

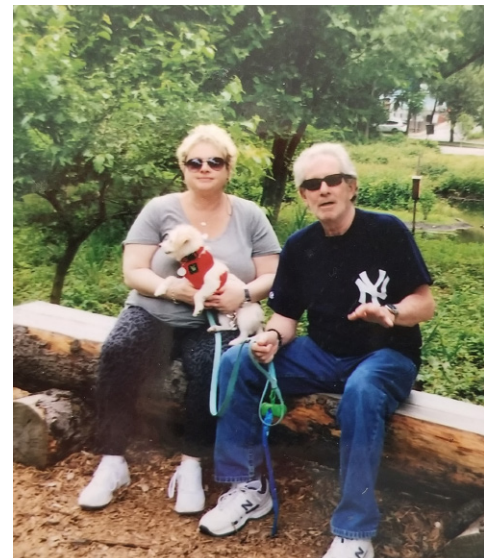


State of the Saw Mill River Watershed

2019
Westchester
County, NY



A Report to the Saw Mill River Watershed Advisory Board, The New York State Hudson River Estuary Program and the Westchester Community Foundation from Groundwork Hudson Valley in partnership with the Center for the Urban River at Beczak, Sarah Lawrence College.



PURPOSE OF THE REPORT

This 2019 document draws together information about the Saw Mill River and its current state: basic statistics, water quality, flora and fauna, recreation, wetlands, urbanization, flood control projects, local flooded areas, restoration efforts, and the municipal-stakeholder collaboration that works together on watershed management. The basics regarding how healthy rivers function are included under the sections titled “**River Primer**” which hopefully will provide an understanding of how alterations of the Saw Mill River have compromised those functions.*

While the New York State’s Department of Environmental Conservation (DEC) and Westchester County consider the Saw Mill a priority watershed, it will be local leadership and stewardship that are the key to watershed improvement. This document welcomes public review and updates so that it reflects local knowledge and experience. With a common understanding of these issues, upstream and downstream, municipal leaders and people who work and live in the watershed will be in a position to make decisions that improve, protect, and restore the river.

*Reference: Stream Processes-A Guide to Living in Harmony with Streams, Chemung Soil and Water Conservation District in Horseheads, NY

Vine-choked trees need helping hands along Saw Mill



By Jamie Kyle McGillian

REGION — Terry Joshi, a 20-year resident of Yonkers, board member of the Park Hill Land Conservancy and volunteer coordinator of the Free-a-Tree project, wants your help along the Saw Mill River and parkway tomorrow (Oct. 28). National Make a Difference Day. I need...

vines may kill the tree or shrub — they're also destroying the habitat for local birds and small animals. Joshi became aware of invasive vines several years ago before she began volunteering her time with the River...

LOCAL NEWS
BioBlitz sends scientists up and down Saw Mill River collecting data
 50 scientists fanned out along the Saw Mill River for a 24-hour BioBlitz. The project was a joint effort by the Hudson Valley Groundwork Hudson Valley and the Saw Mill River Park. The goal was to collect data on the river's biodiversity. The project was led by Anne Megaro of Groundwork Hudson Valley, who points out invasive shrubs and vines during a nature walk at Peace University in Pleasantville on Saturday. With Anne was David Bostell of Sleepy Hollow, (kneeling), Deb Mator of Hastings-on-Hudson, standing at left, and Joe and Linda Hillman of Pleasantville.

It's the Saw Mill RIVER

PLAISANTVILLE — In a tropical storm, to swamp the River Parkway. A good chunk of it is about the flooding. It was in fact, that the Saw Mill River and works here. "It's inevitable, and we all contribute." The barriers at Marble Avenue and the Saw Mill River Parkway are a routine happen. Pleasantville town officials know that it's a flood. "It's inevitable when you live on the West- in Valhalla, the word of the just assume if Saw Mill will say Mill: along 4th Avenue and 5th Avenue in once Street in the corner of the coun- ENVIRONMENT

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Flood? Add asphalt

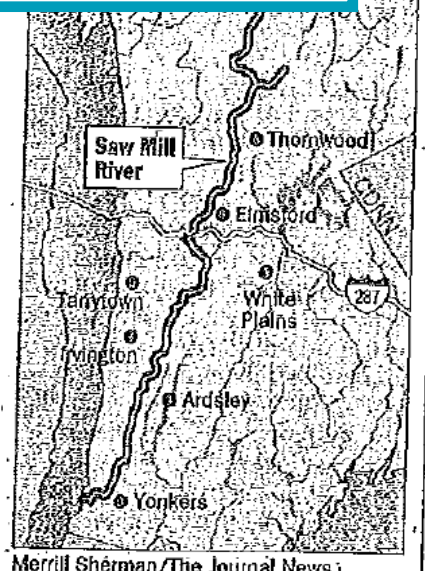
Saw Mill Parkway Pleasantville closures need long-term fix
 It is really past time for a long-term fix. Flooding that has closed the Saw Mill Parkway in Pleasantville more than a dozen times in the last three years. "There's no such solution was in the off- disappointing" after federal, state, city and local officials met in the vi- this week. Instead, state Department of Transportation officials said they would turn to the...

Project to manage watershed begins

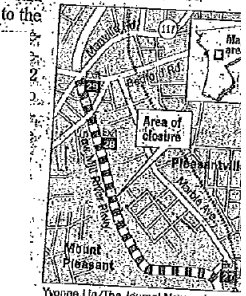
Westchester, Army to spend \$1.7M on 12-community plan

Roger Witherspoon
 The Journal News
 Westchester County and the U.S. Army Corps of Engineers have begun a \$1.7 million project to develop an environmental-management plan for the Saw Mill River watershed. The plan, scheduled for...

serve or improve them, and develop regional environmental laws to provide a uniform system for environmental protection and development in watershed communities.
 "This is mostly a storm-water management plan," county Planning Commissioner Jerry Mulligan said. "We have to look at existing watershed conditions, what impact existing development might have, and what should be in place to protect or improve areas which may have been degraded



Merrill Sherman/The Journal News



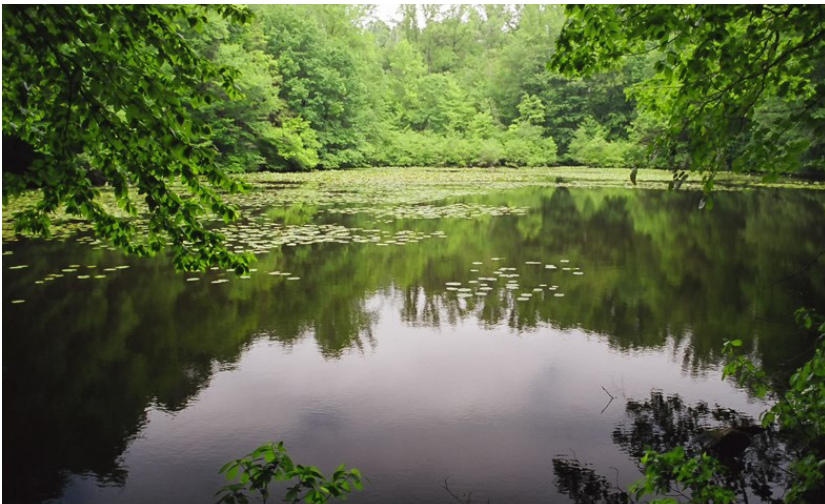
"This is mostly a management plan," Planning Commissioner Mulligan said. "We have to manage watershed conditions, existing development, what we might have, and what we need to protect or improve areas which may have been degraded over the years." Mulligan said one of the things he analyzed is the way the border of Pleasantville, just north of the river, is often referred to as the 'border of Pleasantville'.

THE SETTING

The Saw Mill is one of the most historically important rivers in the Hudson Valley region as well as a watershed with a surprising, multi-faceted character. It is the southernmost tributary of the Hudson River, one of the region's highest priority water bodies, and is situated just a few miles north of New York Harbor. Located entirely within Westchester County, New York, the Saw Mill is closely tied to the development of the County and its towns.

While the river has a gritty character in spots, it actually originates in New Castle, NY, near Chappaqua, in a much more bucolic, suburban wetland. It then flows southwest for more than 20 miles before reaching the Hudson River in Yonkers. As it crosses the western side of Westchester County, the river meanders through 12 political

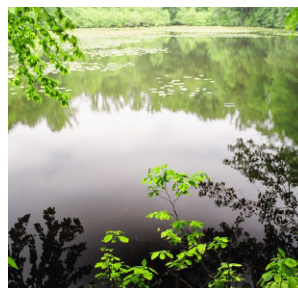
jurisdictions and a diversity of landscapes. The river flows through County and municipal parks, next to the South County Trailway, and around a major nursery. Sandwiched between state and federal highways including its namesake—the Saw Mill River Parkway—which it follows for approximately 15 miles, it is adjacent to high and low-income neighborhoods, and threads its way within flood control channels and warehouses in an industrial valley. After skirting a soccer and baseball field alongside public housing, the river flowed underground for the entire last half mile in downtown Yonkers before emptying into the Hudson River underneath the train station. *However*—since 2011, three “daylighting” projects opened the river to the “light of day” and visitors and residents enjoy the experience of a living river in their downtown.



WATERSHED OVERVIEW — ESSENTIAL FACTS

RIVER PRIMER: A (Healthy) River...

- Is a complex system that gathers, stores, and moves rainwater; and restores groundwater;
- Has “parts”—channels, floodplains, pools, riffles, meanders, riparian buffers, wetlands;
- Purifies rainwater by filtering through soils;
- Moderates floods through its buffers, wetlands and floodplains;
- Maintains habitat for fish, birds, and wildlife;
- Is a dynamic change agent, constantly readjusting due to the energy of various water flow conditions.



Headwaters: Begin in a 1.75 acre pond in the Town of New Castle

Mouth: Flows into the Hudson River underneath the train station at Dock Street and Van der Donck St, Yonkers

New York State water quality classification based on “existing or expected best use”

Saw Mill River Section	Classification	Classification defined uses
Lower reach up to river mile 3	C	Fish propagation
Middle reach between river mile 3 and 9	A	Drinking, swimming, fishing, fish propagation
Upper reach above river mile 9:	B (T)	Swimming, fishing, fish propagation (Trout)

Municipality	Acres in Watershed	% of Watershed in Municipality
Ardsley	473	2.8
Dobbs Ferry	492	2.9
Elmsford	374	2.3
Greenburgh(1)	3384	20.3
Hastings on Hudson	530	3.2
Irvington	252	1.5
Mount Pleasant(1)	5715	34.3
New Castle	1716	10.3
Pleasantville	1148	6.8
Sleepy Hollow	18	0.2
Tarrytown	302	1.8
Yonkers	2275	13.6
Total	16679	100.0

(1) Does not include acres within villages

RIVER PRIMER:

A River...purifies rainwater by filtering water through soils.

A Dirge for the Nepperhan

As fair a stream as ever ran
Was once nitiscent Nepperhan!

Aye, in the primal long ago
Its limpid music—making flow
Was down through plenty—foliaged gates
To where the Hudson corruscates.
And on its vision—op'ning breast
The savage lade with languid rest
Communed with Gitche—Manitou
In dreams, as glided his canoe.
The lotos fragrance fill'd the air
And beauty's birth was everywhere.

Lenni Lenape's eye ne'er did span
A stream more fair than Nepperhan!

'Twas not till Hendrik Hudson's fame
O'er Ocean's pulsing pathway came
And Civilization's strangling arms
Were flung around all nature's charms—
When Yonkers from the forest's dead
Upraised her many timbered head,
That darkness fell across the stream
And shadows dimmed its crystal gleam.

O Stuyvesant! O Platt—Deutsch clan!
Why fouled ye fair sweet Nepperhan?

'Tis now, at Yonkers's spreading feet,
A flow with odorous sins replete;
Its nitid bosom has become
A snake—like yellow scrawl of scum.
And from its fetid bed is blown
A smell would shame those of Cologne;
A festering nuisance day and night
To each olfactoried Yonkerite;
And now the cry from high and low
Is "Dirty Nepperhan must go."
And as for Copcutt's dams, oh my!
More dams than his assail the sky!

Oh, dripping, water loving Pan,
Please pipe a dirge for Nepperhan!

(August 29, 1891, The Yonkers Gazette)

TESTING THE WATER

As the 1891 poem conveys so well, the water quality of the river a century ago had been severely degraded by the stream's use as an industrial sewer. With the installation of sewer systems in the early 1900s in Yonkers, water quality improved. Yet, by the early 1980s, the USGS reports revealed a grim picture noting that the Saw Mill contained the highest concentration of metals among all sites in the National Water-Quality Assessment Program. Subsequent studies confirmed not only the industrial legacy of harm, but verified the consequences to water quality of urbanization. One such study, funded by EPA in 2009 and conducted by Groundwork Hudson Valley's partner Manhattan College, collected samples at 15 sites from the top to bottom of the watershed over 3 years, providing a baseline for subsequent monitoring.

Study & Date	Contaminant/Parameter	Findings	Notes
USGS 1983	Heavy metals DDT PCBs	In streambed sediments In streambed sediments <50 mg per kilogram/h ₂ O	Near mouth Throughout river Final 6 miles
USGS 1990	Cadmium, copper, mercury, nickel, zinc	"worst" in sediments near mouth	Among "worst" nationwide "Worst" Hudson River tributary
NYSDEC 2008	Toxics Organic & nutrient loading Dissolved oxygen Pesticides	Lower & middle sections Lower & middle sections Decrease; impacts fish health In streambed sediment	Urban runoff Urban runoff, storm sewer overflows Road drainage/construction Upper section
Groundwork Hudson Valley & Manhattan College 2009-2012	Fecal coliform: Action Limit 200 organisms Total phosphorus: Action Limit: 0.031	2008-223; 2009-656; 2010-2318; 2011-2094 Range through years from 0.06 to 0.12, spiked 2010-0.18	Additive effect as it travels downstream Additive effect as it travels downstream Sampling at 15 sites

Riverkeeper & Center for the Urban River at Beczak 2015-2018: see next page

ACTIONS IMPROVING WATER QUALITY

- 100,000 tons of trash have been removed from the river since the Great Saw Mill River Cleanup 15 years ago.
- Reports from water quality monitoring by the Groundwork and Riverkeeper/CURB to municipalities have produced real results including fixing sewer line leaks and eliminating cross connections where sanitary sewer lines were mistakenly dumping sanitary waste directly into the river.
- Yonkers separated its sewer and storm-water systems when the river daylighting was constructed in 2012 eliminating sewer overflows during rainstorms. In addition old sewer pipes carrying waste directly into the river were discovered and cut off.



John Klonowski, citizen science volunteer and Harry Hall, Saunders High School teacher of environmental science, conducting early water quality studies.

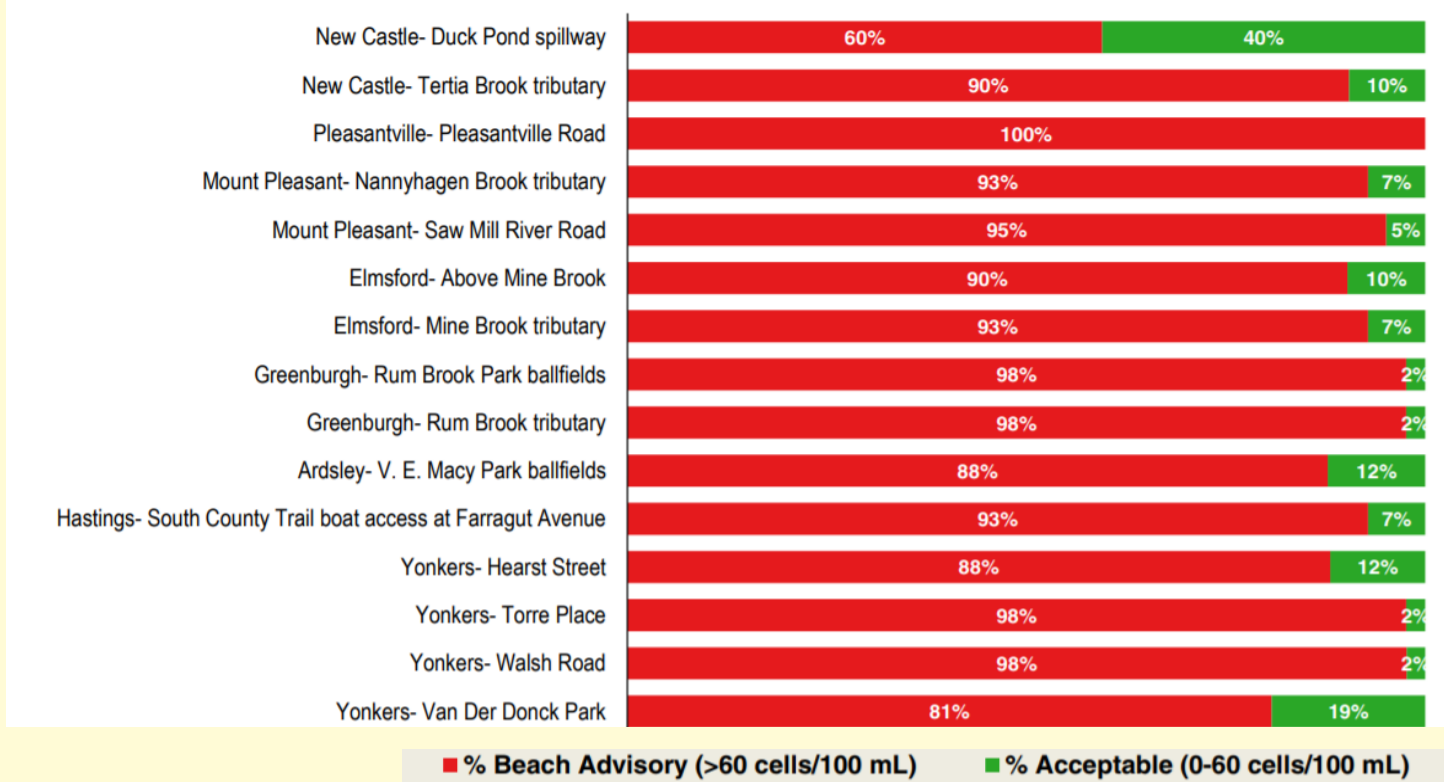
In 2015, Riverkeeper and the Center for the Urban River at Beczak (CURB) launched a new round of sampling using the same 15 sites and focusing only on Enterococcus (“Entero”), which is an indicator of fecal coliform (bacteria). Entero levels, established by the US EPA, determine if a water body is safe for swimming or water sports.

DATA SUMMARY FROM 2015-2018 STUDIES ON THE SAW MILL RIVER



Saw Mill River: % Samples Achieving EPA Safe Swimming Guideline

*Samples collected by Yonkers Paddling and Rowing Club, Pleasantville CAC, and watershed residents
 Samples processed by the Sarah Lawrence College Center for the Urban River
 Results are based on 41-78 samples per site, collected from May-October, 2015-2018
 EPA’s recommended Beach Action Value (BAV) is a guideline for day-to-day beach management*



Courtesy Riverkeeper

FUTURE RECOMMENDED ACTIONS

- Strengthen cooperation between and among municipalities and water quality monitoring partners
- Improve effectiveness in meeting Phase II MS4 Minimum Control Measures collaboratively, for example, by jointly conducting a comprehensive public information campaign regarding stormwater pollution and/or sharing training and equipment.
- Investigate and reduce the use of salt on roadways and impacts on the stream in the winter; re-evaluate monitoring for heavy metals, toxics, PCBs in sediments
- Identify priority stormwater runoff locations and find ways to absorb and treat the runoff before it reaches the stream
- Complete a Watershed Plan involving stakeholders throughout the watershed, providing a strong cooperative plan to improve water quality and restoration



WETLANDS

RIVER PRIMER: Wetlands have three important functions:

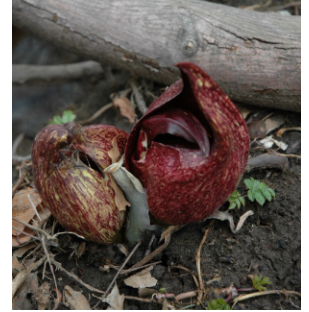
1. Improve and protect water quality by filtering floodwaters;
2. Reduce flooding by absorbing the water like a sponge and releasing it slowly at numerous points to moderate high flows and to continually feed the river's base flow,
3. Provide habitat for aquatic and terrestrial species.

From a 2010 study comes an alarming statistic: almost 40% of the wetlands in the Saw Mill River basin no longer function as wetlands.

River Primer explanation: The loss of wetland functioning is due to urban and suburban development which has reduced or replaced the vegetated land next to wetlands (buffer) with pavement or impervious surfaces (buildings). With little or no buffer, the quantity of rainwater that falls quickly exceeds the ability of the wetlands to absorb and store that quantity of water— leaving the wetlands permanently flooded. When a wetland is permanently flooded, its capability to filter the water is also gone, decreasing water quality. Another consequence of less water absorption by wetlands is that the river's volume and flow rate increases. This powerful force alters the stream by causing more erosion, and scouring the channel. With a deeper channel, the river carries a greater volume of water downstream. Because of a deeper channel, the water bypasses some existing floodplains and wetlands. Flooding then occurs more frequently downstream as the volume of water reaching the bottom of the watershed becomes untenable. In addition, plants and animals that once successfully lived in these wetlands can no longer survive in such conditions, not only changing the ecology of the area, but also further degrading the stream's overall viability and biodiversity.

STATE OF THE WETLANDS

In 2010, the US EPA funded Groundwork to complete a "Wetland Identification Assessment" to identify the best opportunities to revive and restore the historic wetlands in the Saw Mill River watershed. The report specified the number of wetlands represented in each municipality as well as their acreage. Individual field notes completed for each site include recommendations to improve their functioning. Restoration possibilities for three of the wetlands identified in the Assessment appeared in a 1999 Army Corps of Engineers report. The three sites were Woodlands Lake (Irvington), near Chestnut Ridge Way (Dobbs Ferry) and across Saw Mill River road from Mt. Hope Cemetery (Hastings-on-Hudson). For the Dobbs Ferry and Hastings sites, the benefits listed included floodwater retention and pollution filtering.



Municipality	# of Wetlands	Acreage	% of Total Acreage	100 ft. Buffer? Yes	100 ft. Buffer? No	Lawns	Impervious Surface in Buffer
Dobbs Ferry	3	1.9	1.0%	1 (33%)	2 (67%)		2 (67%)
Elmsford	2	2.1	1.0%		2 (100%)	1 (50%)	2 (100%)
Greenburgh	30	24.6	9.0%	14 (47%)	12 (40%)	17 (57%)	14 (47%)
Hastings on Hudson	2	0.5	.01%	2 (100%)			1 (50%)
Irvington	3	15.0	5.0%		3 (100%)		3 (100%)
Mount Pleasant	49	76.8	27.0%	16 (33%)	30 (61%)	29 (59%)	40 (82%)
New Castle	18	149.4	51.0%	2 (11%)	4 (22%)	14 (78%)	13 (72%)
Pleasantville	5	8.6	3.0%	4 (80%)	1 (20%)	2 (40%)	1 (20%)
Yonkers	5	9.1	3.0%	2 (40%)	3 (60%)	4 (80%)	4 (80%)

FUTURE RECOMMENDED ACTIONS These recommendations are directly from the Wetlands Identification and Assessment Study to protect and improve the functioning of remaining wetlands areas in the Saw Mill River Basin:

- Establish a consistent wetland buffer management policy to be adopted by municipalities in the watershed.
- Establish a series of recommended stormwater retrofits and buffer retrofits to be applied to existing residences and property when new applications are made for changes on the property.
- Adopt a watershed wide vegetation management program designed to recreate naturally vegetated buffer strips along wetlands.
- Explore large open spaces that may be available to recreate large wetland restoration projects that re-establish floodplain areas to assist with flooding storage and water quality maintenance.
- Establish a stormwater management committee including representatives from municipalities within the SMRW to explore key stormwater retrofits that would reduce the impact from impervious surfaces.
- Focus on improving the function of floodplain areas, management of riparian wetlands and specific locations where tributaries converge into the Saw Mill River.
- Stabilize stream banks and create more natural stream morphology to assist with creating habitat, reducing stream velocities during storm events and downstream flooding.
- Investigate and provide strategies to address the significant impacts on wetlands from invasive plant species.
- Provide education to homeowners with wetlands on or adjacent to their properties focusing on impervious surfaces and lawn maintenance, the value of vegetated filter strips, and natural habitat along streams and wetlands.

BIODIVERSITY: WHAT LIVES IN THE WATERSHED?

RIVER PRIMER: A River... maintains habitat for fish, birds, and wildlife

For many people when they hear the words “Saw Mill” they think of the highway or the Parkway that runs alongside the river. While the Parkway and resulting development of urban and suburban roads and ornamental lawns certainly has limited the potential for biodiversity in the basin an important area of habitat remains intact. When the Parkway was built, forested lands along the river were set aside to create a pleasant roadway “experience.” Owned by New York State, these lands were protected from local development. This swath of green around the river—an unexpected jewel—is one of the few critical open space corridors remaining in the southern half of the County.

Early studies (1989-2008) assessing biodiversity in the watershed identified a meager number of species. Efforts made by local non-profits, with volunteers, partners, and funding to hire targeted specialists, have given a fuller picture of the diversity and number of species in the watershed. When Groundwork established the Saw Mill River Coalition in 2003, it received funding over several years from the NYS Hudson River Estuary program and the Westchester Community Foundation to support field studies, most importantly the 2009 BioBlitz.

- 1989 Ferry Sloops, entire watershed: 22 fish species
- 2001 NYS DEC: 13 fish species
- 2004 US Army Corps of Engineers: 5 tree species and 7 wildlife species that tolerate urbanized areas (e.g. gray squirrel), 15 bird species, and 6 reptile species;
- 2004 NYS DEC: reports of stocking rainbow trout and brown trout
- 2005 Westchester County Parks, Woodlands Lake: 26 tree species, 39 plant species, 19 bird species; Farragut Avenue: 12 tree species, 33 plant species, 19 bird species, 6 fish species, 6 reptile species, 3 macroinvertebrate species; and
- 2008 Lehman College with Saunders High School students, 8 species of fish.
- 2009 Groundwork and its Coalition partners carried out a BioBlitz—a 24-hour period to identify as many species as possible in designated areas. With funding from the US EPA and Westchester Community Foundation, over 50 scientists from universities, colleges, the NY Botanical Garden, The Smithsonian, and other institutions, combed 8 different sites in the watershed and found 642 species! The scientists that participated were experts in fungi, plants, mammals, bees, spiders, wasps, beetles, macroinvertebrates, birds, aquatic invertebrates, amphibians and reptiles.



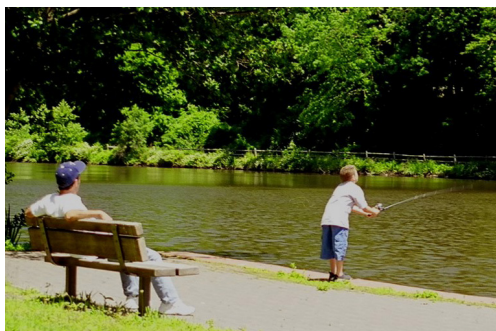
Scientists work with students to identify species of spiders and beetles in the temporary science laboratory set up at Pace University during the BioBlitz.

- 2009-2013 Hudsonia. American eel and migratory fish studies. A species of great “conservation concern” to NYS DEC, and to NOAA, the American eel was present throughout the first twelve miles of the watershed, even above the 20-foot high dam at Woodlands Lake. Their counts doubled at the daylighting park site from 2012 to 2013, an important study to monitor change that may have occurred after the daylighting park in Yonkers was completed in 2012.

FUTURE RECOMMENDED ACTIONS There are three basic recommendations from the work completed to date.

- Disseminate specific information on the species found in each municipality to the residents and businesses in that community. Knowledge of the species and threats to their habitats will go a long way in informing local decisions that affect the ecosystem.
- Continue to monitor species of “concern,” like the American eel, to be able to access whether the habitat improvements planned and implemented (such as daylighting or wetland restoration) are successful.
- Plan public events and provide opportunities for people, especially youth, to understand and enjoy the river environment and biodiversity will support a new generation of scientists and municipal leaders.

ACCESS TO NATURE—RECREATION



Although it is sandwiched between highways in some places, the river is also a place where people find nature, biodiversity, and recreation. However, recreation is dependent upon access. Wherever there is access to the river, people take advantage of it. A prime example is the South County Trail that runs for 14 miles, mostly along the Saw Mill River and is heavily used by bicyclists, runners and walkers. The first controlled access along the river from the south is at Hearst Street in Yonkers. A very-packed parking lot at Farragut Avenue attests to the popularity of the trail. Woodlands Lake at V.E. Macy Park, created by a historic dam along the Saw Mill River, is another destination with parking also along the South County Trail in Irvington that draws individuals and families for fishing, picnics, and canoeing. Further north, the South County Trail links with a 1.2 mile paved path in Tarrytown, which allows access for trail users to the 122 acres of predominantly native

woodland at Tarrytown Lakes and Butternut Ridge Park. Continuing on, a portion of the North County Trail runs along the Saw Mill River. In addition, at the top of the watershed in Chappaqua, near the stream's origins, is the Saw Mill River Audubon Pinecliff Sanctuary, a seven-acre wooded area that features a quarter-mile boardwalk trail. The sanctuary is home to a variety of wildlife and habitats, including ponds, deciduous woodland, swamps and red maples.

Within this context of interconnected trails and parks, Groundwork and the Coalition have focused on improving the recreational opportunities along one of the most scenic, and naturalized riparian areas from the river's border with Yonkers to Woodlands Lake. A Groundwork board member, Steve Pucillo, has worked for over five years with volunteers and local landscapers to establish trail amenities that enhance people's river experience.

These include several "sit and reflect" sites with rough-hewn benches along the trailway with pathways to the river, butterfly gardens, cross-country ski paths next to the river, wetland walkways, and temporary docks to launch kayaks. Given this effort, with funding from the NYS DEC in 2014, Groundwork developed the Saw Mill River Recreation Plan showing the potential for the river to be a wonderful recreational amenity for the watershed towns.

FUTURE RECOMMENDED ACTIONS

- Install a controlled pedestrian/bike crosswalk at Farragut Parkway;
- Develop an accessible floodplain forest path and boardwalk loop at Farragut Avenue;
- Restore a major wetland for wildlife viewing and stormwater control East and West of the Saw Mill Parkway at Lawrence St.

ECOSYSTEM RESTORATION

Projects to restore the river's ecosystem have been rare. Only one formal ecosystem study has been conducted. In 2004, the US Army Corps of Engineers (ACOE) identified nine recommended projects. Only two were completed: Woodlands Lake and Daylighting. Groundwork received funding from NYS for restoration along the river from Farragut Avenue to Woodlands Lake.

Woodlands Lake, Irvington. The lake suffered from sediment accumulation. The sediment was dredged, placed in an adjacent flat area, and Groundwork volunteers planted the area native plants.

Daylighting the "covered reach" of the Saw Mill River at Larkin Plaza. Groundwork was an early champion of the daylighting idea of daylighting, holding a series of community engagement meetings and receiving a grant to inform the habitat plan. The City began construction in December 2010. The design included native riparian plantings, fresh water ponds, riffles, and a tidal basin. Within 4 months of the new water flow, fish had found it. Now turtles, ducks, muskrat, and night herons inhabit the area, along with the American eel. The U.S. Fish and Wildlife Service dedicated the park as a National Urban Wildlife Partnership site.

Farragut Avenue to Woodlands Lake. (right) Since 2005, Groundwork has coordinated over 700 volunteers in invasive vine cutting saving hundreds of trees as part of the NYS DOT Adopt-A-Highway program. A NYS DEC restoration grant funded a restoration plan for the area.



Future Recommended Actions

Conduct an assessment alongside a watershed management plan, of potential ecosystem restoration projects that would improve habitat, public access, natural vegetation and river function.

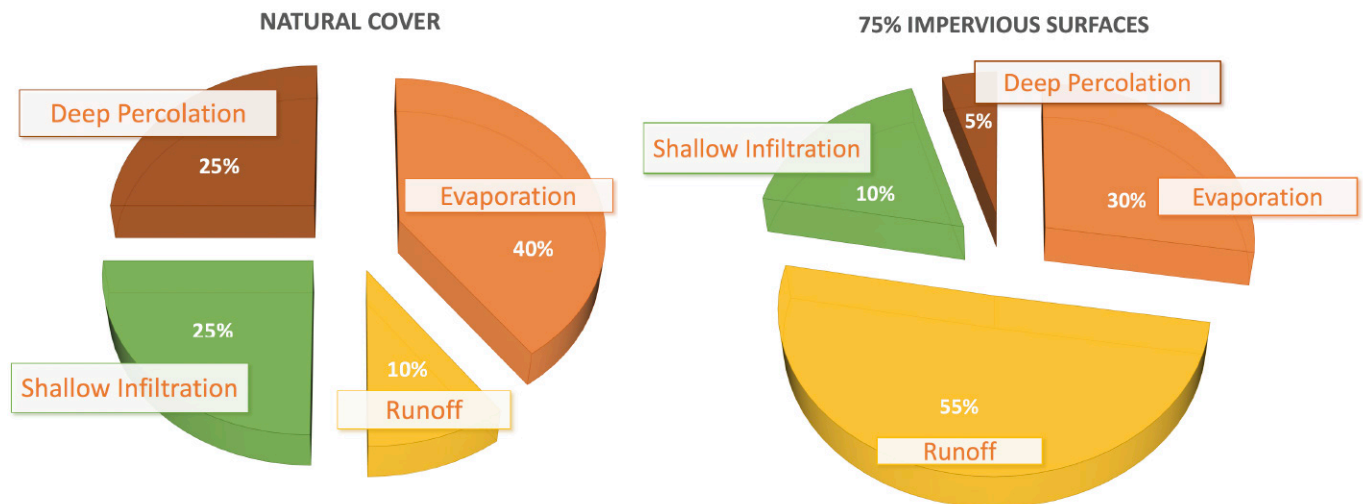


THE STORY OF SAW MILL RIVER FLOODING—URBANIZATION

More than 50 years ago, a **1945 report succinctly laid out the story of flooding along the Saw Mill River** before climate change was in the mix. Presented to the Westchester County Board of Supervisors, it stated, “Westchester has almost had a flood problem...We do not have worse rain now than we had in earlier years. However, *the growth of the County has increased the flood-producing characteristics of our streams* with the result that one inch of rainfall will now produce several times the quantity of water flowing down a stream in a given time than was formerly the case.”

Watershed population in 1920 was 344,436. Construction of the Saw Mill River Parkway began in 1926 and finished in 1954, claiming land along the river. By 1950 with the Parkway becoming a commuter route, the population had risen to 625,816, almost double. More pavement was crammed in the river corridor with the construction of the Interstate Highway 87/287 between 1957 and 1967. The ease of transportation brought even more people to the watershed’s corridor. The 1970 census was 42% higher, 894,104, in just 20 years! People brought changes to the land: housing, driveways, businesses, parking, schools and hospitals, and local streets—more impervious surfaces—leaving less land to absorb and store rainwater. Land use in the Saw Mill River watershed went from primarily forested and vegetated cover to 64% *urban use!*

RIVER PRIMER: DIFFERENCES IN RUNOFF VOLUMES AND INFILTRATION CAPACITY BASED ON LAND USE



RESPONSES TO FLOODING

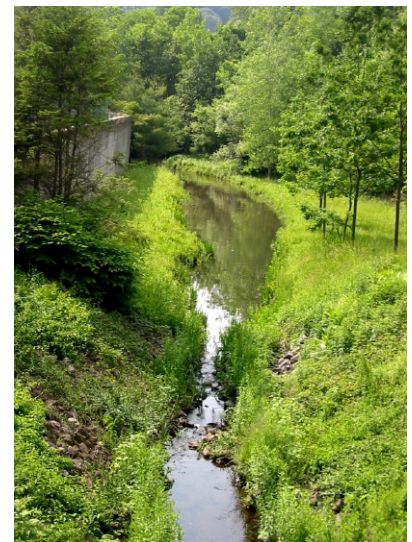
Spurred on by major hurricanes and nor’easters that caused great damage, the projects described here were completed based on engineering approaches to solve a local problem. Because of the costs involved, the pressure of getting something done, and the difficulty of coordinating among jurisdictions (the river has no one “owner”), these projects all lacked a thorough analysis of potential ecosystem damages, downstream consequences, or impacts on river functions that the project would have. It appears that there are many opinions about the value of each project, as noted in some of the descriptions.

1980, New Castle project: In Chappaqua, heavy rain from Tertia Brook tributary overwhelmed the capacity of the Saw Mill River, causing flooding in Chappaqua. A local engineer claimed that while project’s channeling had solved the problem of flooding in downtown Chappaqua, it made flooding worse in Pleasantville (*Westchester Magazine*, 2012).

1989, Ardsley project: The downstream reach was realigned and widened to 20 feet, removing a Conrail bridge. Another section involved improving a 1,160-foot length of concrete flood wall averaging 14 feet in height located behind the Village Green business area. The project also included a stilling basin, filling of low areas and streambed stabilization.

1995, Yonkers project:

The U.S. Army Corps and NYS DEC dredged a 2-mile section to prevent flooding along the highway and residential area bordering the river. After dredging, crews lined the river with porous fabric to keep the soil from shifting, widened the river to 10 feet, and lowered the floor of the river to 3 feet in order to increase the flood-carrying capacity. The project was met with significant resistance from environmental groups and residents concerned about the effect on the ecosystem (method used did not allow for turtles to nest or aquatic life to burrow into sediment).



Ardsley

RIVER PRIMER: Dredging may move a sediment problem downstream; or if nothing changes upstream, sediments may reoccur in the same location. Lowering a riverbed bypasses floodplains pushing flooding downstream, increasing erosion and flow velocities.

RIVER PRIMER: Building in floodplains is very costly over time and should be prevented.

RESPONSES TO FLOODING continued

2004, 2013, Elmsford project. FEMA granted \$800,000 to uplift 7 homes on Babbitt Court, enabling the homes to avoid property damages after storms. River Primer: Building in floodplains is very costly over time and should be prevented.

Pleasantville. The Parkway road is on a bog in Pleasantville. Because the roadway is slowly sinking, three or more inches of asphalt has been added multiple times to raise the parkway elevation. *Question:* what is the volume of the asphalt block that has accumulated over time and does it make sense to continue the practice or change the approach?

SWAB 2016-2017, Woody Debris Damage

Removal. There are other factors causing headaches with localized flooding. The Saw Mill River Watershed Advisory Board (SWAB), made up of municipalities, have worked together with the NYS DEC to remove major debris in the Saw Mill River before the storm season of 2016-2017. Debris can collect at bridges and undersized culverts, undermining infrastructure as well as restricting flow and possibly backing up the river to flood areas.

RIVER PRIMER: Some woody debris is bad: large trees may damage bridges and culverts or cause water backups. NYS conducts twice yearly inspections to ensure that municipalities remove debris that would restrict the river flow. Some debris is good: downed trees provide critical habitat to aquatic species, and removing all debris increases the velocity and power of the river, increasing erosion and carving deeper river channels potentially bypassing floodplains and wetlands that help control flooding downstream. Some of the debris removal work in 2016-2017 involved NYS DOT with heavy equipment in the river which damaged the riparian buffer. Instead of a riparian native plant seed mix (available from NYS DEC), a lawn seed was spread. The disturbed area is now being lost to invasive vines. Recommendation to assist with conflicting goals: review and set guidelines for debris removal.



Elmsford



Pleasantville

RIVER PRIMER: A River... is a dynamic change agent, constantly readjusting due to the energy of various water flow conditions.

“People change things in a stream system and then blame the stream for readjusting.”

HOW WE RE-ADJUST

RECONNAISSANCE—COLLECTING INFORMATION

In 2011, Westchester County adopted a Stormwater Management Law to address flooding problems. The Saw Mill – Pocantico Reconnaissance Plan was a large undertaking to compile and evaluate existing information about flood problem areas. An evaluation criteria was developed and the multiple sites from all the municipalities were reviewed against the criteria to provide a list of prioritized projects to be considered for funding. While the information did not address detailed, watershed-wide analysis with up-to-date hydrologic and hydraulic data, it did bring together “what is known” about the sites. This information will prove useful in prioritizing areas subject to flooding for design and implementation, as well as identifying data needs for other sites.

RAIN IS A COMIN’—INCREASING INTENSITY AND VOLUME

Famous last words of the 1945 Westchester County report: “*We do not have worse rain now than we had in earlier years...*” In 2011, Westchester County experienced record-breaking rain, 20 inches above normal by the end of September, and the Saw Mill River Parkway was closed at least 11 times (*Westchester Magazine*, 2012).

From the Reconnaissance Plan document: “Increases in the frequency of high intensity storms only make matter worse.”

Municipalities, reporting on a watershed survey in 2018-2019, updated the Reconnaissance information on flooding sites, laying out very familiar areas that continue to flood.



Hastings-on-Hudson

MUNICIPALITY	WHAT PARTICULAR AREAS ARE YOU AWARE OF THAT FLOOD AND WITH WHAT FREQUENCY?		
	Area/Road/Cross – Road	Area/Road/Cross – Road	Area/Road/Cross – Road
Village of Irvington	Sunnyside Lane – Heavy Rain	Lewis Road – Medium Rain	Harriman Road – Heavy Rain
Village of Ardsley	Macy Park – flood control practice, every heavy rain	Village Green – flood control practice, during very heavy rain	Bridge St Plaza – during very heavy rain
Village of Pleasantville	Saw Mill River Parkway and Manville Road – Medium Rain		
City of Yonkers	Clunie Avenue & Tompkins Avenue Vicinity – Heavy Rain	Odell Avenue & Nepperhan Avenue Vicinity – Heavy Rain	Heavy Rain
Village of Elmsford	Rte 119 Bridge – Heavy Rain	Valley Avenue – Heavy Rain	Haven St & River St Intersection.
Village of Hastings-on-Hudson	Farragut Avenue and Farragut Parkway still flood occasionally – Heavy Rain		
Town of New Castle	King Street and Greeley Avenue in Chappaqua – Heavy Rain	South Greeley and Washington Avenue	King Street and South Greeley Ave
Town of New Castle	N Greeley Ave between King St and US Postal Office at 107 N Greeley Ave – Heavy Rain	Turner Swamp Sanctuary – Heavy Rain	Wetlands by Kipp St. – Heavy Rain
Town of Greenburgh	Warehouse Lane/NYS Rt. 9A – Medium Rain	Babbitt Court/NYS Rt. 9A – Medium Rain	
Village of Tarrytown	East Sunnyside Lane Flooding occurs around local streams – Heavy Rain	Depot Plaza and Green Street, and along the Hudson River with heavy rains and high tides	Neperan Road at Sunnyside Avenue – road floods and becomes impassable – Heavy Rain
Village of Dobbs Ferry	Saw Mill River Parkway – Heavy Rain		

STEWARDSHIP

Like many watersheds around the country, the Saw Mill River watershed does not have one owner. Ownership is divided up along weird political lines (12 municipalities), and other lines (County Parks—parks and the trailway; State Parkway lands). For many years, no entity took much responsibility for understanding, protecting, or advocating for the river or its watershed.

The tide of citizen participation and stewardship – beginning in the late 1960s and early 1970s environmental movement - finally reached the banks of the Saw Mill in the late 1980's. At this time, the Ferry Sloops—an environmental sailing organization associated with Hudson River Sloop Clearwater—initiated its “Saw Mill River Project.” Through this project, community leaders Bob Walters and John Klonowski commenced water quality monitoring to develop a baseline of data; started a fish survey of the entire tributary; and began a community awareness program—all in an effort to educate people and promote conservation of the fragile aquatic habitat.

In 1998, a group of community leaders, including Bob Walters and James Colassaco, answered a proposal from the US EPA and the National Park Service to establish a non-profit dedicated to working with communities to improve their local environment. This “Trust”—Groundwork Yonkers—now Groundwork Hudson Valley, was established in 2000 with a focus on restoration of the Saw Mill River, including daylighting in downtown Yonkers, ecosystem projects in the watershed, and establishing a stakeholders group in 2003 (the Saw Mill River Coalition). In 2019, the 15th annual Great Saw Mill River Cleanup was held in April. Over 250 volunteers cleaned 4,649 pounds of garbage out of the Saw Mill River at 9 different sites in Yonkers, Elmsford, Dobbs Ferry, Ardsley, Hastings, Irvington, and Greenburgh. Twenty-three sponsors supported the effort with cash funding, and another 20 with donations of supplies.

An important aspect of the program is involvement of youth. Over 500 local youth through Groundwork programs have been involved in Saw Mill River restoration projects and ecological studies. The U.S. Fish and Wildlife Service (USFWS) designated the Saw Mill River as a National Urban Wildlife Youth Partnership site.



COLLABORATION FOR WATERSHED MANAGEMENT

With recognition that watersheds are divided into multiple municipalities, New York State DEC's Hudson River Estuary program funded Groundwork's Saw Mill River Coalition work over many years with a focus on developing some form of an Inter-municipal Agreement. In 2006 they funded training for municipal representatives to attend the Pace Land Use Law Center's program “Land Use Leadership Alliance.” Ten of the twelve municipalities in the watershed attended, and Pace held a special session just for the group to write a working “Memorandum of Agreement with respect to the Saw Mill River.” Eleven of the twelve municipalities signed the document by April 2007. This document supports collaboration to protect and enhance the river. The Coalition meetings continued through 2011 when the County's Saw Mill River Watershed Advisory Board (SWAB) convened. With funding from Westchester Community Foundation and the NYS DEC in 2018, Groundwork and the Center for the Urban River at Beczak (CURB) are providing technical staff support to the County's SWAB.



FUTURE RECOMMENDED ACTION

The next, most important step to support the river is to complete a watershed-wide management plan focusing on priorities of the municipalities with input from people who live and work in the watershed. This will take advantage of all of the rich data that has already been collected; provide action steps based on public priorities in water quality, flood management, ecosystem restoration, biodiversity and recreational access; and provide the required qualified state plan to receive funding for identified projects.

A review of these studies brought to light the fragmented approach to flooding within the watershed and the lack of a comprehensive plan to address it. Flooding is an intermunicipal and watershed-wide problem requiring intermunicipal cooperation and watershed-wide analysis and solutions.

— Westchester County Saw Mill-Pocantico Reconnaissance Plan

The Saw Mill is
more than just a parkway!



Chelydra serpentina —
common snapping turtle