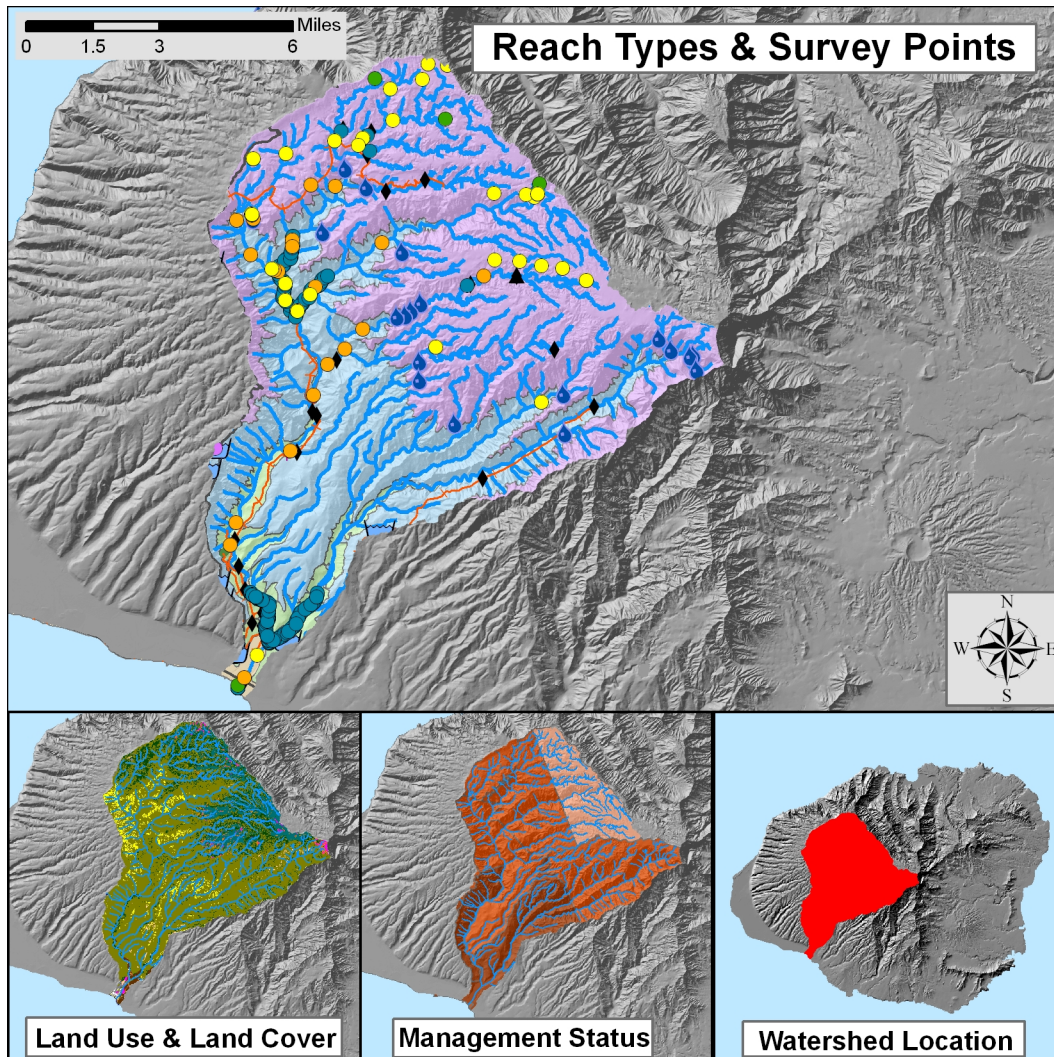


Waimea River, Kaua'i



WATERSHED FEATURES

Waimea River watershed occurs on the island of Kaua'i. The Hawaiian meaning of the name is "reddish water (as from erosion)". The area of the watershed is 85.9 square mi (222.6 square km), with maximum elevation of 5243 ft (1598 m). The watershed's DAR cluster code is 8, meaning that the watershed is very large, and steep in the upper watershed.. The percent of the watershed in the different land use districts is as follows: 12.9% agricultural, 86.6% conservation, 0.1% rural, and 0.4% 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>
0.0	0.0	78.7	5.4	0.0	0.0		15.9

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

Permanent Biodiversity <u>Protection</u>	Managed for Multiple <u>Uses</u>	Protected but <u>Unmanaged</u>	<u>Unprotected</u>
0.0	17.0	61.7	21.3

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	0.06	0.17
Low Intensity Developed	0.3	0.29	0.75
Cultivated	0.6	0.49	1.26
Grassland	0.8	0.71	1.84
Scrub/Shrub	71.6	61.55	159.42
Evergreen Forest	13.8	11.83	30.64
Palustrine Forested	7.2	6.18	16.01
Palustrine Scrub/Shrub	1.4	1.22	3.16
Palustrine Emergent	0.5	0.45	1.17
Estuarine Forested	0.0	0.00	0.00
Bare Land	3.6	3.08	7.97
Unconsolidated Shoreline	0.0	0.00	0.00
Water	0.1	0.08	0.21
Unclassified	0.0	0.00	0.00

STREAM FEATURES

Waimea River is a perennial stream. Total stream length is 276.4 mi (444.9 km). The terminal stream order is 5.

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>
0.2	0.0	10.1	35.6	54.1

The following stream(s) occur in the watershed:

'Awini	'Elekeni'iki	'Elekeninui	Hale'aha	Halekua
Halemanu	Halepa'akai	Hipalau	Kahana	Kauaikinanā
Kawai Iki	Kawaikōi	Koai'e	Koholoina	Kōke'e
Kunini	Loli	Makaweli	Maluapopoki	Mōhihi
Mokihana	Mokuone	Nāwaimaka	Nihoā	Noe
Olokele	'Ōma'o	Oneopaewa	Peamoā	Po'omau
Wahane	Waiāhulu	Waiākōali	Wai'alae	Waiānuenue
Waiau	Waimea	Waineki		

BIOTIC SAMPLING EFFORT

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

1895	1897	1919	1920	1940	1963	1977
1978	1979	1990	1991	1992	1994	1995
1997	2000	2002	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	1	0	9	40
DAR General Surveys	0	0	0	0	5
DAR Larval Trapping	0	219	0	0	0
DAR Point Quadrat	0	153	1	106	0
HDFG	1	0	5	12	3
Published Report	1	0	0	0	3

BIOTA INFORMATION

Species List

Native Species

Crustaceans	<i>Atyoida bisulcata</i>
	<i>Macrobrachium grandimanus</i>
Fish	<i>Awaous guamensis</i>
	<i>Eleotris sandwicensis</i>
	Gobiid sp.
	<i>Kuhlia xenura</i>
	<i>Lentipes concolor</i>
	<i>Mugil cephalus</i>
	Mugilid sp.
	<i>Polydactylus sexfilis</i>
	<i>Sicyopterus stimpsoni</i>
	<i>Stenogobius hawaiiensis</i>
Snails	<i>Neritina granosa</i>
	<i>Neritina vespertina</i>
Worms	<i>Oligochaete sp.</i>

Native Species

Insects	<i>Anax strenuus</i>
	<i>Campsicnemus nigricollis</i>
	<i>Campsicnemus sp.</i>
	Dolichopodid sp.
	Ephydrid sp.
	<i>Eurynogaster mediocris</i>
	<i>Eurynogaster minor</i>
	<i>Forcipomyia hardyi</i>
	<i>Forcipomyia sp.</i>
	<i>Hyposmocoma sp</i>
	<i>Limonia hawaiiensis</i>
	<i>Limonia jacobus</i>
	<i>Limonia sp.</i>
	<i>Limonia stygipennis</i>
	<i>Megalagrion adytum</i>
	<i>Megalagrion calliphya</i>
	<i>Megalagrion eudytum</i>
	<i>Megalagrion heterogamias</i>
	<i>Megalagrion mauka</i>
	<i>Megalagrion oresitrophum</i>
	<i>Megalagrion paludicola</i>
	<i>Megalagrion sp.</i>
	<i>Megalagrion vagabundum</i>
	<i>Microvelia vagans</i>
	<i>Nesogonia blackburni</i>

Paraliancalus metallicus
Procanace bifurcata
Procanace nigroviridis
Procanace quadrisetosa
Procanace sp.
Procanace wirthi
Rhantus pacificus
Saldula exulans
Saldula oahuense
Saldula procellaris
Scatella cilipes
Scatella hawaiiensis
Scatella kauaiensis
Sigmatineurum napali
Telmatogeton hirtus
Telmatogeton sp.
 Tipulid sp.

Introduced Species

Amphibians *Bufo marinus*
Rana rugosa
Crustaceans *Macrobrachium lar*
Procambarus clarkii
Fish *Clarias fuscus*
Gambusia affinis
Misgurnus anguillicaudatus
Oncorhynchus mykiss
Oreochromis mossambicus
Poecilia reticulata
Poecilia sphenops
 Poeciliid sp.
Tilapia sp.
Xiphophorus helleri
Snails Lymnaeid sp.
Melania sp.

Introduced Species

Insects *Anopheles subpictus*
Cheumatopsyche pettiti
 Chironomid larvae
Cricotopus bicinctus
Deiella fasciata
Dolichopus exsul
Enallagma civile
Ischnura posita
Ischnura ramburi
Limonia advena
Ochthera circularis
Syntormon flexible
Toxorhynchites amboinensis

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>Bufo marinus</i>	Introduced	0.125	0.25	0.2
<i>Rana rugosa</i>	Introduced	3	3	3.0
<i>Macrobrachium grandimanus</i>	Endemic	1	3	1.7
<i>Macrobrachium lar</i>	Introduced	1.25	5	2.9
<i>Eleotris sandwicensis</i>	Endemic	2	4.5	2.8
<i>Kuhlia xenura</i>	Endemic	2	4.5	3.2
<i>Sicyopterus stimpsoni</i>	Endemic	0.75	6	2.7
<i>Stenogobius hawaiiensis</i>	Endemic	0.75	4	1.8

Waimea River, Kaua'i

<i>Awaous guamensis</i>	Indigenous	0.75	9	3.1
Gobiid sp.	Indigenous	0.5	1.5	0.9
<i>Mugil cephalus</i>	Indigenous	1	12	4.3
Mugilid sp.	Indigenous	2	12	2.6
<i>Poecilia reticulata</i>	Introduced	0.25	1	0.3
<i>Poecilia sphenops</i>	Introduced	2	2.5	2.4
Poeciliid sp.	Introduced	0.25	1	0.4
<i>Tilapia sp.</i>	Introduced	0.25	8	0.4
<i>Xiphophorus helleri</i>	Introduced	0.75	3	2.0
<i>Neritina vespertina</i>	Endemic	1	1.25	1.1

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>Eleotris sandwicensis</i>	Endemic		0.05			
<i>Kuhlia xenura</i>	Endemic		0.19			
<i>Macrobrachium grandimanus</i>	Endemic		0.06			
<i>Neritina granosa</i>	Endemic		0.01			
<i>Neritina vespertina</i>	Endemic		0.03			
<i>Sicyopterus stimpsoni</i>	Endemic		0.54		0.14	
<i>Stenogobius hawaiiensis</i>	Endemic		2.1			
<i>Awaous guamensis</i>	Indigenous		2.13	8	2.85	
Gobiid sp.	Indigenous		3.21			
<i>Mugil cephalus</i>	Indigenous		1.02			
Mugilid sp.	Indigenous		0.82			
<i>Bufo marinus</i>	Introduced		0.31			
<i>Macrobrachium lar</i>	Introduced		0.22			
<i>Melania sp.</i>	Introduced		0.01			
<i>Poecilia reticulata</i>	Introduced		0.57			
<i>Poecilia sphenops</i>	Introduced		0.05			
Poeciliid sp.	Introduced		0.79			
<i>Rana rugosa</i>	Introduced		0.01			
<i>Tilapia sp.</i>	Introduced		3.34			
<i>Xiphophorus helleri</i>	Introduced		0.14			

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

Waimea River, Kaua'i

<i>Stenogobius hawaiiensis</i>	Endemic		P	P		
<i>Anax strenuus</i>	Endemic					P
<i>Campsicnemus nigricollis</i>	Endemic					P
<i>Eurynogaster mediocris</i>	Endemic					P
<i>Eurynogaster minor</i>	Endemic					P
<i>Forcipomyia hardyi</i>	Endemic					P
<i>Hyposmocoma sp</i>	Endemic					P
<i>Limonia hawaiiensis</i>	Endemic					P
<i>Limonia jacobus</i>	Endemic					P
<i>Limonia stygipennis</i>	Endemic					P
<i>Megalagrion adytum</i>	Endemic					P
<i>Megalagrion calliphya</i>	Endemic					P
<i>Megalagrion eudytum</i>	Endemic					P
<i>Megalagrion heterogamias</i>	Endemic				P	P
<i>Megalagrion mauka</i>	Endemic					P
<i>Megalagrion oresitrophum</i>	Endemic					P
<i>Megalagrion paludicola</i>	Endemic					P
<i>Megalagrion sp.</i>	Endemic			P	P	P
<i>Megalagrion vagabundum</i>	Endemic				P	P
<i>Microvelia vagans</i>	Endemic					P
<i>Nesogonia blackburni</i>	Endemic					P
<i>Paraliancalus metallicus</i>	Endemic					P
<i>Procanace bifurcata</i>	Endemic					P
<i>Procanace nigroviridis</i>	Endemic					P
<i>Procanace quadrisetosa</i>	Endemic					P
<i>Procanace wirthi</i>	Endemic					P
<i>Rhantus pacificus</i>	Endemic					P
<i>Saldula exulans</i>	Endemic					P
<i>Saldula oahuense</i>	Endemic					P
<i>Saldula procellaris</i>	Endemic					P
<i>Scatella cilipes</i>	Endemic					P
<i>Scatella hawaiiensis</i>	Endemic					P
<i>Scatella kauaiensis</i>	Endemic					P
<i>Sigmatineurum napali</i>	Endemic					P
<i>Neritina granosa</i>	Endemic		P			
<i>Neritina vespertina</i>	Endemic		P			
<i>Awaous guamensis</i>	Indigenous		P	P	P	
Gobiid sp.	Indigenous	P	P	P	P	P
<i>Mugil cephalus</i>	Indigenous		P			
Mugilid sp.	Indigenous		P			
<i>Polydactylus sexfilis</i>	Indigenous		P			
<i>Campsicnemus sp.</i>	Indigenous					P

Waimea River, Kaua'i

<i>Forcipomyia</i> sp.	Indigenous					P
<i>Limonia</i> sp.	Indigenous					P
<i>Procanace</i> sp.	Indigenous					P
<i>Telmatogeton</i> sp.	Indigenous			P	P	P
<i>Bufo marinus</i>	Introduced		P			
<i>Rana rugosa</i>	Introduced		P			P
<i>Macrobrachium lar</i>	Introduced		P			
<i>Procambarus clarkii</i>	Introduced					P
<i>Clarias fuscus</i>	Introduced					P
<i>Gambusia affinis</i>	Introduced			P		
<i>Misgurnus anguillicaudatus</i>	Introduced					P
<i>Oncorhynchus mykiss</i>	Introduced					P
<i>Oreochromis mossambicus</i>	Introduced			P		
<i>Poecilia reticulata</i>	Introduced	P	P			
<i>Poecilia sphenops</i>	Introduced		P			
Poeciliid sp.	Introduced		P			
<i>Tilapia</i> sp.	Introduced	P	P	P		
<i>Xiphophorus helleri</i>	Introduced	P	P	P		P
<i>Anopheles subpictus</i>	Introduced					P
<i>Cheumatopsyche pettiti</i>	Introduced					P
Chironomid larvae	Introduced	P		P	P	P
<i>Cricotopus bicinctus</i>	Introduced					P
<i>Deielia fasciata</i>	Introduced					P
<i>Dolichopus exsul</i>	Introduced					P
<i>Enallagma civile</i>	Introduced		P			P
<i>Ischnura posita</i>	Introduced				P	P
<i>Ischnura ramburi</i>	Introduced				P	P
<i>Limonia advena</i>	Introduced					P
<i>Ochthera circularis</i>	Introduced					P
<i>Syntormon flexible</i>	Introduced					P
<i>Toxorhynchites amboinensis</i>	Introduced					P
Lymnaeid sp.	Introduced			P	P	
<i>Melania</i> sp.	Introduced	P	P	P		
Dolichopodid sp.	Undetermined					P
Ephydrid sp.	Undetermined					P
Tipulid sp.	Undetermined					P
<i>Oligochaete</i> sp.	Undetermined					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): 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
> 19 spp.

Yes

Native Macrofauna
Diversity > 5 spp.

Yes

Absence of Priority 1
Introduced

No

Abundance of Any
Native Species

No

Presence of Candidate
Endangered Species

No

Endangered Newcomb's
Snail Habitat

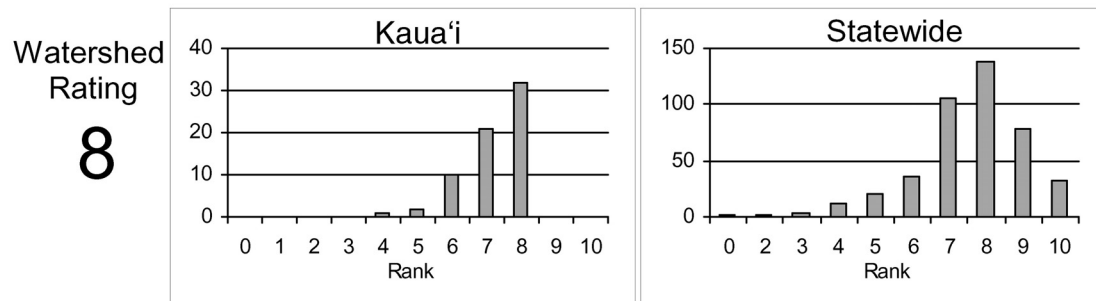
No

CURRENT WATERSHED AND STREAM RATINGS

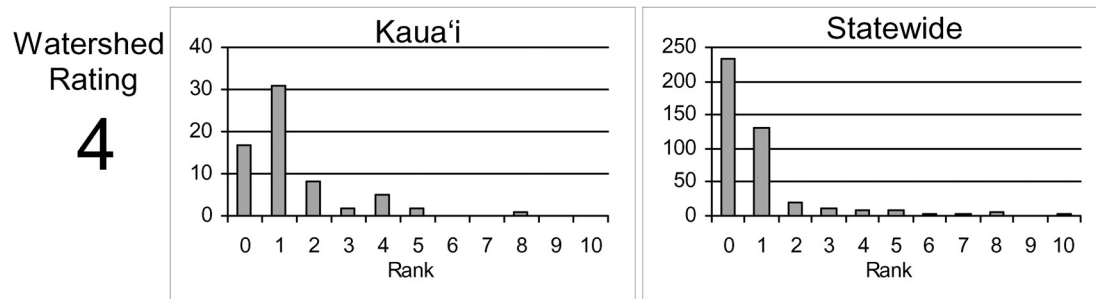
The current watershed and stream ratings are based on the data contained in the DAR Aquatic Surveys Database. The ratings provide the score for the individual watershed or stream, the distribution of ratings for that island, and the distribution of ratings statewide. This allows a better understanding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

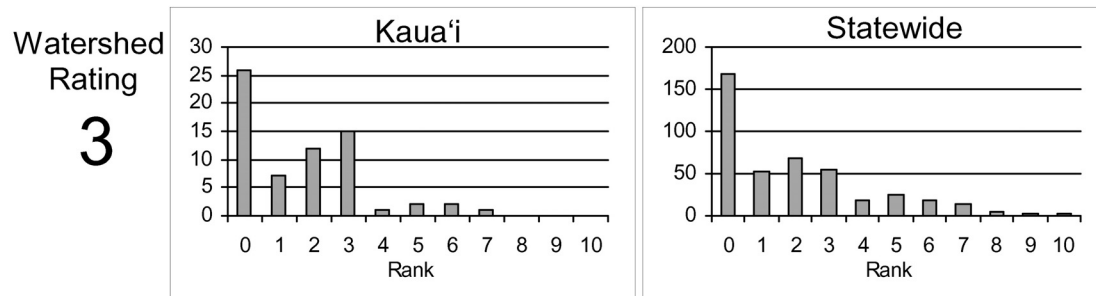
Land Cover Rating: Rating is based on a scoring system where in general forested lands score positively and developed lands score negatively.



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

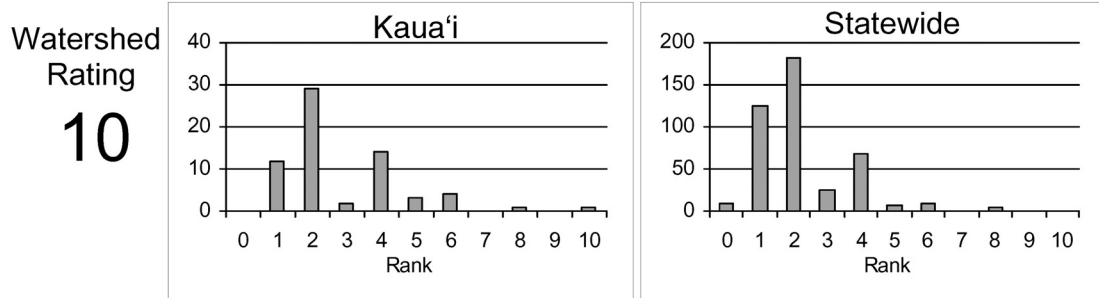


Stewardship Rating: Rating is based on a scoring system where higher levels of land and biodiversity protection within the watershed score positively.

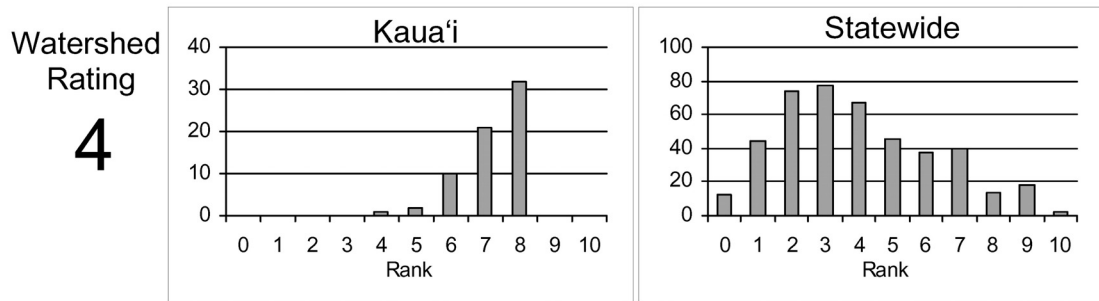


WATERSHED RATING (Cont): Waimea River, Kaua'i

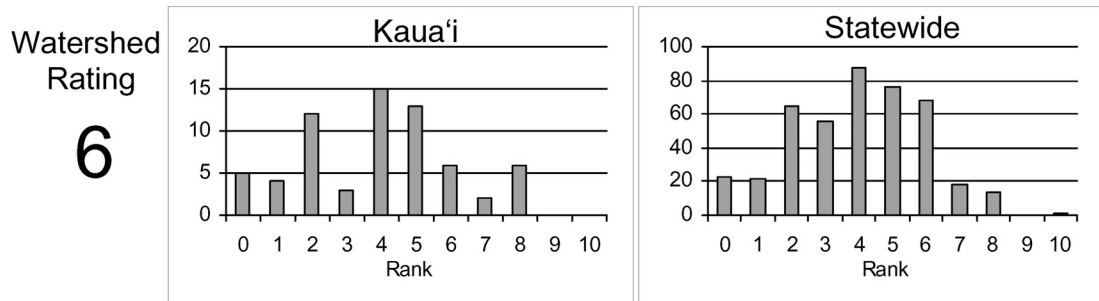
Size Rating: Rating is based on the watershed area and total stream length. Larger watersheds and streams score more positively.



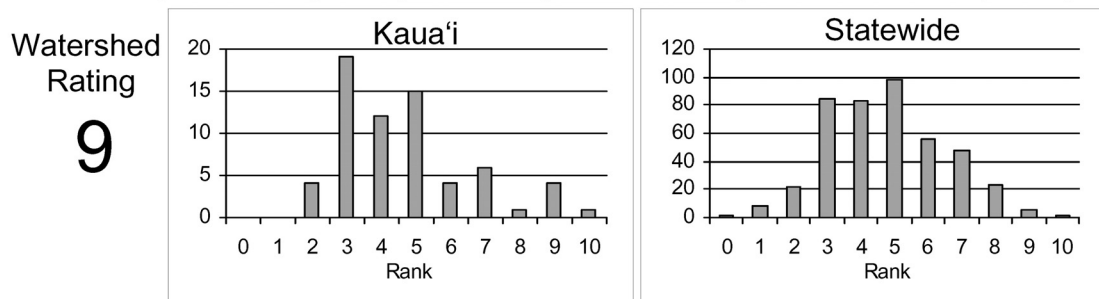
Wetness Rating: Rating is based on the average annual rainfall within the watershed. Higher rainfall totals score more positively.



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.



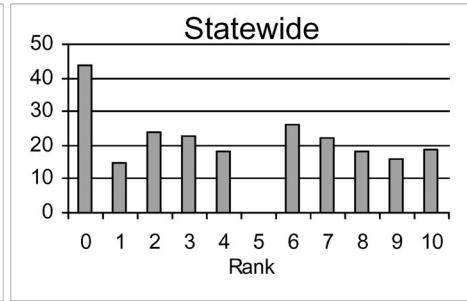
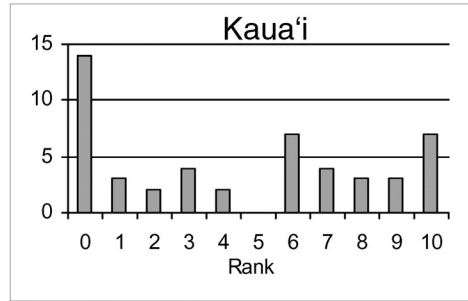
Total Watershed Rating: Rating is based on combination of Land Cover Rating, Shallow Waters Rating, Stewardship Rating, Size Rating, Wetness Rating, and Reach Diversity Rating.



BIOLOGICAL RATING: Waimea River, Kaua'i

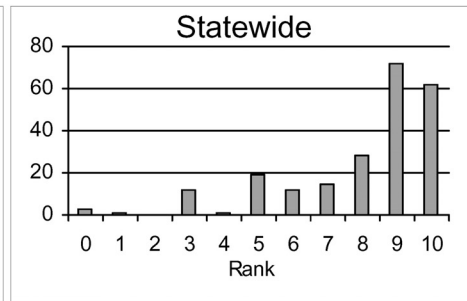
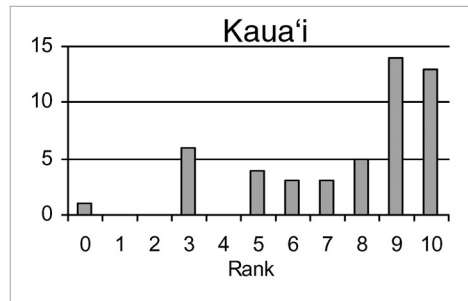
Native Species Rating: Rating is based on the number of native species observed in the watershed.

Stream Rating
10



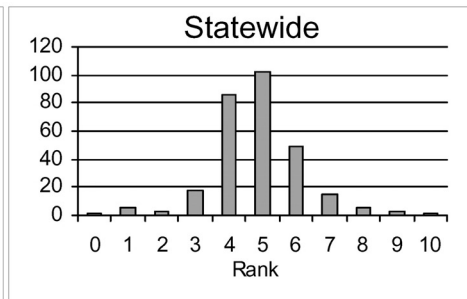
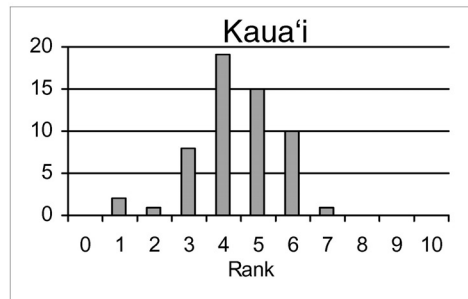
Introduced Genera Rating: Rating is based on the number of introduced genera observed in the watershed.

Stream Rating
3



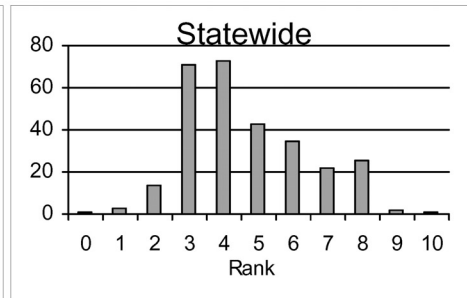
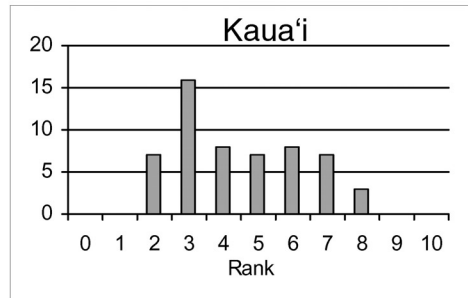
All Species' Score Rating: Rating is based on the Hawaii Stream Assessment scoring system where native species score positively and introduced species score negatively.

Stream Rating
7



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

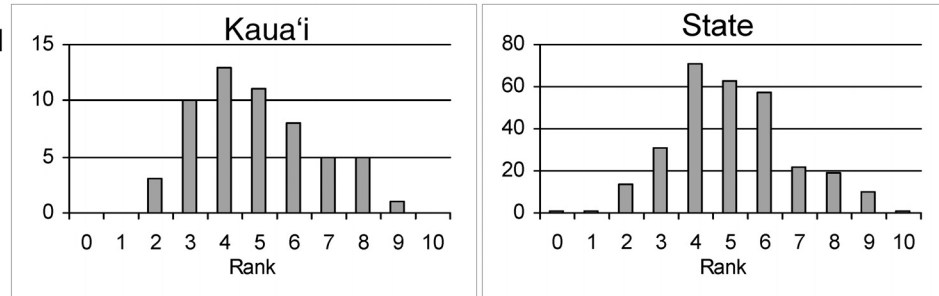
Stream Rating
6



OVERALL RATING: Waimea River, Kaua'i

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

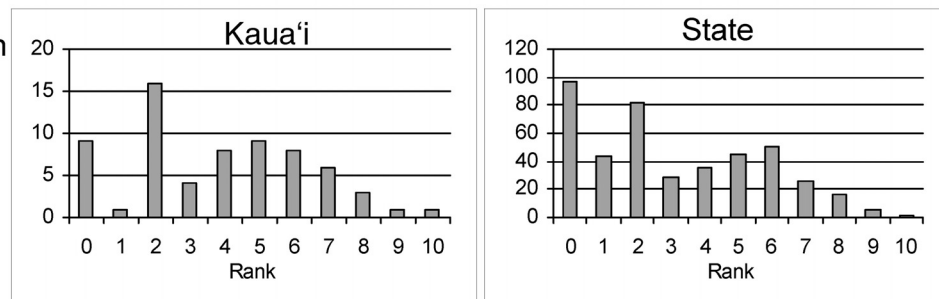
Watershed
Rating
8



RATING STRENGTH: Waimea 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
8



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