crystal Run, NY, 100 m above Scotchtown Ave. bridge
4. Montgomery, NY, 20 m below SR 211 bridge
5. Walden, NY, 50 m below Oak St bridge
6. Galeville, NY, 10 m above Galeville Rd bridge
7. Tuthill, NY, Jellystone Campground

* Orange County Black Dirt Region

An extremely interesting chapter of history occurred in this area in the 1800’s, which is sometimes described as the Muskrat and Beaver War. (Appendix A) Landowners with agricultural interests (the muskrats) battled figuratively and literally with mill and related business owners (the beavers) over whether the Wallkill would be dug and maintained as an agricultural drainage channel or dammed for water power. Ultimately, the farmers won this war and additional drainage projects continued through the 1900’s resulting in the agricultural landscape and drainage network.

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* There are dams at Montgomery, Walden, Wallkill, Rifton and Sturgeon Pool (Map 3). Dams clearly have major environmental impacts on river systems; at the same time they have served valuable historical functions such as hydroelectric power and mill operation.

What could be wrong?

Efforts indicate **phosphorus** enrichment in the watershed as the dominant pollutant. The Wallkill River has experienced two years of documented **Harmful Algae Blooms** (HABS). In August 2015, a HAB in New Paltz was reported to NYSDEC, and confirmed by visual assessment. From August 24, 2016 through at least October 24, 2016, HABs affected as much as 30 miles of the river from Montgomery in Orange County to Sturgeon Pool at Rifton in Ulster County, and into the Rondout Creek downstream of the Wallkill’s confluence. Outlying blooms were also observed on August 15 in the Rifton area and on September 14 in the National Wildlife Refuge at NY-NJ state line. In 2012, Riverkeeper began a community science effort to monitor **Enterococcus**, a fecal indicating bacteria, in the Wallkill River. Other water quality concerns include organic contaminants and heavy metals. In 1997, a DEC CARP study showed the Wallkill to have ten times the concentrations of **DDT** and **dieldrin** of all Hudson River tributaries examined. The banned pesticides were found in the top layers of sediment along the entire length of the river. **Arsenic** contamination has also been documented in the New Jersey portion of the Wallkill River watershed, with approximately 20 river miles impaired.

Resources

* USGS
* River Keeper
* Orange County Water Authority
* ~~Wallkill River Watershed Alliance~~
* Dave Sides, Archie Morris, Jason West, and Ed McCann
* Hudson River Valley Greenway.
* <https://www.newpaltz.edu/geography/gislinks.html>
* <https://www.ocsoilny.org/> - Orange County Soil and Water
* <http://www.wallkillriver.org/> - Wallkill River Watershed Management Group
* <https://hudsonwatershed.org/> - Hudson River Watershed Alliance
* <https://www.ucswcd.org/> - Ulster County Soil and Water Conservation