Assessing Habitat in Watersheds

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What is Habitat?

- The environment in which a plant and animal lives, and in which it is usually found.

- Elements
  - Food
  - Water
  - Shelter

- For each life stage
- For different activities: maintenance, breeding, rearing, hiding from predators, dispersal
- Other species: predation, competition
Habitat Assessment

• Why?
  – Determine restoration actions
    • Site specific
    • Species specific
  – Develop regional priorities
  – Use biotic community as overall indicator of watershed health

• How?
  – Species/community lists
  – Physical elements
  – Determine desired condition
    • Reference sites
What habitat should be there?

- Historic condition
- Succession
- Disturbance
- Habitat conversion
- Physical realities
- Habitat needs in an urban matrix
Habitats in a Watershed

- Terrestrial vegetation and wildlife
  - Connectivity
- Riparian habitat
  - Connection to floodplain
- Aquatic habitat
  - In-stream
  - Upstream/downstream connections
Interactions Between Land and Streams

• Vegetated hillslopes moderate watershed processes
  – Runoff
  – Erosion
  – Channel forming processes

• Elements cycle between environments
  – Nutrients
  – Large woody debris

• Many species require multiple habitat types for different purposes
What determines specific vegetation types?

- Elevation
- Insolation
  - Slope and aspect
- Precipitation
  - Distance from coast
- Soils
- Disturbance
  - Fire, flood, human activities
Chaparral

Ceanothus megacarpus

Adenostema fasciculatum
Chamise
Coastal Sage Scrub

- Eriogonum fasciculatum
- Mimulus aurantiacus
Forest and Oak Woodland
Riparian zones
Beaches and Dunes
Estuaries and Wetlands
Agriculture and Rangeland
Urban, Suburban, Ex-urban
Disturbance

Conejo Creek below Highway 101
January 9, 2005
• Number of fires
• Fire Frequency
Habitat Connectivity
Invasive species
Factors determining instream and riparian habitat

- Location
- Water volume and flows
- Sediment
- Connection to floodplain
- Pollution
- Species composition
Parts of a river system
Sediment load

- Sediment
  - Land use conversion
  - Instream structures
  - Deforestation
  - Fire regime
Southern Steelhead,
*Oncorhynchus mykiss*

- 5 ESU’s of Steelhead in California,
- Southern listed as endangered
- From Santa Maria River to the Mexico border
- Distinct and genetically diverse ESU, with the most ecological flexibility
- 55,000 in the last century to less than 500 today
  - habitat degradation
  - loss of access to spawning areas
Assessing Steelhead Habitat

- Cal. Dept. of Fish and Game Habitat Inventory
  - Habitat type (pool, riffle, run)
  - Channel dimensions
  - Substrate
  - Embeddedness
  - Canopy cover
  - Water quality
- Depth
- Shelter
- Bank composition
- Vegetation
- Food availability

Legend

Salmonid Habitat Quality:  Barrier Origin and Severity:

<table>
<thead>
<tr>
<th>Habitat Quality</th>
<th>Barrier Origin</th>
<th>Anthropogenic</th>
<th>Natural</th>
<th>Severity**</th>
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<td>0.00 - 0.25</td>
<td>Unimpaired</td>
<td>Undetermined</td>
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<tr>
<td>0.25 - 0.40</td>
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<td>Low</td>
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<td>High</td>
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<td>0.70 - 0.85</td>
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<td>Extremely High</td>
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<tr>
<td>0.85 - 1.00</td>
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<td>Extremely High</td>
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</table>

Legend:
- Watershed Boundary
- Water Bodies or Wetlands
- Major Highways
- Minor Highways
- Roads
- Union Pacific Railroad
- Data Sources:
  - GIS
  - Local Survey
  - Highways
  - Roads
  - Floodplains

*See note for barrier description. **See note for detailed description of barrier severity.

BR 1: Keystone Barrier
Unimpaired Habitat or Unaffected Streams

[Map and data sources diagram]
Habitat elements that may differ for Southern steelhead

- Temperature
- Flow
- Habitat typology
- Spawning substrate
- Embeddedness

- Instream shelter
- Bank characterization
- Riparian vegetation
- Cover
- Invasive species
Field measurements for habitat and barriers
Resources
• Manual of California Vegetation
• California Department of Fish and Game Salmonid Stream Habitat Restoration Manual
• Index of Biotic Integrity
• UC ANR Publications
  – Coming soon: Stream Assessment for Forest Landowners

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