

## GENERAL PAIRING PROCEDURE

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See [Cannabis Cultivation Policy Staff Report](#) page 62 for description of factors.

### **Hydrograph**

Hydrological similarity is found using normalized annual hydrographs for each gage and HUC12 pair. The sum of absolute differences in mean monthly flows as a proportion of mean annual flow, are compared to arrive at a correlation.

**Hydro correlation =**

$$\sum |Jan_{gage\%MAF} - Jan_{huc12\%MAF}| + \dots + \\ |Dec_{gage\%MAF} - Dec_{huc12\%MAF}|$$

**HydroMatch =**

$$\frac{(24 - \text{Hydro correlation})}{24}$$

### **Proximity**

Proximity is simply spatial distance between the gage and the centroid of the HUC12 polygon, found using Pythagorean theorem, using projected coordinates and expressed in 1000s of meters.

**Distance =**

$$\frac{\sqrt{((X_{gage} - X_{huc12})^2 + (Y_{gage} - Y_{centroid})^2)}}{1000}$$

Once the calculation is performed for every pair, each HUC12 will have a gage that is the least distant from it (although this may not be the best match overall). This is the minimum distance (MinDist) used below.

**DistanceFactor =**

For Distance < 150:

$$(\text{MinDist} \div \text{Distance}) ^{0.05}$$

Distance < 250:

$$(\text{MinDist} \div \text{Distance}) ^{0.15}$$

Distance > 250.00000001

$$(\text{MinDist} \div \text{Distance}) ^{0.4}$$

### ***Drainage Area***

Drainage area is simply the ratio of the drainage area of the HUC12 stream segment to the drainage area of the gage.

**Area (with factor) =**

For  $\text{Area}_{\text{gage}} < \text{Area}_{\text{huc12}}$  :

$$\left( \frac{\text{Area}_{\text{gage}}}{\text{Area}_{\text{huc12}}} \right)^{0.02}$$

For  $\text{Area}_{\text{gage}} > \text{Area}_{\text{huc12}}$  :

$$\left( \frac{\text{Area}_{\text{huc12}}}{\text{Area}_{\text{gage}}} \right)^{0.02}$$

### ***HUC Differential***

The difference of the HUC12 number of the watershed containing the compliance gage and the HUC12 number of the watershed to be paired to a gage.

**Difference =**

$$|\text{gageHUC12} - \text{HUC12}|$$

**HUC\_Differential =**

For Difference = 0:

1

For Difference  $\neq$  0:

$$\left( \frac{1}{\text{Difference}} \right)^{0.02}$$

***PercentMatch =***

$$(\text{HydroMatch}) (\text{DistanceFactor}) (\text{Area}) (\text{HUC\_Differential})$$