Protecting and managing Hudson River streams: Overview, scales and definitions

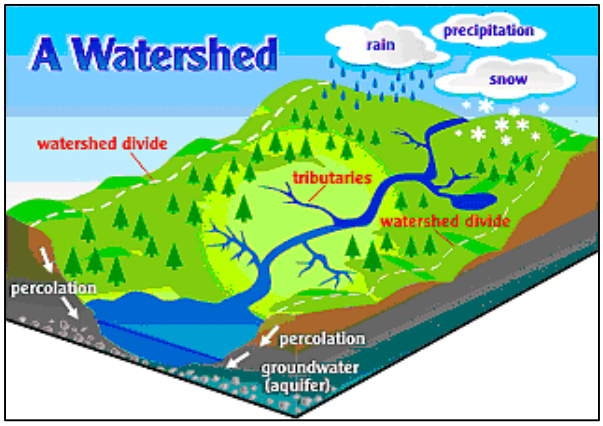
A comprehensive approach to stream management yields many benefits for a local community and its water resources including improving water quality, reducing and mitigating flooding, protecting wildlife habitat and maintaining and enhancing public access and recreational activities. Although much attention has been placed on the health of the Hudson River in recent years, resulting in a dramatic improvement in water quality in the river, the health of the many streams and tributaries of the Hudson River Basin also play an important role for the water quality and overall health of the watershed.

Overview

Streams are part of larger systems called a **stream or riparian corridors, which often include floodplains and wetlands adjacent to streams**. Streams include the water flowing through them and the land beneath them called the **stream bed or channel**. Other spatial scales to consider are the lands around the stream – including the **stream or riparian buffer**, **adjacent floodplains and wetlands**, **upland habitat** and **watershed**.

Size and Scale of Watersheds

- Everyone lives in a watershed. Wherever you are in the world, you are in a watershed.
- A watershed supports a web of life that is interconnected, meaning that every plant and animal interacts with many other organisms in the watershed during their life cycle. A typical watershed is a **network of smaller rivers or streams called tributaries**, which are connected and eventually flow into a larger stream or river.
- Watersheds are divided into smaller drainage areas or subwatersheds. For example, in the Hudson Valley, the Quassaick Creek Watershed (56 square miles) and Moodna Creek Watershed (180 square miles) are subwatersheds of the larger Hudson River Watershed, which drains about 13,500 square miles of land.
- The USEPA promotes the use of a watershed approach to manage our land and water resources, based on scientific research documenting the important connection between land use and watershed health.
- In the US, standard watershed boundaries have been divided and sub-divided by the United States Geologic Survey into successively smaller hydrologic units. Watershed regions each have a Hydrologic Unit Code (HUC).

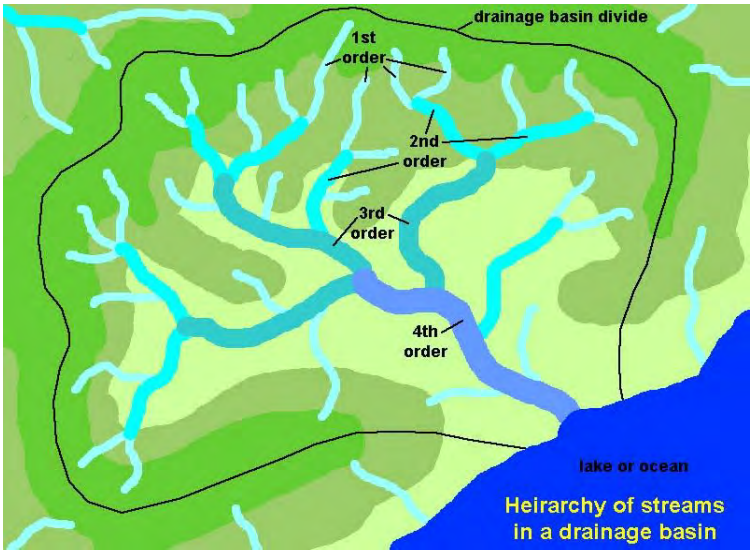


Source: Sandusky River Watershed Coalition

Hudson River Watershed

The Hudson River flows from its highest point at Lake Tear of the Clouds in the Adirondacks and from many other headwater streams, to New York Harbor. The Hudson River is over 325 miles long, and it's up to 200 feet deep, and as wide as 3.5 miles, in some places. The Hudson River watershed drains approximately 13,400 square miles and encompasses 11 major sub-watersheds. More than 65 major tributaries flow into the Hudson River, with the Mohawk River as the largest tributary.

Stream order classification: The Strahler stream order system describes the relative size of streams and their watersheds, with first order streams being the smallest ones that have no tributaries. A second order stream is formed where two first order streams join, but when a second order stream is joined by another first order stream, it remains a second order stream until it's joined by another second order stream (see illustration at left). The Hudson River is a seventh order stream, and the Amazon River, the world's largest, is 12th order. Stream order expresses the exponential change in certain characteristics of some streams and watersheds as small streams join and form larger ones. It's a qualitative indicator that can be used in research and planning applications.



Source: http://www.geologycafe.com

Direct measurements of watershed area, stream flow, and other factors are generally more useful in many cases.

Types of stream flow

Hydrologists, state and federal agencies use different systems to classify streams. One way to classify streams is how the water flows: **perennial streams** have a continuous, year-round flow; **intermittent streams** have seasonal flows at certain times of the year from runoff, springs or melting snow; and both types are sometimes connected directly to the underlying water table. **Ephemeral streams** only flow in direct response to rain events, and their channels are at all times above the water table. To qualify as a stream by definition, the water flow must be perennial or recurring.

Stream or riparian corridor: Natural stream corridors are systems with associated wetlands, floodplains, woodlands, forests and/or steep slopes, through which most of the water drains from upland surfaces. Streams get their water from precipitation, surface runoff and, very importantly, ground water. **Base flow** is groundwater that flows to the surface and feeds streams, and this makes up most of the water in many streams during dry periods.

Stream bed or channel: A stream bed is the area where the water flows through streams and the land is beneath the water.

Stream buffers: A stream or riparian buffer is a strip of natural vegetation along the banks of a stream that separates the stream from developed areas.

A **tributary** is a creek, stream or river that flows into a larger body of water. The Mohawk River is the largest of the more than 65 tributaries that flow into the Hudson River.

An **estuary** is a partially enclosed body of water in which fresh water from streams and rivers mixes with salt water from the ocean. The portion of the Hudson River from the New York Harbor to the Federal Dam at Troy, 153 miles in total, is the tidal Hudson River estuary.

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