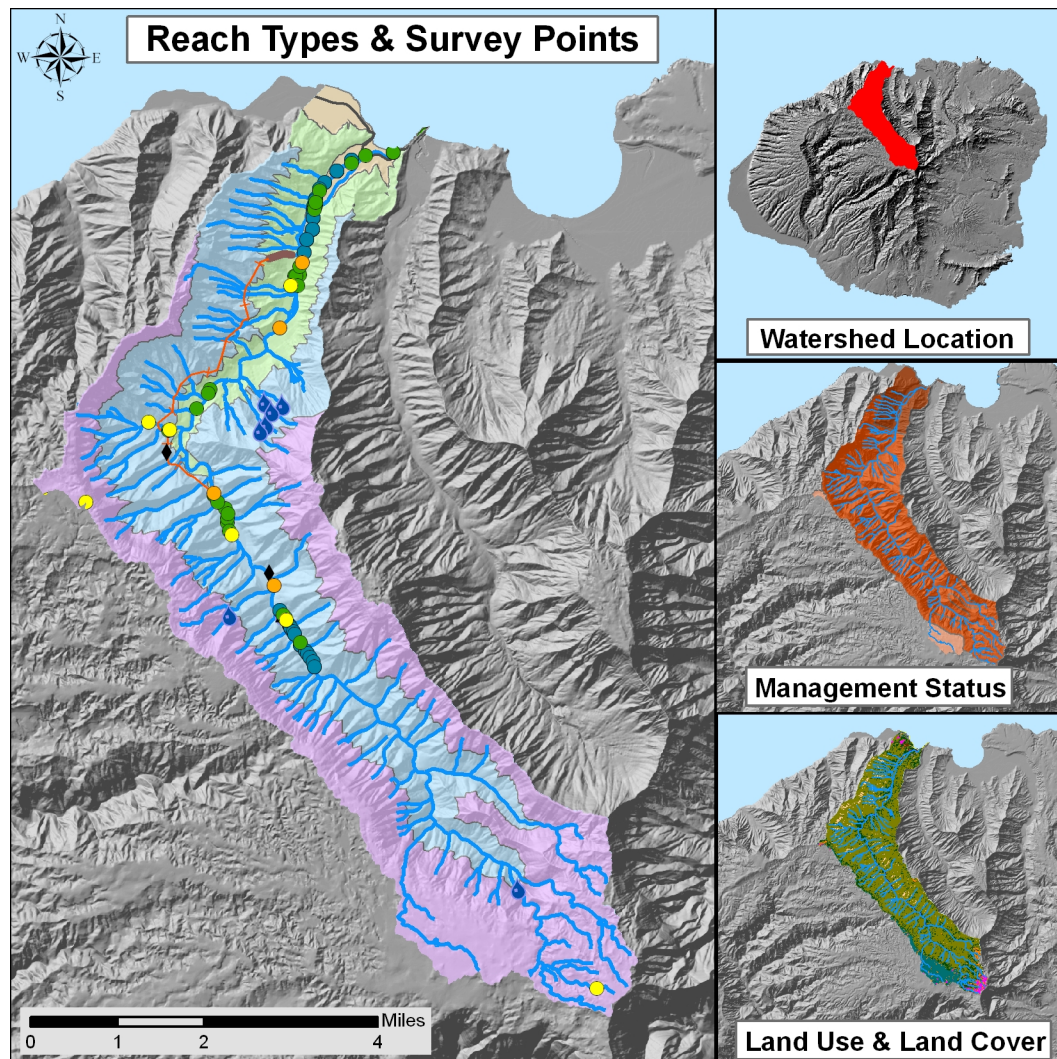


Wainiha River, Kauaʻi



WATERSHED FEATURES

Wainiha River watershed occurs on the island of Kauaʻi. The Hawaiian meaning of the name is “unfriendly water”. The area of the watershed is 23.4 square mi (60.6 square km), with maximum elevation of 5118 ft (1560 m). The watershed's DAR cluster code is 6, meaning that the watershed is large, narrow, and steep in the upper watershed. The percent of the watershed in the different land use districts is as follows: 0% agricultural, 97.9% conservation, 1.5% rural, and 0.5% 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 Private</u>
0.0	0.0	88.5	0.2	0.0	0.0	11.3

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

<u>Permanent Biodiversity Protection</u>	<u>Managed for Multiple Uses</u>	<u>Protected but Unmanaged</u>	<u>Unprotected</u>
0.0	4.9	83.6	11.5

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	0.0	0.00	0.00
Low Intensity Developed	0.3	0.08	0.21
Cultivated	0.2	0.06	0.15
Grassland	2.0	0.47	1.23
Scrub/Shrub	71.8	16.79	43.49
Evergreen Forest	15.4	3.60	9.32
Palustrine Forested	6.5	1.53	3.96
Palustrine Scrub/Shrub	1.8	0.41	1.07
Palustrine Emergent	1.1	0.25	0.65
Estuarine Forested	0.0	0.00	0.00
Bare Land	0.1	0.03	0.08
Unconsolidated Shoreline	0.0	0.00	0.00
Water	0.7	0.17	0.43
Unclassified	0.0	0.00	0.00

STREAM FEATURES

Wainiha River is a perennial stream. Total stream length is 89.4 mi (143.8 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	3.0	17.2	53.9	25.9

The following stream(s) occur in the watershed:

Hiaupe Makawea Maunahina Wainiha

BIOTIC SAMPLING EFFORT

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

1966	1977	1979	1984	1986	1987	1989
1990	1991	1992	1993	1994	1996	1997
2001	2005					

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	4	6	1
DAR General Surveys	0	0	1	0	0
DAR Point Quadrat	0	85	7	29	0
HDFG	0	0	3	1	0
Published Report	1	13	13	8	0

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

Crustaceans	Amphipod sp. <i>Atyoida bisulcata</i> <i>Macrobrachium grandimanus</i>
Fish	<i>Awaous guamensis</i> <i>Eleotris sandwicensis</i> Gobiid sp. <i>Kuhlia sandwicensis</i> <i>Kuhlia xenura</i> <i>Lentipes concolor</i> <i>Mugil cephalus</i> <i>Sicyopterus stimpsoni</i> <i>Stenogobius hawaiiensis</i>
Snails	<i>Clithon cariosus</i> <i>Neritina granosa</i> <i>Neritina vespertina</i> Snail sp.
Sponges	<i>Heteromeyenia baileyi</i>
Worms	Hirudinean sp. <i>Oligochaete sp.</i>

Native Species

Insects	<i>Anax sp.</i> <i>Calospectra hawaiiensis</i> Coleoptera sp. Collembola sp. Diptera sp. Ephydrid sp. <i>Hydroptila sp.</i> <i>Megalagrion adytum</i> <i>Megalagrion eudytum</i> <i>Megalagrion heterogamias</i> <i>Megalagrion oresitrophum</i> <i>Megalagrion sp.</i> <i>Megalagrion vagabundum</i> <i>Orthocladus grimshawi</i> <i>Procanace sp.</i> <i>Scatella sp.</i> <i>Telmatogeton hirtus</i> <i>Telmatogeton sp.</i> Tipulid sp.
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Introduced Species

Amphibians	<i>Bufo marinus</i> <i>Rana catesbiana</i> <i>Rana rugosa</i>
Crustaceans	<i>Hyalella azteca</i> <i>Macrobrachium lar</i>
Fish	<i>Oncorhynchus mykiss</i> <i>Poecilia reticulata</i> <i>Xiphophorus helleri</i>
Snails	Lymnaeid sp.
Worms	<i>Bothriocephalus acheilognathi</i>

Introduced Species

Insects	<i>Aedes nocturnus</i> <i>Anopheles nigerrimus</i> <i>Cheumatopsyche analis</i> <i>Cheumatopsyche pettiti</i> Chironomid larvae <i>Cricotopus bicinctus</i> Ephemeroptera sp. <i>Oxythira maya</i> Simuliid sp. Trichoptera larvae
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Species Size Data: Species size (inches) observed in DAR Point Quadrat Surveys.

<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				2.38	
<i>Eleotris sandwicensis</i>	Endemic		0.14	0.62		
<i>Kuhlia xenura</i>	Endemic		0.46			
<i>Lentipes concolor</i>	Endemic				0.2	
<i>Macrobrachium grandimanus</i>	Endemic			0.62		
<i>Neritina granosa</i>	Endemic		1.44			
<i>Neritina vespertina</i>	Endemic		0.6			
<i>Sicyopterus stimpsoni</i>	Endemic		2.98	2.81	2.18	
<i>Stenogobius hawaiiensis</i>	Endemic		0.24	0.94		
<i>Awaous guamensis</i>	Indigenous		2.21	6.24		
<i>Mugil cephalus</i>	Indigenous		0.02			
<i>Bufo marinus</i>	Introduced		0.02			
<i>Macrobrachium lar</i>	Introduced		0.02			
<i>Rana catesbiana</i>	Introduced		0.12			

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				2.38	
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<i>Macrobrachium lar</i>	Introduced		0.02			
<i>Rana catesbiana</i>	Introduced		0.12			

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>Macrobrachium grandimanus</i>	Endemic		P	P	P	
<i>Eleotris sandwicensis</i>	Endemic		P	P	P	
<i>Kuhlia xenura</i>	Endemic		P	P		
<i>Lentipes concolor</i>	Endemic	P	P	P	P	
<i>Sicyopterus stimpsoni</i>	Endemic	P	P	P	P	

Wainiha River, Kaua'i

<i>Stenogobius hawaiiensis</i>	Endemic	P	P	P	
<i>Calospectra hawaiiensis</i>	Endemic	P	P	P	
<i>Megalagrion adytum</i>	Endemic				P
<i>Megalagrion eudytum</i>	Endemic		P	P	
<i>Megalagrion heterogamias</i>	Endemic		P	P	
<i>Megalagrion oresitrophum</i>	Endemic		P	P	P
<i>Megalagrion sp.</i>	Endemic		P	P	
<i>Megalagrion vagabundum</i>	Endemic			P	
<i>Orthocladus grimshawi</i>	Endemic	P	P	P	
<i>Telmatogeton hirtus</i>	Endemic			P	
<i>Clithon cariosus</i>	Endemic			P	
<i>Neritina granosa</i>	Endemic	P	P	P	
<i>Neritina vespertina</i>	Endemic	P			
Amphipod sp.	Indigenous		P	P	
<i>Awaous guamensis</i>	Indigenous	P	P	P	
Gobiid sp.	Indigenous		P		
<i>Kuhlia sandvicensis</i>	Indigenous	P		P	
<i>Mugil cephalus</i>	Indigenous	P			
<i>Anax sp.</i>	Indigenous			P	
<i>Procanace sp.</i>	Indigenous			P	
<i>Scatella sp.</i>	Indigenous			P	
<i>Telmatogeton sp.</i>	Indigenous		P	P	
<i>Heteromeyenia baileyi</i>	Indigenous		P	P	
<i>Bufo marinus</i>	Introduced	P			
<i>Rana catesbiana</i>	Introduced	P		P	
<i>Rana rugosa</i>	Introduced	P		P	
<i>Hyalella azteca</i>	Introduced			P	
<i>Macrobrachium lar</i>	Introduced	P	P	P	
<i>Oncorhynchus mykiss</i>	Introduced			P	
<i>Poecilia reticulata</i>	Introduced	P			
<i>Xiphophorus helleri</i>	Introduced		P		
<i>Aedes nocturnus</i>	Introduced			P	
<i>Anopheles nigerrimus</i>	Introduced			P	
<i>Cheumatopsyche analis</i>	Introduced	P	P	P	
<i>Cheumatopsyche pettiti</i>	Introduced			P	
Chironomid larvae	Introduced		P		
<i>Cricotopus bicinctus</i>	Introduced	P	P	P	
Ephemeroptera sp.	Introduced	P	P	P	
<i>Oxythira maya</i>	Introduced	P	P	P	
Simuliid sp.	Introduced	P	P	P	
Trichoptera larvae	Introduced			P	
Lymnaeid sp.	Introduced		P	P	

<i>Bothriocephalus acheilognathi</i>	Introduced	P		
Coleoptera sp.	Undetermined	P	P	P
Collembola sp.	Undetermined	P		P
<i>Diptera</i> sp.	Undetermined	P	P	P
Ephydrid sp.	Undetermined		P	P
<i>Hydroptila</i> sp.	Undetermined	P	P	P
Tipulid sp.	Undetermined			P
Snail sp.	Undetermined		P	
Hirudinean sp.	Undetermined	P	P	P
<i>Oligochaete</i> sp.	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): Outstanding

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

The Nature Conservancy- Priority Aquatic Sites (1985): Yes

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.

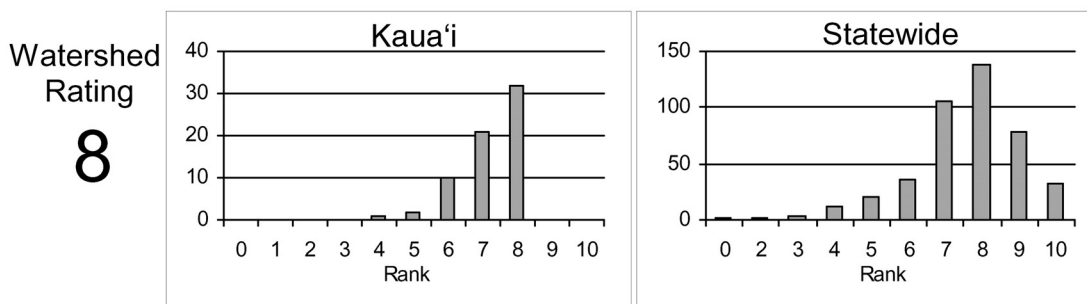
Native Insect Diversity <u>> 19 spp.</u>	Native Macrofauna <u>Diversity > 5 spp.</u>	Absence of Priority 1 <u>Introduced</u>
No	Yes	No
Abundance of Any <u>Native Species</u>	Presence of Candidate <u>Endangered Species</u>	Endangered Newcomb's <u>Snail Habitat</u>
Yes	No	No

CURRENT WATERSHED AND STREAM RATINGS

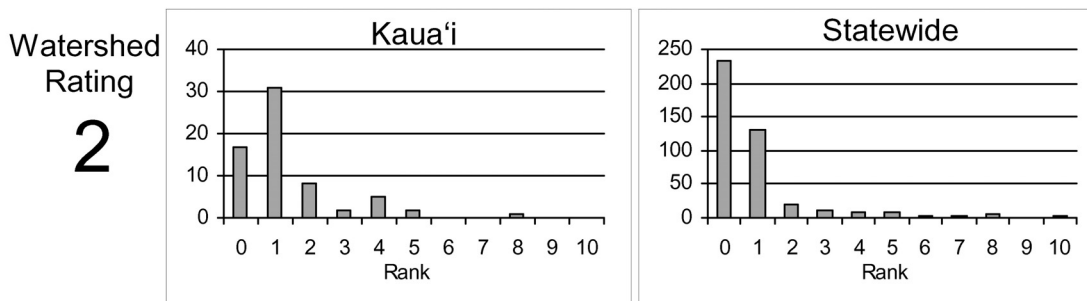
The current watershed and stream ratings are based on the data contained in the DAR Aquatic Surveys Database. The ratings provide the score for the individual watershed or stream, the distribution of ratings for that island, and the distribution of ratings statewide. This allows a better understanding 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: Wainiha River, Kaua'i

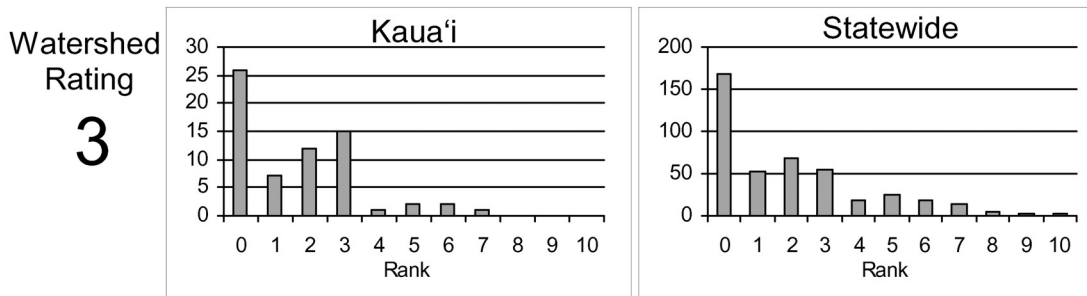
Land Cover Rating: Rating is based on a scoring system where in general forested lands score positively and developed lands score negatively.



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



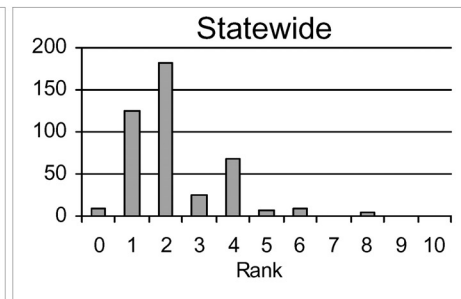
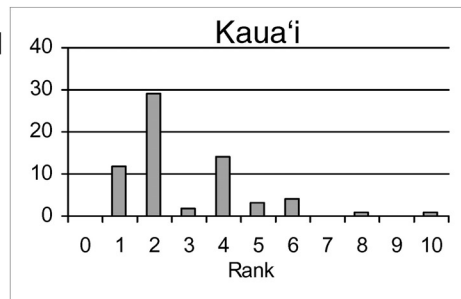
Stewardship Rating: Rating is based on a scoring system where higher levels of land and biodiversity protection within the watershed score positively.



WATERSHED RATING (Cont): Wainiha River, Kaua'i

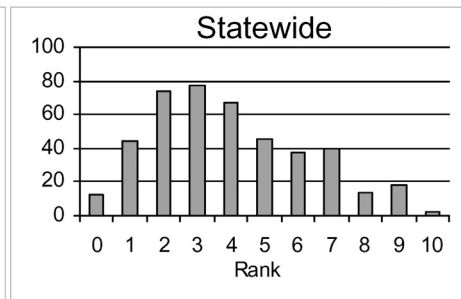
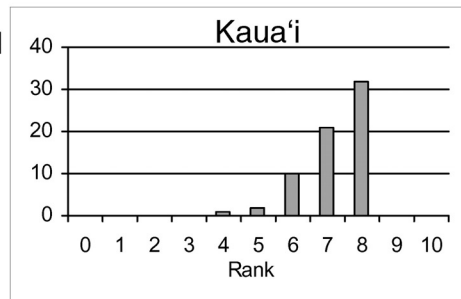
Size Rating: Rating is based on the watershed area and total stream length. Larger watersheds and streams score more positively.

Watershed
Rating
6



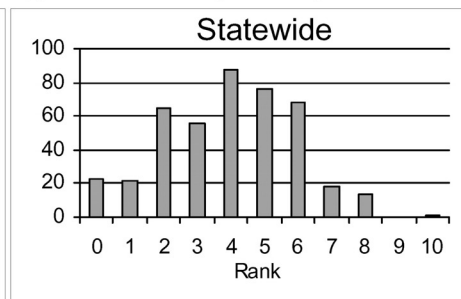
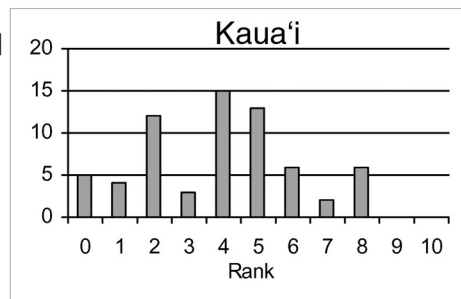
Wetness Rating: Rating is based on the average annual rainfall within the watershed. Higher rainfall totals score more positively.

Watershed
Rating
9



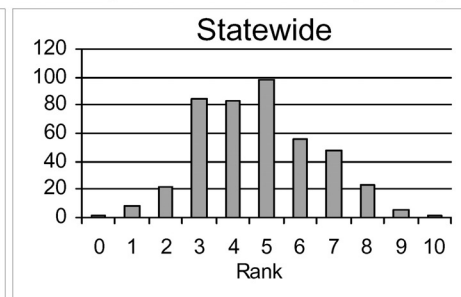
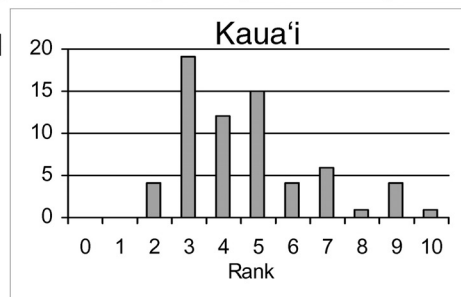
Reach Diversity Rating: Rating is based on the types and amounts of different stream reaches available in the watershed. More area in different reach types score more positively.

Watershed
Rating
8



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.

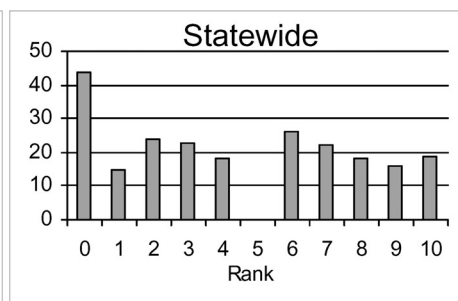
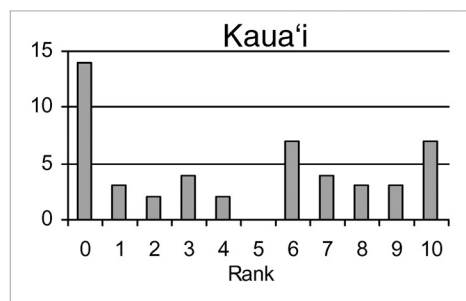
Watershed
Rating
9



BIOLOGICAL RATING: Wainiha River, Kaua'i

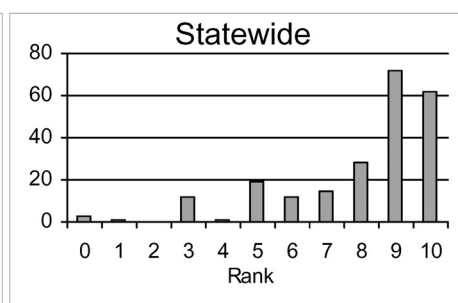
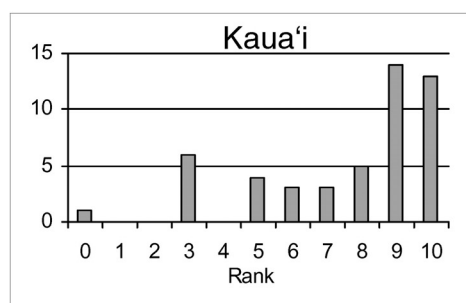
Native Species Rating: Rating is based on the number of native species observed in the watershed.

Stream
Rating
10



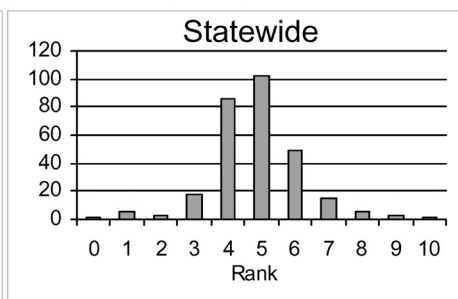
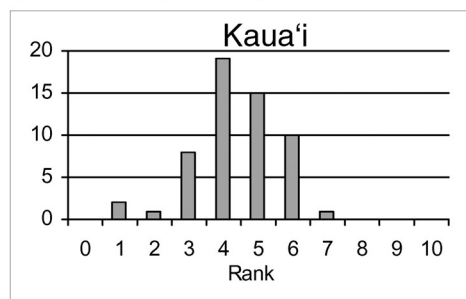
Introduced Genera Rating: Rating is based on the number of introduced genera observed in the watershed.

Stream
Rating
6



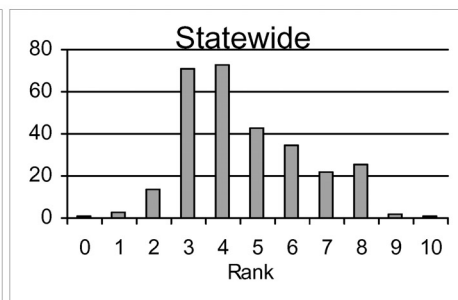
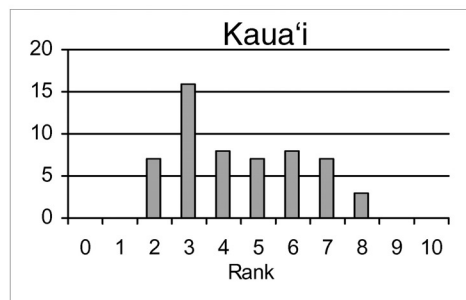
All Species' Score Rating: Rating is based on the Hawaii Stream Assessment scoring system where native species score positively and introduced species score negatively.

Stream
Rating
5



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

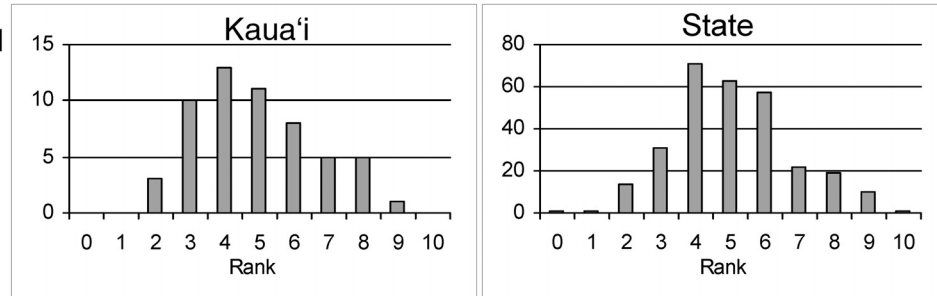
Stream
Rating
6



OVERALL RATING: Wainiha River, Kaua'i

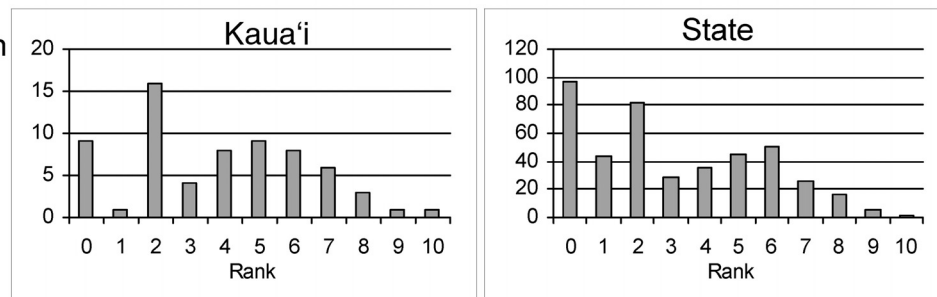
Overall Rating: Rating is a combination of the Total Watershed Rating and the Total Biological Rating.

Watershed
Rating
8

**RATING STRENGTH: Wainiha River, Kaua'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
10

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