Climate Shield Variable Descriptions (February 7, 2015)

The Climate Shield fish distribution models provide stream-specific probabilistic predictions about the occurrence of juvenile bull trout and cutthroat trout in association with different scenarios for climate change and brook trout invasions. Descriptions of all potential cold-water habitats <11ºC are provided in tables associated with ArcGIS shapefiles downloadable from the project website. Examples of the tables for cutthroat trout and bull trout are provided below with definitions of headers. For more details about how the values in the tables were derived, please see the Climate Shield manuscript (Isaak et al. 2015, Global Change Biology 21: doi: 10.1111/gcb.12879).

1. NorWeST: The river basin corresponding to the area where NorWeST stream temperature scenarios were previously developed.

2. PATCH_ID: Unique identifier for one cold-water habitat within a NorWeST unit.

3. MinTempC (MeanTempC): MinTempC was used in the bull trout model and was the lowest mean August temperature predicted for any 1-km section within a cold-water habitat. MeanTempC was used in the cutthroat trout model and was the mean August temperature across all 1-km sections constituting a cold-water habitat.

4. Slope: Stream slope was represented as the average value across all reaches within a cold-water habitat.

5. LengthKM: Habitat size was represented as the channel length of each cold-water habitat. The upstream extent of a habitat was delimited at 15% and VIC model flow predictions of summer flows > 0.0057 m3/s.

6. BT_0BKT – BT_100 (CT__0BKT – CT_100): These five fields are probabilities of juvenile bull trout (cutthroat trout) occurrence within a cold-water habitat based on the prevalence of brook trout at 0%, 25%, 50%, 75%, or 100% of the sites within a habitat. The probabilities were predicted using the Climate Shield native trout models developed from known species occurrence in >500 cold-water streams. This information can be used to assess how vulnerable a native trout population would be to a brook trout invasion or whether a native trout population would persist in the absence of brook trout. Note that because native trout populations in habitats with slopes >10% are resistant to brook trout invasions, probabilities in those habitats do not change relative to brook trout prevalence.

Bull trout example shapefile table:

NorWeST	PATCH_ID	MinTempC	Slope	LengthKM	BT_0BRK	BT_25BRK	etc…
Clearwater	37	9.52	11.26	3.28	0.09	0.09	
Clearwater	38	7.77	10.44	13.76	0.41	0.41	
Clearwater	40	7.09	5.86	13.68	0.70	0.63	
Clearwater	41	9.83	11.12	3.47	0.08	0.08	

Clearwater	42	8.38	13.32	5.87	0.15	0.15	
Clearwater	43	8.57	8.17	7.32	0.29	0.25	
Clearwater	44	9.56	14.46	3.85	0.06	0.06	

Cutthroat trout example shapefile table:

NorWeST	PATCH_ID	MeanTempC	Slope	LengthKM	CT_0BRK	CT_25BRK	etc…
Clearwater	37	9.95	11.26	3.28	0.69	0.69	
Clearwater	38	9.27	10.44	13.76	0.95	0.95	
Clearwater	39	10.59	11.63	2.50	0.69	0.69	
Clearwater	40	8.92	5.86	13.68	0.96	0.92	
Clearwater	41	10.36	11.12	3.47	0.75	0.75	
Clearwater	42	8.85	13.32	5.87	0.51	0.51	
Clearwater	43	9.65	8.17	7.32	0.91	0.87	

Note: Reaches coded as "intermittent" in the NHD streams used to develop these maps were not deleted to provide users with maximum flexibility in applying this information. But those reaches can be highlighted or deleted from the shapefiles available at the link below simply by linking then to the NHD stream dataset.

http://www.fs.fed.us/rm/boise/AWAE/projects/ClimateShield/maps.html