

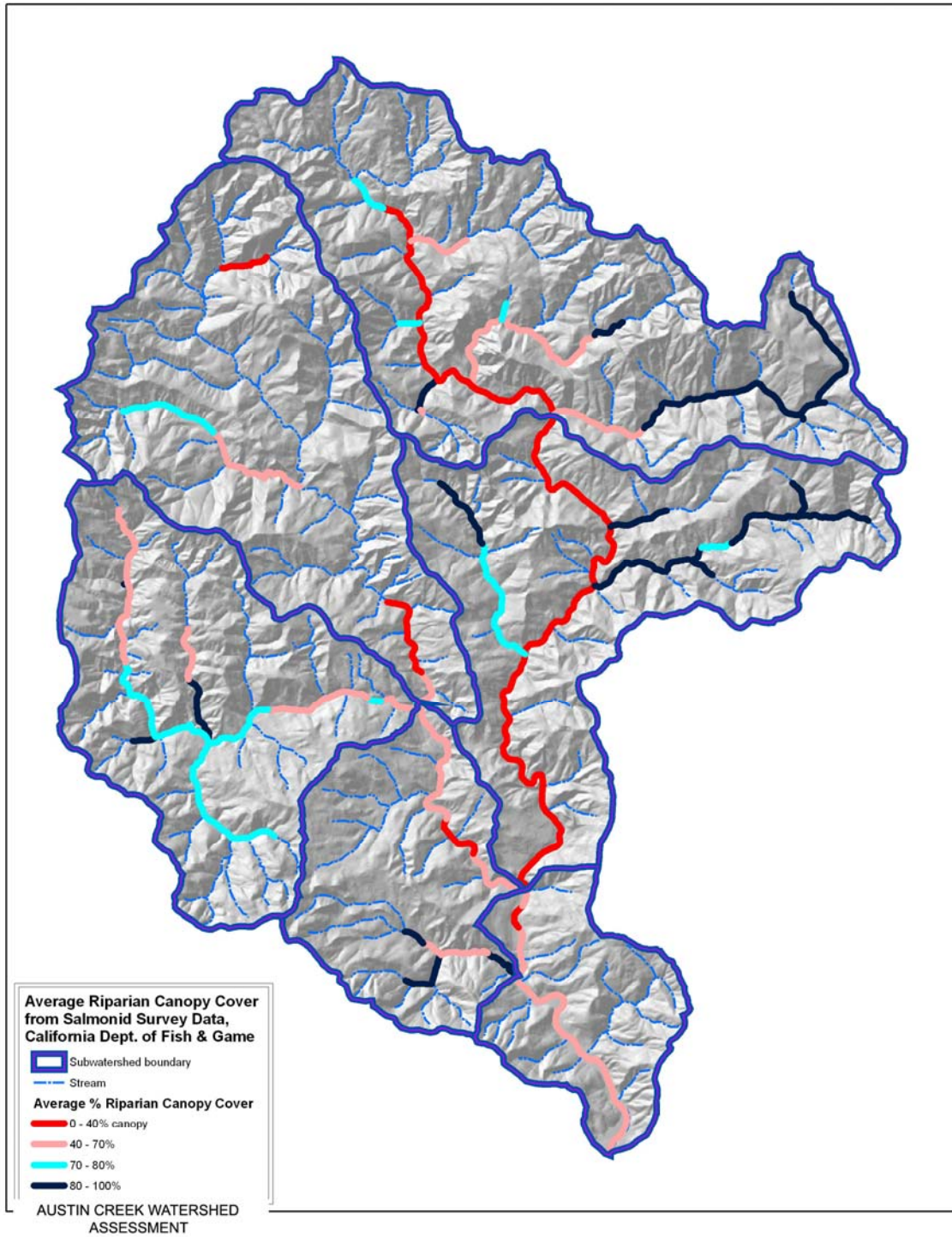
APPENDIX B

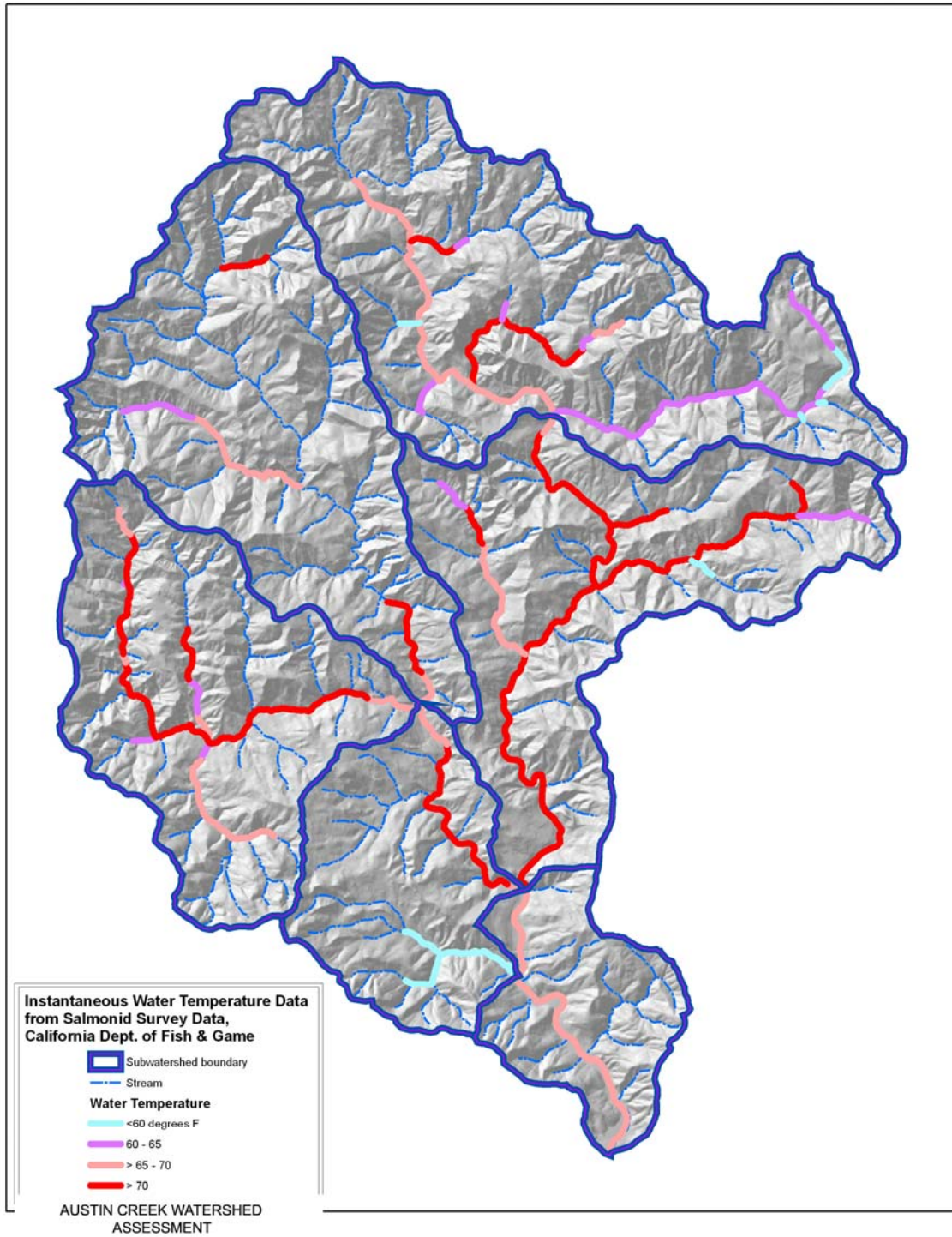
FISH AND GAME STREAM SURVEYS AUSTIN CREEK WATERSHED ASSESSMENT

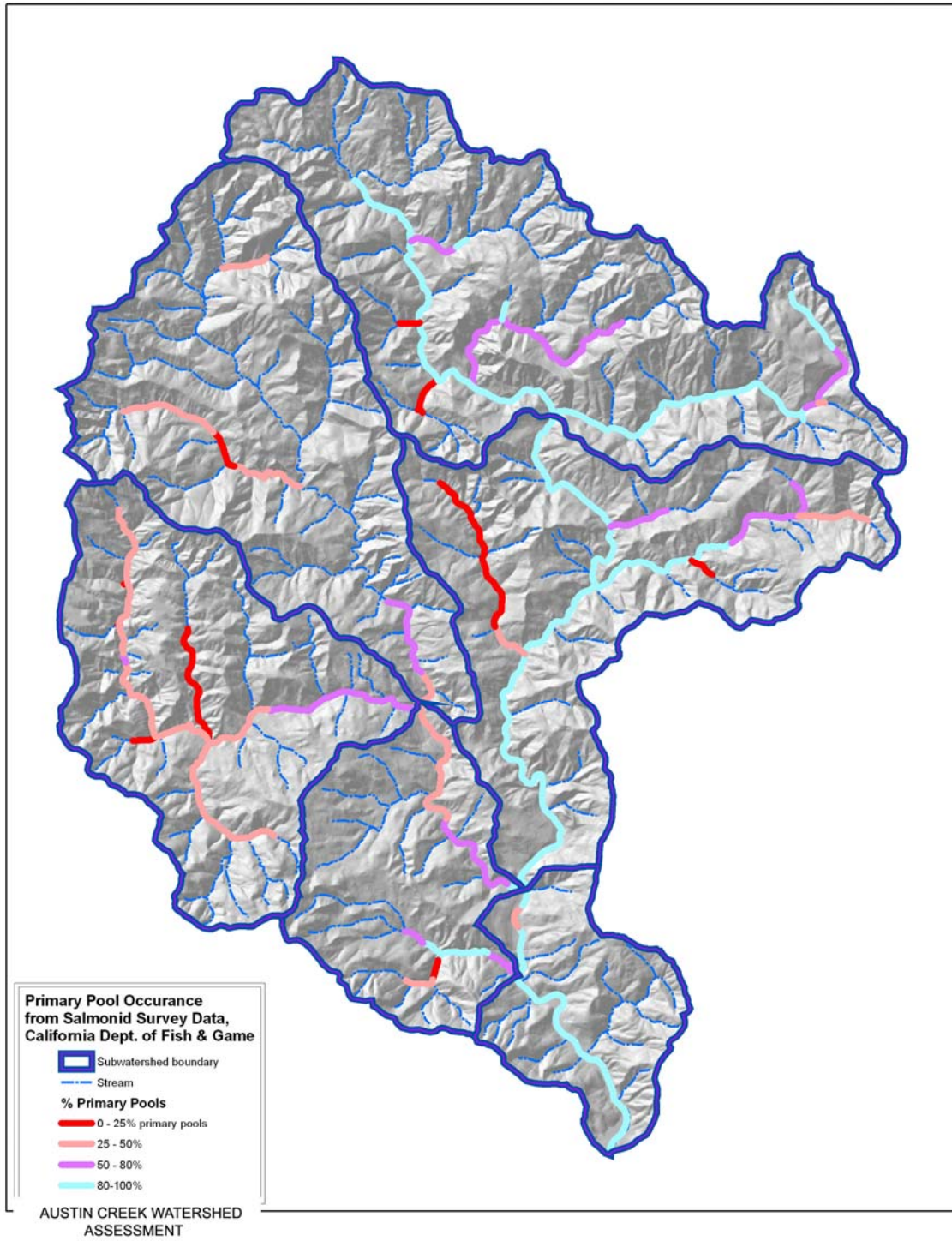
Appendix B Fish Habitat Surveys

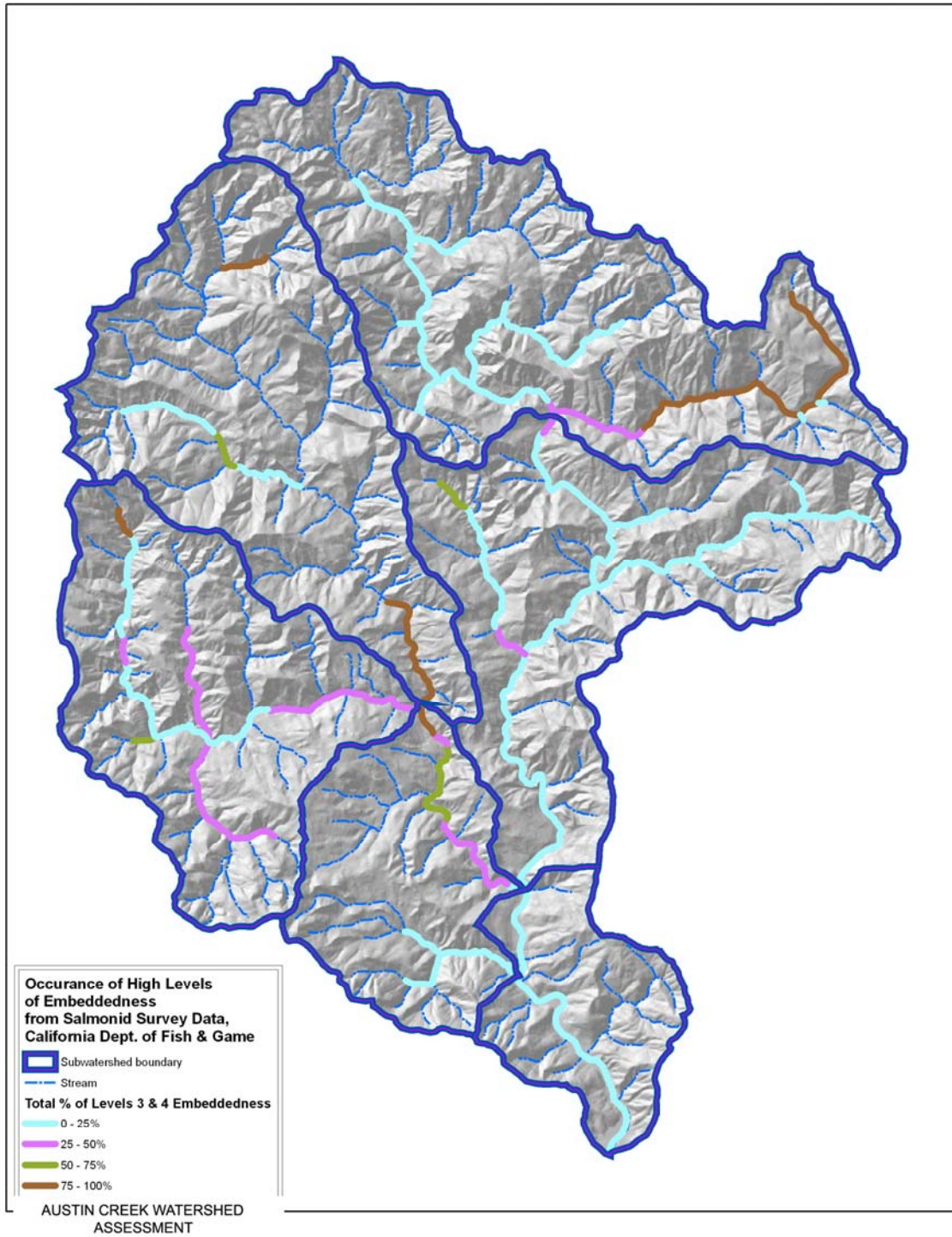
The California Department of Fish and Game periodically conducts surveys of fish habitat in creeks. These may include biological surveys of fish, completed by electro-fishing, to determine the numbers of juvenile salmonids and other species. The habitat survey uses an approach outlined in the California Salmonid Habitat Restoration Manual.

A description of the information from the surveys and its use in a series of four maps is included.









Fish and Game Stream Surveys GIS Layer for the Russian River Basin

Abstract:

The “reachsum” GIS database of salmonid habitat data summarizes in-stream salmonid habitat surveys, at the geomorphic reach level, using the Rosgen classification of channel type. The database was built from data collected from surveys done or supervised by the California Department of Fish & Game from 1994 to 2001.

Purpose:

The database was intended for salmonid habitat restoration planning at a scale between the habitat unit level and the entire tributary level, with a focus on the geomorphic reach. These data should be particularly useful for selecting potential restoration sites based on their habitat data. In addition, we are using this approach because the geomorphology of streams has an important effect on availability and type of salmonid habitat, and also influences what types of restoration projects are appropriate.

Description:

The reach-level habitat data were used to in the “2002 Draft Russian River Basin Fisheries Restoration Plan” by Bob Coey et al. (available at http://hopland.uchrec.org/ihrmp/publications/draftbp/draft_basin_plan.htm). The basin plan includes 4 reach-level variables to help explain the state of salmonid habitat data in the Russian River basin, and each variable was divided into four categories based on a combination of the following inputs: the target habitat objectives listed in the “California Stream Habitat Restoration Manual, 3rd edition”, Bob Coey’s expert opinion, and statistical clustering in ArcView3 using the Jenk’s optimization. The variables and categories used were as follows, and are included as an example of how the habitat data can be displayed to help in restoration planning:

A. Riparian canopy analysis: Shows the average percent riparian canopy cover by reach. This parameter is intended to show reaches that might need canopy restoration projects.

- Data categories: Displayed by approximate natural breaks (derived from the Jenks optimization routine in the GIS software, ArcView 3). Categories are:
 - 0-25% (very low)
 - 25-50% (low)
 - 50-80% (marginal)
 - 80-100% (high; desirable)

- Related background data: Vegetation near main stream channels, 1990, from CDF, was derived from 25m Landsat. This dataset is intended to show how riparian canopy density relates to surrounding vegetation.
- Target habitat objectives from California Salmonid Stream Habitat Restoration Manual (Flosi, et al. 1998, 3rd edition): Undesirable: <70% Desirable: >80% (for the reach average)

B. Upper water temperature analysis: Shows the upper water temperature sampled for each reach. This parameter is intended to show reaches that might have problems with salmonid survival because of high temperatures. They comprise one-time samples and are highly correlated with the air temperature at the time of sampling, but they are the only temperature records that cover every single surveyed reach.

- Data categories: Displayed by manual breaks. Categories are:
 <60° Fahrenheit (low; desirable)
 60-65° F (intermediate; desirable)
 >65-70° F (marginal)
 >70° F (high)
 - Related background data: Vegetation near main stream channels, 1990, from CDF, derived from 25m Landsat imagery. This dataset is intended to show how the upper sampled water temperature relates to vegetation near the stream channels.
 - Target habitat objectives from Restoration Manual:
- | <u>Species</u> | <u>Undesirable</u> | <u>Desirable</u> |
|----------------|--------------------|------------------|
| Chinook | >65° F | 40-65° F |
| Coho | >65° F | 48-60° F |
| Steelhead | >70° F | 40-65° F |

C. Percent primary pools analysis: Shows the percent primary pools by reach. In this analysis, primary pools are main channel pools (of habitat types 4.x, 5.x, 6.x) greater than, or equal to, 2 feet deep This parameter is intended to show which reaches might need restoration projects to improve pool depth where possible.

- Data categories: Displayed by approximate natural breaks. Categories are:
 0-25% (very low)
 25-50% (low)

50-80% (intermediate; desirable)
80-100% (high; desirable)

- Related background data: 1994 land cover data, from CDF & USDA Forest Service, were derived from 25m Landsat imagery and other sources. This dataset is intended to show which reaches have a large amount of conifer & hardwoods in surrounding areas, and which ones are dominated by other land uses such as agriculture.
- Target habitat objectives from Restoration Manual:
Undesirable: <40% Desirable: >= 50%

D. Percent embeddedness analysis: The total percent of levels 3 and 4 embeddedness by reach. Embeddedness level 3 is for cobble that is embedded 50 to 75% as surveyed in main channel pool tailouts, and level 4 is for 75 to 100% embedded. This parameter is intended to show which reaches have sediment problems as measured by embeddedness levels.

- Data categories: Displayed by quartile breaks. Categories are:
0-25% (low embeddedness)
25-50% (intermediate)
50-75% (high)
75-100% (very high)
- Related background layer: Percent slope (slope steepness), as derived from 10-meter Digital Elevation Model (DEM). This dataset is intended to show how slope steepness and instability relates to stream sedimentation.
- Target habitat objectives from Restoration Manual:
Undesirable: >50% embedded Desirable: <25% embedded