

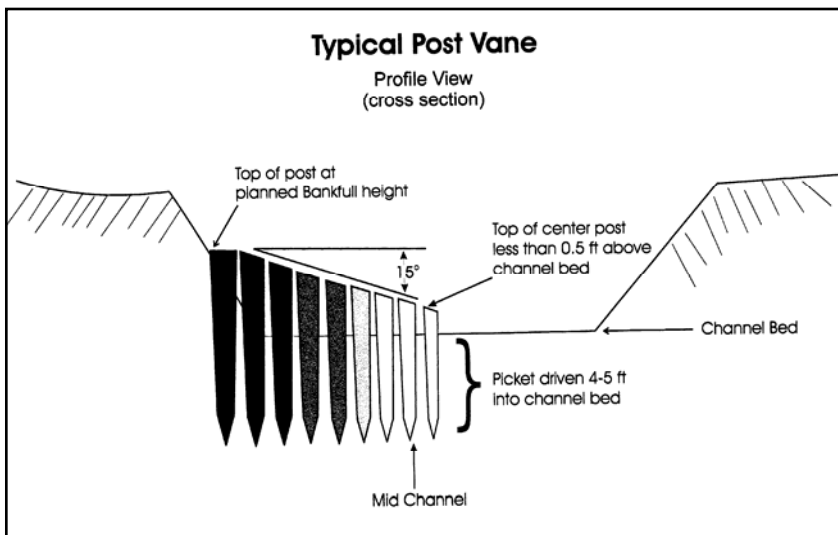
# Post Vanes

**Vanes** are structures that deflect streamflow toward the opposite bank. As flows are deflected, energies are concentrated and the concentrated force is focused at the base of the opposite bank causing it to erode, collapse, and recede. As the bank recedes, the channel widens, the thalweg deepens and shifts toward the receding bank, bed materials are flushed away, and a pool forms at the base of the bank.



Three post vanes installed along an eroding bank of Comanche Creek, ion 2003

However, the receding bank resists erosion to some degree depending on its stability and repels the concentrated flow. The repelled flow then rebounds toward mid-channel, gradually crossing over and impinging on the other bank. In other words, a baffle installed on the left bank will deflect flows toward the right bank only to be rebounded again toward the left bank farther downstream. Just as flow velocity accelerates opposite the deflector, it slows along the bank adjacent to the structure.



As the velocity slows, sediments drop out of suspension and a point bar begins to form, adjacent to the structure. When a series of structures is installed at appropriately spaced intervals, materials eroded from the concave bank, opposite one deflector, will tend to be deposited adjacent to or on top of the next downstream

deflector, thus forming a convex bank.

These deposited materials are soon stabilized by encroaching streambank vegetation and a new floodplain evolves where none existed before. The effectiveness of a deflector will depend on its size relative to the width and

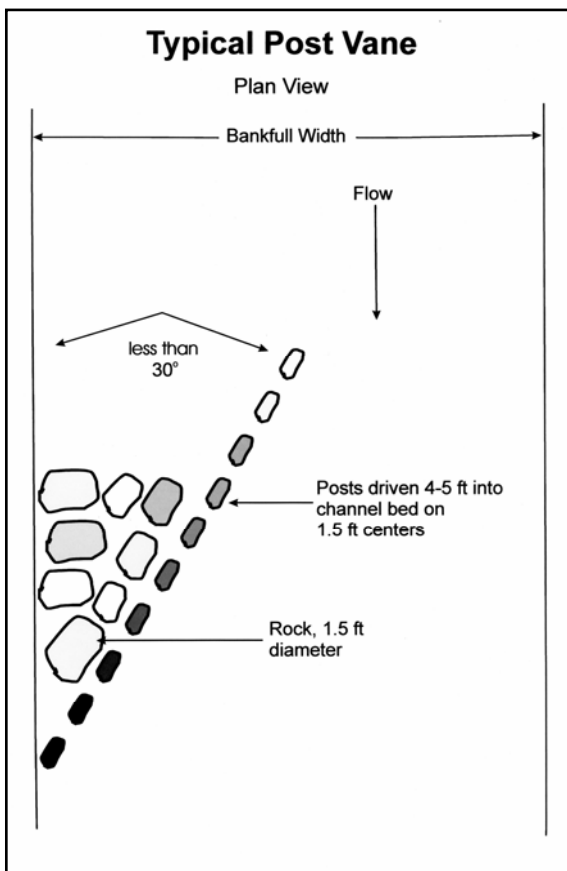
depth of the channel, its competence to withstand the shear forces generated by increasing flow velocities, and the relative stability of the receding bank. In some situations, bank stability can be decreased by removing protective streambank vegetation.

To promote sediment deposition on the evolving point bar, the lengths of posts for both vanes and baffles should taper gradually downward from the planned bankfull elevation toward the bed at mid-channel. Taller structures generate turbulence which tends to flush away point bar deposits so the tops of the deflectors should not be higher than planned bankfull elevation.



Volunteers install vanes along a bank of Comanche Creek, July 2005

**Van**es can be built of rock, boulders, logs, or posts. However, to have sufficient mass to resist flood flows, the size of required boulders and logs would be too large and not practical for hand-made structures or manual labor. This guide emphasizes **post vanes**, which can be installed by hand labor, although in some situations machinery may expedite construction.



A vane is a straight-edged structure protruding from the streambank into the oncoming current at an angle from the streambank not exceeding  $30^{\circ}$ . The top edge of the vane dips downward at a  $15^{\circ}$  angle from horizontal, beginning at bankfull level of the streambank to streambed elevation at mid-channel. It is important that the base of the vane, where it is embedded in the streambank, not extend above planned bankfull level.

For post vanes, use straight sturdy wooden posts 6-8 inches in diameter and 6-8 feet long for most applications.

Posts are driven into the streambed, using a sledge hammer, to a depth of 3-5 feet,

depending on cohesiveness of bed materials. Opening a start hole with a digging bar or auger may facilitate installation. Six inch posts should be spaced 18 inch centers, leaving a space of about 12 inches between posts. After all posts have been driven to the right depth, scribe a line from the bank to mid-channel at about 15° from horizontal; then cut off the excess with a saw. Optimally, the apex of the angle between the vane and the bank can be filled with rocks too large to slide between the posts. In no case should the rocks be piled higher than the vane edge.

To size a vane at a 30° angle to the bank, place a mark on the bank at the planned bankfull apex of the meander and measure out to not more than mid-channel. This is the width of the vane. Multiply the width by 2 and measure downstream from the first mark. The second mark will be the base of the vane. To be sure that the angle does not exceed 30° (depending on channel characteristics), multiply the width by 3, and install the base of the vane at that point.



A vane being trimmed to the correct height, Comanche Creek, July 2005

When the opposite bank begins to recede in response to treatment, the vane can be extended into the channel to “chase” the opposite bank. A point bar will evolve downstream from the vane on the same side of the channel. If the vane is too tall, turbulence will prevent formation of a point bar.

