

## How Wide is a Riparian Area?

When planning forest management activities near a stream, it can be useful to determine the boundaries of the individual components of a riparian area. These components include the stream, its floodplain and a portion of the adjacent upland terrain. Each of these three components performs different functions and has unique sensitivities to management activities.

Hydrologists have developed a method to consistently identify the boundary of the stream channel. The bankfull width is generally associated with the level of the two-year stream flow event. This event represents the maximum stream flow that can be accommodated within a channel before the water spreads across the floodplain. Measure the bankfull width in a relatively straight section of channel with stable banks located between bends and within a riffle. The bankfull width typically extends from the base of the lowest stable woody vegetation on one bank across to the stable woody vegetation on the other bank. In the absence of woody vegetation, use long-lived herbaceous vegetation such as sedges, but avoid grasses as they frequently establish within the bankfull channel.

The floodplain includes the area that would be inundated during the 50-year flood event. Hydrologists have developed a method to provide a rough determination of the boundaries based on extrapolation of bankfull measures. To find the upper limit of the floodplain, determine the maximum depth for the bankfull channel event, double this depth and then project a line horizontally into the adjacent forest.



Figure 1. Determining floodplain width on a foothills stream with a lodgepole pine dominated riparian area.

Besides the 50 year flood event, three additional processes that results in inundation of the lands adjacent to a stream include: beaver activity; formation of debris jams that obstruct the bankfull channel; and the spring run-off events that occur prior to ice-out. As a result, the bankfull extrapolation method often leads to an underestimation of the floodplain.

Therefore to confirm the functioning floodplain, consider the concept of the channel migration zone as synonymous with the floodplain. The channel migration zone constitutes the area that a stream has a likelihood of moving around on over a period of decades or forest management cycles. This zone is best

**For more information on this or other Fish and Watershed Research Program Quicknotes, please contact: Rich McCleary, Tel.: (780)865-8383, Email: rich.mccleary@gov.ab.ca, or visit [www.fmf.ab.ca](http://www.fmf.ab.ca)**

identified through the combination of terrain and soil features. Terrain features, including relic channels, provide evidence of the recent location of the stream channel. Soil characteristics, including a stratification of litter or organic material with recently deposited silts and sand, provide a telltale sign that an area has been recently inundated. Other soil characteristics that are typical of a wetland site, including a hygric to hydric moisture regime, are well described in any of the provincial eco-site field guides.

The floodplain boundary, identified through a combination of channel measurement extrapolations, terrain and soil characteristics, is typically straighter and much less dynamic than the stream channel boundary. As a result, the edge of the floodplain is more conducive for establishing management boundaries than a meandering stream channel.

Although most of the unique ecological functions associated with a riparian area are limited to the floodplain, a portion of the adjacent upland terrain may serve to contribute large woody debris and leaf litter, as well as regulate stream temperature by providing shade or insulating qualities during the winter months. These functions are largely limited to trees within the equivalent distance of one tree height from the edge of the floodplain. In many parts of Alberta this distance averages 20 m. This distance may be adjusted if wildlife, aesthetics or other values are deemed important at any particular site.

In conclusion, a riparian area includes the stream channel, its entire floodplain or channel migration zone, plus a portion of the adjacent terrain for a distance of one tree height. Within any watershed, riparian area characteristics will vary down the length of a stream. These characteristics will also vary between watersheds depending upon the relief and eco-region. Developing a concise terminology to describe riparian areas and watersheds is an important step in the sustainable management of the resources that these areas provide. The Foothills Model Forest is developing an integrated classification system for stream channels, riparian areas and watersheds to assist resource planning.

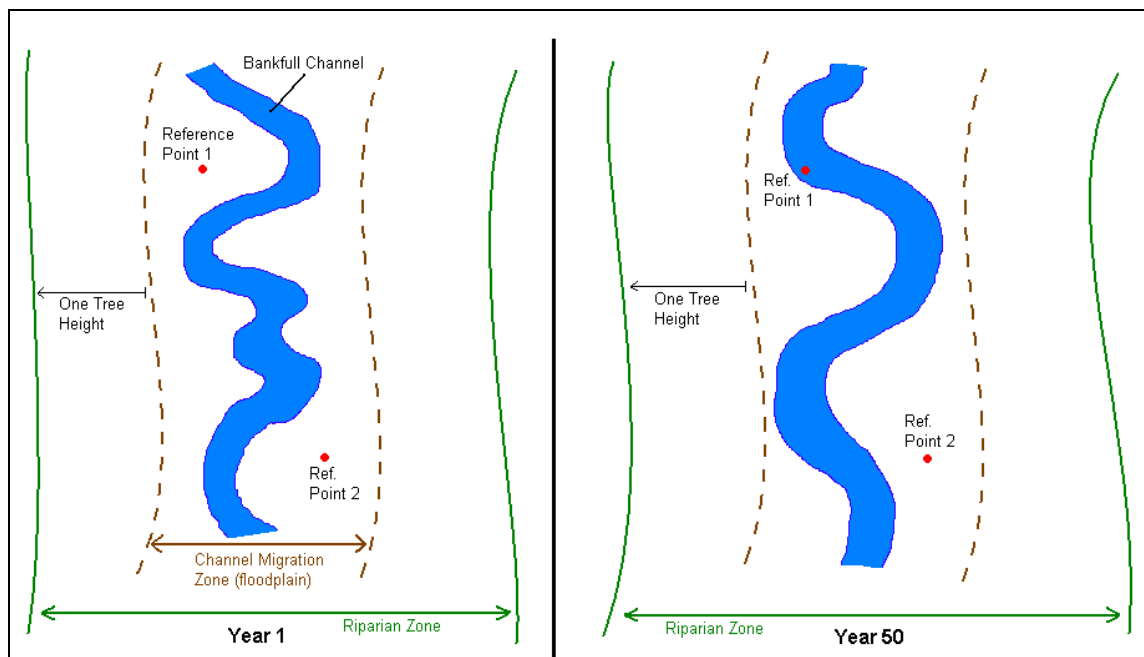


Figure 2. Diagram of the three components of a riparian zone at different stages of a forest management cycle.