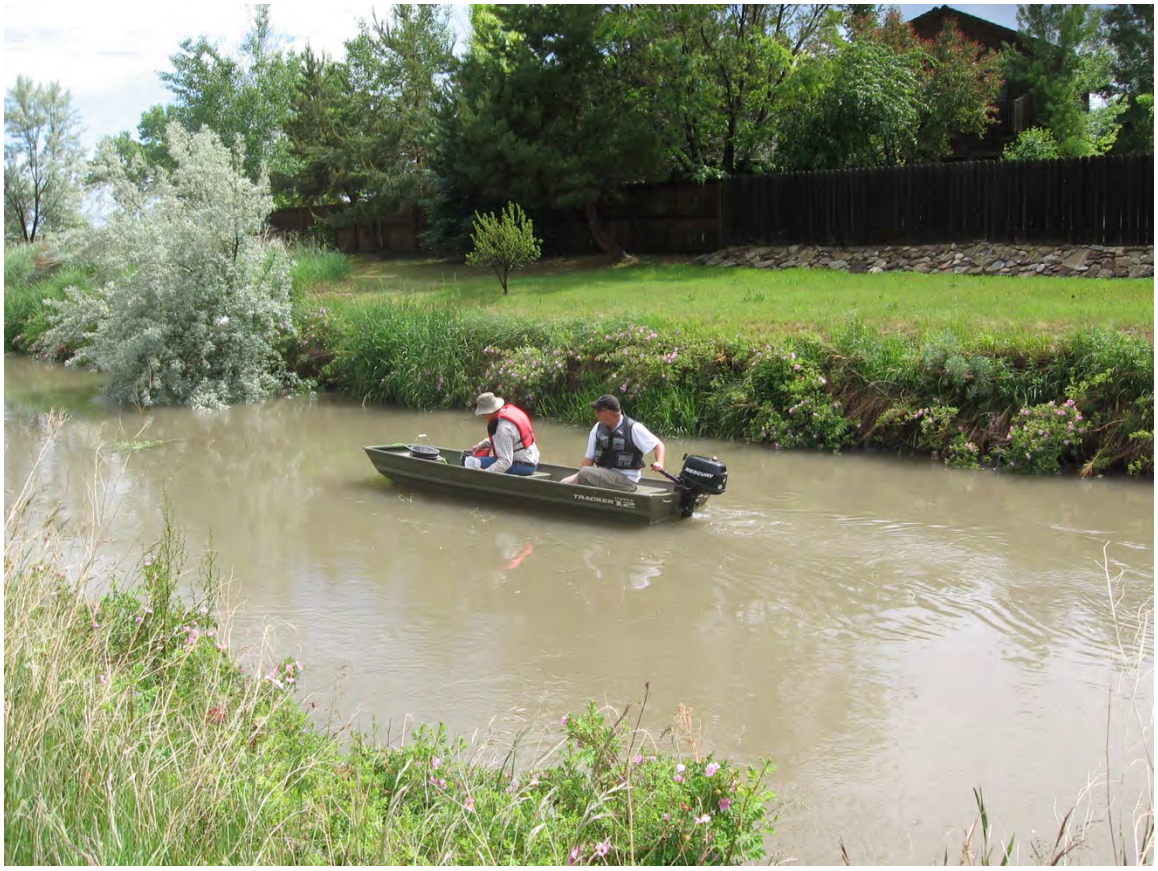

The Application of CanalSentry™ To the Billings Bench Canal June 16, 2009

Report Prepared By:

INNOVIUM
Combining Chemistry & Nature

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Executive Summary:

Innovium has developed a product which significantly reduces seepage in canals, is biodegradable and is much safer to use than polyacryamide in this application. CanalSentry™ is a carbohydrate based natural product which contains a small amount of polyacrylamide. When applied at a rate of 3ppm into the canal water, it effectively aggregates small clay, silt, and silicates particles which reside in the water as suspended solids. These small particles are attracted to the negatively charged polymer and form aggregates which drop out of the water and fill the small cracks and crevices in the canal where water is seeping from.

On June 16, 2009, with the assistance of personnel from the Billings Bench Canal, Mark Hochwalt and Matt Hochwalt from Innovium LLC, and Del Smith and John Osterberg from the Bureau of Reclamation, treated a 2.7 mile reach of the Billings Bench Canal. Prior to treating the canal, flow measurements were made at the top and bottom of the reach to assess the flow rates and leakage rate over the reach. The upper reach was flowing at 324cfs and the lower reach was flowing at 304cfs. There was one diversion gate open in the reach which was flowing at approximately 10cfs. Based on this information, the estimated seepage loss was pegged at 10cfs.

To treat the canal, a water sample was taken to assess the water turbidity which is an indicator of suspended solids. The sample showed the water's turbidity to be 50 NTU. This is very low and Innovium likes to treat waters in this application above 100 NTU to produce a sufficient bed of solids from the treatment. Since the canal company had sufficient material for a second treatment, it was decided to go ahead and treat the canal to see how effectively the product performed at this low suspended solids rate.

The dosage of CanalSentry™ need to treat the water and achieve 3 ppm was 140 pounds per lineal canal mile. 440 pounds of CanalSentry™ was evenly applied across the 3.1mile reach. Flow measurements made after the application showed the upper end of the canal was running at 325cfs and the lower end of the canal was running at 311cfs. 10 cfs was being diverted by an open head gate. The loss after application was 4 cfs. The loss before the application was 10cfs, therefore the application showed a savings of 6 cfs or a 60% reduction in seepage.

The calculated water savings for doing the treatment, assuming that one treatment will last the irrigation season is as follows:

Water Savings per day = 6 cfs X 3600sec per hour X 24 hours
= 518,400 cf per day / 43560 cf per acre ft
= 11.9 acre ft per day

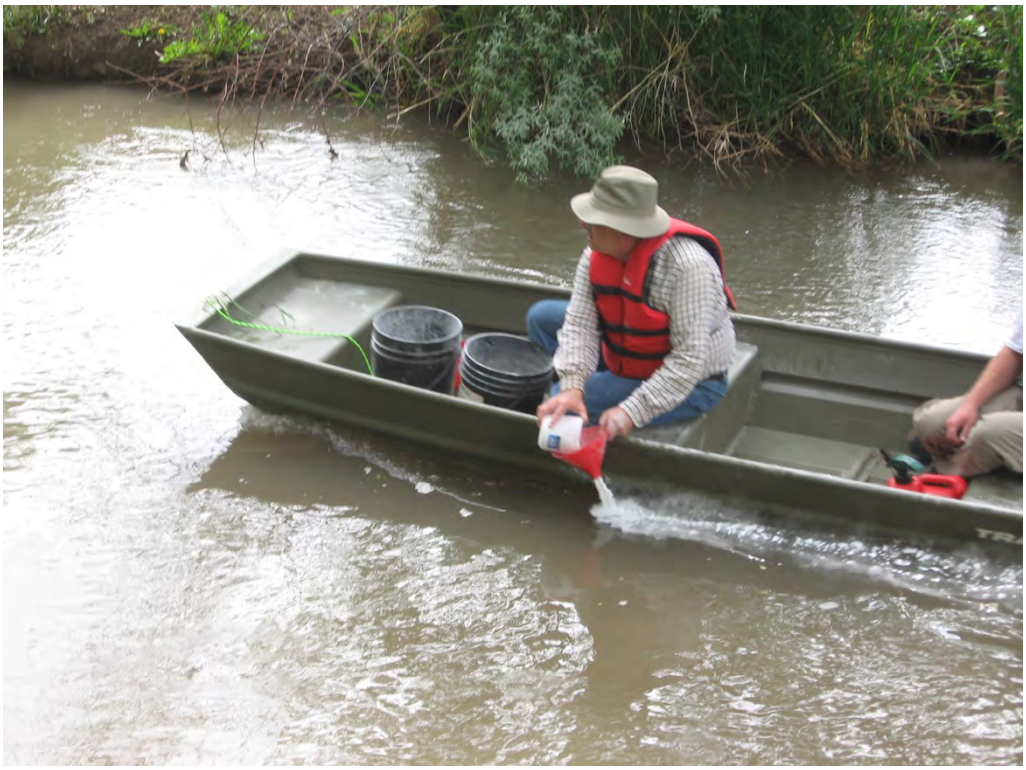
Water savings per season = 11.9 acre ft per day X 120days
= 1428 acre ft

Application Details:

A 2.7 mile reach of the Billings Bench Canal was treated with CanalSentry™, a bio-friendly carbohydrate based canal sealant developed by Innovium LLC. Prior to the application, flow measurements were taken by the Bureau of Reclamation using a Teledyne RDI StreamPro ADCP (Acoustic Doppler Current Profiler). The measurements were to confirm losses in the reach that were measured two weeks prior to the application. During those measurements, the reach was loosing 10 cfs. On the day of application the top of the reach had a flow rate of 324 cfs and the bottom of the reach had a flow rate of 304 cfs. There was one gate open in the reach that was flowing at 10cfs, therefore the loss in the reach was calculated at 10cfs.

2.7 Mile Reach of the Billings Bench Canal Treated with CanalSentry™

The map above shows the portion of the canal that was treated with CanalSentry™. The treatment was started at the Pemberton Ln. Bridge and preceded upstream to 0.4 mile beyond Hilltop road. 140 lbs per lineal canal mile was applied. The total reach of application was 3.1 miles and 440 lbs of CanalSentry™ was evenly applied by motor boat using a simple funnel for metering.



Application of CanalSentry

The application began at approximately 3:00 pm in the afternoon after being delayed by a small thundershower. The application took approximately three hours. About mid application the crew experienced some motor problems with the outboard motor on the boat which caused an approximate ½ hour delay.

The dosage rate was targeted at 3ppm in the water which represents ½ half of the acrylamide level allowed in drinking water by the NSF 60 drinking water standard. The amount per canal mile was calculated using the flow rate and the velocity of the water with a target of 3 ppm for the concentration of the product in the water and was determined that 140 pounds per lineal mile was required.

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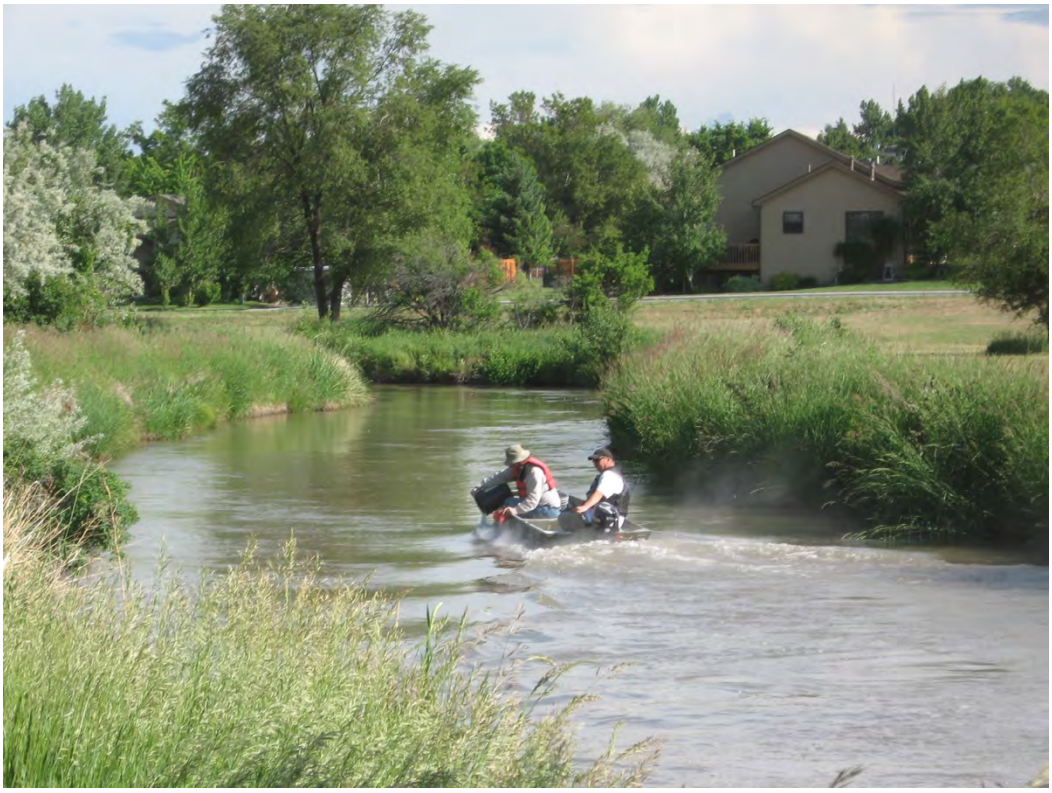
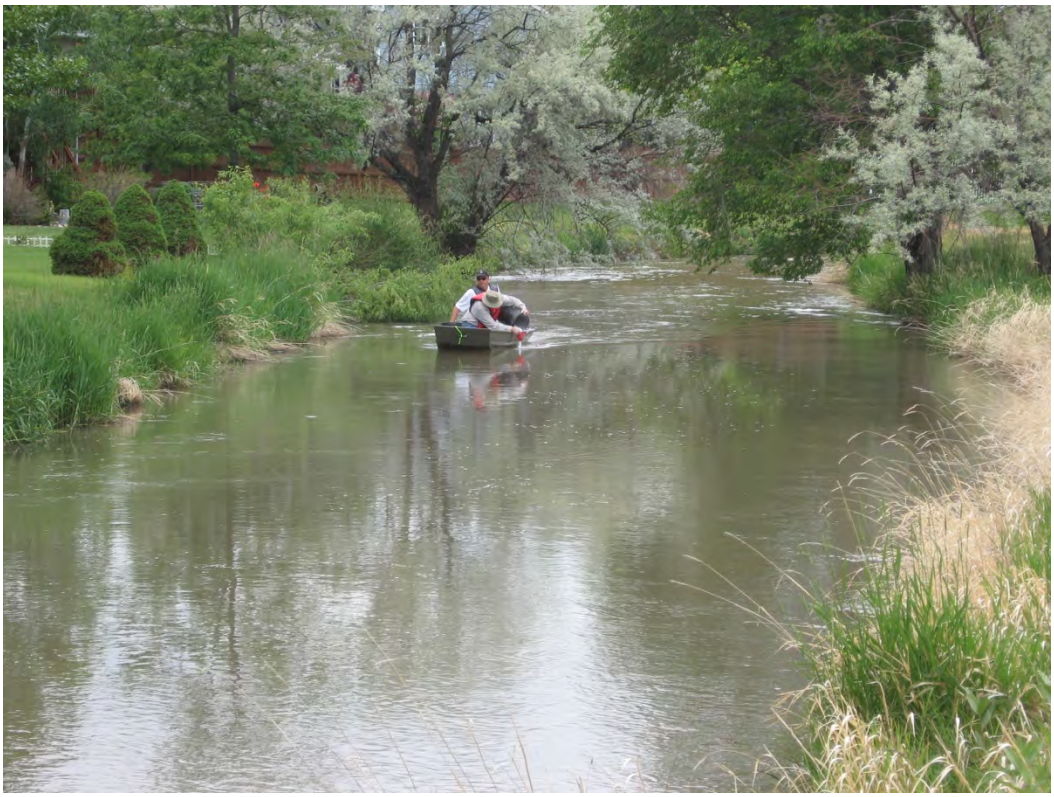
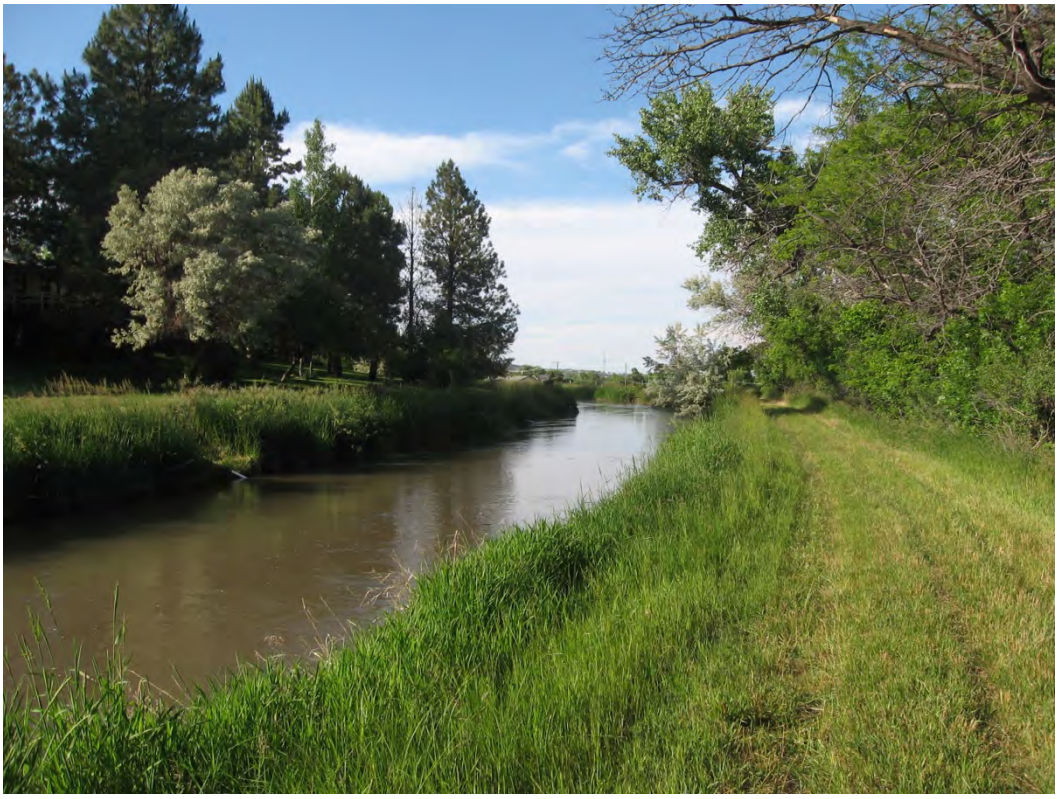
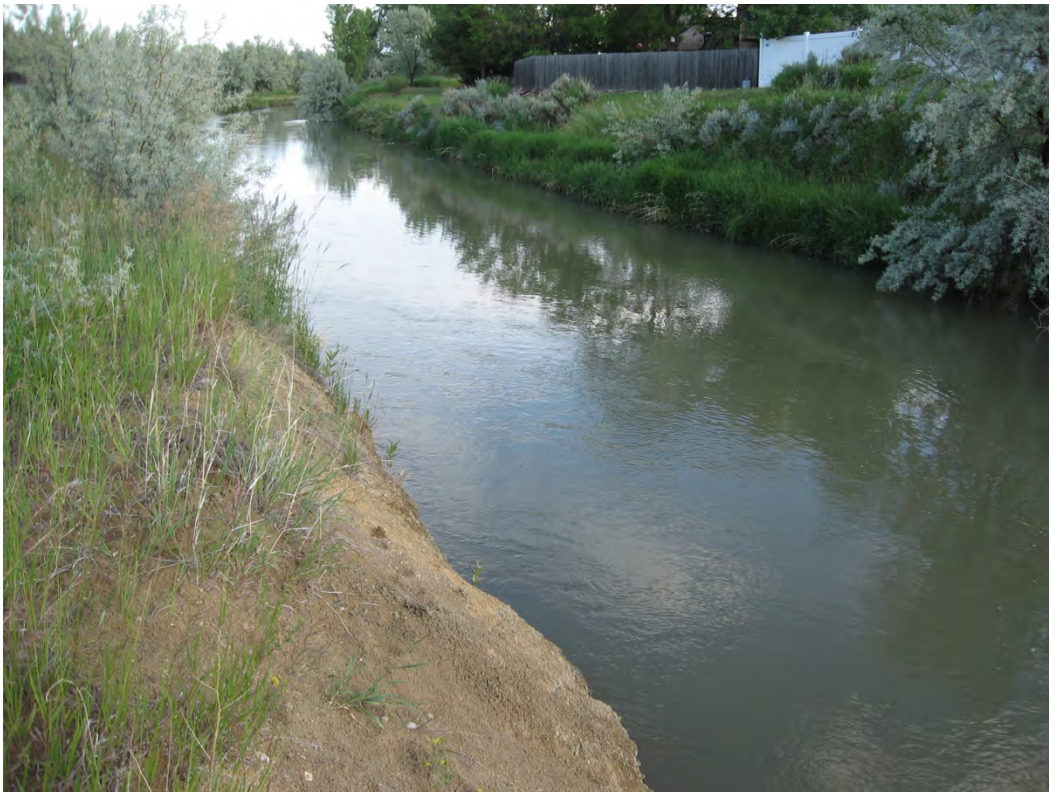




Application along the Reach



Upper Reach of the Canal before Application

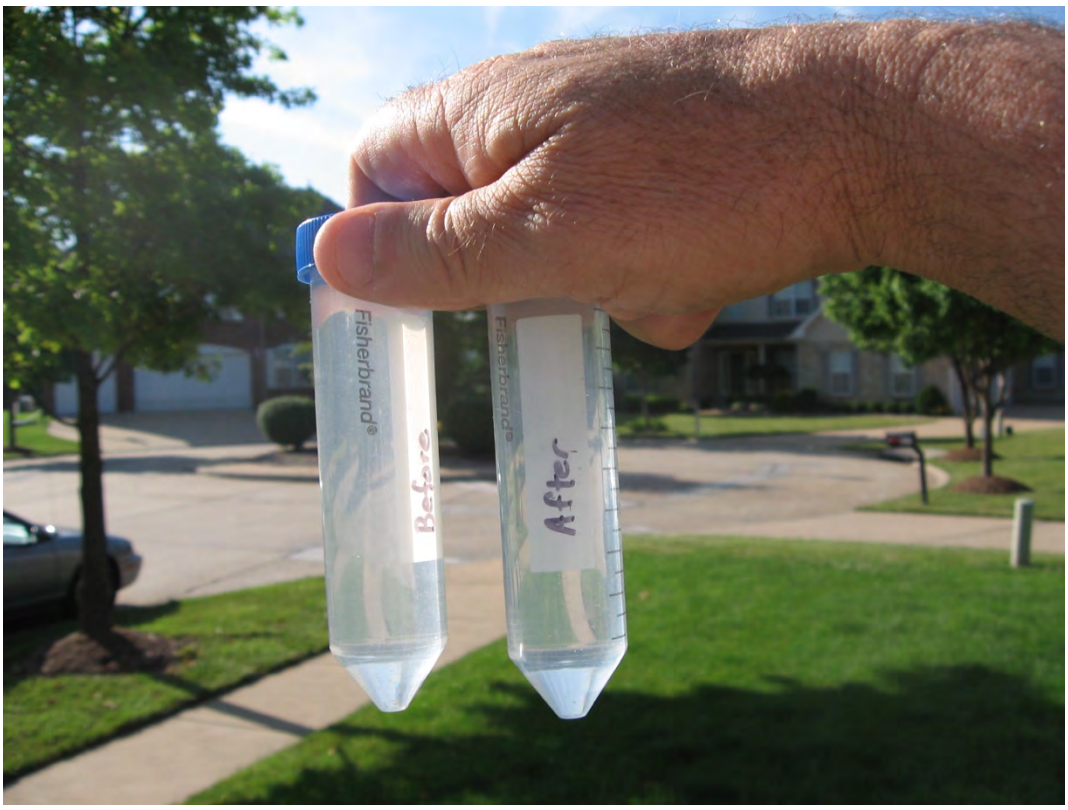


Lower Reach of the Canal after Application

Results:

Flow measurements were taken on the lower end of the reach just after the application. The flow was measured at 311 cfs. The lower reach flow rate before application was 304 cfs. Assuming the upper reach flow rate had not changed; 7 cfs of flow was picked up after the application.

To validate the flow numbers after the application, a complete set of measurement were made the next morning. The flow rate at the upper reach was measured at 325 cfs and the flow rate on the lower reach was measured at 311cfs. One gate was still open on the reach flowing at 10 cfs. The loss over the reach was 325-10 – 311 = 4cfs. Before the application this reach was loosing 10cfs. Therefore the application reduced the seepage by 6cfs, or a 60 percent reduction in seepage.



Before and After Treatment Water Samples

The calculated water savings for doing the treatment, assuming that one treatment will last the irrigation season is as follows:

Water Savings per day = 6 cfs X 3600sec per hour X 24 hours
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