

# Defining Purpose

The first step in planning a habitat restoration project is to define your purpose. This consists of two major parts: (1) identifying which part of your stream and watershed you wish to rehabilitate, and (2) defining the goal of your project. These decisions will set the framework for your later efforts. Before you begin, however, you will need to understand the basic “ingredients” that make up good trout habitat.

## What is Good Trout Habitat?

A good trout stream has variety. Habitat requirements are different for adult trout, juveniles, fry and eggs. While different life stages require different habitats, all trout need clean, cold water. Above all, this means having enough water in the stream to hold trout through all life stages, from spawning to adulthood. It also means keeping the water at temperatures that can support trout.

Different species of trout have different temperature tolerances. For most adult trout, water temperatures in the 70s (°F) are lethal. While trout may survive higher temperatures for a short time, they cannot survive sustained exposure to these temperatures. Generally, temperatures in the 50s and low 60s (°F) are best for trout growth. Developing eggs in the gravels are less tolerant of high temperatures than adult trout.

Dissolved oxygen is another key element. Trout are active fish, requiring a plentiful supply of oxygen. Oxygen is introduced to a stream from the atmosphere by the splashing of water (for example, over riffles) and from photosynthesis in aquatic plants and algae. The amount of oxygen water can hold varies with water temperature and elevation. For most coldwater streams, oxygen levels of six parts per million are needed for good trout growth and survival.

Good trout streams also offer a plentiful food supply. Aquatic invertebrates are the principle food for most trout, though they will feed on smaller fish and terrestrial insects as well. Trout food organisms depend, in turn, upon aquatic plants (including algae as well as rooted plants) and plant



Pools, riffles and woody debris offer the variety that makes good trout habitat on a Shared Streams project in Minnesota.

matter that has fallen into the stream from riparian vegetation. Clean bottom gravel (free of excess silt and other fine sediments) is also important for many aquatic invertebrates.

Clean gravels are important for trout spawning habitat, as well. If silt clogs spawning gravels, trout eggs may be suffocated or fry trapped in the gravels. Well-aerated water should pass through spawning beds to provide oxygen and remove wastes. Spawning areas should also be free from large-scale scouring and bed movement, or the delicate eggs and sac-fry may be crushed. To meet this variety of needs, spawning beds are often found in gentle glides, at the tail ends of pools (upstream from a riffle),

and/or over instream springs where fresh water wells up through the gravels.

When they emerge from spawning gravel, young trout cannot easily hold their position in swiftly flowing waters. They generally move to the edge of streams, taking up feeding stations in the slower moving water in backwaters, along undercut banks, and behind instream boulders and debris. Submerged plants and debris provide protection from predators, as well as relief from currents.

Adult trout generally move from the near-shore backwaters to areas of greater current where they have access to more food organisms. Instream boulders and debris remain important as cover and in providing breaks in the current that can be used as feeding lies. Undercut banks and deep pools also offer cover that adult trout use for hiding.

Just as habitat needs vary at different points in a trout's life, they also change over the course of the year. In areas with cold winters, trout seek out areas (such as deeper pools) that will not freeze to the bottom. Spring-fed streams, which maintain a constant water temperature, also make good overwintering habitat. In areas with heavy spring runoff, trout need habitat that provides shelter from the extreme flows—for example, in secondary channels, backwater pools, shallows along the stream's edge, or protected areas behind instream debris. In areas with low summer flows, trout congregate in larger pools that maintain sufficient depth despite the low water levels.

This review highlights only some of the connections between trout and their environment. The idea is to help you identify whether your stream has potential as cold-water fisheries habitat. While it describes the general elements of good trout habitat, you should research the specific habitat needs for the trout that use your stretch of stream. Without that knowledge, you will be unable to develop an effective restoration program.

## Selecting a Location on Your Stream

Your first step will be to decide if your stream is appropriate for a restoration project. Some basic guidelines can help you decide if your stream is appropriate for a restoration project. These are guidelines, not absolute standards. They serve to highlight common-sense concerns that you will need to consider when consulting with a fisheries expert, so that if you choose to pursue a restoration project on your stream, it is well suited for protection and restoration.

- The stream should include habitat which supports fresh water fish or will be capable of supporting them after restoration.
- Your stream should offer a significant restoration opportunity. First, the stream should have the potential (once it is rehabilitated) to make important contributions to coldwater fisheries in your area. If a restored stream will provide only marginal habitat, you may



A Minnesota Tree Farmer discusses his Shared Streams project with expert advisors.

want to focus your efforts elsewhere. Second, there should be evidence of degradation in the watershed, so that attention is focused on those areas most in need of help. *In streams that are already in good condition, projects that alter habitat may end up doing more harm than good, despite your best intentions.*

- If there are obvious factors limiting trout production, make sure that it is within your means to address them. If water diversion or poor land use practices are a major problem, instream habitat work may accom-

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plish little until the damaging land or water use is changed. In such cases, you may find it more productive to direct your energies into building partnerships with other landowners, water managers, or others responsible for the harmful activities. In some cases, changing the damaging practices will be all that is needed to allow a stream to recover naturally.

- If your stream is adjacent to publicly owned property, any improvement to your property will also benefit

the public and thus make your project more attractive to cost/share programs. If the stream habitat quality on your land is high with low fishing pressure relative to adjacent public lands, your section of stream may serve as an important population source to the adjacent public lands. Enhancing a tributary with important spawning habitat may improve the quality of a public fishery downstream, even if there is not public access to the tributary itself. A restoration project would also have high value if the stream provides habitat for a salmonid population that is a unique genetic resource.

- Projects should be within your practical capabilities. Some projects are so large in scope as to be beyond what a Tree Farmer can address alone. In such situations, you can still contribute to restoration efforts by working as part of a larger coalition. In some cases, larger projects can be broken into more manageable pieces that you can tackle in turn.

As you consider whether or not you should work on your section of a stream, you should talk with representatives from your state fisheries agency and other experts with knowledge of your local area. They can help you to evaluate your stream's potential. Agency

employees can also let you know about ongoing restoration efforts that your project would complement.

## Defining Your Goal

You will also need to define the goal of your restoration effort. Goals help keep efforts focused throughout the duration of the restoration program (which may span several years). Generating public support for your efforts will also be easier if you have clearly stated the purpose toward which you will be working.

At this early stage, your goal should be stated broadly; you will set more specific objectives once you have more information on the stream. A good way to approach this is by writing a "mission statement" outlining the general purpose of your efforts. For many Tree Farmers, this might be something like: "Improve habitat to allow for natural reproduction of trout (salmonids) in the stream." Your goal may be broader than just trout, particularly if you are working as part of a coalition effort. If so, your mission statement should reflect that: "Enhance riparian conditions to improve water quality, fish and wildlife habitat, and scenic value." Be sure that your mission statement accurately reflects your goals. It's a lot like ensuring that your forest management plan meets your objectives for your forest.

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