

## ABSTRACT

Many rivers in Connecticut (CT) have been straightened for agricultural purposes. This is a good system for producing crops and field irrigation, but channelization destroys river habitat and causes a decrease in certain types of fish and wildlife. Large woody debris is being added to rivers to increase structural diversity in the river systems. An increase in structural diversity attracts more fish and wildlife to the area, which it had previously been lacking.

For my project, I filmed a short video documentary about the large woody debris installation project at the Bent of the River Audubon Center in Southbury, CT. My documentary will be aired on local TV channels such as Neat TV and the Connecticut channel in February as well as at board meetings for the Audubon.

I also created a brochure for homeowners that can be found at several places around Woodbury and Southbury. The Audubon's goal for this large woody debris project is mainly to increase river habitat and structural diversity in a river so that more wildlife is attracted to the area. Their goal is also to get more publicity and get more people hearing about it, so that more organizations may help in the Pomperaug River restoration project.



Fig 1. (Left) Stretch of river without large woody debris (LWD). (Right) Stretch of river with LWD creating a diversity of habitats for fish.

## INTRODUCTION

Many river systems in CT have been degraded due to flooding, erosion, and other man-made problems. This is causing a loss of habitat for many freshwater species. Because of the loss of habitat, there is less biodiversity in the river. To increase habitat and have a more diverse stream habitat, large woody debris (LWD) can be installed in the stream or river (Figs. 1 & 2).

LWD may be installed in a river for various reasons, including minimizing erosion, flood control, and habitat restoration. LWD is anything, including logs, sticks, and branches that are ten centimeters in diameter and two meters in length or greater (Fig. 2). It may occur naturally as fallen material or may be manually installed in streams or rivers. The effects of this wood material are also interchangeable with the effects of large boulders. A restoration project has recently begun in the Pomperaug River at the Bent of the River Audubon Center (BOTR) in Southbury, CT. Large downed trees were anchored to the bottom of the river at ten different sites to reform the river back to a more natural flood plain since it was channelized in the 1950's. BOTR has partnered with the Pomperaug River Watershed Coalition (PRWC) to observe changes in the river.

Although a considerable amount of data has been collected on the effects of LWD installations in the Pomperaug River, most of the information is in the format of scientific reports and large power points, which was of little use to the public, and more specifically, to land owners with rivers on their property. The goal of this project is to compile the data into a more user-friendly format for the public as well as for educational purposes. I developed a short documentary video on the effects of LWD in the Pomperaug River to show the effects of the debris in the river. The short documentary video is to demonstrate the positive effects of the restoration project to the funding agency. This documentary will also be used as an educational video in classrooms to the public. The last part of my project included making a brochure for homeowners explaining the benefits of LWD installation on their properties as a means of erosion and flood control.



Fig 4. (Left) The 2012 pre-LWD installation fish surveys using electrofishing. (Right) White sucker represented 15% of the fish population in the Pomperaug River in 2014.



Fig 2. Examples of large woody debris (LWD) in the Pomperaug River.

## METHODS

- This project takes place in the Pomperaug River flowing through the Bent of the River Audubon Center in Southbury, CT (Fig.3).
- The project began five years ago, and the LWD was installed November of 2014.
- LWD was installed at 10 sites (Fig. 3).

### Three major components took place before LWD installation began:

- Habitat restoration activities including plantings of native trees and shrubs, and removal of invasive plants around the river in 2012.
- Before LWD installation, fish surveys took place in 2012 (Fig. 4).
  - It was found that warm water fish greatly outnumbered cool and cold water fish species in the river.
  - Post installation fish surveys were taken in 2014 (Fig. 4) and indicated that fish communities in the river have not changed significantly since 2012.
- Avian surveys were conducted in 2011, 2012, 2013, and 2014.
  - These surveys included mapping different territories of avian species.

- Data were analyzed to see if the LWD installations caused a change in bathymetry and fish communities.
- I documented the effects of the LWD installations by comparing pre-installation photos to post-installation photos and underwater footage that I took of fish utilizing the LWD.
- The majority of the data came from interviews of employees of PRWC and BOTR for the short documentary video.
- Some data came from the "Instream and Riparian Improvements to the Pomperaug River -DEEP.ppt."
- All data were used in the development of a documentary on the effects of the LWD installations, which will be used at general presentations on the BOTR as well as at PRWC board meetings.
- My video and brochure have been presented to other audiences, such as the presentation I held at the Southbury public library on February 26 publicizing my video and brochure.
- My documentary will also be aired on Charter which is broadcasted to several towns in CT as well as Neat TV, a local TV station broadcasted to Woodbury and Bethlehem.
- Links for my documentary can be found on the BOTR and PRWC websites
- I created the brochure using the same data collected for the video as well as my AP environmental science textbook.
- The brochure was distributed at Nonnewaug High School, the Woodbury and Southbury public libraries, and at the BOTR and PRWC.

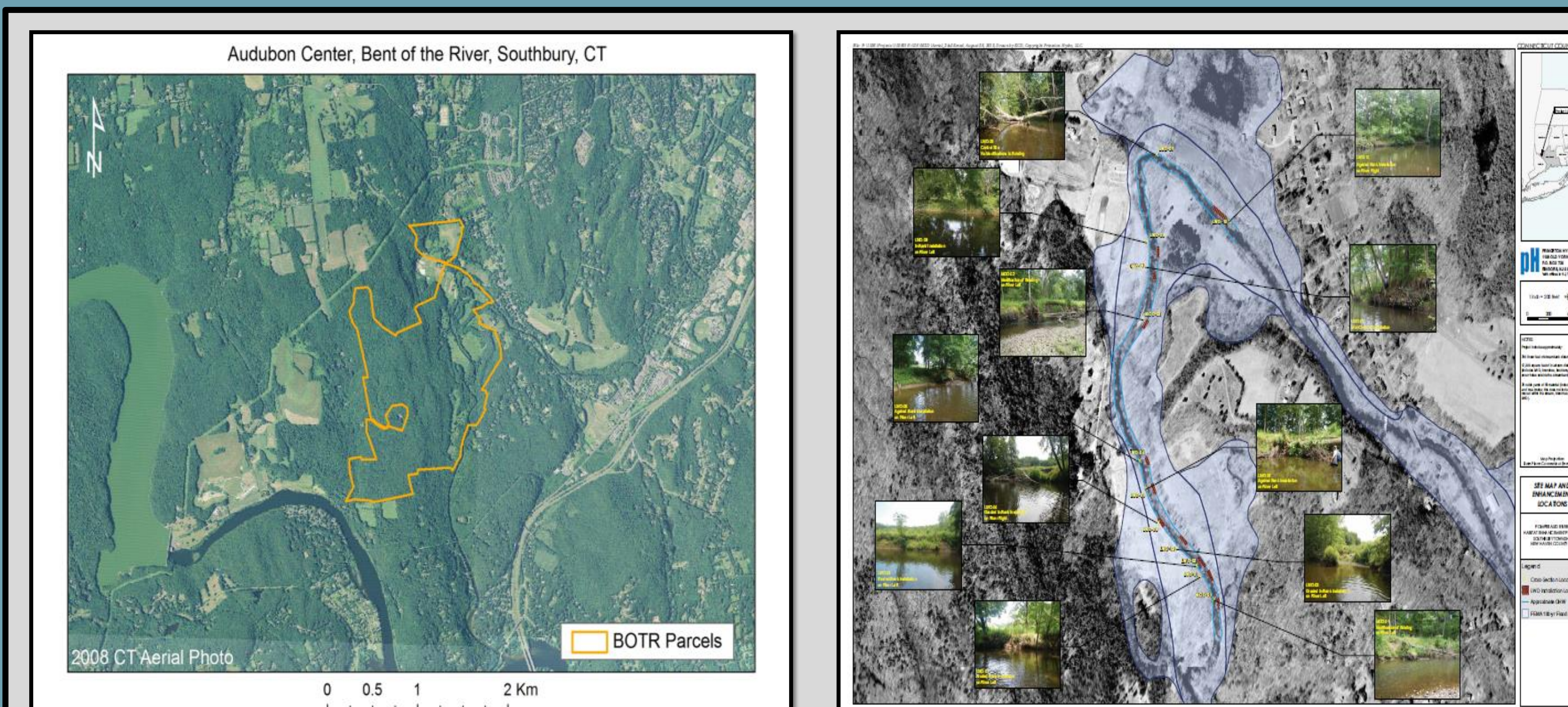


Fig. 3 (Left) A map of the BOTR property, and (Right) a map displaying the locations of the 10 LWD sites along the two-mile stretch of the Pomperaug River running through the BOTR property.

## RESULTS

The following results of the LWD project were captured in the documentary video and brochure:

- Comparisons between pre-installation fish surveys in the Pomperaug River to similar streams show that the Pomperaug River fish community is mostly comprises warm water fish.
- When LWD is installed, it creates deep pools, runs, and glides, which tend to circulate more colder, ground water.
- Increase in colder water pools is expected to bring in more cool and cold water fish, such as trout and eel, increasing diversity of fish in the stream.
- Pre-installation fish surveys compared to post-installation fish surveys does not show much of a change in fish species in the Pomperaug River.
- An increase in cold water fish is expected to be seen in the coming years, but will take time to establish itself.
- Although changes in fish species in the river have not been noted, it has been observed that there is an increase in wildlife using the LWD.
- Birds use the LWD as perching sites and reptiles use the LWD as basking sites.
- LWD forces water to flow into a channel in the middle of the stream, moving the river away from the bank, which decreases erosion damage.

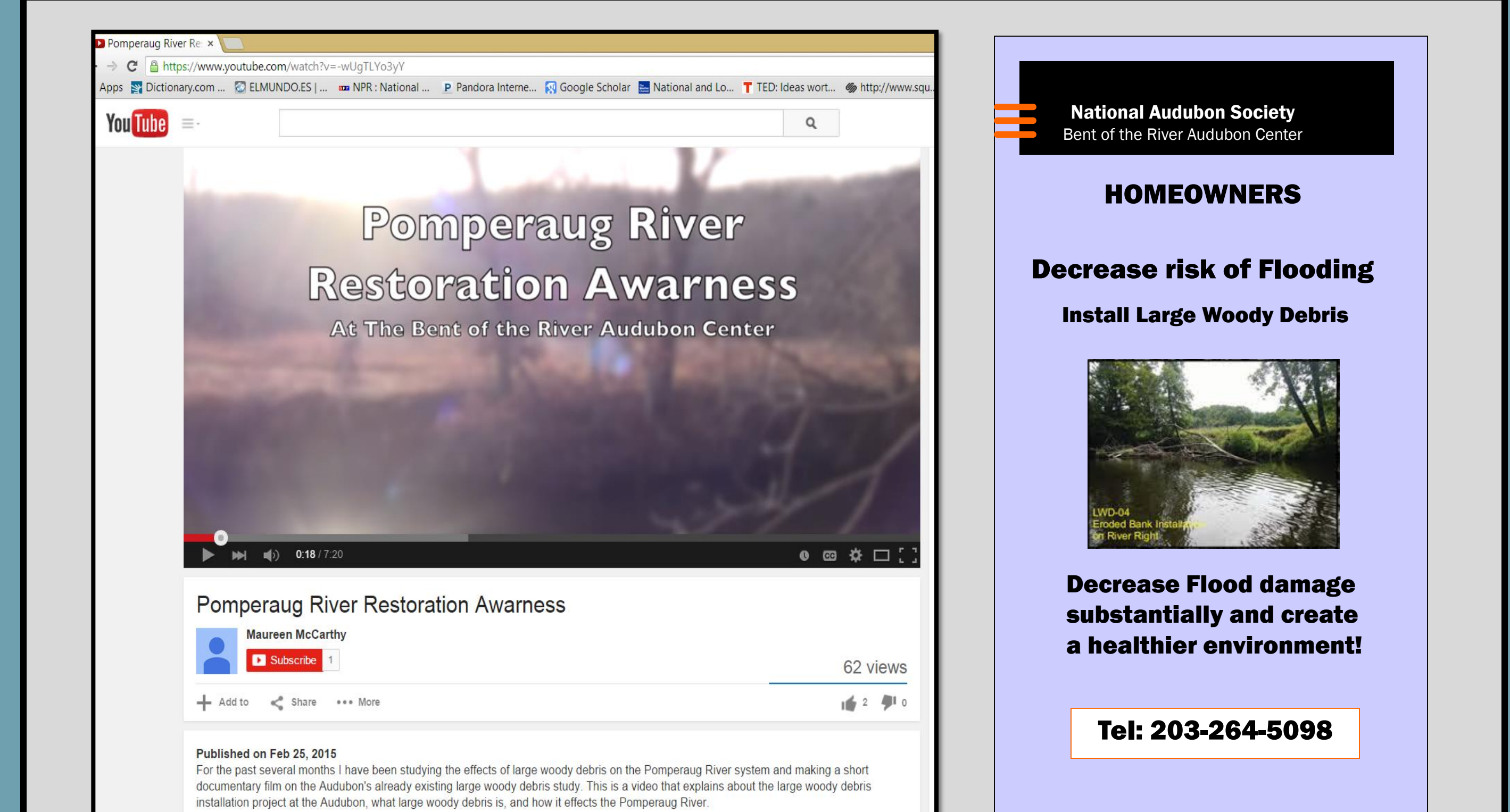


Fig 5. A documentary video and brochure were produced to increase awareness of the LWD project at BOTR.

## CONCLUSIONS

The documentary video was and will continue to be widely distributed. It was shown on Charter and Neat TV in mid February and March, and can be found online (<https://www.youtube.com/watch?v=wUgTLYo3yY>) (Fig. 5). This documentary will also be shown during BOTR and PRWC board meetings, and links to my documentary can be found on both the BOTR and PRWC websites.

The brochures can be found at the Woodbury and Southbury public libraries as well as at the BOTR and PRWC office and Nonnewaug High School. The brochure will be found on the BOTR and PRWC websites.

By widely distributing the video and brochure, I have provided the general public with knowledge and tools to improve riparian areas on their own properties. I hope these educational tools increase the local communities interest in the LWD installation project at BOTR and perhaps use this knowledge to install LWD in other local rivers.

## ACKNOWLEDGEMENTS

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## REFERENCES

Personal communication with James Drennan and Leslie Kane of BOTR as well as Carol Haskins of PRWC  
*Instream and Riparian Improvements to the Pomperaug River - DEEP.ppt*