



WATER/WASTEWATER

User

City of Medford, Oregon

Partner

The Freshwater Trust

Challenge

Counteracting the effects of warming river water caused by wastewater treatment plant

Solution

Esri ArcGIS Spatial Analyst

Results

- Generate approximately 100 acres of restored streamside forest
- Reduce phosphorus, nitrogen, and sediment in the Rogue River
- Create cooler, cleaner water for Chinook salmon and steelhead trout

Prioritizing River Restoration in Oregon

Since 2011, The Freshwater Trust (TFT) has been working with the City of Medford, Oregon, to plant trees along the banks of the Rogue River to mitigate the effects of the warm water that is discharged by the city's wastewater treatment plant. The nonprofit uses ArcGIS® to identify the areas along the Rogue River that are best suited to restoration.

The Challenge

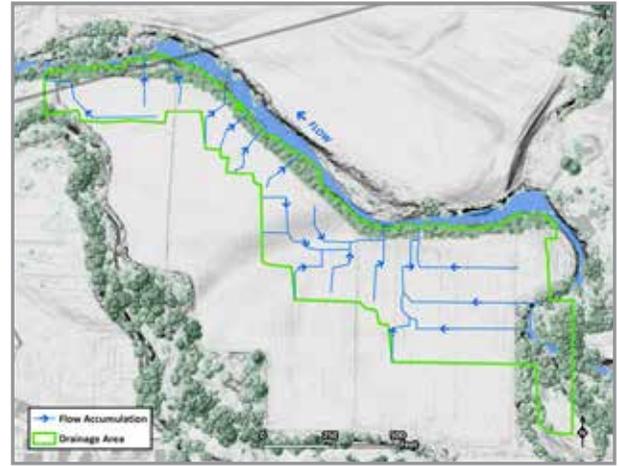
Medford discharges 17 million gallons of clean—but warm—water into the Rogue River daily. Warmer rivers have less oxygen and cause fish eggs to incubate earlier, hindering survival. To comply with the Clean Water Act, TFT offered a natural solution: plant trees to generate the shade needed to cool the water. For this to work, the organization needed to calculate the thermal benefits from increased shade and scout the watershed to identify where the shade could be produced.

The Partner

The Freshwater Trust is a group of bold problem solvers designing and implementing data-driven solutions that protect and restore America's freshwater. Using science, technology, policy, and finance, the nonprofit builds and manages solutions that improve water quality and quantity.



Existing riparian canopy and topography within a potential planting site based on lidar data. The current canopy is used to model the incoming solar radiation under preproject conditions.



Drainage area and flow accumulation on the agricultural field that is filtered by the future planting area. The drainage area was delineated using the available lidar data to develop a high-resolution map of the flow of runoff across an agricultural field.

“Planting trees would end up saving the city more than \$8 million and provide large-scale benefits for the watershed as a whole, including sequestering carbon, filtering pollutants, and providing critical habitat for wildlife.”

Julia Bond
Science Director, The Freshwater Trust

The Solution

“Planting trees would end up saving the city more than \$8 million and provide large-scale benefits for the watershed as a whole, including sequestering carbon, filtering pollutants, and providing critical habitat for wildlife,” said Julia Bond, Science Director, TFT. Shade generated from the trees is quantified and expressed as credits that the City of Medford purchases to meet its permit obligations. The Freshwater Trust is charged with generating the credits, which means that its staff has to figure out where to plant the trees. To identify and prioritize a potential restoration site, TFT uses multiple geospatial datasets, including lidar and orthoimagery, with the ArcGIS Analysis and Spatial Analyst toolboxes to identify sites that have good restoration potential. The results of the spatial analysis are used to quantify the potential shade benefit from planting trees. This work evaluates possible planting sites on a number of factors, including credit-generating potential, environmental benefits, and effect on endangered fish habitat. With results in hand, staff contact landowners that have properties with good restoration potential and propose planting projects. Landowners then sign leases with The Freshwater Trust and are compensated for their involvement in the program.

The Results

TFT’s program with Medford, Oregon, is a novel regulator-approved water quality trading program. In 2012, the program received recognition from President Obama during the White House Conference on Conservation. “It worked for business; it worked for farmers; it worked for salmon,” he said. The program will generate approximately 100 acres of restored streamside forest, reducing phosphorus by 37 pounds a year, nitrogen by 245 pounds a year, and sediment by 83,900 pounds a year. All of this will mean cooler, cleaner water for Chinook salmon and steelhead trout, two quintessential Pacific Northwest species. ArcGIS took the guesswork out of freshwater restoration. Using twenty-first-century technology, TFT is able to be more strategic and effective in its actions—something the organization says is desperately needed throughout the entire field of conservation.



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