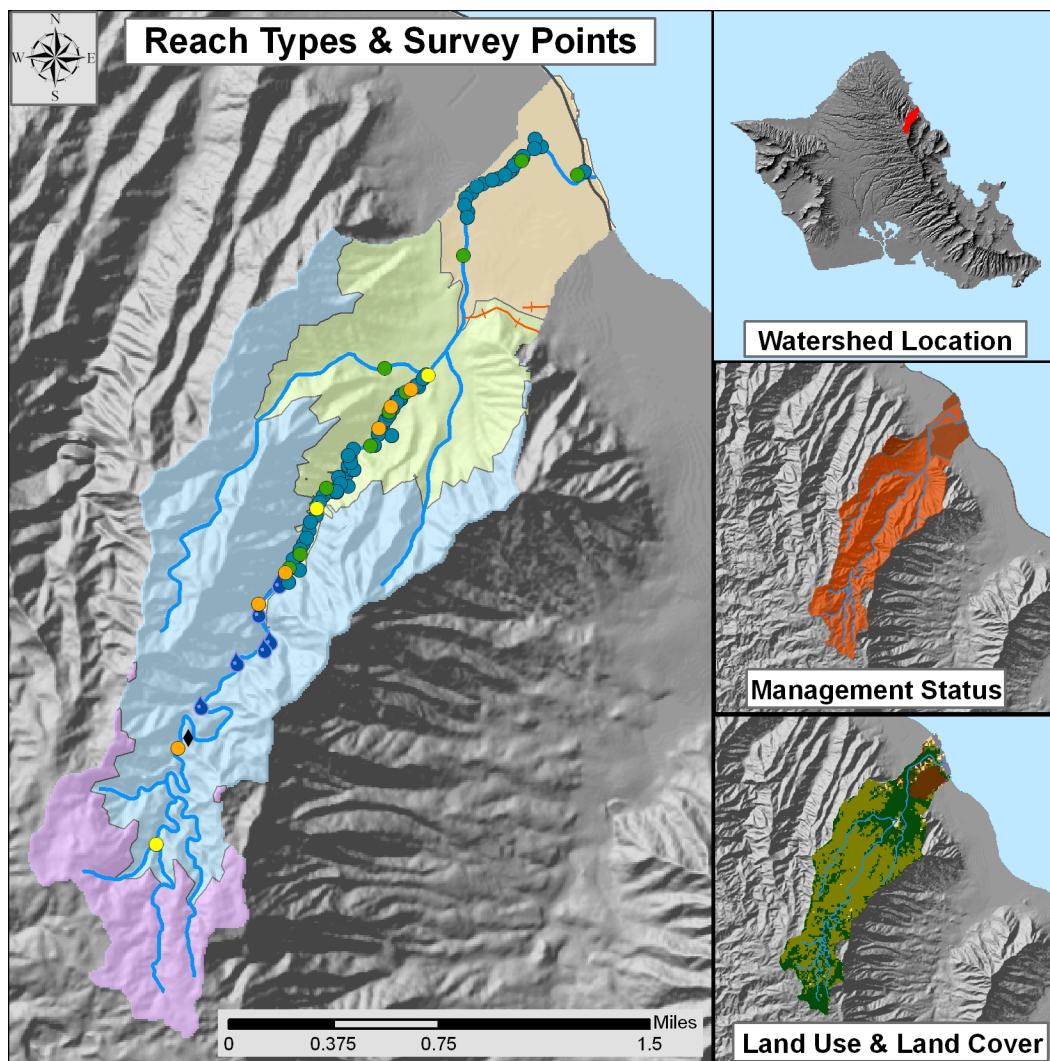


Kaluanui, O‘ahu



WATERSHED FEATURES

Kaluanui watershed occurs on the island of O‘ahu. The Hawaiian meaning of the name is “the big pit”. The area of the watershed is 2.4 square mi (6.1 square km), with maximum elevation of 2831 ft (863 m). The watershed's DAR cluster code is 5, meaning that the watershed is medium size, steep in the upper watershed, and with little embayment. The percent of the watershed in the different land use districts is as follows: 30.1% agricultural, 68.5% conservation, 0% rural, and 1.3% 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>
0.4	0.0	85.0	0.0	3.1	0.0	11.5

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	0.0	88.5	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	0.1	0.00	0.00
Low Intensity Developed	1.6	0.04	0.10
Cultivated	5.5	0.13	0.34
Grassland	1.2	0.03	0.07
Scrub/Shrub	55.1	1.30	3.37
Evergreen Forest	36.4	0.86	2.22
Palustrine Forested	0.0	0.00	0.00
Palustrine Scrub/Shrub	0.0	0.00	0.00
Palustrine Emergent	0.0	0.00	0.00
Estuarine Forested	0.0	0.00	0.00
Bare Land	0.0	0.00	0.00
Unconsolidated Shoreline	0.0	0.00	0.00
Water	0.0	0.00	0.00
Unclassified	0.0	0.00	0.00

STREAM FEATURES

Kaluanui is a perennial stream. Total stream length is 8.8 mi (14.2 km). The terminal stream order is 2.

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	12.3	28.7	48.8	10.2

The following stream(s) occur in the watershed:
Kaluanui

BIOTIC SAMPLING EFFORT

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

1929	1962	1978	1979	1980	1990	1992
1993	1999	2002	2003	2004		

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	3	2	1
DAR Larval Trapping	0	8	0	0	0
DAR Observation	0	1	7	0	0
DAR Point Quadrat	0	22	59	4	0
DAR Report	0	0	1	0	0
HDFG	0	0	5	1	0
Published Report	0	3	8	0	0
Unpublished Report	0	0	1	0	0

BIOTA INFORMATION

Species List

Native Species

Crustaceans	<i>Atyoida bisulcata</i>
	<i>Macrobrachium grandimanus</i>
	<i>Macrobrachium sp.</i>
Fish	<i>Awaous guamensis</i>
	<i>Eleotris sandwicensis</i>
	Gobiid sp.
	<i>Kuhlia sandvicensis</i>
	<i>Kuhlia sp.</i>
	<i>Kuhlia xenura</i>
	<i>Lentipes concolor</i>
	<i>Mugil cephalus</i>
	<i>Sicyopterus stimpsoni</i>
	<i>Stenogobius hawaiiensis</i>
Snails	<i>Ferrissia sharpi</i>
	<i>Neritina granosa</i>
Worms	Hirudinean sp.
	<i>Namalycastis abiuma</i>
	<i>Namalycastis sp.</i>
	<i>Oligochaete sp.</i>

Native Species

Insects	<i>Campsicnemus patellifer</i>
	<i>Campsicnemus sp.</i>
	<i>Collembola sp.</i>
	<i>Dasyhelea hawaiiensis</i>
	<i>Dasyhelea sp.</i>
	Empidid sp.
	Ephydrid sp.
	<i>Hemerodromia sp.</i>
	<i>Hydroptila sp.</i>
	<i>Hyposmocoma sp</i>
	<i>Limonia jacobus</i>
	<i>Limonia sp.</i>
	<i>Megalagrion hawaiiense</i>
	<i>Megalagrion nigrohamatum</i>
	<i>nigrolineatum</i>
	<i>Megalagrion oceanicum</i>
	<i>Megalagrion sp.</i>
	<i>Orthocladus sp.</i>
	<i>Procanace bifurcata</i>
	<i>Scatella cilipes</i>
	<i>Scatella clavipes</i>
	<i>Scatella hawaiiensis</i>
	<i>Scatella oahuense</i>
	Tipulid sp.

Introduced Species

Amphibians	<i>Bufo marinus</i>
	<i>Rana rugosa</i>
Crustaceans	<i>Macrobrachium lar</i>
	<i>Procambarus clarkii</i>

Introduced Species

Insects	<i>Cheumatopsyche analis</i>
	<i>Cheumatopsyche pettiti</i>
	Chironomid larvae
	<i>Chrysotus longipalpus</i>

Fish	<i>Channa maculata</i>	<i>Cricotopus bicinctus</i>
	<i>Clarias fuscus</i>	
	<i>Gambusia affinis</i>	
	<i>Misgurnus anguillicaudatus</i>	
	<i>Poecilia reticulata</i>	
	<i>Poecilia sphenops</i>	
	Poeciliid sp.	
	<i>Sarotherodon melanotheron</i>	
	<i>Tilapia</i> sp.	
	unidentified poeciliid	
	<i>Xiphophorus helleri</i>	
	<i>Xiphophorus</i> sp.	
Snails	<i>Tarebia granifera</i>	
	Thiarid sp.	

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>Macrobrachium grandimanus</i>	Endemic	1.5	1.5	1.5
<i>Macrobrachium lar</i>	Introduced	0.75	6	2.8
<i>Eleotris sandwicensis</i>	Endemic	3	3	3.0
<i>Kuhlia xenura</i>	Endemic	1.5	3	2.5
<i>Lentipes concolor</i>	Endemic	1	1	1.0
<i>Sicyopterus stimpsoni</i>	Endemic	1	2	1.5
<i>Stenogobius hawaiiensis</i>	Endemic	1.5	2.5	2.0
<i>Awaous guamensis</i>	Indigenous	0.75	5.5	2.7
<i>Kuhlia</i> sp.	Indigenous	1.25	4	3.2
<i>Gambusia affinis</i>	Introduced	0.25	1	0.6
<i>Poecilia sphenops</i>	Introduced	1.5	2.5	1.7
<i>Sarotherodon melanotheron</i>	Introduced	0.75	8	4.8
unidentified poeciliid	Introduced	2.5	2.5	2.5
<i>Xiphophorus helleri</i>	Introduced	1	3	2.0
<i>Neritina granosa</i>	Endemic	0.06	1.5	0.1
<i>Tarebia granifera</i>	Introduced	0.75	0.75	0.8

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			
<i>Kuhlia xenura</i>	Endemic		0.01			
<i>Lentipes concolor</i>	Endemic			0.04		
<i>Macrobrachium grandimanus</i>	Endemic		0			
<i>Neritina granosa</i>	Endemic			4.29		
<i>Sicyopterus stimpsoni</i>	Endemic			0.26		
<i>Stenogobius hawaiiensis</i>	Endemic		0			

<i>Awaous guamensis</i>	Indigenous		1.03	
<i>Kuhlia sp.</i>	Indigenous	0.09		
<i>Gambusia affinis</i>	Introduced	0		
<i>Macrobrachium lar</i>	Introduced	0	1.93	1.38
<i>Poecilia sphenops</i>	Introduced	0.03		
<i>Sarotherodon melanotheron</i>	Introduced	0.07		
unidentified poeciliid	Introduced	0		
<i>Xiphophorus helleri</i>	Introduced	0.02	0.47	

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	
<i>Macrobrachium grandimanus</i>	Endemic		P	P	P	
<i>Eleotris sandwicensis</i>	Endemic		P	P		
<i>Kuhlia xenura</i>	Endemic		P			
<i>Lentipes concolor</i>	Endemic		P	P		
<i>Sicyopterus stimpsoni</i>	Endemic		P	P		
<i>Stenogobius hawaiiensis</i>	Endemic		P			
<i>Megalagrion hawaiiense</i>	Endemic					P
<i>Megalagrion nigrohamatum</i> <i>nigrolineatum</i>	Endemic			P	P	
<i>Megalagrion oceanicum</i>	Endemic				P	
<i>Megalagrion sp.</i>	Endemic			P	P	
<i>Ferrissia sharpi</i>	Endemic			P		
<i>Neritina granosa</i>	Endemic			P	P	
<i>Awaous guamensis</i>	Indigenous		P	P		
Gobiid sp.	Indigenous			P	P	
<i>Kuhlia sandwicensis</i>	Indigenous		P			
<i>Kuhlia sp.</i>	Indigenous		P			
<i>Mugil cephalus</i>	Indigenous		P			
<i>Limonia sp.</i>	Indigenous			P		
<i>Namalycastis sp.</i>	Indigenous			P		
<i>Bufo marinus</i>	Introduced		P	P		
<i>Rana rugosa</i>	Introduced		P			
<i>Macrobrachium lar</i>	Introduced		P	P	P	
<i>Procambarus clarkii</i>	Introduced		P			
<i>Clarias fuscus</i>	Introduced		P	P		
<i>Gambusia affinis</i>	Introduced		P			
<i>Misgurnus anguillicaudatus</i>	Introduced		P			
<i>Poecilia reticulata</i>	Introduced		P	P		
<i>Poecilia sphenops</i>	Introduced		P			
Poeciliid sp.	Introduced			P		

<i>Sarotherodon melanotheron</i>	Introduced	P	
<i>Tilapia sp.</i>	Introduced	P	
unidentified poeciliid	Introduced	P	
<i>Xiphophorus helleri</i>	Introduced	P	P
<i>Xiphophorus sp.</i>	Introduced		P
<i>Cheumatopsyche analis</i>	Introduced	P	P
Chironomid larvae	Introduced	P	P
<i>Cricotopus bicinctus</i>	Introduced		P
<i>Tarebia granifera</i>	Introduced	P	
Thiarid sp.	Introduced		P
Empidid sp.	Undetermined		P
Ephydrid sp.	Undetermined		P
<i>Hydroptila sp.</i>	Undetermined		P
Tipulid sp.	Undetermined	P	
Hirudinean sp.	Undetermined		P
<i>Oligochaete sp.</i>	Undetermined		P
<i>Macrobrachium sp.</i>	Unknown	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): Yes

Hawaii Stream Assessment Rank (1990): Outstanding

U.S. Fish and Wildlife Service High Quality Stream (1988): No

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.

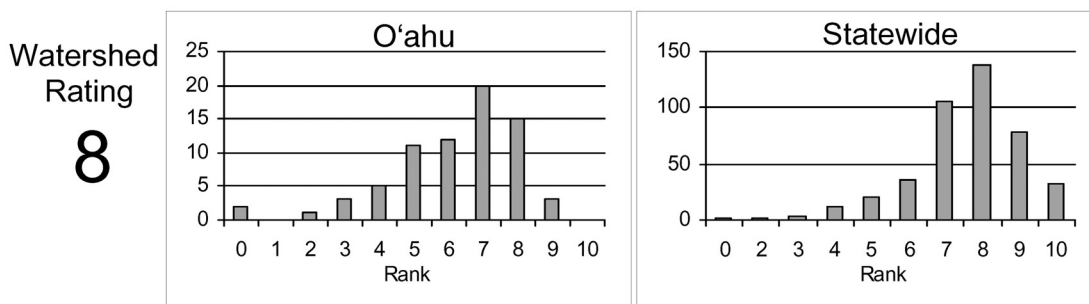
Native Insect Diversity <u>> 19 spp.</u>	Native Macrofauna <u>Diversity > 5 spp.</u>	Absence of Priority 1 <u>Introduced</u>
No	Yes	No
Abundance of Any <u>Native Species</u>	Presence of Candidate <u>Endangered Species</u>	Endangered Newcomb's <u>Snail Habitat</u>
No	Yes	No

CURRENT WATERSHED AND STREAM RATINGS

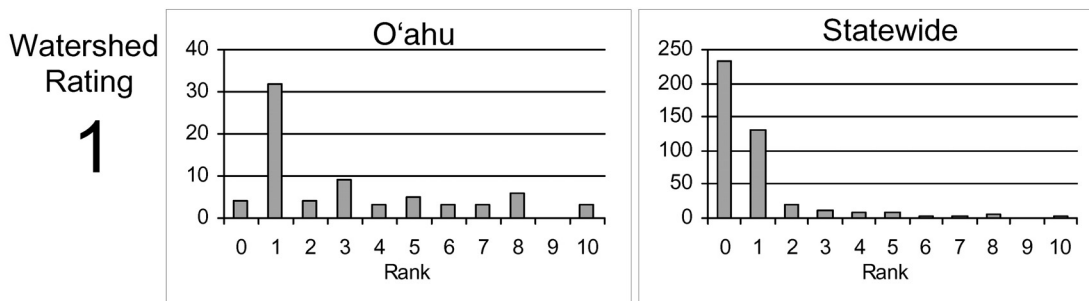
The current watershed and stream ratings are based on the data contained in the DAR Aquatic Surveys Database. The ratings provide the score for the individual watershed or stream, the distribution of ratings for that island, and the distribution of ratings statewide. This allows a better understanding 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: Kaluanui, O‘ahu

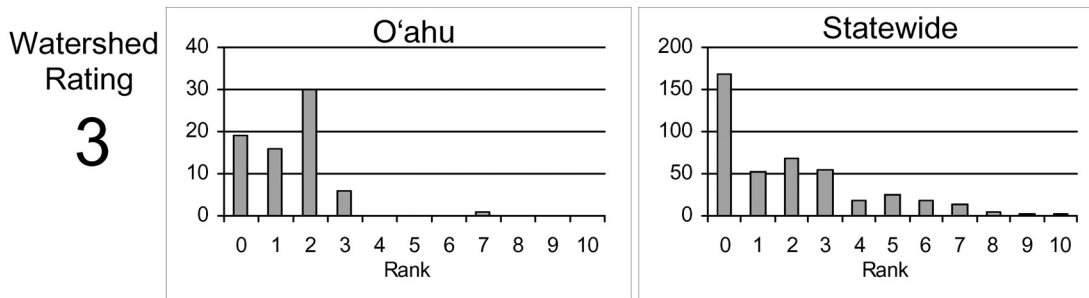
Land Cover Rating: Rating is based on a scoring system where in general forested lands score positively and developed lands score negatively.



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



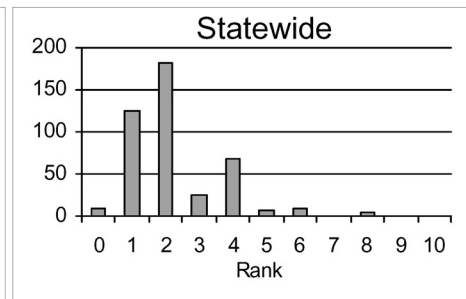
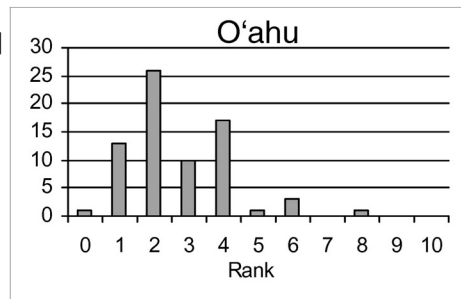
Stewardship Rating: Rating is based on a scoring system where higher levels of land and biodiversity protection within the watershed score positively.



WATERSHED RATING (Cont): Kaluanui, O'ahu

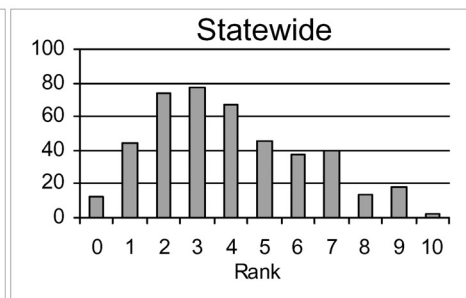
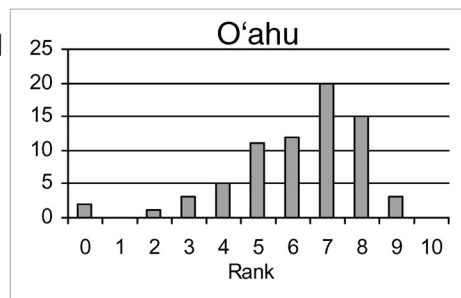
Size Rating: Rating is based on the watershed area and total stream length. Larger watersheds and streams score more positively.

Watershed
Rating
2



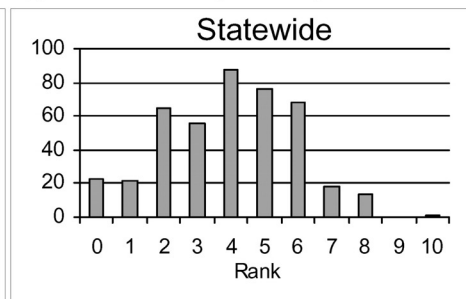
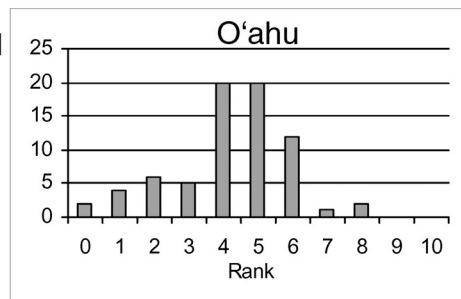
Wetness Rating: Rating is based on the average annual rainfall within the watershed. Higher rainfall totals score more positively.

Watershed
Rating
6



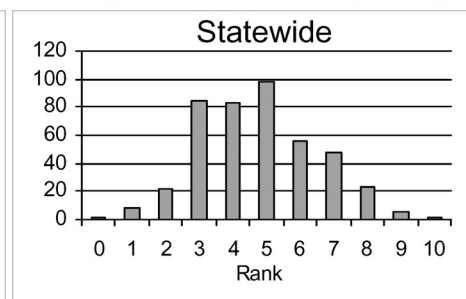
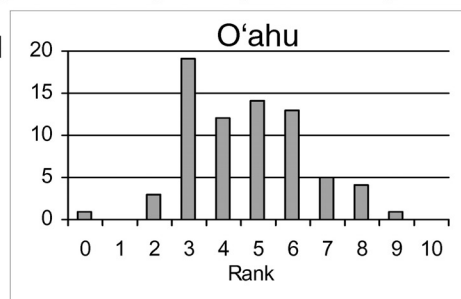
Reach Diversity Rating: Rating is based on the types and amounts of different stream reaches available in the watershed. More area in different reach types score more positively.

Watershed
Rating
6



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.

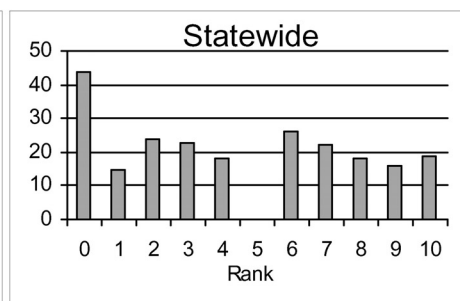
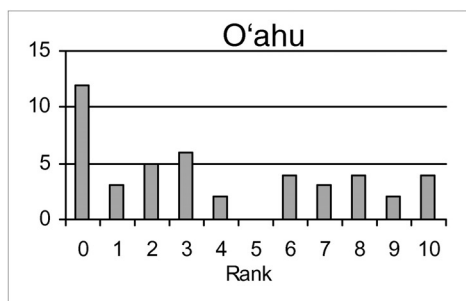
Watershed
Rating
6



BIOLOGICAL RATING: Kaluanui, O'ahu

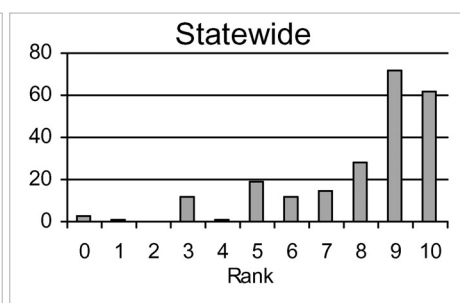
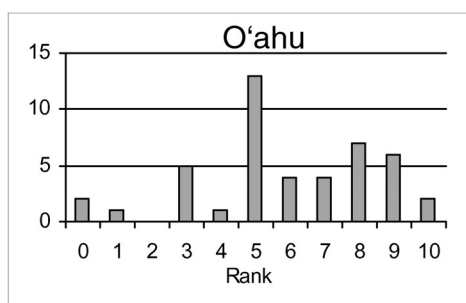
Native Species Rating: Rating is based on the number of native species observed in the watershed.

Stream
Rating
10



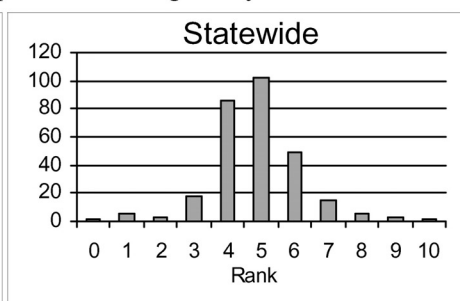
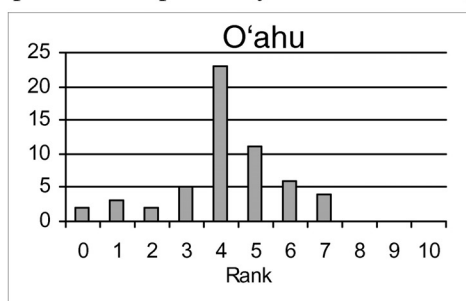
Introduced Genera Rating: Rating is based on the number of introduced genera observed in the watershed.

Stream
Rating
3



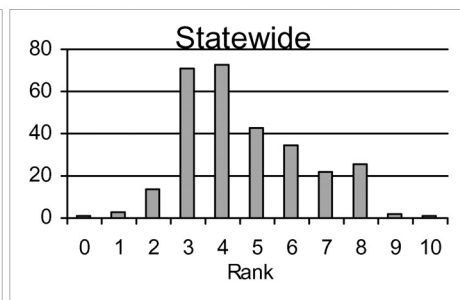
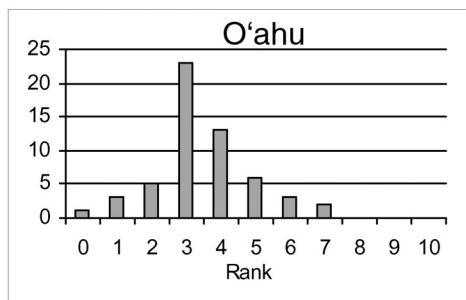
All Species' Score Rating: Rating is based on the Hawaii Stream Assessment scoring system where native species score positively and introduced species score negatively.

Stream
Rating
6



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

Stream
Rating
6

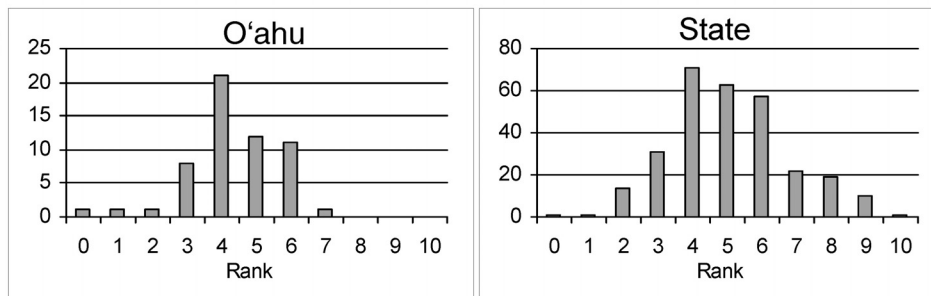


OVERALL RATING: Kaluanui, O‘ahu

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

Watershed
Rating

6

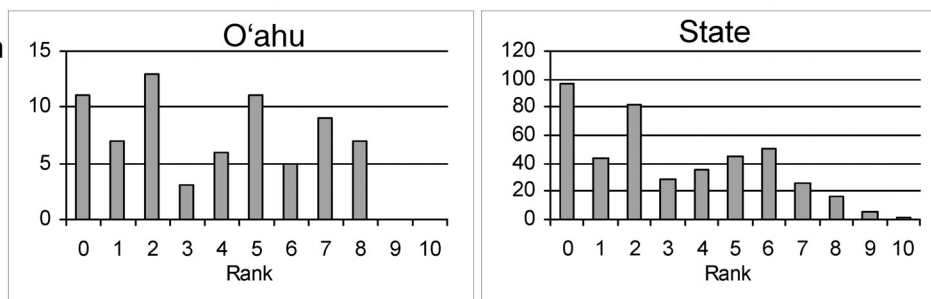


RATING STRENGTH: Kaluanui, O‘ahu

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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