

14 Step Methods*

To Step Up

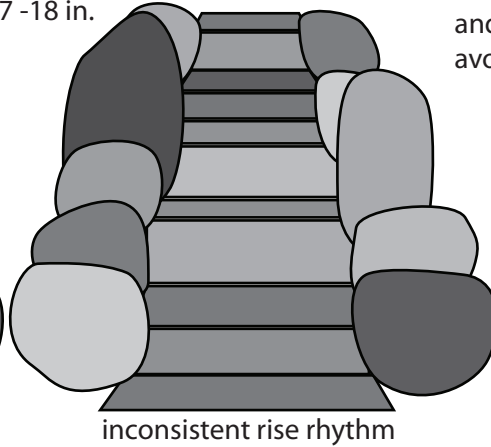
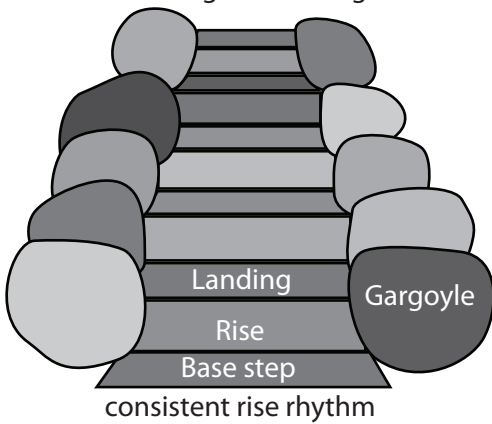
From Front Country

To Back Country

Stair Cases

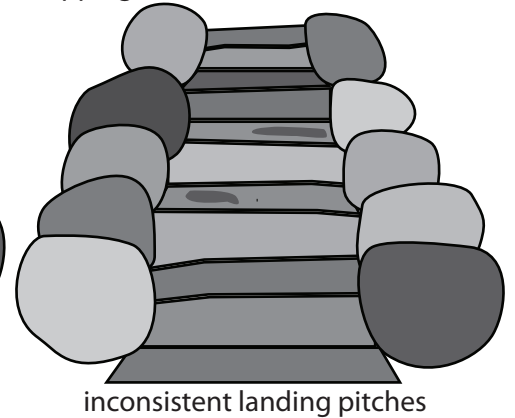
1,2. RISE Change

Rise above/under the "ideal" 7-9 in. rise... to 4-14+ (usually 6-12), and if the lanscape allows include a few tall gargoye rails/hand holds. If there are several flights on a trail segment try to stick to a height theme, even if variable, so users know what "rhythm" to expect. Most will expect a consistent rhythm, but back country means organic. Think jazz or bluegrass, not techno. Try not to make it too irregular or do too many high steps in a row. Provide 7-8 inch rises or users will start to go around steps. "Normal" Step ratio: riser height + landing width = 17 -18 in.



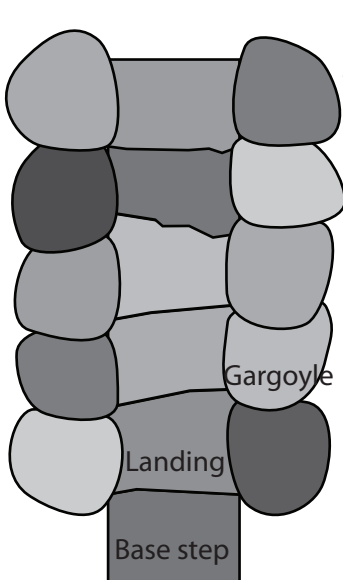
3. PITCH Change

From "ideal" 0-2% slope in any direction To <15% l/r, r/l; <10% outslope. Don't inslope to the back of the landing to avoid puddles and ice. Think rhythm again. Changing the camber/pitch could twist ankles, and make slippery situations more dangerous so don't do this on smooth stone and wet areas. Rough stone with bumps may add relief and pitch, but keep bumps soft (<1/4 in.) to avoid tripping users.



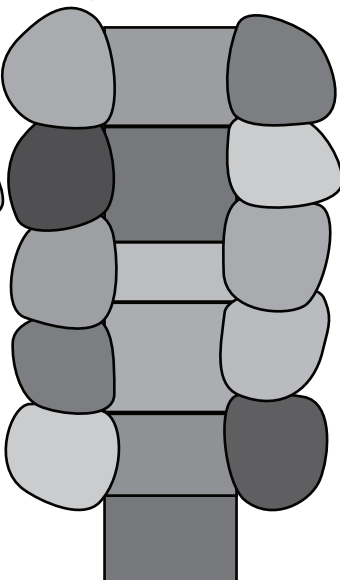
4. FACE Change

Angle faces instead of making them perfectly perpendicular, and use faces with small imperfections. Consider minimum depths of close to 11 in.



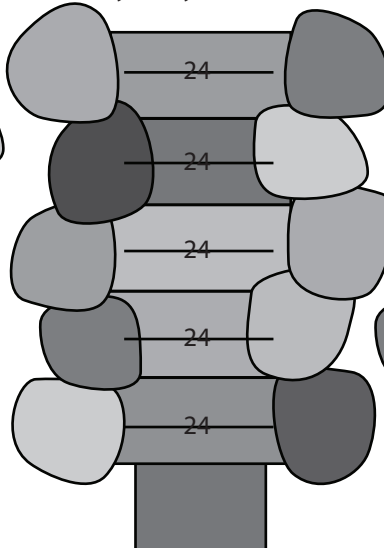
5. LAND Change

From "ideal" 11-18 in. To 9-18+ in. This may be necessary anyway to deal with different stone sizes and slope changes. Usually longer run for shorter rise.



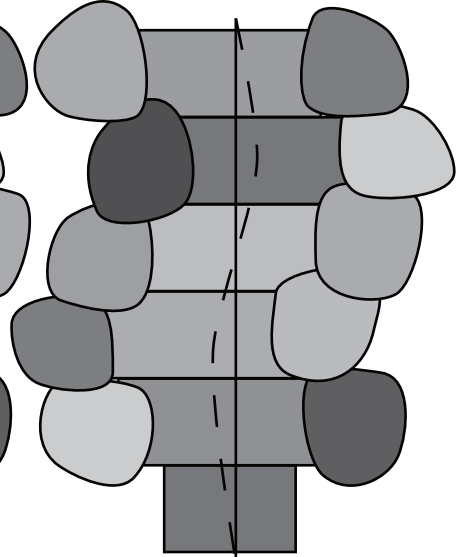
6. WIDTH Change

Squeeze or pinch the landing widths. >42 in. for two people, +/-24 in. one lane, include some wide breaks or landings after +/-8 stairs. (average shoulder width 22 in., body sway 4 in.)



7. ZIGZAG

#4 will do this too, but here the width is maintained. Flights can be curved, and/or turned into L's or switchbacks with landings.



*Method 0, step away altogether and reroute the trail at 0-15% with frequent grade reversals to eliminate the need for steps. Some infrequent grades at 20-30% for <15 yards sandwiched with grade reversals may help gain elevation in place of steps (not ideal in large tread watersheds, nor high clay soils where slopes over 20% can be slippery).

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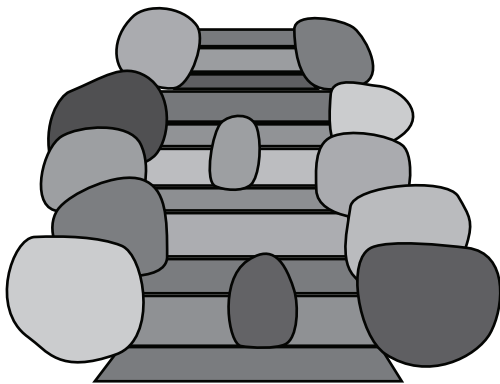
From Front Country

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Stair Cases

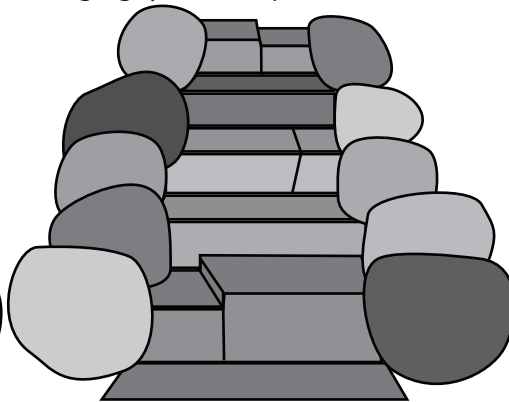
8. DIVIDE

Divide the flight with a central or off-center gargoyle. Think two stair cases side-by-side. Maintain structural integrity with good contact and stone selection.



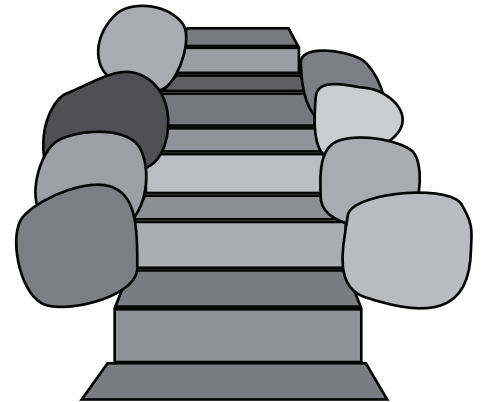
9,10. SPLIT

Piece two stones together (consider grains and striations) or break or cut whole steps for this look. Keep good contact to ensure the pieces are locked in. CONSIDER offset rises (like 1,2) where one side is higher than the other and also tie in gargoyles as steps



11. SKIP

Skip left, right or both gargoyles. Usually, but not exclusively, on the top and/or bottom steps. Or bury them to step height so they disappear, but still help lock the steps together. or function as steps.



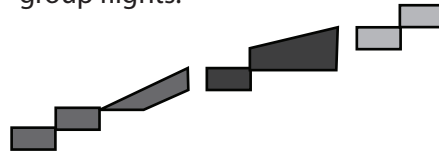
12. GROUP

Break one long case into smaller ones. Try to limit flights to no more than 12-15 feet without a 6+ ft landing to lower the chance of broken bones and death from falls from the top of the flight. The groups also provide a reprieve from a constant slog up, and quite often are necessary to deal with slope changes where steps can rise far above grade or get buried into the slope.



13. RAMPS

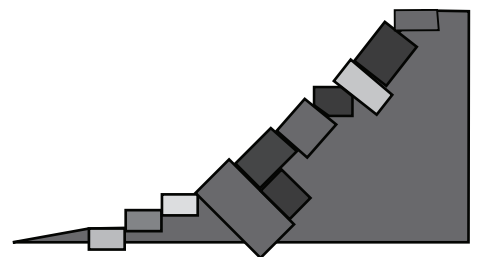
Use ramps instead of steps to gain elevation. Vary runs and intersperse between steps or as stand-alone structures. Ramps look less out-of-place than steps. Still consider base steps. <30% is not as slippery. They are not ideal for dusty or muddy areas where sediment can reduce ramp friction. Ramps can help when grades are between 20-40% where steps are hard to match the slope without low rises, long runs, or solitary base step steps and small group flights.



14. SCRAMBLE

On slopes over *80% a "scamble case" with irregular hand and footholds for users to "scramble" (or crawl on all fours). Gargoyles and embedding optional. See the separate Scamble Case diagram for limitations and safety concerns.

*most stairs (7-9 inch rises and 11-16 in. runs) are best suited for slopes between 43-82%. Steeper than that and they have to be turned or the rises have to increase and landings decrease, lower than that and the cases have to be grouped, or stand as single steps and base steps, or the first few buried in a self-created steeper slope.



**14 methods becomes several thousand:

5 Methods can be done 120 ways

5! = 5x4x3x2x1=120 permutations

6! = 720

7! = 5040

8! = 40,320

10! = 3,628,800

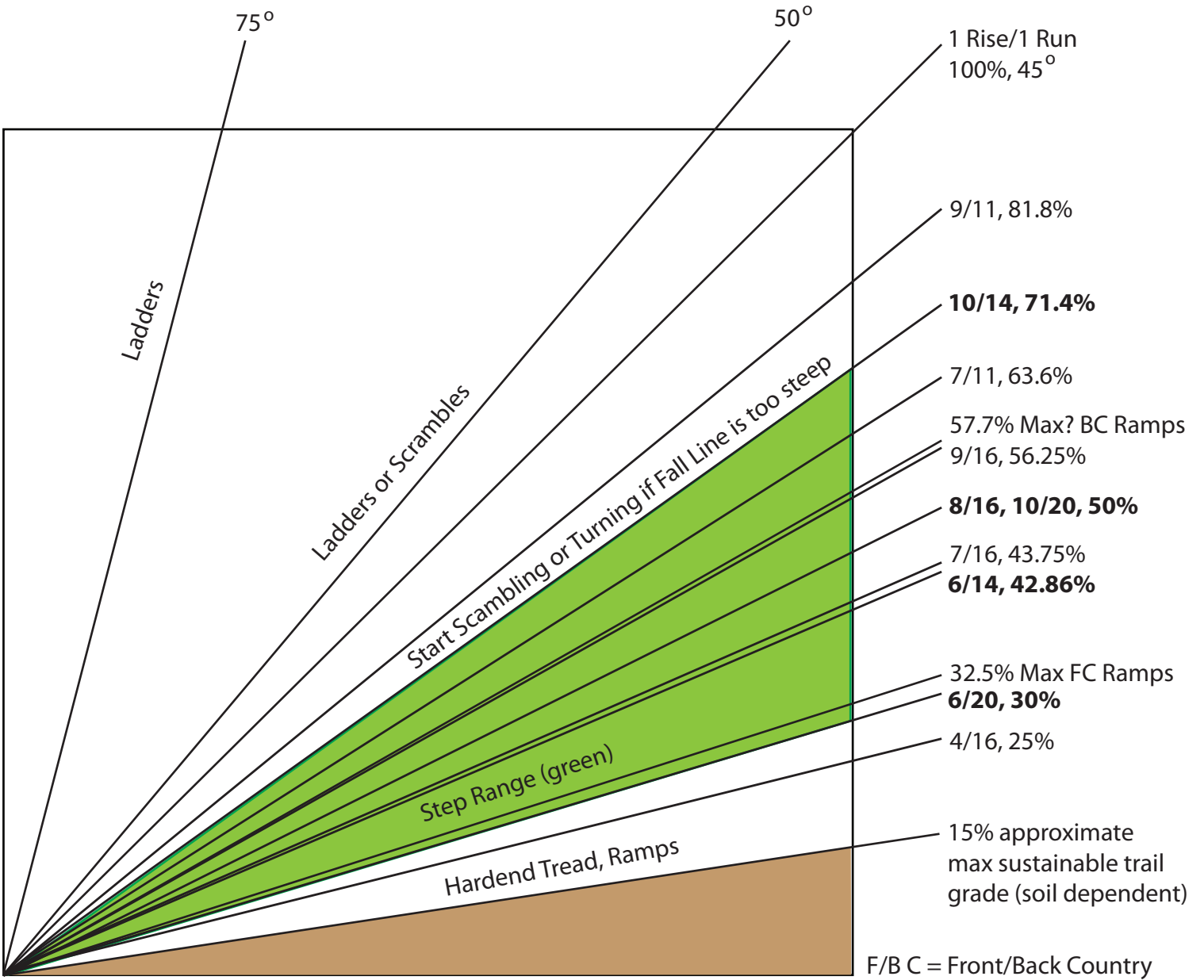
13! = 6,227,020,800

14! = 87,178,291,200

15. Gargoyles: Consider gargoyles as possible steps. Unlike these drawings, consider 2-3 or more gargoyles deep (not 1 row) and scattered out from the case so it blends into the surrounds. Also consider the gravity or weight of the left vs. right side as to not have a lopsided gargoyle look where the left or right has more mass.



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F/B C = Front/Back Country