

Reprinted from the Fall 2014 issue

## Stream daylighting: Finding buried treasures close to home

By David Peifer, ANJEC project director

As the most densely populated state, it is no surprise that New Jersey contains a large number of former streams that have been forced to flow in pipes and culverts. Around the turn of the last century, confining a polluted stream underground was considered good practice by sanitary engineers, planners and developers. As cities and suburbs continued to expand throughout the 20<sup>th</sup> century, many small local tributaries were piped, filled and developed over.

Although no statewide mapping exists for stream burial in New Jersey, we can get some idea of the extent of these activities in neighboring Philadelphia and in Baltimore.<sup>1</sup> It's reasonable to assume that New Jersey has had similar rates of conversion.

This practice generally came to an end with modern environmental regulation that makes stream burial much more difficult. However, some of these buried streams have the potential to be brought back to life by a process called "stream daylighting."

### What is stream daylighting?

Stream daylighting is being discovered nationally as a remedy for a number of problems. According to the organization American Rivers, "Daylighting projects expose some or all of a previously covered river, stream, or stormwater drainage. Daylighting exists in several forms including:

- Natural restoration – restoring a stream to natural stream conditions;
- Architectural restoration – restoring a stream to open air, flowing water but within a constructed channel; or
- Cultural restoration – celebration of a buried stream through markers or public art used to inform the public of the historic stream path, although the stream remains buried."

A natural restoration provides the greatest environmental benefit by restoring natural functions. However, results may not always be obvious, and ongoing monitoring is needed to confirm success. Architectural restoration can



*A US Army Corps of Engineers stream daylighting project at Cobbs Creek in Philadelphia involved removing about 700 feet of stream from a culvert.*

*(Continued)*

provide important benefits, like connecting people with water and enhanced real estate values. Cultural restoration is not really restoration at all but can be an important community enhancement or a first step toward restoration. A cultural restoration is inexpensive and can be done by interested citizens.

### **New Jersey examples**

An early example of stream daylighting happened in Union County's Warinanco Park in Roselle in 2008. As part of a wetlands mitigation plan for a toxic contamination removal project in Rahway, Merck & Co. removed 2,000 feet of a previously buried stream from a culvert and restored it with native planting, pools, riffles and other enhancements. The project is on public land and now provides a substantial amenity to the park, complementing and restoring the original design by the Olmsted Brothers in 1923.

In Trenton, a portion of Petty's run<sup>2</sup> was daylighted under the direction of Princeton Hydro, the City of Trenton and the New Jersey Department of Environmental Protection (NJDEP) as part of a larger urban revitalization effort. The project created affordable housing and green space on a brownfield. Project partners relocated the stream to avoid contaminated areas, removed 250 feet of pipe and created an adjacent floodplain meadow. The result is a new green space with flowing water, habitat improvement and a walking trail replacing a degraded urban landscape subject to flooding.

### **Finding buried streams in your community**

Buried streams are likely to be found in heavily developed, older neighborhoods, although suburban areas built before the 1970s are not immune. Comparing historic maps to present conditions can help identify areas that may contain buried streams. Local historical societies and academic institutions often have collections of historic maps. In older urban areas, old maps of sewer systems that often captured streams may be available.

Another method is to use the streams view on NJDEP's Geoweb system together with aerial images. Look for a straight line rather than a pattern typical of a natural stream to identify a flowpath where streams are buried. The straight line may also indicate a ditch, so verify this by referring to the aerial image. Ditches are often visible whereas buried sections are not.

Once you have identified likely candidate areas, confirm them by a field visit. Often the ends of pipes or culverts are visible and flowing water can be heard in stormwater catch basins and manholes. Avoid entering pipes or culverts that may be dark, slippery and could contain toxic sewer gasses.

### **When to consider daylighting**

Daylighting is not feasible for all buried streams, but some situations make the option more attractive. The site in Warinanco Park, for example, was publically owned and bringing back the stream enhanced the quality of the park. Situations where pipes or culverts are in need of replacement due to age or inadequate size can be prime candidates since daylighting can actually be cheaper than replacement.

In streams captured in combined sewer systems where their water quality is still reasonably good, daylighting can reduce the flows, preventing unwanted discharges. In redevelopment areas a daylighted stream can provide important amenity value and stimulate real estate investment.

Daylighting can also be used on brownfield sites to route water away from contaminated areas. Where burying a stream has been a barrier to fish migration, daylighting can restore fish access to spawning areas and upstream habitat. Daylighting can also improve water quality by restoring natural functions where water quality impairments exist, particularly excessive nitrogen levels.

### **Further Reading**

- New Life for Buried Streams: Rocky Mountain Institute
- Showing Buried Streams the Daylight, U.S. E.P.A
- Daylighting Streams: American Rivers

<sup>1</sup>Mapping of buried streams in Philadelphia ([www.phillyh2o.org/maps.htm](http://www.phillyh2o.org/maps.htm)) and Baltimore ([http://andrew.elmore.cc/pubs/Elmore&Kaushal\\_2008\\_Frontiers.pdf](http://andrew.elmore.cc/pubs/Elmore&Kaushal_2008_Frontiers.pdf))

<sup>2</sup>Petty's Run project - [www.princetonhydro.com/projects/natural-resource-management-projects/river/pettys-run-daylighting](http://www.princetonhydro.com/projects/natural-resource-management-projects/river/pettys-run-daylighting)