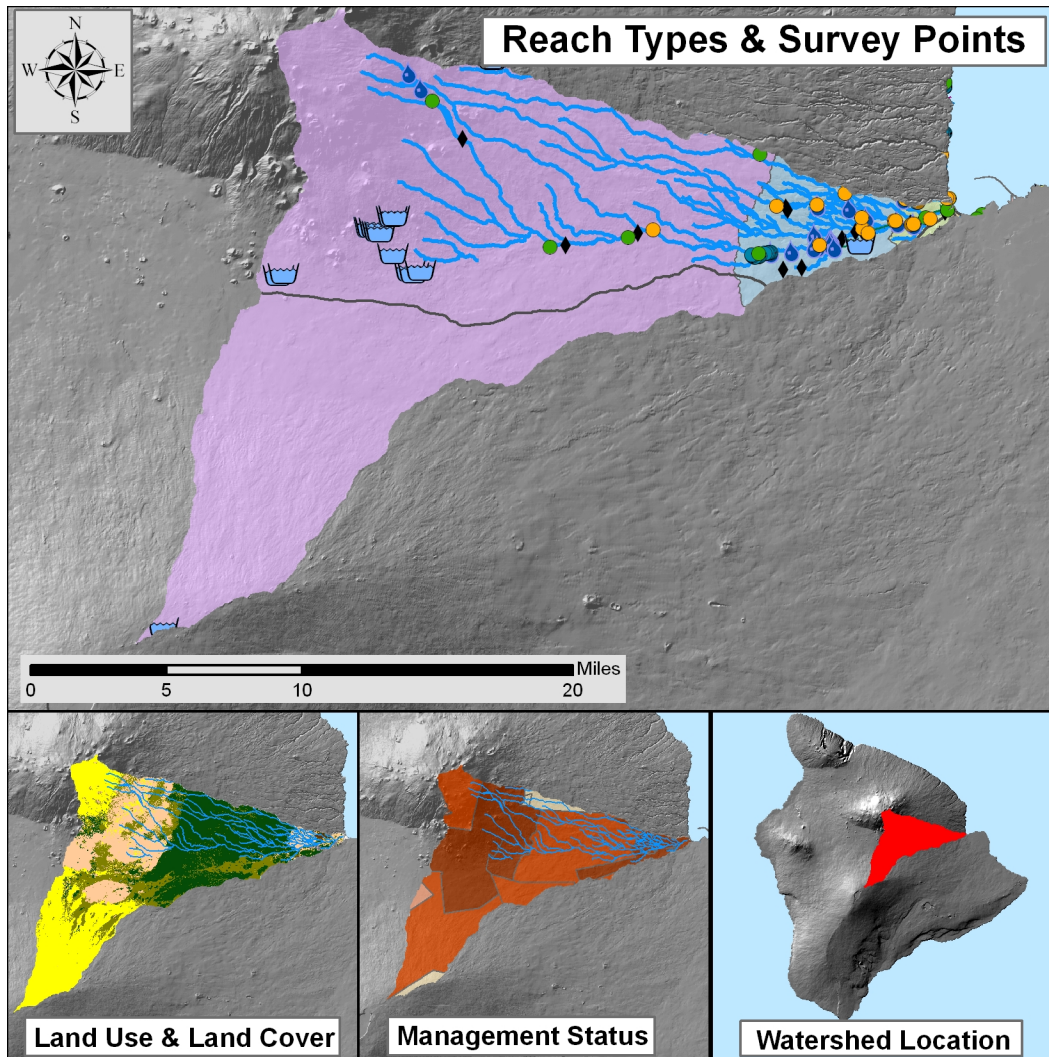


## Wailuku River, Hawai'i



### WATERSHED FEATURES

Wailuku River watershed occurs on the island of Hawai'i. The Hawaiian meaning of the name is "water [of] destruction". The area of the watershed is 252.2 square mi (653.2 square km), with maximum elevation of 13779 ft (4200 m). The watershed's DAR cluster code is not yet determined. The percent of the watershed in the different land use districts is as follows: 22.4% agricultural, 76.9% conservation, 0% rural, and 0.7% urban.

**Land Stewardship: Percentage of the land in the watershed managed or controlled by the corresponding agency or entity. Note that this is not necessarily ownership.**

| <u>Military</u> | <u>Federal</u> | <u>State</u> | <u>OHA</u> | <u>County</u> | <u>Nature Conservancy</u> | <u>Other</u> | <u>Private</u> |
|-----------------|----------------|--------------|------------|---------------|---------------------------|--------------|----------------|
| 1.0             | 3.9            | 60.1         | 28.3       | 0.0           | 0.0                       |              | 6.7            |

**Land Management Status: Percentage of the watershed in the categories of biodiversity protection and management created by the Hawaii GAP program.**

|   |                                     |                                   |                    |
|---|-------------------------------------|-----------------------------------|--------------------|
| Permanent Biodiversity<br><u>Protection</u> | Managed for Multiple<br><u>Uses</u> | Protected but<br><u>Unmanaged</u> | <u>Unprotected</u> |
| 3.9   | 1.2                                 | 56.0                              | 38.9               |

**Land Use: Areas of the various categories of land use. These data are based on NOAA C-CAP remote sensing project.**

|                          | <u>Percent</u> | <u>Square mi</u> | <u>Square km</u> |
|--------------------------|----------------|------------------|------------------|
| High Intensity Developed | 0.1            | 0.17             | 0.43             |
| Low Intensity Developed  | 0.2            | 0.54             | 1.39             |
| Cultivated               | 0.2            | 0.57             | 1.48             |
| Grassland                | 20.6           | 52.08            | 134.88           |
| Scrub/Shrub              | 18.1           | 45.73            | 118.45           |
| Evergreen Forest         | 31.8           | 80.24            | 207.83           |
| Palustrine Forested      | 0.0            | 0.00             | 0.00             |
| Palustrine Scrub/Shrub   | 0.0            | 0.06             | 0.16             |
| Palustrine Emergent      | 0.0            | 0.00             | 0.00             |
| Estuarine Forested       | 0.0            | 0.00             | 0.00             |
| Bare Land                | 28.9           | 72.81            | 188.57           |
| Unconsolidated Shoreline | 0.0            | 0.00             | 0.00             |
| Water                    | 0.0            | 0.01             | 0.03             |
| Unclassified             | 0.0            | 0.00             | 0.00             |

**STREAM FEATURES**

Wailuku River is a perennial stream. Total stream length is 196.1 mi (315.6 km). The terminal stream order is 4.

**Reach Type Percentages: The percentage of the stream's channel length in each of the reach type categories.**

|                |              |               |              |                   |
|----------------|--------------|---------------|--------------|-------------------|
| <u>Estuary</u> | <u>Lower</u> | <u>Middle</u> | <u>Upper</u> | <u>Headwaters</u> |
| 0.0            | 0.2          | 3.9           | 30.4         | 65.5              |

The following stream(s) occur in the watershed:

|             |           |              |         |              |
|-------------|-----------|--------------|---------|--------------|
| Aale        | 'Āwehi    | Ho'okelekele | Kahoama | Kalohewahewa |
| Kapehu      | Kioho'ole | Kipi         | Lualu   | Mokupau      |
| Nakakauila  | Nukupahu  | Pakaluahine  | Waiau   | Wailuku      |
| Waipāhoehoe |           |              |         |              |

**BIOTIC SAMPLING EFFORT**

Biotic samples were gathered in the following year(s):

|      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|
| 1953 | 1966 | 1967 | 1977 | 1978 | 1979 | 1984 |
| 1994 | 1995 | 2001 | 2002 | 2003 |      |      |

**Distribution of Biotic Sampling: The number of survey locations that were sampled in the various reach types.**

| <u>Survey type</u> | <u>Estuary</u> | <u>Lower</u> | <u>Middle</u> | <u>Upper</u> | <u>Headwaters</u> |
|--------------------|----------------|--------------|---------------|--------------|-------------------|
| Damselfly Surveys  | 0              | 0            | 0             | 0            | 2                 |
| DAR Point Quadrat  | 0              | 0            | 0             | 36           | 0                 |
| HDFG               | 0              | 0            | 4             | 7            | 1                 |
| Published Report   | 2              | 0            | 3             | 1            | 4                 |

**BIOTA INFORMATION****Species List****Native Species**

|                    |   |
|--------------------|---|
| <b>Crustaceans</b> | Amphipod sp.<br><i>Atyoida bisulcata</i><br>Copepod sp.<br>Ostracod sp. |
| <b>Fish</b>        | <i>Awaous guamensis</i><br>Gobiid sp.<br><i>Sicyopterus stimpsoni</i>   |
| <b>Snails</b>      | <i>Ferrissia sharpi</i><br><i>Neritina granosa</i>                      |
| <b>Worms</b>       | Hirudinean sp.<br><i>Oligochaete</i> sp.                                |

**Native Species**

|                |  |
|----------------|--|
| <b>Insects</b> | <i>Anax junius</i><br><i>Anax</i> sp.<br><i>Anax strenuus</i><br><i>Campsicnemus tibialis</i><br><i>Chironomus hawaiiensis</i><br><i>Dasyhelea hawaiiensis</i><br><i>Forcipomyia hardyi</i><br><i>Hyposmocoma</i> sp.<br><i>Limonia hawaiiensis</i><br><i>Limonia jacobus</i><br><i>Megalagrion blackburni</i><br><i>Megalagrion calliphya</i><br><i>Megalagrion hawaiiense</i><br><i>Megalagrion</i> sp.<br><i>Microvelia vagans</i><br><i>Paralaincalus metallicus</i><br><i>Procanace</i> sp.<br><i>Rhantus pacificus</i><br><i>Saldula exulans</i><br><i>Saldula procellaris</i><br><i>Scatella clavipes</i><br><i>Scatella fluvialis</i><br><i>Scatella oahuense</i><br><i>Scatella williamsi</i><br><i>Sigmatineurum englundii</i><br><i>Telmatogeton</i> sp.<br>Tipulid sp. |
|----------------|--|

**Introduced Species**

|                    |  |
|--------------------|--|
| <b>Amphibians</b>  | <i>Rana catesbiana</i>   |
| <b>Crustaceans</b> | <i>Hyalella azteca</i><br><i>Macrobrachium lar</i><br><i>Procambarus clarkii</i> |
| <b>Fish</b>        | <i>Poecilia reticulata</i><br>Poeciliid sp.                                      |

**Introduced Species**

|                |   |
|----------------|---|
| <b>Insects</b> | <i>Cheumatopsyche analis</i><br>Chironomid larvae<br><i>Cricotopus bicinctus</i><br><i>Enallagma civile</i><br><i>Hydroptila potosina</i><br><i>Ischnura posita</i> |
|----------------|---|

Wailuku River, Hawai'i

|               |                                  |                       |
|---------------|----------------------------------|-----------------------|
| <b>Snails</b> | <i>Cipangopaludina chinensis</i> | <i>Limonia advena</i> |
|               | Lymnaeid sp.                     | Trichoptera larvae    |
|               | Physid sp.                       |                       |
|               | <i>Pseudosuccinea columella</i>  |                       |
| <b>Worms</b>  | <i>Camallanus cotti</i>          |                       |

**Species Size Data: Species size (inches) observed in DAR Point Quadrat Surveys.**

| <u>Scientific Name</u>   | <u>Status</u> | <u>Minimum Size</u> | <u>Maximum Size</u> | <u>Average Size</u> |
|--------------------------|---------------|---------------------|---------------------|---------------------|
| <i>Rana catesbiana</i>   | Introduced    | 1.5                 | 3                   | 2.3                 |
| <i>Atyoida bisulcata</i> | Endemic       | 1                   | 1.5                 | 1.2                 |
| <i>Megalagrion sp.</i>   | Endemic       | 0.38                | 0.5                 | 0.5                 |
| <i>Anax junius</i>       | Indigenous    | 1.5                 | 1.5                 | 1.5                 |

**Average Density: The densities (#/square yard) for species observed in DAR Point Quadrat Surveys averaged over all sample dates in each reach type.**

| <u>Scientific Name</u>   | <u>Status</u> | <u>Estuary</u> | <u>Low</u> | <u>Mid</u> | <u>Upper</u> | <u>Headwaters</u> |
|--------------------------|---------------|----------------|------------|------------|--------------|-------------------|
| <i>Atyoida bisulcata</i> | Endemic       |                |            |            | 0.1          |                   |
| <i>Megalagrion sp.</i>   | Endemic       |                |            |            | 0.34         |                   |
| <i>Anax junius</i>       | Indigenous    |                |            |            | 0.05         |                   |
| Lymnaeid sp.             | Introduced    |                |            |            | 0.05         |                   |
| <i>Rana catesbiana</i>   | Introduced    |                |            |            | 0.1          |                   |

**Species Distributions: Presence (P) of species in different stream reaches.**

| <u>Scientific Name</u>          | <u>Status</u> | <u>Estuary</u> | <u>Lower</u> | <u>Middle</u> | <u>Upper</u> | <u>Headwaters</u> |
|---------------------------------|---------------|----------------|--------------|---------------|--------------|-------------------|
| <i>Atyoida bisulcata</i>        | Endemic       | P              |              | P             | P            |                   |
| <i>Sicyopterus stimpsoni</i>    | Endemic       | P              |              |               |              |                   |
| <i>Anax strenuus</i>            | Endemic       |                |              |               |              | P                 |
| <i>Campsicnemus tibialis</i>    | Endemic       |                |              |               |              | P                 |
| <i>Chironomus hawaiiensis</i>   | Endemic       | P              |              |               |              | P                 |
| <i>Dasyhelea hawaiiensis</i>    | Endemic       |                |              |               | P            |                   |
| <i>Forcipomyia hardyi</i>       | Endemic       |                |              |               |              | P                 |
| <i>Hyposmocoma sp.</i>          | Endemic       |                |              |               | P            | P                 |
| <i>Limonia hawaiiensis</i>      | Endemic       |                |              |               |              | P                 |
| <i>Limonia jacobus</i>          | Endemic       |                |              |               |              | P                 |
| <i>Megalagrion blackburni</i>   | Endemic       |                |              |               | P            | P                 |
| <i>Megalagrion calliphya</i>    | Endemic       |                |              |               | P            | P                 |
| <i>Megalagrion hawaiiense</i>   | Endemic       |                |              |               | P            | P                 |
| <i>Megalagrion sp.</i>          | Endemic       |                |              | P             | P            | P                 |
| <i>Microvelia vagans</i>        | Endemic       |                |              |               | P            | P                 |
| <i>Paralaincalus metallicus</i> | Endemic       |                |              |               |              | P                 |

Wailuku River, Hawai'i

|                                 |            |   |   |   |   |
|---------------------------------|------------|---|---|---|---|
| <i>Rhantus pacificus</i>        | Endemic    |   |   |   | P |
| <i>Saldula exulans</i>          | Endemic    |   |   |   | P |
| <i>Saldula procellaris</i>      | Endemic    |   |   |   | P |
| <i>Scatella clavipes</i>        | Endemic    |   |   | P |   |
| <i>Scatella fluvialis</i>       | Endemic    |   |   | P |   |
| <i>Scatella oahuense</i>        | Endemic    |   |   | P |   |
| <i>Scatella williamsi</i>       | Endemic    |   |   | P |   |
| <i>Sigmatineurum englundii</i>  | Endemic    |   |   | P |   |
| <i>Ferrissia sharpi</i>         | Endemic    |   |   |   | P |
| <i>Neritina granosa</i>         | Endemic    | P |   |   |   |
| Amphipod sp.                    | Indigenous |   |   | P |   |
| <i>Awaous guamensis</i>         | Indigenous |   | P |   |   |
| Gobiid sp.                      | Indigenous |   | P | P |   |
| <i>Anax junius</i>              | Indigenous |   | P | P | P |
| <i>Anax sp.</i>                 | Indigenous |   | P | P |   |
| <i>Procanace sp.</i>            | Indigenous |   |   | P |   |
| <i>Telmatogeton sp.</i>         | Indigenous |   | P | P | P |
| <i>Rana catesbiana</i>          | Introduced |   |   | P |   |
| <i>Hyalella azteca</i>          | Introduced |   | P |   |   |
| <i>Macrobrachium lar</i>        | Introduced |   | P |   |   |
| <i>Procambarus clarkii</i>      | Introduced |   | P | P |   |
| <i>Poecilia reticulata</i>      | Introduced |   | P |   |   |
| Poeciliid sp.                   | Introduced |   | P | P |   |
| <i>Cheumatopsyche analis</i>    | Introduced | P |   | P | P |
| Chironomid larvae               | Introduced |   | P | P |   |
| <i>Cricotopus bicinctus</i>     | Introduced |   |   | P | P |
| <i>Enallagma civile</i>         | Introduced |   |   | P |   |
| <i>Hydroptila potosina</i>      | Introduced |   |   | P |   |
| <i>Ischnura posita</i>          | Introduced |   |   | P |   |
| <i>Limonia advena</i>           | Introduced |   |   | P |   |
| Trichoptera larvae              | Introduced |   | P |   |   |
| Lymnaeid sp.                    | Introduced | P |   | P |   |
| Physid sp.                      | Introduced |   |   |   | P |
| <i>Pseudosuccinea columella</i> | Introduced |   |   |   | P |
| <i>Pseudosuccinea columella</i> | Introduced |   |   |   | P |

|                        |              |   |   |   |
|------------------------|--------------|---|---|---|
| Copepod sp.            | Undetermined | P | P | P |
| Ostracod sp.           | Undetermined |   | P | P |
| Tipulid sp.            | Undetermined |   |   | P |
| Hirudinean sp.         | Undetermined |   | P | P |
| <i>Oligochaete sp.</i> | Undetermined | P | P | P |

### HISTORIC RANKINGS

**Historic Rankings:** These are rankings of streams from historical studies. "Yes" means the stream was considered worthy of protection by that method. Some methods include non-biotic data in their determination. See Atlas Key for details.

Multi-Attribute Prioritization of Streams - Potential Heritage Streams (1998): No

Hawaii Stream Assessment Rank (1990): Moderate

U.S. Fish and Wildlife Service High Quality Stream (1988): Yes

The Nature Conservancy- Priority Aquatic Sites (1985): No

National Park Service - Nationwide Rivers Inventory (1982): No

**Current DAR Decision Rule Status:** The following criteria are used by DAR to consider the biotic importance of streams. "Yes" means that watershed has that quality.

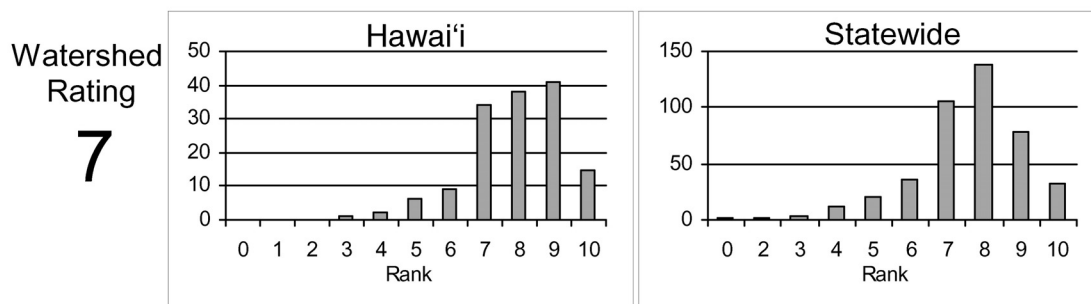
|  |  |  |
|--|--|--|
| Native Insect Diversity<br><u>&gt; 19 spp.</u> | Native Macrofauna<br><u>Diversity &gt; 5 spp.</u>  | Absence of Priority 1<br><u>Introduced</u>   |
| No   | Yes  | No   |
| Abundance of Any<br><u>Native Species</u>      | Presence of Candidate<br><u>Endangered Species</u> | Endangered Newcomb's<br><u>Snail Habitat</u> |
| No   | No   | No   |

### CURRENT WATERSHED AND STREAM RATINGS

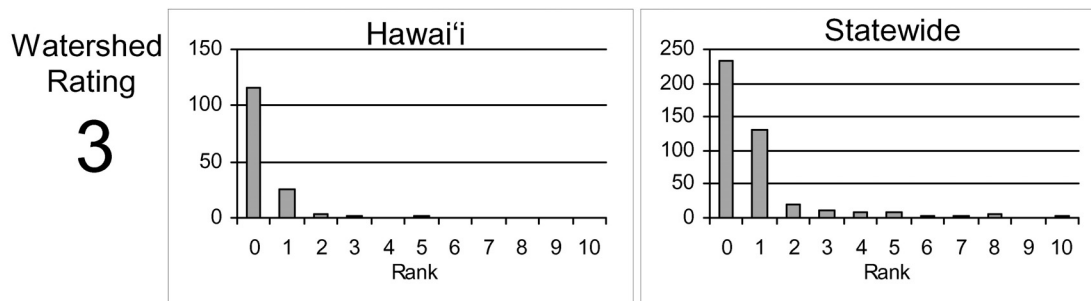
The current watershed and stream ratings are based on the data contained in the DAR Aquatic Surveys Database. The ratings provide the score for the individual watershed or stream, the distribution of ratings for that island, and the distribution of ratings statewide. This allows a better understanding of the meaning of a particular ranking and how it compares to other streams. The ratings are standardized to range from 0 to 10 (0 is lowest and 10 is highest rating) for each variable and the totals are also standardized so that the rating is not the average of each component rating. These ratings are subject to change as more data are entered into the DAR Aquatic Surveys Database and can be automatically recalculated as the data improve. In addition to the ratings, we have also provided an estimate of the confidence level of the ratings. This is called rating strength. The higher the rating strength the more likely the data and rankings represent the actual condition of the watershed, stream, and aquatic biota.

#### WATERSHED RATING: Wailuku River, Hawai'i

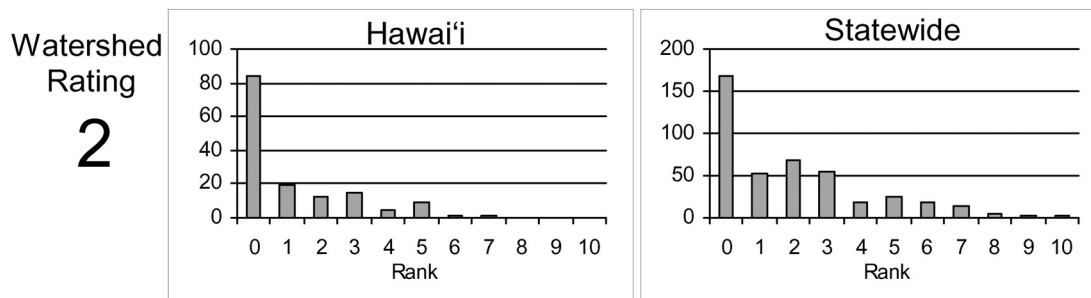
Land Cover Rating: Rating is based on a scoring system where in general forested lands score positively and developed lands score negatively.



Shallow Waters Rating: Rating is based on a combination of the extent of estuarine and shallow marine areas associated with the watershed and stream.

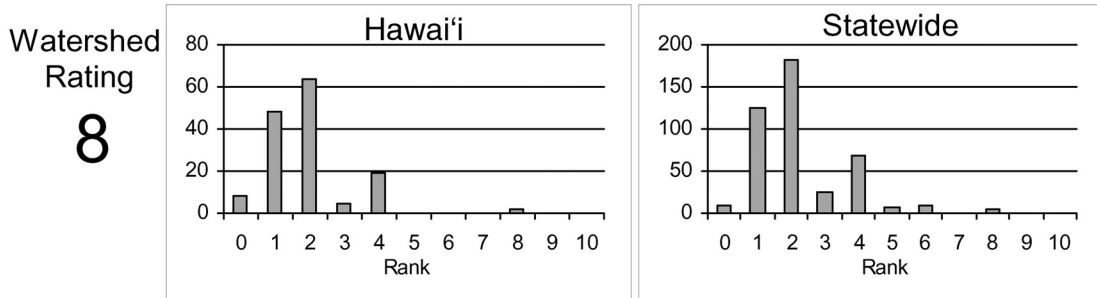


Stewardship Rating: Rating is based on a scoring system where higher levels of land and biodiversity protection within the watershed score positively.

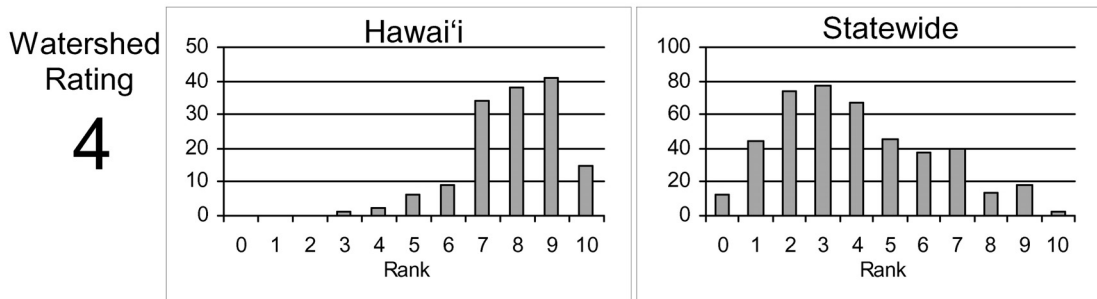


**WATERSHED RATING (Cont): Wailuku River, Hawai'i**

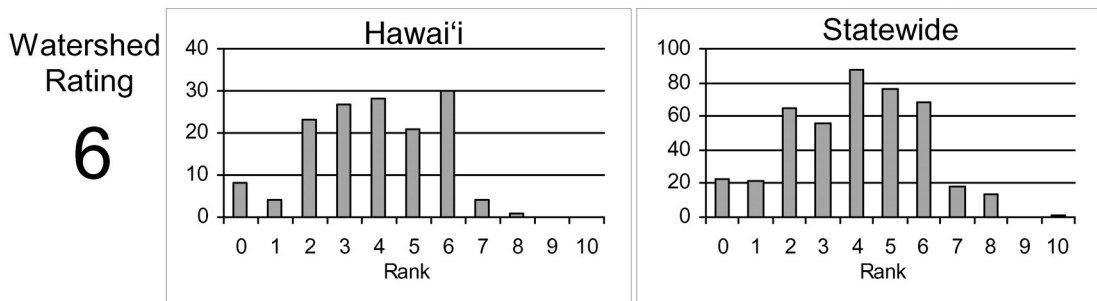
Size Rating: Rating is based on the watershed area and total stream length. Larger watersheds and streams score more positively.



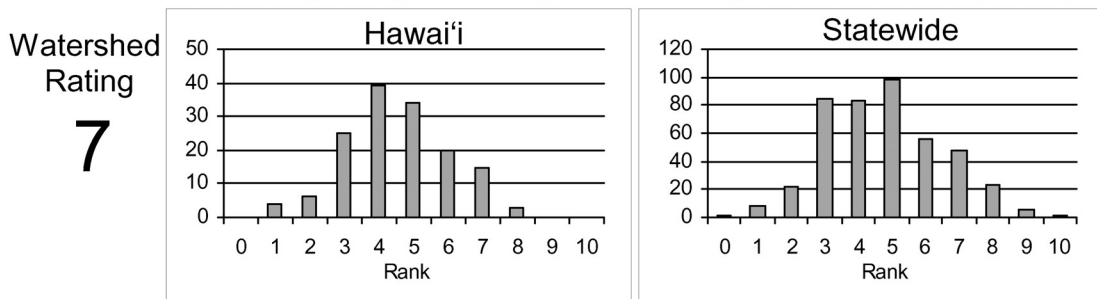
Wetness Rating: Rating is based on the average annual rainfall within the watershed. Higher rainfall totals score more positively.



Reach Diversity Rating: Rating is based on the types and amounts of different stream reaches available in the watershed. More area in different reach types score more positively.



Total Watershed Rating: Rating is based on combination of Land Cover Rating, Shallow Waters Rating, Stewardship Rating, Size Rating, Wetness Rating, and Reach Diversity Rating.

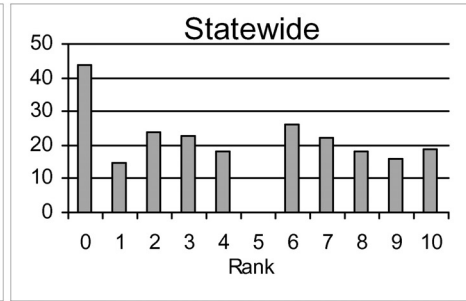
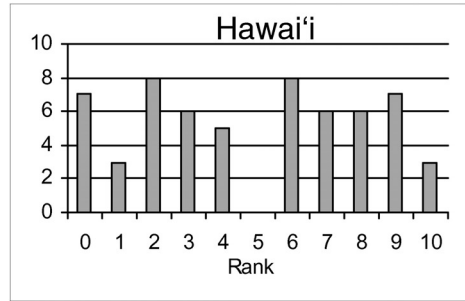




**BIOLOGICAL RATING: Wailuku River, Hawai'i**

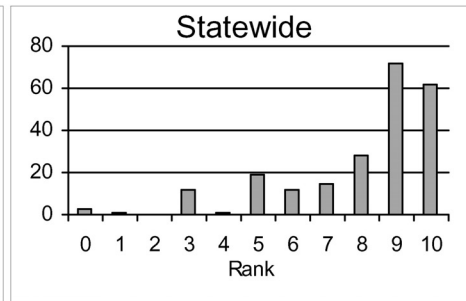
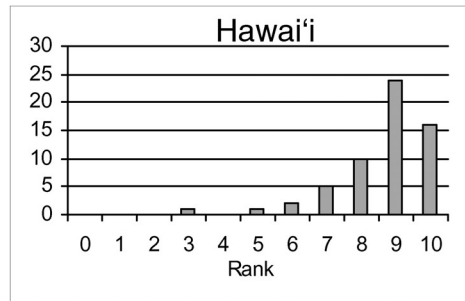
Native Species Rating: Rating is based on the number of native species observed in the watershed.

Stream Rating  
**4**



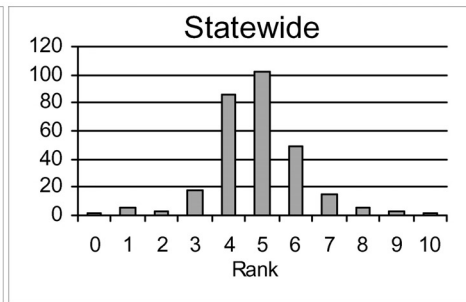
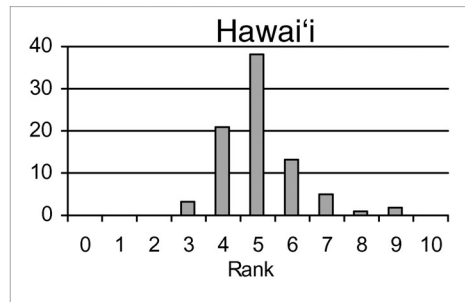
Introduced Genera Rating: Rating is based on the number of introduced genera observed in the watershed.

Stream Rating  
**8**



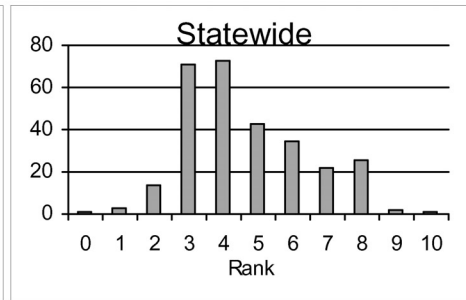
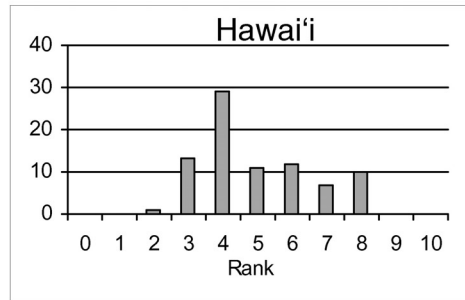
All Species' Score Rating: Rating is based on the Hawaii Stream Assessment scoring system where native species score positively and introduced species score negatively.

Stream Rating  
**5**



Total Biological Rating: Rating is the combination of the Native Species Rating, Introduced Genera Rating, and the All Species' Score Rating.

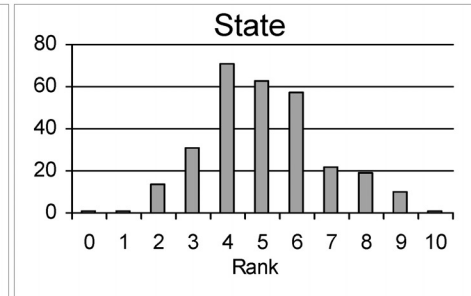
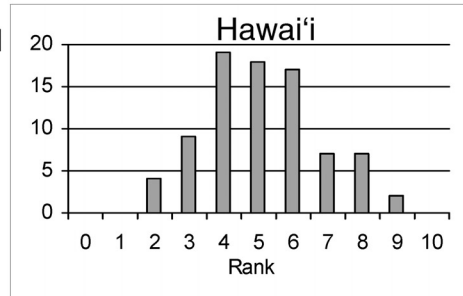
Stream Rating  
**5**



**OVERALL RATING: Wailuku River, Hawai'i**

Overall Rating: Rating is a combination of the Total Watershed Rating and the Total Biological Rating.

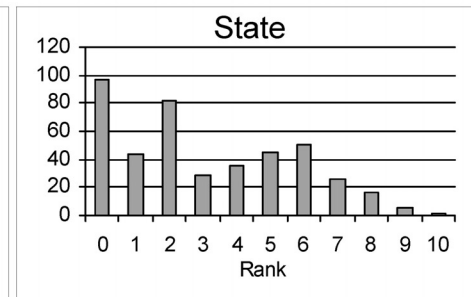
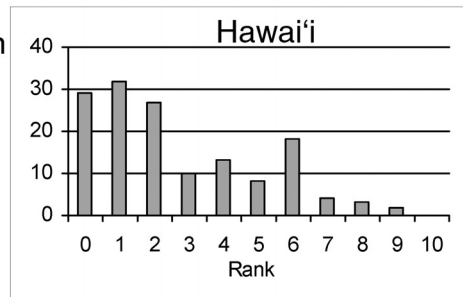
Watershed  
Rating  
**6**



**RATING STRENGTH: Wailuku River, Hawai'i**

Rating Strength: Represents an estimate of the overall study effort in the stream and is a combination of the number of studies, number of different reaches surveyed, and the number of different survey types.

Information  
Rating  
**8**



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