

Emergency Restoration of Trout Spawning Beds

By Thomas W. Amidon, Senior Associate
Omni Environmental LLC
www.Omni-Env.com

In September of 2011, members of a local fishing club, a quarry owner, and the New Jersey Department of Environmental Protection (NJDEP) worked together to restore trout spawning beds that had been threatened by an accidental discharge from a sedimentation pond on the quarry property. The restoration was performed on an emergency basis in a race against time with the fall trout spawning season, which was expected to occur approximately three weeks after the discharge occurred. The project succeeded because of the cooperative efforts of all three stakeholders: the vigilance of the local fishing club, whose members act as environmental stewards for the watershed that contributes to the stream flowing through their property; the quarry owner, who acted responsibly by developing and executing an effective plan to restore the damage to the stream bed; and the State authorities, who worked quickly to review and approve the restoration approach.

The alarm bells were first raised by Ross Kushner of the Pequannock River Coalition, who happened to be in the field performing *in-situ* temperature and dissolved oxygen monitoring on behalf of a private fishing club that owns a property through which flows one of the highest quality trout streams in the State of New Jersey. In fact, the stream supports naturally reproducing wild populations of brown trout, brook trout, and rainbow trout, and was therefore among the very first streams in the State to be classified as Category One. Wild brook trout require extremely high-quality water to support a reproducing population.



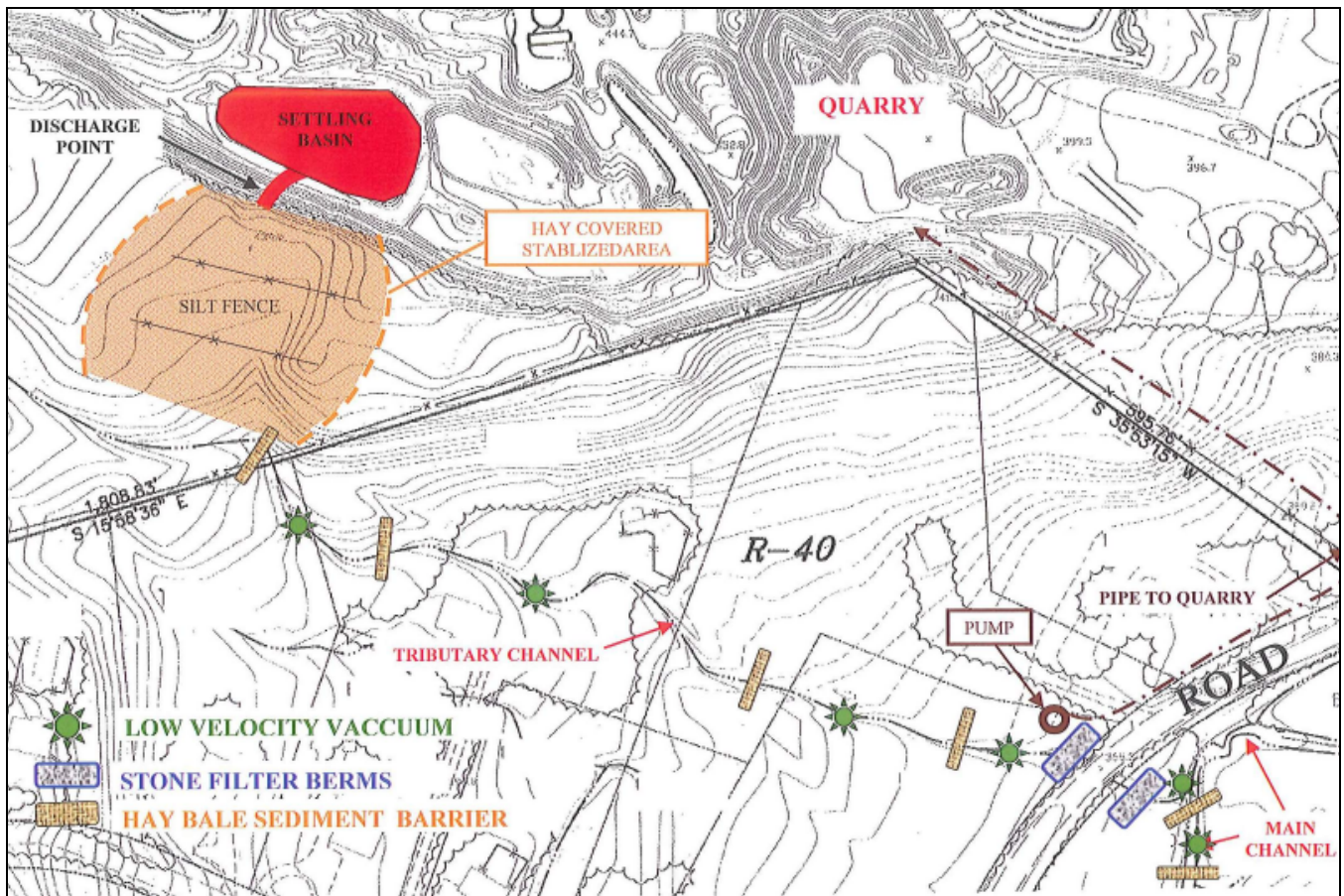
An active quarry immediately upstream and within the same sub-watershed experienced a catastrophic failure of one of its settling basins. The failure resulted in the discharge of rock dust slurry into a tributary containing trout spawning beds and eventually emptying into the main trout stream. A representative from NJDEP Water Compliance and Enforcement visited the site to inspect the damage the day after the spill was reported. The State concluded that there had been a spill, but that no remediation measures would be necessary. From a strictly water quality perspective, the inspector was correct. The rock dust slurry had settled to the stream bottom, and would eventually pass through the stream to the downstream reservoir, where it would settle to the bottom permanently and pose no instream water quality hazard.



However, the slurry formed a 6-to-12-inch-thick sludge in places, and coated the entire bed of the tributary as well as a portion of the main stream. The fall spawning season was less than three weeks away, and the fishing club and its consultant (Omni Environmental LLC) recognized that a significant portion of the spawning beds would be destroyed. Furthermore, the process of allowing the material wash out naturally would take at least a few months and result in even greater damage to downstream beds between the tributary and the reservoir. The

sludge deposits would have certainly impacted the trout spawning this season, and may have resulted in permanent degradation to this relatively pristine resource. The NJDEP trout expert who visited the following week agreed with Omni's assessment and called for emergency remedial measures.

As soon as it became clear that the discharge had degraded the spawning beds, the quarry owner immediately performed interim emergency actions to remove the source material at the point of discharge, stabilize the source area, and prevent further slurry migration. Under the direction of Boswell Engineering¹ (Boswell), the quarry owner installed silt fencing and removed the bulk of the source material by hand. The washed out area immediately downstream of the breached sedimentation basin was seeded and stabilized with hay. Finally, hay bale sediment barriers were installed at strategic locations along the affected tributary as well as the main stream channel to prevent the degradation of additional spawning beds downstream of the areas already affected.



With the interim emergency measures in place, Boswell, on behalf of the quarry, began to develop a final remedial approach for this environmentally sensitive area. Boswell worked closely with the various NJDEP enforcement offices as well as Omni to develop an overall remediation strategy that would remove the slurry from the tributary and stream without harming the stream bed. In this situation, the

¹ Frank J. Rossi, P.E., www.boswellengineering.com

greatest challenge was to ensure the remedial solution was not worse than the problem itself – in other words, to “DO NO HARM.” Boswell devised an innovative and effective solution using a low-pressure wash combined with a low-velocity vacuum to gently remove the slurry. The channel was segmented into workable reaches with the hay bale sediment filters, and each reach was restored individually according to the sensitivity of the aquatic biota present within the channel. The highly labor-intensive work proceeded using a sequential phased approach, proceeded incrementally downstream from the tributary to the stream in individual segments. During the restoration, nearly all water (and suspended material) in the tributary was collected downstream and pumped up to a basin on the quarry property. Downstream of the pump, stone filter berms were installed in the tributary on either side of the road culvert, and additional hay bale sediment filters within the main stream channel were used to minimize migration while the final low-velocity vacuuming was performed.

The NJDEP reviewed and approved the remedial approach within just a few days, and the work was completed within a week after receiving approval. Most importantly, the restoration was completed in time for the fall spawning, which was observed even in the most affected tributary!

Several lessons emerge from this project, the first of which is the importance of environmental stewardship and vigilance. If the spill had not been detected and reported promptly, the environmental impacts would have been much more substantial and likely permanent. The fishing club performs stream monitoring not only in the actual fishing areas, but also upstream within the watershed. Moreover, the fishing club has members in the field almost every day throughout the fishing season, and at least weekly throughout the year. It is therefore no surprise or happenstance that the spill was detected within days of its occurrence. The second lesson is that it is important to understand the State regulatory agency well enough to bring the right resources to bear. In this case, NJDEP was contacted through its emergency hotline, which routed the case to the Bureau of Land Use Enforcement, which subsequently handed the case to the Bureau of Water Enforcement. This makes perfect sense, since the quarry operates under a general stormwater discharge permit. However, NJDEP was at first inclined to treat this as an after-the-fact enforcement issue, rather than an emergency remediation issue. It was not until the State’s trout expert was invited to assess the damage that the State authorized emergency remedial actions. NJDEP responded quickly and decisively as soon as it understood, through its own trout fishery expert, the nature and extent of the problem. Getting the attention of the trout expert, who works in a completely different division (Fish and Wildlife), was critical. Finally, the actions of the quarry in this case illustrate the importance of partnerships. Granted, the quarry was under regulatory pressure to remediate, but when faced with a decision whether to gently vacuum the stream bed or to simply sweep the bed and pump the suspended material back to the quarry pond, the quarry developed an innovative solution. The quarry quickly and efficiently brought to bear resources and equipment that neither the fishing club nor even the State would have available. Had the quarry dragged its feet or hid behind a lawyer, the opportunity to restore these particular spawning beds would have been lost. The quarry did neither, and its decisive action illustrates how stakeholders with disparate interests can work together to achieve positive environmental results.

