USER'S MANUAL

FOR THE

CALIFORNIA WILDLIFE HABITAT RELATIONSHIPS SYSTEM

AND BIOVIEW

VERSION 9.0

Recommended Citation for CWHR Version 9.0:

California Department of Fish and Wildlife. California Interagency Wildlife Task Group. 2014. CWHR Version 9.0 personal computer program. Sacramento, California.

Recommended Citation for User's Manual:

California Department of Fish and Wildlife. California Interagency Wildlife Task Group. 2014. User's manual for version 9.0 of the California Wildlife Habitat Relationships System and BioView. Sacramento, California.

User's Manual Contributors (alphabetically):

Joel Boros Philip Eagleson Barrett A. Garrison Melanie Gogol-Prokurat Terry A. Giles Stacie L. Hooper Robert J. Laacke Rose Leonard Monica D. Parisi Karyn J. Sernka

<u>Contact</u>: CWHR Coordinator Biogeographic Data Branch California Department of Fish and Wildlife CWHR@wildlife.ca.gov

Last updated 9/19/2018

Contents

INTRODUCTION	
INSTALLATION	
Uninstalling the program	
STARTING THE PROGRAM	5
Main Menu	5
SPECIES INFORMATION WINDOW (Species Info tab)	6
Selecting a Species	7
Activity/Status Information	
Subspecies Range Maps	
Habitat Suitability Information	9
Location Information	
Life History and Range Map	
Element Information by Species	
SINGLE CONDITION QUERY	15
Overview	15
Location	16
Habitats	
Habitat Stages	
Elements	
Species	20
Special Status	21
Seasonality	22
Run Query	23
Save query	23
Reports	24
ERRORS	26
TWO CONDITION QUERY	
Species Comparison Report	
Habitat Value Comparison Report	
Weighted Habitat Value Comparison Report	
Habitat Summary	
Crosswalks	
Habitat Descriptions	
Classification Rules	
	2

Opening Bioview	
Configuring Your Data for Bioview	
Create/Edit Habitat Data File	41
Running Bioview	43
Select Species	
Bioview Reports	45
Displaying Output Data from Bioview using GIS	46
LITERATURE CITED	48
DEFINITIONS	
Activity Codes	
Calculation Methods for Average Habitat Suitability Value	49
Element Importance Ratings	
Habitat Suitability Levels	
Harvest Species	50
APPENDIX A: CWHR Habitat Codes	51
Habitat Stages (size and cover classes)	51
Habitat Size Classes	51
Habitat Cover Classes	51
CWHR Habitat Names	52
Discontinued Types	53
Using Numeric Values with the Fuzzy Logic Option	53
APPENDIX B: FUZZY LOGIC AND ITS APPLICATION TO CWHR	54

INTRODUCTION

The California Wildlife Habitat Relationships System (CWHR) is a comprehensive information system on California's wildlife. The CWHR System contains life history, habitat relationships and management information for 712 species of amphibians, reptiles, birds and mammals that are considered to be regularly occurring in California. Bioview was originally developed by the US Forest Service Pacific Southwest Research Station (PSW) as a stand-alone computer application utilizing the databases of CWHR to translate habitat suitability ratings for wildlife species into data that can be used in a Geographic Information System (GIS) for spatial and temporal analysis. The two applications have now been integrated so that the user can take maximum advantage of both.

This manual supports Version 9.0 of the CWHR database and Bioview. It is relatively brief and deals specifically with these software applications. Additional information on all aspects of the CWHR System can be gathered from a CWHR training course or from the website: <u>https://www.wildlife.ca.gov/Data/CWHR</u>.

The CWHR software application (Version 9.0) has been reprogrammed to make it compatible with 64 bit operating systems such as Windows 7. The interface has also been altered to be more user-friendly and intuitive, while preserving the structure and functionality. All queries and reports from previous versions are still present in 9.0, with the exception of the Species by Element report. The information that goes into this report is still available through the Element Information window.

CWHR now links dynamically with online content from the Department of Fish and Wildlife, such as range maps, life history accounts, and habitat descriptions from California's Guide to Wildlife Habitats (Mayer and Laudenslayer, eds., 1988). If no internet connection is present, CWHR will still run and will perform queries, but online content will not be accessible. The new application will also check the online source for any updates, and automatically prompt the user to download the latest version. This will allow us to continuously release updates to the model, rather than compiling updates to release all at once every few years.

Users can now save the query results as a PDF for reports, or as a spreadsheet (.csv format) for further analysis. Reports now include all the query parameters that were used, making verification, replication, and comparison of outputs easier. There is no longer a limit to the number of habitat types and stages that can be included in a single query.

INSTALLATION

CWHR Version 9.0 with Bioview (hereinafter collectively referred to as CWHR) can be downloaded from the CWHR website (<u>https://www.wildlife.ca.gov/Conservation/CWHR/Registration</u>). The user is required to register prior to downloading the application. Unzip CWHR 9.0.zip. Open the resulting folder 'CWHR 9.0' and run 'setup.exe'. This will install CWHR to a new directory under the 'All Programs' menu called 'California Department of Fish and Wildlife'¹. Once the installation has completed, CWHR will automatically launch.

Uninstalling the program

To uninstall CWHR, click on the Start Menu and select 'Control Panel' then 'Programs and Features' and 'California Wildlife Habitat Relationships'. Choose 'Uninstall'. For Windows 7, click on the Start Menu and select 'Control Panel' then under 'Programs' chose 'Uninstall a program'. For Windows 8, hover the cursor in the bottom-left corner of the screen until a small image of the Start Screen appears, then right-click on the icon to open the Start Context Menu, select Programs and Features, select the CWHR program and press 'Uninstall/Change' button to uninstall.

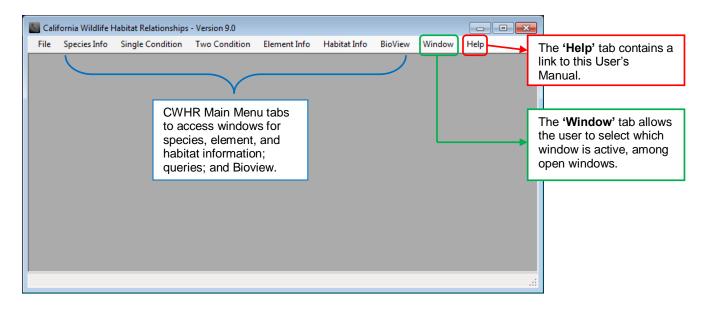
¹ In order to install properly, you may be required to remove older versions of CWHR from your computer. Follow the instructions for uninstalling the program at the end of this section, and then install the new version.

STARTING THE PROGRAM

Click on the Start Menu \rightarrow All Programs \rightarrow California Department of Fish and Wildlife \rightarrow California Wildlife Habitat Relationships. Clicking on this will launch CWHR 9.0.

Main Menu

The main menu window of CWHR contains tabs to open windows containing species, element, and habitat information; queries; and Bioview. Each of these tabs will open a new window, and multiple windows can be open at once. Detailed descriptions of how to use each window are contained in this User's Manual.



SPECIES IN	FORMATION WINDOW (Species Info tab)
California Wildlife Habitat Relationships - Ve File Species Info Single Condition Tw	rsion 9.0 🕞 🗐 💽 🐨 🕞
Species Information	
Common Name CWHR ID CNDDB ID Search Results	Acconn woodpecker AFRICAN CLAWED FROG AGILE KANGAROO RAT ALDER FLYCATCHER ALLENS HUMMINGBIRD ALPINE CHIPMUNK AMERICAN BADGER AMERICAN BADGER AMERICAN BEAVER AMERICAN BITTERN AMERICAN BILLEROG Taxonomic Alphabetic Scientific
ABERT'S TOWHEE Melozone aberti CWHR ID: B485 CNDDB ID: ABPBX74050	Activity/Status Life History Generate Report Habitat Suitability Bements Full Species List Locations Click here for a list of all vertebrates (except fish) known to occur in California
ncludes taxonomy, life history attr elements, and habitat suitability va or each modeled species: Activity and Range Map. These can be vie species list for the entire state, wh	an retrieve all available information about a species in the CWHR database. This butes, legal status ² , geographic distribution, seasonality, ratings for special habitat lues for all size and cover classes of CWHR habitat types. Six reports are available /Status, Locations (in list form by region), Habitat Suitability, Elements, Life History, wed within the program or exported to .pdf using the 'generate report' button. A ch includes all species that occur in the state whether or not they are modeled in this window using the 'Full Species List' button.

² Note that the legal status listed in CWHR may not reflect recent changes in status. Please refer to the CDFW list of <u>STATE &</u> <u>FEDERALLY LISTED ENDANGERED & THREATENED ANIMALS OF CALIFORNIA</u> or the CDFW <u>SPECIAL ANIMALS</u> list for the current status of a species.

Selecting a Species

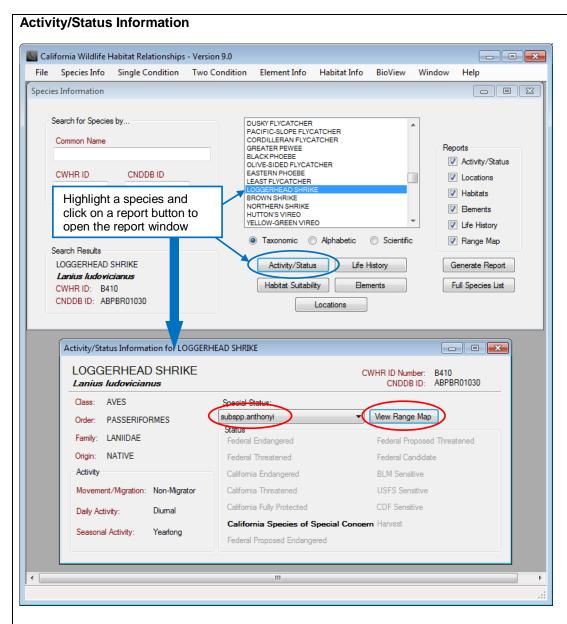
You may select a species by entering its CWHR ID code, common name, scientific name, or CNDDB ID (same as the Natureserve code for most species) in the appropriate box. Common names are those from lists of accepted taxonomy such as that from the American Ornithologist's Union (AOU) for birds. Choose the "Scientific" option below the names list to select by scientific name. Begin typing in the name field and the list will be reduced to names containing that combination of letters.

Sealifornia Wildlife Habitat Relationships - Version 9.0		
File Species Info Single Condition Two Conditio	n Element Info Habitat Info BioView	Window Help
Species Information Search for Species by Common Name BIG CWHR ID BIG CWHR ID BIG BIG BIG BIG BIG BIG BIG BIG	BIG BROWN BAT TOWNSEND'S BIG-EARED BAT BIG FREE-TAILED BAT BIG-EARED WOODRAT BIGHORN SHEEP	Reports Image: Conservation of the second
Search Results BIG BROWN BAT <i>Eptesicus fuscus</i> CWHR ID: M032 CNDDB ID: AMACC04010	 Taxonomic Alphabetic Scientific Activity/Status Life History Habitat Suitability Elements Locations 	Range Map Generate Report Full Species List

You can also scroll through the complete CWHR species list to select a species. The list can be ordered (1) taxonomically (grouped by family), (2) alphabetically by common name, or (3) alphabetically by scientific name.

California Wildlife Habitat Relationships - Version 9.	0	_ • •
File Species Info Single Condition Two Cond	dition Element Info Habitat Info BioView W	/indow Help
Species Information	Scroll throug	yh the
Search for Species by Scientific Name CWHR ID CNDDB ID Select sort order of species list	Cardellina canadensis Cardellina pusifia Cardellina pusifions Cardinalis cardinalis Cardinalis sinutus Cardinalis sinutus Carbarta caratta Carbordacus erythrinus Castor canadensis Catharus fuscescens Catharus guttatus Catharus guttatus Catharus minimus Catharus ustulatus	Reports ✓ Activity/Status ✓ Locations ✓ Habitats ✓ Bements ✓ Life History
Search Results LOGGERHEAD SEA TURTLE Caretta caretta CWHR ID: R081 CNDDB ID: ABAAA01010 Limited information is av are not modeled in CWH		Range Map Generate Report Full Species List

Use the left mouse button to select the name of the desired species and view the report windows described below. For species that are not currently modeled in CWHR, detailed information is not available; only the common and scientific names, CWHR ID code, and CNDDB ID will be displayed in the **Search Results** box on the lower left.



After selecting a species, click the 'Activity/Status' button. A new window will open displaying the accepted common and scientific names, class, order, family, CWHR ID number and CNDDB ID of the selected species. Legal status is also displayed at the specific and subspecific level. The status of the species or of a selected subspecies is displayed in bold when its name is highlighted by the mouse in the **Special Status** list (statuses that do not apply to the species are grayed out). The window also displays the species' patterns for migration, daily activity and seasonal activity.

Definitions for legal status and activity codes can be viewed by clicking the left mouse button when the mouse arrow is over the status or code of interest. Note that the legal status listed in CWHR may not reflect recent changes in status. Please refer to the CDFW list of <u>STATE & FEDERALLY LISTED ENDANGERED & THREATENED ANIMALS OF CALIFORNIA</u> or the CDFW <u>SPECIAL ANIMALS</u> list for the current status of a species. Amphibians and reptiles designated as Harvest species in CWHR are those species that are non-native and can be collected with no limit under a fishing license. See the <u>California Code of Regulations, Title 14</u>, Sections 5.05 and 5.60 for a full list of Harvest amphibians and reptiles.

Subspecies Range Maps

Subspecies range maps are currently available for some subspecies, and the CWHR is working to continue the development of subspecies range maps. If a subspecies range map is available, the 'View Range Map' button will become active within the Activity/Status Information window when the subspecies is selected. Click on the 'View Range Map' button to open a .pdf map of the subspecies range. If no subspecies range is available, the 'View Range Map' button will be grayed out.

e Species Info Single Condition	Two Condition	Element Info	Habitat Ir	nfo B	lioView	Window
itat Suitability Information for BIGHO	ORN SHEEP					
BIGHORN SHEEP Dvis canadensis				ID Numl CNDDB		83 IALE04010
uitable Habitats	Size and Stage	Classes	Rep.	Cov.	Feed	Suit. Value
LKALI DESERT SCRUB	1 Seedling Sh	rub	М	М	М	0.66
DESERT RIPARIAN DESERT SCRUB	2S Young Sh	rub Sparse	М	М	м	0.66
ESERT SUCCULENT SHRUB	2P Young Sh	rub Open	м	М	м	0.66
ESERT WASH	2M Young Sh	rub Moderate	М	М	М	0.66
	3S Mature Sh	rub Sparse	М	М	М	0.66
	3P Mature Sh	rub Open	М	М	М	0.66
	3M Mature Sł	rub Moderate	М	М	М	0.66
	4S Decadent	Shrub Sparse	М	М	М	0.66
Calculation Method	4P Decadent	Shrub Open	М	М	М	0.66
Arithmetic	4M Decadent	Shrub Moderate	М	М	М	0.66
Calculation Scope						
Include all available classes						
Include only classes with ratings						
Include only classes with fatings						
		Arithme	etic Average	Suitabili	ity Value:	0.66
			ale Average	Juitabili	ly value.	0.00

Select the **'Habitat Suitability'** report button in the Species Information Window to view the habitat suitability window. Suitable habitats for the species are displayed in the **Suitable Habitats** list. When a habitat is highlighted, the suitability ratings (H=High, M=Medium, L=Low, blank=Unsuitable) for reproduction (Rep.), cover (Cov.), and feeding (Feed) are listed for each stage. An average habitat suitability value (Suit. Value) is also calculated for each size and stage class using <u>arithmetic or geometric mean</u> based on numeric scores for the suitability ratings (H=1.00, M=0.66, L=0.33, none=0.00). An overall Average Suitability Value is calculated for the type across all size and stage classes in the bottom right corner of the window. Average habitat suitability for the type can be calculated using (1) all available classes (both occupied and unoccupied stages) or (2) only classes with ratings (occupied stages only). Choose which habitats you would like included in the average habitat suitability score by selecting the appropriate button in the "Calculation Scope" box.

More information on the habitat types can be found in the Habitat Info tab on the main menu.

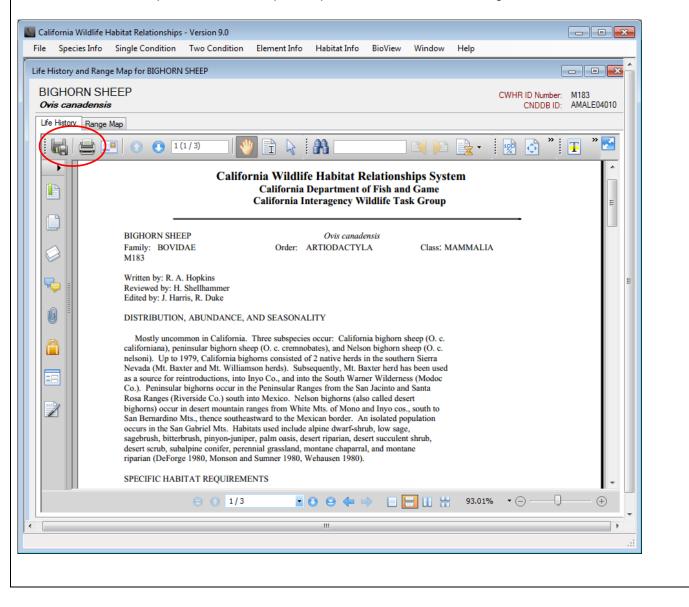
Species Info Single Condition	Version 9.0		×
Species Info Single Condition	Two Condition Element Info Habitat Info	o BioView Win	dow
ation Information for BIGHORN SHEEP) Â
IGHORN SHEEP <i>Instant Constant State</i> <i>Instant Constant State</i>	CWHR ID Numb CNDDB		E
ocation options	Location	Season 🔶	
Counties	CENTRAL CALIFORNIA COAST RANGES	Yearlong	
0	COLORADO DESERT	Yearlong	
USDA Ecoregions (CIWTG Endorsed)	MODOC PLATEAU	Yearlong 🗧	
_ ,	MOJAVE DESERT	Yearlong	
Cal Water Hydrologic Regions	MONO	Yearlong	
	NORTHWESTERN BASIN AND RANGE	Yearlong	
USES National Forests	SIERRA NEVADA SIERRA NEVADA FOOTHILLS	Yearlong Yearlong	
	SONORAN DESERT	Vandana	
	Sononvin Desent	reationg 🚽	

Select the 'Locations' report button in the Species Information Window to view the Location Information Window. This window displays locations where the species is predicted to occur in California based on the species CWHR range maps. Location categories include counties, USDA Ecoregions, CALWATER Hydrologic Regions, and USFS National Forests. The seasonality pattern is given for each location. To alternate between location categories, select from the Location Options buttons.

Life History and Range Map

Select the 'Life History' report button in the Species Information Window to view an online pdf with the life history description and species range map. Note that you must be connected to the internet to access the life history accounts and range maps.

The life history account is based on notes taken from Volumes I (Amphibians and Reptiles) (Zeiner et al. 1988), II (Birds) (Zeiner et al. 1990a), or III (Mammals) (Zeiner et al. 1990b) of "*California's wildlife*". Many of these accounts have not been updated since their original publication. However, information on taxonomy and management status is updated by the CWHR staff as resources allow or as new models are developed. You can save or print the pdf from within the CWHR viewing window.



File Spee Life History	Wildlife Habitat Relationship cies Info Single Condition and Range Map for BIGHOR	Two Condition Element Inf	o Habitat Info	BioView Win	dow Help			
Ovis ca	DRN SHEEP nadensis Range Map					CWHR ID Num CNDDE	ber: M183 BID: AMALE04010	
		.(1/1)	A) D D		I 📮 🗹	
		Calife	rnia Wildlife Habitat F California Department o California Interagency Wi	f Fish and Game	n Bighorn Sheep Ovis canadersis			
					Ovis canadensis Mi 83			
							E	
		Wink: Range Simme Range Simme Range Warking Range √ Quorty Boundates Waler Toolsis Congreat Mage: Zohner et al. (1985-1990) Revision Halory: S Tomes (1995) T Skephenson (2008)						
		Range maps are based on available or Ukless otherwise noted allowe, maps 1988-1990, California's Widtlick. Vo that have been added or edited since	cearrence data and professional knowle were originally published in Zeiner, D. 1-III. California Depart. of Fish and G ariginal publication.	dge. They represent current, but C., WF. Luudenslayer, Jr., K.E. M anne, Sacramento, California. Up	nothistoric or potential, range. layer, and M. White, eds. dates are noted in maps			
				💠 🔿 📘		50.19% ▼ (_)[]	······································	
							 ♦ In 	

The range map tab contains the range map for the species. You can zoom, print, or save the pdf file from the CWHR viewing window. Range maps for subspecies, if available, can be accessed from within the <u>Activity/Status Information Window</u>.

The GIS shapefiles of species ranges can be downloaded as a bundle from the website at https://www.wildlife.ca.gov/Conservation/CWHR/Registration (the user is required to register before downloading the data). They can also be downloaded individually in the BIOS Viewer, https://map.dfg.ca.gov/bios/.

Element Information by Species

Select the 'Elements' report button in the Species Information Window to open the Element Information by Species list: habitat elements predicted by CWHR to be used by the species for reproduction, cover, and feeding. Click on any element in the list to highlight it, and its definition will be displayed in the Element Definition box at the bottom of the window. The number in parenthesis next to the word "Elements" in the top left corner of the window shows the number of elements listed.

Elements are given one of the following ratings based on their importance to the species and their level of use:

E=Essential: The element must be present for the species to be present.

S=Secondarily Essential: The element must be present within the home range of the species for the species to be present unless it is compensated by the presence of another secondarily essential element that serves the same function to the species.
 P=Preferred: The element is used by the species to a greater degree than what would be expected from its abundance; the element enhances the value of the habitat, but is not essential for the species presence.
 Not listed=Not Rated

The definition of each importance level can also be found by clicking on the name of that level in the **Importance Level Definitions** box at the bottom of the window.

S Califor	nia Wildlife H	labitat Relationships	s - Version 9.0			[• ×
File S	pecies Info	Single Condition	Two Condition	Elem	ent Info	Habita	t Info	
Element I	Information f	or BIGHORN SHEEP	•					
	IORN SH			C	WHR ID N CND	umber: DB ID:		E04010
	Elements ((22)		Repro	Cover	Feedin	g 🔺	
	ACORNS					Р		
	BARREN			E	E			
	BERRIES					Р		
	CLIFF							
	FORBS					E	=	
	FRUITS					Р		
	GRAMINO			_	_	E		
		HERBACEOUS		P	P	E		
	LAYER - S	HRUB		P	P	Р		
	MINE ROCK			P S	P			
	ROOTS			5	5	Р		
	SHRUB/G	DACC		Р	Р	P		
	SHRUBS	11/1.3.3				E		
	SPRINGS					S	-	
			Importance Le			-		
			importance Le		Elements		•	
	Element D							
	Areas with	in a vegetation domina	ated habitat that are o	devoid of	f vegetatior	1.		
	Importanc	e Level Definitions						
	<u>E - Es</u>	sential	S - Secondary		<u>P - Pref</u>	erred		
•		III						+
								.:

ement In		for BIGHORN S	tion Two Conditio HEEP	n cieme	ent Info	Habita	
	ORN SH In adensis			CI	WHR ID N CND		M183 AMALE04010
	Elements	(5)		Repro	Cover	Feeding	
	BARREN	Ŭ		E	E	_	
	FORBS GRAMINO	פחומ				E	
		HERBACEOUS		Р	Р	E	
	SHRUBS					Е	
	L		Importance	Level Ea	sential Eler	marta	
)_{-{}-1'	importance	Level, Es:	sential ciel	nents	
	- Element D	Jefinition					
	Importanc	e Level Definitio	ns				
	<u>E - E</u> s	ssential	<u>S - Secondary</u>		P - Pref	ferred	
		1	!!				۱.

By default, all elements with suitability are shown in the list. To show only elements with a specific importance level, select the importance level of interest in the **Importance Level** drop-down list directly below the table. The number in parenthesis next to the word "Elements" in the top left corner of the window shows the number of elements rated at the suitability level selected.

More information on Elements can be found in the <u>Element Info</u> tab in the main menu.

SINGLE CONDITION QUERY

Overview

The Single Condition Query option produces a list of wildlife species predicted to occur in a single habitat situation defined by the user. Open the single condition query window by clicking on the "Single Condition" tab. A query window opens with 8 tabs allowing the user to define the query based on location, habitats, habitat stages, elements, species, special status, and seasonality. Each tab represents an opportunity to restrict the query based upon that query parameter. If the user skips a tab and nothing is selected, the query will not be constrained for that parameter type. For example, if no locations are selected, the query will not be constrained by location. All locations throughout the state will be considered. If no special status categories are selected, the query will not be restricted be species status. All species, including those with special status, will be considered.

The user can define the query using any or all of these tabs, or load a previously saved query by using the "Load Query" button in the "Run Query" tab. Loading a previously saved query will modify the selections in each tab according to the query parameters of the saved query. The user then has the option to further modify the query parameters in the tabs before running the query.

California Wildlife Habitat Relationships - Version 9.0	- • •
File Species Info Single Condition Two Condition Element Info Habitat Info BioView W	Window Help
Single Condition Query	
Report Type Summary Summary Detailed	
Cancel	
Load/Save Query Load Query Save Query	
Back	

Two types of reports can be produced with the single condition query: a *Species Summary Report* or *Species Detail Report*. The *Species Summary Report* lists only the names and special status categories of the species that meet the query parameters. The *Species Detail Report* lists, by species, all habitat suitability values for all habitats and stages selected. The report can be very long if many habitats and stages are selected.

Species Info	Single Condition	on Two	Conditio	on Ele	ement In	fo Hal	bitat Info	BioView	Windo	w
Condition Que	ery								•	
ation Habitats			. .			0				
ation Habitats	Habitat Stages		Species		Status	Seasona	lity Run	Query		
		S	elect	Locat	ION					
Available			_		Selecter	-				
CENTRAL CALIFO CENTRAL CALIFO	RNIA COASTER RNIA COAST RANG	ES ER	_		EL DOR/ SIERRA	NEVADA I	ER			
COLORADO DESE GREAT VALLEY EF										
KLAMATH MOUN	TAINS ER									
MODOC PLATEAL MONO ER		=								
	FORNIA COAST ER FORNIA COAST RAI			_ <						
NORTHERN CALIF	FORNIA INTERIOR (COAST RAN	>	<						
SIERRA NEVADA		ER								
SIERRA NEVADA SONORAN DESEF										
	GREAT BASIN ER FORNIA COAST ER									
		F								
Locaton Option	S									
Counties Ma	an									
0 000.000										
USDA Ecor	egions (CIWTG En	dorsed) Ma								
© 000/(200)		1001000) <u>1110</u>	-							
Cal Water H	lydrologic Regions	Man								
	garologic negions	map								
	nal Forests <u>Map</u>									
	na rotests <u>iviap</u>									
									Next	
									Next	

Click on the **Location** tab within the Single Condition Query Window to select the geographic locations to be included in the query. Available location categories are Counties, USDA Ecoregions, Cal Water Hydrologic Regions, and USFS National Forests. Locations from more than one category can be used in a query. To toggle between categories, click the button next to the desired category under **Location Options**. Note that if locations from two categories are chosen, the full extent of both categories will be included in the query (e.g., in the example above, all of El Dorado County AND all of the Sierra Nevada Ecoregion will be included, NOT just the area where the two intersect). Double click on a location or use the arrows to add a highlighted location to the list of selected locations for the query.

Reference maps for the location categories are available by clicking on the word "Map" next to the category name in the Location Options box.

Habitats
California Wildlife Habitat Relationships - Version 9.0 File Species Info Single Condition Two Condition Element Info Habitat Info BioView Window
Single Condition Query
Location Habitats Habitat Stages Elements Species Special Status Seasonality Run Query
Select Habitats
All Habitats
Check Stages? By default, all habitat stages are selected. By clicking the 'Check Stages?' button, all stages begin unchecked and are toggled manually.
Suitability Threshold
Reproduction: Low -
Cover: Low -
Feeding: Low -
Back

Click on the **Habitats** tab within the Single Condition Query Window to select the CWHR habitats to be included in the query. If no specific selections are made using the Habitats tab, the query will include all habitats. To specify the habitats to be used in the query, click the checkbox next to the habitat name. All habitats with a check next to their name will be included in the query. To select all habitats within a habitat group, click the checkbox next to the group name (e.g., clicking the "Conifer types" box will add all conifer types). Reference range maps of the CWHR habitat types can be accessed in the "Habitat Info" main menu tab.

Habitats must be selected first, and then the stages for each habitat are selected in the next tab. By default, all habitat stages are included in the query. To select only specific habitat stages, click the "Check Stages?" button in the middle of the Habitats Tab, and then proceed to the Habitat Stages tab to make your selections.

A threshold suitability level for the habitats of High, Medium, or Low may also be selected to constrain the query. The query defaults to Low if no suitability level is selected. Generally, the higher the suitability level, the fewer the number of species predicted, because species with suitability levels less than the specified level will be excluded from the query.

Habitat Stages

Habitat stages allow further refinement of the query parameters by density and size class of the habitat types. For each habitat selected, habitat stages can be defined if desired. If no habitat stages are selected for a given habitat type, all habitat stages for that habitat type will be included. To activate the Habitat Stages tab, the user must click the "Check Stages?" button in the middle of the Habitats tab before proceeding to the Habitat Stages tab. If the "Check Stages?" button has not been activated, the list of habitats in the Habitat Stages tab will be grayed out and no habitat stage selections will be possible.

After clicking the "Check Stages?" button in the middle of the Habitats tab, click on the Habitat Stages tab within the Single Condition Query Window to select the habitat stages to be included in the query. The list of habitats included in the query are listed on the left hand side of the window. Highlight a habitat type to generate a selectable list of habitat stages on the right side of the window.

By default, if no specific habitat stages are selected for a given habitat type, all habitat stages will be included for that habitat type. If specific habitat stages have been selected, those habitat stages with a check mark next to their name will be included in the query for that habitat type. A different set of habitat stages can be selected for each habitat type included in the query. Hover your mouse over the habitat stage name in the Habitat Stages list to see the habitat stage definition, or see the definition tables in <u>Appendix A</u>.

To include no habitat stages of a type (i.e., to exclude the habitat type), you must deselect the type from the Habitats tab.

California Wildlife Habitat Relationships - Vers						×
	Condition	Element Info	Habitat Info	BioView	Window	
ingle Condition Query					• •	Â
Location Habitats Habitat Stages Elements	Species Sp	ecial Status Sea	sonality Run Qu	iery		
	t Habita	t Stages				
Habitats Closed-Cone Pine-Cypress	7	Habitat Stag	es abitat Stages			
Douglas-Fir Eastside Pine		🔳 1	Seedling Tree			
Jeffrey Pine Juniper			S Sapling Tree S P Sapling Tree O			
Klamath Mixed Conifer			M Sapling Tree M	loderate	E	
Montane Hardwood-Conifer			D Sapling Tree D S Pole Tree Spar			
Pinyon-Juniper Ponderosa Pine			P Pole Tree Oper	n		
Red Fir Redwood			M Pole Tree Mod D Pole Tree Den			
Sierran Mixed Conifer Subalpine Conifer			S Small Tree Spa			Ξ
White Fir			P Small Tree Ope M Small Tree Mo		-	
			III	uerale	Þ.	
No stages selected is the same as all stages s	elected. To r	remove a habitat, d	leselect it from the		b.	
						-
	III				•	

Elements

Click on the **Elements** tab within the Single Condition Query Window to select the elements to be **excluded** from the query. By default, CWHR assumes all elements are present if the user does not select any elements to exclude. If elements are excluded, the resulting species list will exclude those species requiring the missing elements based on the species-specific element requirement. For example, if an Essential element is excluded, any species it is essential to will be excluded. If a Secondarily Essential element is excluded and is not compensated by another Secondarily Essential element (i.e., both the secondarily essential element and its complement have been excluded), the species dependent on the Secondarily Essential element will be excluded. For more information on Elements and their definitions, see the <u>Element Info</u> tab in the main menu.

Elements may be selected for exclusion individually by clicking the box next to their name in the Exclude Elements list, or all Elements within a group can be selected by checking the box next to the Element group (e.g., Human Made Elements).

Sealifornia Wildlife Habitat Relationships - Version 9.0	- • •
File Species Info Single Condition Two Condition Element Info Habitat Info	BioView Window
Single Condition Query	- • - · •
Location Habitats Habitat Stages Elements Species Special Status Seasonality Run Qu	ierv
Exclude Elements	
iau-	
b ⊡ Dead Vegetation	
B. Physical	
ia-	
Brush Pile	
···· ✓ Buildings ···· ✓ Campground	
	≡
···· ✓ Fences ···· ✓ Jetty	
▼ Mine	
···· ✓ Nest Box	
··· · · · · · · · · · · · · · · · · ·	
···· ✓ Pack Stations ···· ✓ Salt Ponds	
Water - Created Body	
Back	Next
· III	4

TIP: CWHR assumes all elements that are likely to be present in a given habitat or ordinarily adjacent habitats are present, unless the user excludes them. It does not, for example, assume tidepools to be present in valley oak woodland habitat, so there is no need for the user to exclude this element from such a query. Elements do not drive query results in CWHR. Any results constrained by the elements you select will first be constrained by the habitats you select.

Species

Click on the **Species** tab within the Single Condition Query Window to select the species to be included in the query. If no species are selected, all modeled species in the CWHR database will be included in the query. Species can be added to the query by double-clicking the species name or highlighting the selected species and clicking the arrow button to add them to the selected species list. The available species list can be sorted alphabetically or taxonomically.

Pile Species Into Single Condition Two Condition Lement Into Pabitat Into BioView Window Single Condition Query Image: Condition Query Image: Condition Mouse Select Species Species Available Select Species Select Select Select GuaDaLier, Seal, Converter, Seal, GuaDaLier, Seal, Converter, Seal, GuaDaLier, Seal, Converter, Seal, GuaDaLier, Seal, Converter, Converter, Seal, Converter, Conver	California Wildlife Habitat Relationships - Version 9.0
Location Habitats Habitats Species Special Status Seasonality Run Query Select Available VESTERN JUMPING MOUSE Selected PACIFIC JUMPING MOUSE NORTHERN FUR-SEAL NORTHERN SEALION COMMON PORCUPINE ISLAND GRAY FOX NORTHERN SEALION CALIFORNIA SEALION COYOTE BLACK BEAR ISLAND GRAY FOX ISLAND GRAY FOX NGTHERN FUR-SEAL NORTHERN SEALION CALIFORNIA SEALION COYOTE ISLAND GRAY FOX ISLAND GRAY FOX NGTHERN FUR-SEAL NORTHERN SEALION CALIFORNIA SEALION MORTHERN SEAL ISLAND GRAY FOX ISLAND GRAY FOX NGTHERN SEAL ISLAND GRAY FOX ISLAND GRAY FOX NGTHERN FUR-SEAL ISLAND GRAY FOX ISLAND GRAY FOX NORTHERN SEAL ISLAND GRAY FOX ISLAND GRAY FOX NORTHERN SEAL ISLAND GRAY FOX ISLAND GRAY FOX NORTHERN SEAL ISLAND GRAY FOX ISLAND GRAY FOX NARTHERN SEAL ISLAND GRAY FOX ISLAND GRAY FOX INGTAIL ISLAND GRAY FOX ISLAND GRAY FOX INGR	File Species Info Single Condition Two Condition Element Info Habitat Info BioView Window
Select Species Available VestFind Mouse Coumdon Porcupine RED FOX GRAV FOX IISLAND GRAV FOX IISLAND GRAV FOX NISTAIN BRAVEN Northern VestBall Northern VestBall Output for the seal Not the seal Output for the seal Output for the seal Output for the seal	Single Condition Query
Available Selected WESTERN JUMPING MOUSE NORTHERN FUR-SEAL COMMON PORCUPINE NORTHERN STELLER) SEA-LION RED FOX Safeted GRAY FOX NORTHERN STELLER) SEA-LION ISLAND GRAY FOX NORTHERN ELEPHANT SEAL NORTHERN INFLUE ISSEA-LION NORTHERN ELEPHANT SEAL NORTHERN STELLER) SEA-LION ISLACK SEAR NORTHERN STELLER) SEAALION ISLACK SEAAL NORTHERN SELENS SEAALION ISLACK SEAAL Back ISLACK SEAAL Back Norther SEAAL	Location Habitats Habitat Stages Elements Species Special Status Seasonality Run Query
WESTERN JUMPING MOUSE PACIFIC JUMPING MOUSE COMMON PORCUPINE RED FOX GRAY FOX ISLAND GRAY FOX ISLAND GRAY FOX ISLAND GRAY FOX RUTFOX COVOTE BLACK BEAR NORTHERN FUR-SEAL GUADALUPE FUR-SEAL OUADALUPE FUR-SEAL GUADALUPE FUR-SEAL NORTHERN FUR-SEAL NORTHERN STUR-SEAL RACOON SEA OTTE Back	Select Species
PACIFIC JUMPING MOUSE COMMON PORCUPINE RED FOX GRAY FOX ISLAND GRAY FOX KIT FOX COYOTE BLACK BEAR NORTHERN FUR-SEAL NORTHERN STELLER) SEALION CALIFORNIA SEALION NORTHERN FUR-SEAL NORTHERN STELLER) SEALION CALIFORNIA SEALION NORTHERN SEAL RINGTAL RACCOON SEA OTTER Image: Taxonomic Alphabetic	
	PACIFIC JUMPING MOUSE COMMON PORCUPINE RED FOX GRAY FOX ISLAND GRAY FOX KIT FOX COYOTE BLACK BEAR NORTHERN FUR-SEAL GUADALUPE FUR-SEAL NORTHERN SEALLON CALIFORNIA SEA-LION CALIFORNIA SEA-LION CALIFORNIA SEA-LION CALIFORNIA SEA-LION CALIFORNIA SEA-LION NORTHERN SEAL HARBOR SEAL RINGTAIL RACCOON SEA OTTER
ii.	

Special Status

Click on the **Special Status** tab within the Single Condition Query Window to select the special status categories to be included in the query. This tab can be used to restrict the query to species with special legal status, or to native, introduced, or harvest species. By default, species with any status are included in the query. Selecting a status category in this tab will eliminate all species without that status from the predicted species list. More than one status category can be selected for a single query. Categories available in CWHR include Federal Endangered, Federal Threatened, California Endangered, California Threatened, California Fully Protected, California Protected, California Species of Special Concern, Federally-Proposed Endangered, Federally-Proposed Threatened, Federal Candidate (former Category 1 species), US Bureau of Land Management (BLM) Sensitive, USDA Forest Service (USFS) Sensitive, CA Department of Forestry & Fire Protection (CDF) Sensitive, or select "All Special Statuses" to include all of these categories. Other status categories include Native, Introduced, and Harvest.

Please note that the legal status listed in CWHR may not reflect recent changes in status. Please refer to the CDFW list of <u>STATE &</u> <u>FEDERALLY LISTED ENDANGERED & THREATENED ANIMALS OF CALIFORNIA</u> or the CDFW <u>SPECIAL ANIMALS</u> list for the current status of a species.

To view a list of species in a designated status category, click on the "Special Status Species Lists" button and choose the status of interest from the drop-down menu.

Location		ecies Special Status Seasonality Run Query	
		a otatao oatogonos	
	Special Status		
	All Special Statuses	California Species of Special Concern	
	Federal Endangered	Federal Proposed Endangered	
	Federal Threatened	Federal Proposed Threatened	
	California Endangered	Federal Candidate	
	California Threatened	BLM Sensitive	
	California Fully Protected	USFS Sensitive	:
	California Protected	CDF Sensitive	
	Other Statu	3	
	Native		
	Introd	uced	
	Harve	st	
		Special Status	
		Species Lists	
Back		Next	L

Seasonality

Click on the **Seasonality** tab within the Single Condition Query Window to select the seasonality patterns to be included in the query. The predicted species list will include only those species that meet the selected seasonality patterns for habitat and location. By default, species from all possible seasonality patterns are included in the query.

There are four season categories: species present yearlong, winter visitors, summer visitors and breeders, and migrants. The categories include all seasonality patterns that overlap the season for which they are named, except yearlong. For example, 'Summer Visitors' includes species that occur in summer only, from spring to summer, from summer to fall, and from spring to fall.

Seasonality patterns may be different for habitats and locations because habitat seasonality patterns are statewide ratings while location seasonality patterns are geographically restricted but not habitat restricted.

ile Species Info Single Condit	ion Two Condition	Element Info	Habitat Info	BioView	Window
ngle Condition Query					
Location Habitats Habitat Stages	Elements Species Sp	pecial Status Sea	sonality Run Que	ny	
	Select Seasona	ality Pattern	1		
	Seasonal Definitions				
	Spring: March 1	to May 31			
	Summer: June 1	to July 31			
	Fall: August 1 to N	November 30			
	Winter: December 1	to February 28			
Habitat		Location			E
All Season Categories		All Sea	ason Categories		
Species Present Year	ong	Specie	es Present Yearlon	9	
Winter Visitors		🔲 Winter	r Visitors		
Summer Visitors and B	reeders	Summ	er Visitors and Bree	eders	
Migrants		Migrar	nts		
				_	
Back				N	lext
					▼ [

TIP: Note that season in CWHR refers to the seasonality use pattern of each species. If you are interested in knowing all the species that might be seen in a given location during the summer, for example, you must remember to select both "Species Present Yearlong" and "Summer Visitors and Breeders".

Run Query

Click on the **Run Query** tab at any time to save a query or generate a summary or detailed report. The default settings will be used for any query parameters that have not been customized using the query tabs.

Save query

To save a query, click the "Save Query" button and designate a query name and file location. The query will be saved as an *.scq file, which can be loaded into CWHR in a future session. Loading a previously saved query will modify the selections in each tab according to the query parameters of the saved query. The user then has the option to further modify the query parameters in the tabs before running or re-saving the query.

California Wildlife Habitat Relationships - Version 9.0	
File Species Info Single Condition Two Condition Element Info Habitat Info BioView Window	
Single Condition Query	•
Location Habitats Habitat Stages Elements Species Special Status Seasonality Run Query	
Run Query	
Report Type	
Run	
	=
Cancel	
Load/Save Query	
Load Query Save Query	
Back	-
	÷

Reports

A summary report will generate a list of species meeting the query parameters, while a detailed report will provide all information from the summary report plus location, seasonality, and habitat suitability information for each species. Reports can be saved in .pdf or .csv (spreadsheet) format.

The pdf report includes the date, the list of species and their status, the total number of species, and a list of the query parameters.

To save the report output as a spreadsheet (*.csv) file, click on "Save to Spreadsheet (CSV)" in the lower right hand corner. The **summary report** .csv file includes the list of species and their status. The **detailed report** .csv file includes the list of species and their habitat suitability ratings for each habitat type.

82							» :		100 ×
	- 1	1 (1/3)			I			I "	199
								9/18/2014	
								.,,	
		CALIFORNIA DEPARTMENT OF	CALIFORNIA		ITAT RELATIO ted by the	ONSHIPS SYST	EM		
		FISH & WILDLIFE	CALIFORN	IA INTERAGE	ICY WILDLIFE	TASK GROUP			
		253	CALIFORM		tained by the NT OF FISH AI	ND WILDLIFE			
				Database	Version: 9.0				
				COPECTES SU	MARY REPOR				
	FF	Federal Endangered	CF = California Fully			Proposed Threatener	4 00 - 00	F Sensitive	- 1
			CF = California Fully						
		 warms of 1100 bits bits bits 	CP = California Prote	cted	FC = Federal Ca	andidate	HA = Har	rvest	
		California Endangered	SC = California Spec	ies of Special Conce	n BL = BLM Sensi	itive	HA = Har	rvest	
	CT =	California Endangered	SC = California Spec PE = Federally-Propo	ies of Special Conce sed Endangered	n BL = BLM Sensi FS = USFS Sens	itive sitive			
	CT =	California Endangered California Threatened	SC = California Spec PE = Federally-Propo	ies of Special Conce sed Endangered	n BL = BLM Sensi FS = USFS Sens	itive sitive			_
	CT = Note	California Endangered California Threatened	SC = California Spec PE = Federally-Propo	ies of Special Conce sed Endangered o the full species or Status	n BL = BLM Sensi FS = USFS Sens	itive sitive	ct population seg		d
ID	CT = Note	California Endangered California Threatened : Any given status code for a Species Name CALIFORNIA TIGER SALA	SC = California Spec PE = Federally-Propo a species may apply to	es of Special Conce sed Endangered the full species or	n BL = BLM Sensi FS = USFS Sensi o only one or more	itive sitive	Native	gments.	d
ID A0	CT = Note 001 007	California Endangered California Threatened : Any given status code for a Species Name CALIFORNIA TIGER SALA CALIFORNIA NEWT	SC = California Spec PE = Federally-Propo a species may apply to	ies of Special Conce sed Endangered o the full species or Status	n BL = BLM Sensi FS = USFS Sensi o only one or more SC SC	itive sitive subspecies or distin	Native	gments.	d
ID 40 40	CT = Note 001 007 012	California Endangered California Threatened : Any given status code for a Species Name CALIFORNIA TIGER SALA CALIFORNIA NEWT COMMON ENSATINA	SC = California Spec PE = Federally-Propo a species may apply to	ies of Special Conce sed Endangered o the full species or Status	n BL = BLM Sensi FS = USFS Sensi o only one or more SC SC SC	itive sitive subspecies or distine BL FS	Native NATIVE NATIVE NATIVE NATIVE	gments.	d
ID A0 A0 A0	CT = Note 001 007 012 028	California Endangered California Threatened : Any given status code for a Species Name CALIFORNIA TIGER SALA CALIFORNIA NEWT COMMON ENSATINA WESTERN SPADEFOOT	SC = California Spec PE = Federally-Propo a species may apply to AMANDER	ies of Special Conce sed Endangered o the full species or Status	n BL = BLM Sensi FS = USFS Sens o only one or more SC SC SC	itive sitive subspecies or distin BL FS BL	Native NATIVE NATIVE NATIVE NATIVE NATIVE	gments.	d
ID A0 A0 A0 A0 A0	CT = Note	California Endangered California Threatened Any given status code for a Species Name CALIFORNIA TIGER SALA CALIFORNIA NEWT COMMON ENSATINA WESTERN SPADEFOOT FOOTHILL YELLOW-LEGG	SC = California Spec PE = Federally-Propo species may apply to AMANDER GED FROG	ies of Special Conce sed Endangered o the full species or Status FE FT C	n BL = BLM Sensi FS = USFS Sens o only one or more SC SC SC SC	itive sitive subspecies or distine BL FS	NATIVE NATIVE NATIVE NATIVE NATIVE	gments.	d
ID A0 A0 A0 A0 A0 A0 A0	CT = Note 001 007 012 028 043 071	California Endangered California Threatened Any given status code for a Species Name CALIFORNIA TIGER SALA CALIFORNIA NEWT COMMON ENSATINA WESTERN SADEFOOT POOTHILL YELLOW-LEGG CALIFORNIA RED-LEGGE	SC = California Spec PE = Federally-Propo species may apply to AMANDER GED FROG	ies of Special Conce sed Endangered o the full species or Status	n BL = BLM Sensi FS = USFS Sens o only one or more SC SC SC	itive subspecies or distin BL FS BL BL FS	Native, NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE	gments.	d
ID A0 A0 A0 A0 A0 A0 B0	CT = Note 001 007 012 028 043 071 051	California Endangered California Threatened Any given status code for a Species Name CALIFORNIA NEWT COMMON ENSATINA WESTERN SPADEFOOT FOOTHILL YELLOW-LEGG CALIFORNIA RED-LEGGE GREAT BLUE HERON	SC = California Spec PE = Federally-Propo species may apply to AMANDER GED FROG	ies of Special Conce sed Endangered o the full species or Status FE FT C	n BL = BLM Sensi FS = USFS Sens o only one or more SC SC SC SC	itive sitive subspecies or distin BL FS BL	NATIVE NATIVE NATIVE NATIVE NATIVE	gments.	d
ID A0 A0 A0 A0 A0 A0 B0 B0	CT = Note 001 007 012 028 043 071 051 052	California Endangered California Threatened Any given status code for a Species Name CALIFORNIA TIGER SALA CALIFORNIA NEWT COMMON ENSATINA WESTERN SADEFOOT POOTHILL YELLOW-LEGG CALIFORNIA RED-LEGGE	SC = California Spec PE = Federally-Propo species may apply to AMANDER GED FROG	ies of Special Conce sed Endangered o the full species or Status FE FT C	n BL = BLM Sensi FS = USFS Sens o only one or more SC SC SC SC	itive subspecies or distin BL FS BL BL FS CD	NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE	gments.	d
ID A0 A0 A0 A0 A0 A0 B0 B0 B1	CT = Note 001 007 012 028 043 071 051 052	California Endangered California Threatened California Threatened CALIFORNIA TIGER SALA CALIFORNIA NEWT COMMON ENSATINA WESTERN SPADEFOOT FOOTHILL YELLOW-LEGG CALIFORNIA RED-LEGGE GREAT BLUE HERON GREAT EGRET	SC = California Spec PE = Federally-Propo species may apply to AMANDER GED FROG	ies of Special Conce sed Endangered o the full species or Status FE FT C	n BL = BLM Sensi FS = USFS Sens o only one or more SC SC SC SC	itive subspecies or distinut BL FS BL BL FS CD CD	NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE	gments.	d
ID A00 A00 A00 A00 B00 B1 B1	CT = Note 001 007 012 028 043 071 051 051 052 110 111	California Endangered California Threatened Any given status code for a Species Name CALIFORNIA TIGER SALA CALIFORNIA NEWT COMMON ENSATINA WESTERN SPADEFOOT FOOTHILL YELLOW-LEGG GREAT EGRET OSPREY	SC = California Spec PE = Federally-Propo species may apply to AMANDER GED FROG	ies of Special Conce sed Endangered o the full species or Status FE FT C	n BL = BLM Sensi FS = USFS Sens o only one or more SC SC SC SC SC SC SC SC	itive subspecies or distinution BL FS BL BL FS CD CD CD	NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE	gments.	d
ID A0 A0 A0 A0 A0 B0 B0 B1 B1 B1	CT = Note 001 007 012 028 043 071 051 052 110 111 113	California Endangered California Threatened Any given status code for a Species Name CALIFORNIA TIGER SALA CALIFORNIA NEWT COMMON ENSATINA WESTERN SPADEFOOT FOOTHILL YELLOW-LEGG CALIFORNIA RED-LEGGG GREAT BLUE HERON GREAT EGRET OSPREY WHITE-TAILED KITE	SC = California Spec PE = Federally-Propo species may apply to AMANDER GED FROG	es of Special Conce sed Endangered Full species or Status FE FT C FT FT FT CE	n BL = BLM Sensi FS = USFS Sensi c only one or more SC SC SC SC SC SC CF CF CF SC	Itive subspecies or distinct BL FS BL BL FS CD CD CD BL BL FS CD	NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE	gments.	d
ID A0 A0 A0 A0 A0 B0 B0 B0 B1 B1 B1 B1 B1 B1 B1	CT = Note Note 001 007 012 028 043 071 051 052 110 111 113 114 121	California Endangered California Threatened California Threatened California TiGER SALA CALIFORNIA TIGER SALA CALIFORNIA NEWT COMMON ENSATINA WESTERN SPADEFOOT FOOTHILL YELLOW-LEGG CALIFORNIA RED-LEGGE GREAT BLUE HERON GREAT EGRET OSPREY WHITE-TAILED KITE BALD EAGLE NORTHERN HARRIER SWAINSON'S HAWK	SC = California Spec PE = Federally-Propo species may apply to AMANDER GED FROG	es of Special Conce sed Endangered be full species or Status FE FT C FT FT	n BL = BLM Sensi FS = USFS Sensi o only one or more SC SC SC SC SC SC CF CF CF CF	itive subspecies or distin- BL FS BL FS CD CD CD CD BL BL FS CD BL FS CD	NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE	gments.	d
ID A0 A0 A0 A0 A0 B0 B1 B1 B1 B1 B1 B1 B1 B1 B1 B1 B1 B1 B1	CT = Note Note 001 007 012 028 043 071 051 052 110 111 113 114 121 126	California Endangered California Threatened California Threatened CALIFORNIA TIGER SALA CALIFORNIA NEWT COMMON ENSATINA WESTERN SPADEFOOT FOOTHILL YELLOW-LEGG CALIFORNIA RED-LEGGE GREAT BLUE HERON GREAT EGRET OSPREY WHITE-TAILED KITE BALD EAGLE NORTHERN HARRIER	SC = California Spec PE = Federally-Propo species may apply to AMANDER GED FROG	es of Special Conce sed Endangered Full species or Status FE FT C FT FT FT CE	n BL = BLM Sensi FS = USFS Sensi c only one or more SC SC SC SC SC SC CF CF CF SC	Itive subspecies or distinct BL FS BL BL FS CD CD CD BL BL FS CD	Native NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE NATIVE	gments.	d

bitat Relationships - Version 9.0 - [Single Conditio Single Condition Two Condition Elemen									
Single Condition Two Condition Element) 😥 🔂 🔁							- 8 ×
							9/18/3	2014	â
CALIFOR	ALIFORNIA W	VILDLIFE HABI	ITAT RELATI	ONSHI	PS SY	STEM			
FISH &		support	ed by the	TASK	GROU	JP			
			ained by the						
			Version: 9.0			-			
	· (SPECIES DET	AILED REPOR	RT					
FE = Federal Endanger			PT = Federally		l Threate	ened	CD = CDF Sensitive		
FT = Federal Threatene CE = California Endang	gered SC = California Specie	es of Special Concern		itive			HA = Harvest		
CT = California Threate Note: Any given status	ened PE = Federally-Proposis s code for a species may apply to		FS = USFS Ser o only one or more		es or dis	stinct pop	ulation segments.		
ID Species Nan		Status					Nativo /Introd	used	
-	IGER SALAMANDER	FE FT CT	SC				Native/Introd	uceu	
	Location Name		Season						
	Alameda		Yearlong						
	Habitat Name Blue Oak-foothill Pine 1		Season Yearlong	R C H H					
	Blue Oak-foothill Pine 2S		Yearlong	M M	М				
	Blue Oak-foothill Pine 2P Blue Oak-foothill Pine 2M	1	Yearlong Yearlong	L L L L	L				
	Blue Oak-foothill Pine 2D) 1/123 • • •	Yearlong	1 1	1		E 🔚 🚺 👯 195.225	• •⊖Ū-	
							Save to Si	rreadsheet (CSV) San	re PDF
	ersion 9.0 - [Single Condition Query Rep Two Condition Element Info Ha		Window Help		w 🖹			-	
		abitat Info BioView	Image: Species: 1		* 2	A I			₽ ×
ecies Info Single Condition	Two Condition Element Info H	abitat Info 🛛 BioView	Image: Species: 1		•				₽ ×
vecies Info Single Condition	Two Condition Element Info Ha	abitat Info BioView	Image: Species: 1		•	4			₽ ×
Included Locations All Locations and Locations All Locations and Included Habitats i Aspen, Blue Oak	Two Condition Element Info Ha •	abitat Info BioView	C 2 (2/2) Species: 1 meters Pine-cypress, Coz		c Woodla	and, Dou			₽ ×
Included Locations All Locations Included Locations All Locations Included Locations Included Habitats i Aspen, Blue Oal Eucalyptus, Jeff	Two Condition Element Info Ha	abitat Info BioView Total Number of Query Para Pine, Closed-cone P ed Conifer, Lodgep	C 2 (2/2) Species: 1 meters Pine-cypress, Coa ole Pine, Montan	e Hardw	: Woodla	and, Dou	ardwood-conifer,		₽ ×
Included Locations All Locations Included Locations All Locations Included Locations Included Habitats i Aspen, Blue Oal Eucalyptus, Jeff Pinyon-juniper, Habitat Suitability	Two Condition Element Info Harrison Harrison Image: Image	abitat Info BioView Total Number of Query Para Pine, Closed-cone P ed Conifer, Lodgep ood, Sierran Mixed	C 2 (2/2) Species: 1 meters Pine-cypress, Coa ole Pine, Montan	e Hardw	: Woodla	and, Dou	ardwood-conifer,		₽ ×
Included Locations All Locations Included Locations All Locations Included Locations Included Habitats i All Location Sea Included Habitats i Aspen, Blue Oak Eucalyptus, Jeffi Pinyon-juniper, Habitat Suitability Reproduction - I	Two Condition Element Info Ha Image: Second Sec	abitat Info BioView Total Number of Query Para Pine, Closed-cone P ed Conifer, Lodgep ood, Sierran Mixed	C 2 (2/2) Species: 1 meters Pine-cypress, Coa ole Pine, Montan	e Hardw	: Woodla	and, Dou	ardwood-conifer,		₽ ×
Included Locations All Locations Included Locations All Locations Included Locations Included Habitats i Aspen, Blue Oal Eucalyptus, Jeff Pinyon-juniper, Habitat Suitability	Two Condition Element Info Ha Image: Seasons Image: Seasons Image: Seasons sons Included Seasons Image: Seasons & (Stages) K Woodland, Blue Oak-foothill Prey Pine, Juniper, Klamath Mixe Proderosa Pine, Red Fir, Redwith Threshold Low, Cover - Low, Feeding - Low Low, Cover - Low, Feeding - Low Easons Seasons	abitat Info BioView Total Number of Query Para Pine, Closed-cone P ed Conifer, Lodgep ood, Sierran Mixed	C 2 (2/2) Species: 1 meters Pine-cypress, Coa ole Pine, Montan	e Hardw	: Woodla	and, Dou	ardwood-conifer,		₽ ×
Included Locations All Locations Included Locations All Locations Included Locations Included Habitats i Aspen, Blue Oak Eucalyptus, Jeffi Pinyon-juniper, Habitat Suitability Reproduction - I Included Habitat S	Two Condition Element Info Ha Image: Second Sec	abitat Info BioView Total Number of Query Para Pine, Closed-cone P ed Conifer, Lodgep ood, Sierran Mixed	C 2 (2/2) Species: 1 meters Pine-cypress, Coa ole Pine, Montan	e Hardw	: Woodla	and, Dou	ardwood-conifer,		₽ ×
Included Locations All Locations Included Locations All Locations Included Locations Included Location Included Habitats I Aspen, Blue Oak Eucalyptus, Jeff Pinyon-juniper, Habitat Suitability Reproduction - I Included Habitat S All Habitat Seas	Two Condition Element Info Ha Image: Second Sec	abitat Info BioView Total Number of Query Para Pine, Closed-cone P ed Conifer, Lodgep ood, Sierran Mixed	C 2 (2/2) Species: 1 meters Pine-cypress, Coa ole Pine, Montan	e Hardw	: Woodla	and, Dou	ardwood-conifer,		₽ ×
Included Locations All Locations Included Locations All Locations Included Locations Included Location I All Location Sea Included Habitats I Aspen, Blue Oak Eucalyptus, Jeff Pinyon-juniper, Habitat Suitability Reproduction - I Included Habitat S All Habitat Seas Excluded Elements No Elements Excluded Species	Two Condition Element Info Ha Image: Ima	abitat Info BioView Total Number of Query Para Pine, Closed-cone P ed Conifer, Lodgep ood, Sierran Mixed	C 2 (2/2) Species: 1 meters Pine-cypress, Coa ole Pine, Montan	e Hardw	: Woodla	and, Dou	ardwood-conifer,		₽ ×
Included Locations All Locations Included Locations All Locations Included Locations All Location Sea Included Habitats i Aspen, Blue Oal Eucalyptus, Jeff Pinyon-juniper, Habitat Suitability Reproduction - I Included Habitat S All Habitat Seas Excluded Elements No Elements Exc California Tiger Included Species California Tiger	Two Condition Element Info Ha Image: Second Sec	abitat Info BioView Total Number of Query Para Pine, Closed-cone P ed Conifer, Lodgep ood, Sierran Mixed ww	Pine-cypress, Coal d Conifer, Subalp	e Hardw ine Conif	: Woodla ood, Mo ier, Vallo	and, Dou ontane H ey Oak V	ardwood-conifer, Voodland, White Fir	-	5 ×
Included Locations All Locations Included Locations All Locations Included Locations All Location Sea Included Habitats i Aspen, Blue Oal Eucalyptus, Jeff Pinyon-juniper, Habitat Suitability Reproduction - I Included Habitat S All Habitat Seas Excluded Elements No Elements Exc California Tiger Included Species California Tiger	Two Condition Element Info Ha Image: Second Sec	abitat Info BioView Total Number of Query Para Pine, Closed-cone P ed Conifer, Lodgep ood, Sierran Mixed	C 2 (2/2) Species: 1 meters Pine-cypress, Coa ole Pine, Montan	e Hardw ine Conif	: Woodla ood, Mo ier, Vallo	and, Dou ontane H ey Oak V	ardwood-conifer, Voodland, White Fir 123.41% • (-)	-	
Included Locations All Locations Included Locations All Locations Included Locations All Location Sea Included Habitats i Aspen, Blue Oal Eucalyptus, Jeff Pinyon-juniper, Habitat Suitability Reproduction - I Included Habitat S All Habitat Seas Excluded Elements No Elements Exc California Tiger Included Species California Tiger	Two Condition Element Info Ha Image: Second Sec	abitat Info BioView Total Number of Query Para Pine, Closed-cone P ed Conifer, Lodgep ood, Sierran Mixed ww	Pine-cypress, Coal d Conifer, Subalp	e Hardw ine Conif	: Woodla ood, Mo ier, Vallo	and, Dou ontane H ey Oak V	ardwood-conifer, Voodland, White Fir	-	

******TIP: When CWHR is used for any official or regulatory processes, the pdf format showing the query parameters and date should be used.*******

ERRORS

	Ennono
CWHR	
<u> </u>	All Species Eliminated! Please check the query parameters to ensure the intended query is being performed.
	ОК
with the sel	Ige is generated when no species meet the specified query parameters. This may happen if the selected species (or species ected special status designations) do not occur in the selected locations or habitats. It can also happen if the selected not occur in the selected location Mendocino County and Habitat type Desert shrub).
California	Wildlife Habitat Relationships - Version 9.0
8	Unhandled exception has occurred in your application. If you click Continue, the application will ignore this error and attempt to continue. If you click Quit, the application will close immediately.
	Collection was modified; enumeration operation may not execute.
▼ <u>D</u> et	ails <u>C</u> ontinue <u>Q</u> uit
	vindow may appear upon minimizing a CWHR information window. This is a known bug in the program but does not affect ts or other uses of the program. Click "Continue" to continue on using the program. Clicking "Quit" will close CWHR.
CWHR	
<u>^</u>	No internet connection! Cannot produce life history report.
	ОК
internet cor Click "OK" t generate th	window may appear when generating a report from the Species Information window. This is a result of intermittent or a lack of intercent on a lack of an

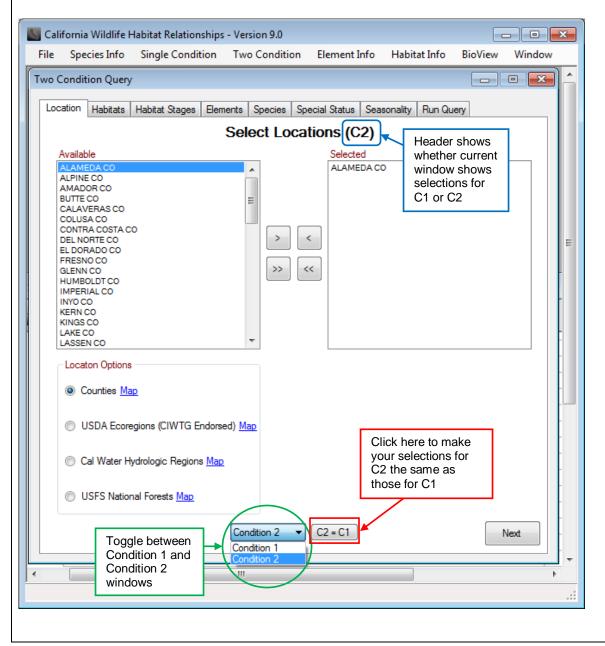
CWHR 83
Not enough parameters have been selected to generate a detailed report. Would you like to generate a species summary report instead?
Yes <u>No</u>
This error may appear when running a query with a detailed report type. This is a result of not having enough restricting conditions to generate a detailed report. Clicking "Yes" generates a species summary report; while clicking "No" returns the user to Run Query tab of the Single Condition Query window. To resolve this issue, be more specific with the query (i.e. selet more paramaters).
California Wildlife Habitat Relationships - Version 9.0
Unhandled exception has occurred in your application. If you click Continue, the application will ignore this error and attempt to continue. If you click Quit, the application will close immediately.
Unable to load the native components of SQL Server Compact corresponding to the ADO.NET provider of version 8080. Install the correct version of SQL Server Compact. Refer to KB article 974247 for more details.
Details Continue Quit
This error can occur when installing CWHR. This a known error which causes the program to crash upon opening it. To resolve this issue a Microsoft SQL Server Compact Service Pack must be installed; the file can be found here https://www.microsoft.com/en-us/download/details.aspx?id=5783 . Alternatively, if more assistance is needed contact CWHR staff to get the appropriate file and instal instructions.
Please check our <u>CWHR FAQ and Software Troubleshooting</u> webpage for more information about software troubleshooting.

TWO CONDITION QUERY

The Two Condition Query is similar to the Single Condition Query except that two habitat conditions are defined so that predicted species lists or habitat values can be compared. Three types of reports are available in this query. The **Species Comparison Report** lists all the wildlife species predicted to occur in the two conditions. For example, the list of species expected to occur in the same habitat type in two different locations can be compared, or the list of species in two different habitat conditions in the same location can be compared. The **Habitat Value Comparison Report** (or **Weighted Habitat Value Comparison Report** if weights are defined) lists, for each species, the mean suitability value for all habitats and stages for each of the two conditions specified in the query, and the difference in suitability values between the two conditions. For example, the query shows the change in average habitat suitability value for a species as the size class or cover class changes in a given habitat type.

The selection windows for the two condition query are the same as those for the single condition query with a few exceptions. (See "<u>Single Condition Query</u>" above for help with the query parameter selection process.)

First, the user must specify query parameters for both conditions displayed as *Condition 1* (C1) and *Condition 2* (C2). For each selection window, the user must toggle between both conditions when entering the query parameters. If a query parameter is set for Condition 1 but not for Condition 2, the query will not be constrained for Condition 2. Click the **C2=C1** button to set the query parameters for *Condition 2* the same as those selected for *Condition 1*: Clicking **C2=C1** will copy the parameters from *Condition 1* to *Condition 2*.



Second, for the *Habitat Value Comparison* and *Weighted Habitat Value Comparison* options you will need to select a method for calculating average habitat suitability value for reproduction, cover and feeding for a species in each selected habitat and stage. The choices are <u>arithmetic and geometric mean</u>.

Salifornia Wildlife Habitat Relationships - Version 9.0	×
File Species Info Single Condition Two Condition Element Info Habitat Info BioView Window	_
Two Condition Query	Â
Location Habitats Habitat Stages Elements Species Special Status Seasonality Run Query	
Run Query	
Denot Tara	
Report Type Weighted H V Comparisons	
Calculation Method	
Arthmetic Mean	Ε
Geometric Mean	-
Cancel	
Load/Save Query	-
Load Query Save Query	
	-
	-
Back	

Finally, for the *Weighted Habitat Value Comparison*, you will need to apply weights to each habitat stage selected. Weights are generally based on acreage of the habitat types (or percentage of acreage) within the study region. When you click the "Use Weights" button, boxes will appear next to each selected habitat stage in which the weight must be entered. You can either use the arrows to select a number or type in an integer value from 0 to 100.

	ndition Quen	y Habitat S			Constant	Constant Charton	Constant	Run Qu			ľ
Locati	on Habitats				Species Habi	Special Status		Run Qu	ery		I
Hal	pitats		5	GIGG		labitat Stages	5(01)			_	
Blu	ie Oak Woodla	and				····· 🔲 All Habitat	Stages		Use Wei	ghts	L
						🔽 1 See	dling Tree		100		L
						🔲 2S Sa	pling Tree Sp	arse			L
						🔲 2P Sa	pling Tree Op	en			L
						2M Sa	apling Tree Mo	oderate			
						🔲 2D Sa	apling Tree De	nse			
						🔲 3S Po	le Tree Spars	e			
						🔲 3P Po	le Tree Open				
						🔲 3M Po	ole Tree Mode	rate			H
						🔲 3D Po	ole Tree Dense	e			
						🔲 4S Sn	nall Tree Spars	se			F.
						🔲 4P Sn	nall Tree Oper	1			H
							nall Tree Mod				H
							nall Tree Dens				H
						. —	edium/Large T		е		P
							edium/Large T				ł.
							edium/Large 1			シ ート	ŀ.
						5D M	edium/Large 1	Free Dens	•		r.
	No stages sele	ected is the	same as al	stages	selected.	To remove a ha	abitat, deselec	t it from the	e 'Habitats' ta	ab.	ŀ
В	ack			Con	dition 1	▼ C2 = C1]		1	Next	ł
											ŀ

Species Comparison Report

In the Species Comparison Report, an "X" in the column under the appropriate condition indicates that CWHR predicted the species to occur in that condition. Blank columns indicate that CWHR did not predict the species to occur in that condition.

Image: Contract of the second seco	<text><image/></text>		🖂 🖂 🛃 🖬 🗐 🖬 🖬			
<page-header><text><image/><section-header><section-header><section-header><section-header><section-header></section-header></section-header></section-header></section-header></section-header></text></page-header>	<page-header></page-header>					
<text><image/></text>						
A DECAMPANE DEFINITION OF A DECAMPANE DEFINITION DE LA DECAMPANE DEL DEL DEL DEL DEL DEL DEL DEL DEL DE					10/6/2014	
Image: Supported by PB And Maintained Low PB And PB </td <td>Image: Strate Strate</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Image: Strate					
CALIFORNIA INTERGENCY WILDLIFE TASK GROUP anitaliance by the CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE Database Version: 9.0* Defense of the second of the secon	Image: Construction of the state of th		CALIFORNIA DEPARTMENT OF			
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE Database Version: 9.0 Department of person and person of the p	Image: Control of the state of the stat		FISH & CALIFORNIA	INTERAGENCY WILDLIFE TASK GROUP		
Database Version: 9.0 DECIDE COMPARISON REPORT T = Federal Endangered Cf = California Fully Protected T = rederally-Proposed Inreatened CD = CDF Sensitive T = Federal Threatened Cf = California Species of Special Concern H = Eddrally-Proposed Inreatened CD = CDF Sensitive C = California Endangered S C = California Species of Special Concern H = BLM Sensitive H = Harvest C = California Threatened P = Federally-Proposed Endangered CF = CF H = Harvest C = California Tineatened P = Federally-Proposed Endangered CF = CF Nattive Not reviews tatus coef for a species may apply to the full species or by o us or more subspecies or distinct population segments. Not reviews tatus coef for a species may apply to the full species or full segments. V A000 CALIFORNIA TIGER SALAMANDER FE FT CT SC Nattive X A001 CALIFORNIA GIANT SALAMANDER FE CF Nattive Nattive X A005 SOUTHERN TORRENT SALAMANDER FE C C Nattive X A005 COLIFORNIA NEWT SC Nattive Nattive X A005 CALIFORNIA NEWT SC Nattive Nattive X A005 CULIFORNIA NEWT SC Nattive Nattive X A005 <td>Image: Control of the state of the stat</td> <td>🧠 🗌</td> <td></td> <td></td> <td></td> <td></td>	Image: Control of the state of the stat	🧠 🗌				
FE = Federal Endangered CF = California Fully Protected FT = Federal Candidate CD = CDF Sensitive FT = Federal Threatened CP = California Species of Special Concern FL = Federal Candidate HA = Harvest CE = California Threatened CP = California Species of Special Concern FL = BLM Sensitive HA = Harvest CT = California Threatened CP = California Species of Special Concern FL = SEMStree Native/Intro Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments. Native/Intro X A0001 CALIFORNIA TIGER SALAMANDER FE = FE CE CF NATIVE X A0001 COLIFORNIA TIGER SALAMANDER FE CE CF NATIVE X A0001 CALIFORNIA TIGER SALAMANDER FE CE CF NATIVE X A0001 CALIFORNIA TIGER SALAMANDER FE CE CF NATIVE X A0001 CALIFORNIA TIGENT SALAMANDER FE CE CF NATIVE X A0005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A0005 S	FE = Federal Endangered CF = California Fully Protected PT = Federally-Proposed Threatened CD = CDF Sensitive FT = Federal Threatened CF = California Protected FC = Federal Candidate HA = Harvest ET = California Endangered SC = California Sendagered SC = California Sendagered FC = Protected CT = California Endangered SC = California Sendagered FC = Federal Candidate HA = Harvest CT = California Tratemed FE = Federally-Proposed Endangered FS = USFS Sensitive Native/Intro Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments. Native/Intro X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA GIANT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER NATIVE NATIVE NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A005 SOUTHERN TORRENT SALAMANDER NATIVE					
FE = Federal Endangered CF = California Fully Protected PT = Federally-Proposed Threatened CD = CDF Sensitive FT = Federal Threatened CP = California Protected FC = Federal Candidate HA = Harvest CE = California Endangered SC = California Endangered SC = California Section Section HA = Harvest CE = California Endangered SC = California Endangered FS = USFS Sensitive HA = Harvest CT = California Endangered FE = Federally-Proposed Endangered FS = USFS Sensitive Native/Intro Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments. Native/Intro X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A003 CALIFORNIA GIANT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A006 ROUGH-SKINNED NEWT NATIVE NATIVE X A006 ROUGH-SKINNED NEWT NATIVE NATIVE <td>FE = Federal Endangered CF = California Fully Protected PT = Federally-Proposed Threatened CD = CDF Sensitive FT = Federal Threatened CF = California Protected FC = Federal Candidate HA = Harvest ET = California Endangered SC = California Sendagered SC = California Sendagered FC = Protected CT = California Endangered SC = California Sendagered FC = Federal Candidate HA = Harvest CT = California Tratemed FE = Federally-Proposed Endangered FS = USFS Sensitive Native/Intro Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments. Native/Intro X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA GIANT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER NATIVE NATIVE NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A005 SOUTHERN TORRENT SALAMANDER NATIVE</td> <td></td> <td></td> <td></td> <td></td> <td></td>	FE = Federal Endangered CF = California Fully Protected PT = Federally-Proposed Threatened CD = CDF Sensitive FT = Federal Threatened CF = California Protected FC = Federal Candidate HA = Harvest ET = California Endangered SC = California Sendagered SC = California Sendagered FC = Protected CT = California Endangered SC = California Sendagered FC = Federal Candidate HA = Harvest CT = California Tratemed FE = Federally-Proposed Endangered FS = USFS Sensitive Native/Intro Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments. Native/Intro X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA GIANT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER NATIVE NATIVE NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A005 SOUTHERN TORRENT SALAMANDER NATIVE					
FT = Federal Threatened CP = California Protected CP = California Protected FE = Federal Candidate HA = Harvest CE = California Endangered SC = California Species of Special Common BL = BLM Sensitive BL = BLM Sensitive CT = California Threatened PE = Federally-Proposed Endangered FS = USFS Sensitive Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments. C1 C2 ID Species Name Status Native/Intro X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC X A002 NORTHWESTERN SALAMANDER NATIVE NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA REWT NATIVE NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC NATIVE X A006 RED-BELIED NEWT NATIVE NATIVE X A009 DUNN'S SALAMANDER SC NATIVE X A0100 <td>FT = rederal Threatmed CP = California Protected FC = Federal Candidate HA = Harvest CE = California Endangered SC = California Species of Special Concern BL = BLM Sensitive CT = California Threatened PE = Federally-Proposed Endangered FS = USFS Sensitive Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments. C1 C2 ID Species Name Status Native/Intro X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA GIANT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC NATIVE X A005 ROUGH-SKINNED NEWT SC NATIVE X A006 RED-BELLIED NEWT NATIVE NATIVE<td></td><td></td><td></td><td>) = CDF Sensitive</td><td></td></td>	FT = rederal Threatmed CP = California Protected FC = Federal Candidate HA = Harvest CE = California Endangered SC = California Species of Special Concern BL = BLM Sensitive CT = California Threatened PE = Federally-Proposed Endangered FS = USFS Sensitive Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments. C1 C2 ID Species Name Status Native/Intro X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA GIANT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC NATIVE X A005 ROUGH-SKINNED NEWT SC NATIVE X A006 RED-BELLIED NEWT NATIVE NATIVE <td></td> <td></td> <td></td> <td>) = CDF Sensitive</td> <td></td>) = CDF Sensitive	
CT = California Threatened PE = Federally-Proposed Endangered FS = USFS Sensitive Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments. C1 C2 ID Species Name Status X A001 CALIFORNIA TIGER SALAMANDER FE FT X A002 NORTHWESTERN SALAMANDER NATIVE X A002 NORTHWESTERN SALAMANDER FE CE X A002 NORTHWESTERN SALAMANDER FE CE X A003 NORTHWESTERN SALAMANDER NATIVE X A004 CALIFORNIA GIANT SALAMANDER NATIVE X A005 SOUTHERN TORRENT SALAMANDER NATIVE X A006 ROUGH-SKINNED NEWT NATIVE X A006 ROUGH-SKINNED NEWT NATIVE X A008 RED-BELIED NEWT NATIVE X A009 DUNN'S SALAMANDER SC X A010 DEI NORTE SALAMANDER SC X A010 DEI NORTE SALAMANDER NATIVE X A009 DUNN'S SALAMANDER NATIVE X A010 DEI NORTE SALAMANDER SC NATIVE X A010 DEI NORTE SALAMANDER SC NATIVE <	CT = California Threatened PE = Federally-Proposed Endangered FS = USFS Sensitive Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments. C1 C2 ID Species Name Status X A001 CALIFORNIA TIGER SALAMANDER Native/Intro X A002 NORTHWESTERN SALAMANDER NATIVE X A004 CALIFORNIA GIANT SALAMANDER NATIVE X A004 CALIFORNIA GIANT SALAMANDER NATIVE X A005 SOUTHERN TORRENT SALAMANDER NATIVE X A005 SOUTHERN TORRENT SALAMANDER NATIVE X A006 ROUGH-SKINNED NEWT NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A008 RED-BELLIED NEWT NATIVE NATIVE X A009 DUNN'S SALAMANDER SC NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE <		FT = Federal Threatened CP = California Protected	FC = Federal Candidate HA		
Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments. C1 C2 ID Species Name Status Native/Intro X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC X A002 NORTHWESTERN SALAMANDER FE CT SC NATIVE X A001 COLIFORNIA TIGER SALAMANDER FE CE CF NATIVE X A003 LONG-TOED SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER FE CE C FS NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A006 ROUGH-SKINNED NEWT NATIVE NATIVE X A006 ROUGH-SKINNED NEWT NATIVE NATIVE X A009 DUNN'S SALAMANDER SC NATIVE X A009 DUNN'S SALAMANDER SC NATIVE X A010 DEI NORTE SALAMANDER SC NATIVE X A010	Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments. C1 C2 ID Species Name Status Native/Intro X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A005 LONG-TOED SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA TALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A005 ROUGH-SKINNED NEWT SC NATIVE X A005 RED-BELIED NEWT SC NATIVE X A009 DUNN'S SALAMANDER SC NATIVE X A010 DEL NORTE SALAMANDER SC <td></td> <td></td> <td></td> <td></td> <td></td>					
X X <td>X X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A003 LONG-TOED SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA GIANT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A005 SOUTHEN TORRENT SALAMANDER SC NATIVE X A006 ROUGH-SKINNED NEWT NATIVE NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A010 DEL NORTE SALAMANDER SC NATIVE X A010 DEL NORTE SALAMANDER SC NATIVE</td> <td></td> <td></td> <td></td> <td>ion segments.</td> <td></td>	X X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A003 LONG-TOED SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA GIANT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A005 SOUTHEN TORRENT SALAMANDER SC NATIVE X A006 ROUGH-SKINNED NEWT NATIVE NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A010 DEL NORTE SALAMANDER SC NATIVE X A010 DEL NORTE SALAMANDER SC NATIVE				ion segments.	
X X <td>X X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A003 LONG-TOED SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA GIANT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A005 SOUTHEN TORRENT SALAMANDER SC NATIVE X A006 ROUGH-SKINNED NEWT NATIVE NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A010 DEL NORTE SALAMANDER SC NATIVE X A010 DEL NORTE SALAMANDER SC NATIVE</td> <td></td> <td>\frown</td> <td></td> <td></td> <td></td>	X X A001 CALIFORNIA TIGER SALAMANDER FE FT CT SC NATIVE X A002 NORTHWESTERN SALAMANDER FE CE CF NATIVE X A003 LONG-TOED SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA GIANT SALAMANDER FE CE CF NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A005 SOUTHEN TORRENT SALAMANDER SC NATIVE X A006 ROUGH-SKINNED NEWT NATIVE NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A010 DEL NORTE SALAMANDER SC NATIVE X A010 DEL NORTE SALAMANDER SC NATIVE		\frown			
X X A002 NORTHWESTERN SALAMANDER Intervention Intervention X A002 NORTHWESTERN SALAMANDER FE CE CF NATTVE X A004 CALIFORNIA GIANT SALAMANDER FE CE CF NATTVE X A004 CALIFORNIA GIANT SALAMANDER FE CE CF NATTVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATTVE X A006 ROUGH-SKINNED NEWT NATTVE NATTVE X A006 RED-BELLIED NEWT SC NATTVE X A009 DUINN'S SALAMANDER SC NATTVE X A010 DEL NORTE SALAMANDER SC NATTVE X A010 DEL NORTE SALAMANDER SC NATTVE	X A002 NORTHWESTERN SALMANDER Image: Construction of the construction					
X A007 LONG-TOED SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA GIANT SALAMANDER NATIVE NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A007 CALIFORNIA NEWT NATIVE NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A008 RED-BELLIED NEWT NATIVE NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A010 DEI NORTE SALAMANDER NATIVE NATIVE X A010 DEI NORTE SALAMANDER SC NATIVE	X A002 LONG-TOED SALAMANDER FE CE CF NATIVE X A004 CALIFORNIA GIANT SALAMANDER NATIVE NATIVE X A005 SOUTHERN TORENT SALAMANDER SC FS NATIVE X A006 ROUGH-SKINNED NEWT NATIVE NATIVE X A006 RED-BELLIED NEWT NATIVE NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A008 RED-BELLIED NEWT NATIVE NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A010 DEL NORTE SALAMANDER NATIVE TO ANTIVE X A010 DEL NORTE SALAMANDER SC NATIVE			FE FT CT SC		
X A004 CALIFORNIA GIANT SALAMANDER NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A006 ROUGH-SKINNED NEWT NATIVE NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A008 RED-BELLIED NEWT NATIVE X A009 DUNN'S SALAMANDER NATIVE X A009 DUNN'S SALAMANDER NATIVE X A010 DEI NORTE SALAMANDER SC NATIVE X A010 DEI NORTE SALAMANDER SC NATIVE	X A044 CALIFORNIA GIANT SALAMANDER NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A007 CALIFORNIA NEWT NATIVE NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A008 RED-BELLED NEWT NATIVE X A009 DUNN'S SALAMANDER NATIVE X A010 DEL NORTE SALAMANDER NATIVE X A010 DEL NORTE SALAMANDER SC NATIVE			FF CF CF		
X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A006 ROUGH-SKINNED NEWT NATIVE NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A008 RED-BELIED NEWT NATIVE NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A010 DEL NORTE SALAMANDER SC NATIVE X A010 DEL NORTE SALAMANDER SC NATIVE	X A005 SOUTHERN TORRENT SALAMANDER SC FS NATIVE X A006 ROUGH-SKINNED NEWT NATIVE NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A009 DUNN'S SALAMANDER NATIVE X A009 DUNN'S SALAMANDER NATIVE X A010 DEL NORTE SALAMANDER NATIVE X A010 DEL NORTE SALAMANDER NATIVE					
X A006 ROUGH-SKINNED NEWT NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A008 RED-BELLIED NEWT NATIVE NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A010 DEI NORTE SALAMANDER SC NATIVE V A010 DEI NORTE SALAMANDER NATIVE V	X A006 ROUGH-SKINNED NEWT NATIVE X A007 CALIFORNIA NEWT SC NATIVE X A008 RED-BELLIED NEWT NATIVE NATIVE X A009 DUNN'S SALAMANDER NATIVE NATIVE X A010 DFL NORTE SALAMANDER SC NATIVE			SC FS		
X A007 CALIFORNIA NEWT SC NATIVE X A008 RED-BELLIED NEWT NATIVE X A009 DUNN'S SALAMANDER NATIVE X A010 DEI NORTE SALAMANDER NATIVE X A010 DEI NORTE SALAMANDER SC V A010 DEI NORTE SALAMANDER SC	X A007 CALIFORNIA NEWT SC NATIVE X A008 RED-BELLIED NEWT NATIVE X A009 DUNN'S SALAMANDER NATIVE X A010 DEL NORTE SALAMANDER NATIVE X A010 DEL NORTE SALAMANDER SC			50 15		
X A008 RED-BELLIED NEWT NATIVE X A009 DUNN'S SALAMANDER NATIVE X A010 DFL NORTE SALAMANDER NATIVE X A010 DFL NORTE SALAMANDER SC V A010 DFL NORTE SALAMANDER NATIVE	X A008 RED-BELLIED NEWT NATIVE X A009 DUNN'S SALAMANDER NATIVE X A010 DFL NORTE SALAMANDER NATIVE SC I/11 SC I/11			SC		
X A009 DUNN'S SALAMANDER X A010 DEL NORTE SALAMANDER C 1/11 C O O O I / 11 C O O O O O O O O O O O O O O O O O	X A009 DUNN'S SALAMANDER NATIVE X A010 DEL NORTE SALAMANDER SC NATIVE C 0 1/11 C 0 0 (= = U U U 123.41% - O - O - O - O - O - O - O - O - O -					
X A010 DFL NORTE SALAMANDER SC NATIVE ▼ ⊕ 0 1/11 • ● ● □ □ □ ● ● □ □ □ □ ● ● □ □ □ □ ● ● ● □ □ □ □ □ ●	X A010 DEL NORTE SALAMANDER SC NATIVE Image: Constraint of the second se					
				SC		-
					_	- (+)
Save to Spreaddheet (CSV) Save PDF	Save to Spreadsheet (CSV) Save PDF					
	i.			5	ave to Spreadsheet (CSV) Sav	Ne PDF
		r of spec	ies predicted for either condition i	is summarized at the bottom of the	a report. The au	uary narama
of species predicted for either condition is summarized at the bottom of the report. The query para	of species predicted for either condition is summarized at the bottom of the report. The query parame				s ispoir. The qu	Jory parame
	of species predicted for either condition is summarized at the bottom of the report. The query parameters	attions ar	e also listed at the bottom of the	report.		
of species predicted for either condition is summarized at the bottom of the report. The query parar tions are also listed at the bottom of the report.						
		dlife Habitat Rela	tionships - Version 9.0 - [Two Condition Query Report]			
tions are also listed at the bottom of the report.	ions are also listed at the bottom of the report.			nfo BioView Window Help		
tions are also listed at the bottom of the report. Habitat Relationships - Version 9.0 - [Two Condition Query Report]	Lions are also listed at the bottom of the report.				>	

The total both habi

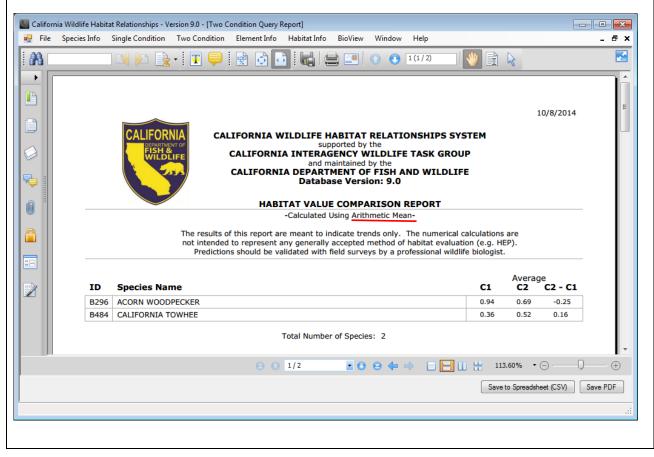
File S	Species Info Single Condition Two Condition Element Info Habitat Info	BioView Window Help	*		- 8 :	
•	X R079 GIANT GARTERSNAKE			NATIVE		
	X R080 TWO-STRIPED GARTERSNAKE	SC	BL FS	NATIVE		
	X R094 SANDSTONE NIGHT LIZARD	SC		NATIVE		
•	Total Nu	Imber of Species: 491				
	Query Parameters (C1) Included Locations All Locations Included					
9	Included Location Seasons All Location Seasons Included					
		niper, Klamath Mixed Conifer, Lodg	pepole Pine, Montan	e Hardwood,	_	
	All Location Seasons Included Included Habitats & (Stages) Aspen, Blue Oak Woodland (2M, 2D, 3S, 1, 2S, 2P), B Douglas-fir, Eastside Pine, Eucalyptus, Jeffrey Pine, Jur	hiper, Klamath Mixed Conifer, Lode Pine, Red Fir, Redwood, Sierran M	jepole Pine, Montan lixed Conifer, Subal	e Hardwood,	€	

To save the report output as a spreadsheet (*.csv) file, click on "Save to Spreadsheet (CSV)" in the lower right hand corner.

*******TIP: When CWHR is used for any official or regulatory processes, the pdf format showing the query parameters and date should be used.*******

Habitat Value Comparison Report

The *Habitat Value Comparison Report* lists the mean habitat suitability value of all habitats and stages selected for every species in the query. The suitability values for reproduction, feeding and cover are averaged using the method selected during the query process (arithmetic or geometric mean). The difference between average habitat suitability values for *Condition I* and *Condition II* (C2-C1) is also reported. For example, the report below shows the average habitat suitability for two bird species in Blue Oak Woodland with trees of size class 5 (C1) and trees of size class 3 (C2).



Weighted Habitat Value Comparison Report

The **Weighted Habitat Value Comparison Report** lists the *weighted average suitability* value and *condition rating* for each species. These values are based on user-defined weights of habitats and stages that range from 0-100. The **weighted average suitability value** is the weighted mean (geometric or arithmetic, as defined by the user) habitat suitability of all habitats and stages included in the query for each species. The habitat suitability values for each habitat and stage are weighted by the user from 0-100 and then the arithmetic or geometric mean of these values is taken. The **condition rating** is produced by multiplying the habitat weights provided by the user for each habitat stage by the average habitat suitability value to yield "habitat units". The "habitat units" are then summed to produce the condition rating. More information on the calculation of weighted habitat values can be found in the <u>Definitions</u> section.

For example, the report below shows the condition rating and weighted average habitat suitability for two bird species in Blue Oak Woodland with the following conditions:

C1: 100% large/open trees of size class 5P

C2: 50% large/open trees (size class 5P) and 50% sapling/open trees (size class 2P)

		ss - Version 9.0 - [Two Condition Query Report] ion Two Condition Element Info Habitat Info BioView Window Help							_ 8 ×
A									
		CALIFORNIA FISH & CALIFORNIA CALIFOR CALIFOR CALIFOR	WILDLIFE HABITAT RI supported by th NIA INTERAGENCY WII and maintained by NIA DEPARTMENT OF F Database Versior ED HABITAT VALUE CO	e DLIFE TA the ISH AND : 9.0	ASK GROUF WILDLIFE	5		11/10/2014	
E		not intended to represer	-Calculated Using Arithmo are meant to indicate trends t any generally accepted me validated with field surveys	s only. The thod of hal	oitat evaluatio	on (e.g. H	EP).		
	ID	Species Name	C1	condition I C2	Rating C2 - C1	Weig C1	ghted Av C2	erage C2 - C1	
	B296	ACORN WOODPECKER	100	00 66.6	-33.33	1.00	0.67	-0.33	
	B484	CALIFORNIA TOWHEE	33.0	0 66.50	33.50	0.33	0.66	0.33	
	Total Number of Species: 2 Query Parameters (C1)								
			⊖ ⊙ 1/2 • ⊙ ⊖ ⇐ ⇒	,			🗆 🔚 W 🕷	195.22% • 🖂 —	
								Save to Spreadsheet (CS	SV) Save PDF
report ou	itput as	meters selected for Condition 1 a spreadsheet (*.csv) file, click n CWHR is used for any offici	on "Save to Spreads	heet (C	SV)" in the	lower	right ha	and corne	er.

	The Control of the Co	
💀 File Speci	es Info Single Condition Two Condition BenentInfo Habitat Info BioView Window Help	_ @ ×
; 0 n 0	Query Parameters (C1)	
	Query Farameters (C1)	-
	Included Locations	
	All Locations Included	
	Included Location Seasons	
Star 1	All Location Seasons Included	
0		
<u> </u>	Included Habitats & (Stages) & [Weights]	=
	Blue Oak Woodland(5P[100], 2P[0])	
	Habitat Suitability Threshold	
	Reproduction - Low, Cover - Low, Feeding - Low	
E	Included Habitat Seasons	
	All Habitat Seasons Included	
	Excluded Elements	
	No Elements Excluded	
	Element Exclusion Threshold	
	Reproduction - Essential, Cover - Essential, Feeding - Essential	
	Included Species	
	Accorn Woodpecker, California Towhee	
	Included Special Statuses All Statuses Included	-
	⊖ 0 1/2 5 0 ⊕ ♠ ⇒ □ 🕒 🛛 💥 195.2% •⊙−	⊕
	Save to Spreadheat CS	V) Save PDF
	dife Habitat Relationships - Version 9.0 - [Iwo Condition Query Report]	
-	es Info Single Condition Two Condition Bement Info Habitat Info BioView Window Help	_ @ ×
•		<u> </u>
	Query Parameters (C2)	-
	Included Locations	
	All Locations Included	
🔁 🛛	Included Location Seasons	
0	All Location Seasons Included	
	Included Habitats & (Stages) & [Weights]	
	1/2	
11		Ξ
	Blue Oak Woodland(5P[50], 2P[50])	
	Habitat Suitability Threshold	
	Reproduction - Low, Cover - Low, Feeding - Low	
	Included Habitat Seasons	
	All Habitat Seasons Included	
	Excluded Elements	
	No Elements Excluded	
	⊖ 0 1/2 . 0 ⊕ (⇒)	
		~ 0
		Save PDF
	Save to Spreadheat (S	V) Save PDF

ELEMENT INFORMATION WINDOW

Click on Element Info in the main menu to access the Element Information Window. This window allows the user to query the CWHR database for information on the 124 habitat elements in the CWHR System. Users may query for a list of species that use a particular element, and can also access an Element Information report by species.

📓 California Wildlife Habitat Relationships - Ve	ersion 9.0
File Species Info Single Condition Tv	wo Condition Element Info Habitat Info BioView
Element Information	
Elements ACORNS ALGAE AMPHIBIANS AQUATICS - EMERGENT AQUATICS - GUIDANSPOSED	Element Definition Fruit of an oak.
AQUATICS - SUBMERGED BANK BARREN BERRIES	Element Type VEGETATIVE DIET ELEMENTS
Species -> Essential (1) Species	-> Secondary (14) Species -> Preferred (36)
BRUSH EASTER EASTER ISLAND LEWIS'S	AILED PIGEON MOUSE N FOX SQUIRREL N GRAY SQUIRREL SCRUB-JAY WOODPECKER M'S CHIPMUNK
	ep Cov Feed Rep Cov Feed
	.ii

Select an element by highlighting it in the **Elements** list. The definition of the element is shown in the **Element Definition** box and the category (i.e., vegetative diet element) is shown in the **Element Type** box.

All wildlife species predicted by CWHR to find the element Essential (E), Secondarily Essential (S), or Preferred (P) are displayed in the **Species->Essential**, **Species-> Secondary** and **Species->Preferred** association lists. The number of species on each list is given in parenthesis next to the list title. Highlighting a species name in one of these lists with a single mouse click will display the importance of the element for reproduction, cover and feeding in the **Importance Level** box below the list. Species may appear in multiple association lists if the element has different importance ratings for different life requisites.

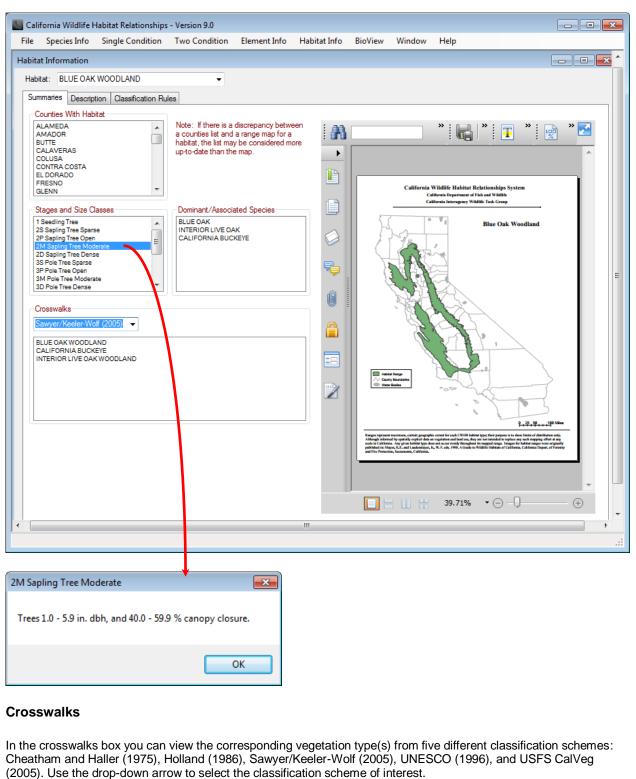
Double-click on a species name in one of the lists to open an <u>Element Information by species</u> window, which gives a list of all elements associated with that species.

HABITAT INFORMATION WINDOW

Click on Habitat Info in the main menu to access the Habitat Information Window. This window allows the user to select CWHR habitats and view information about them, including the habitat range map, written description, and classification rules.

Habitat Summary

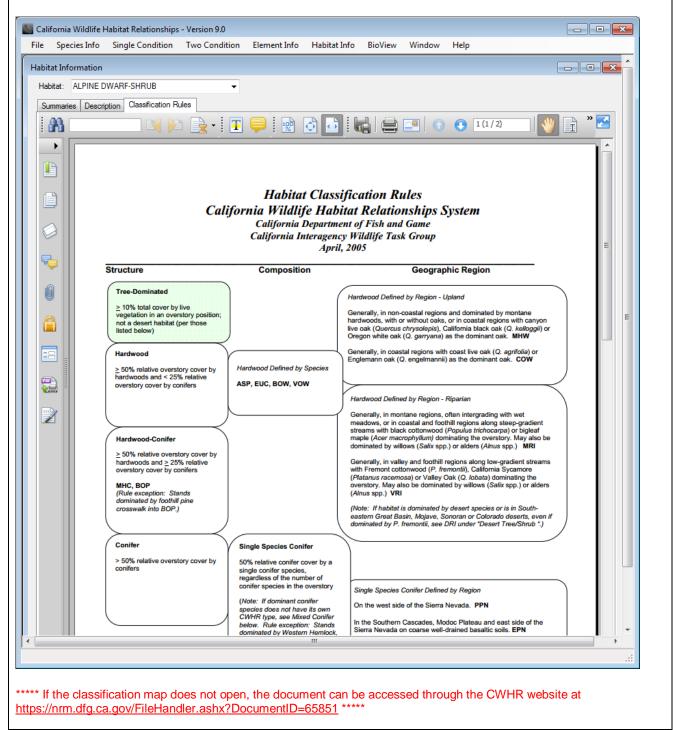
When a habitat is selected in the drop-down **Habitat** list, this page displays a geographic range map, available stage and size classes, a list of counties where the habitat in known to occur, and dominant plant species associated with the habitat. Definitions of habitat stages can be displayed by clicking on the stage name.



Habitat Descriptions To view a habitat description, click on the "Description" tab and select the desired habitat from the Habitat list. The written habitat descriptions include information on vegetation structure and composition, inclusion of the type in other classifications, information on the development and duration of habitat stages; the biological setting including wildlife use, physical setting, distribution of the habitat type, and literature cited. Salifornia Wildlife Habitat Relationships - Version 9.0 - • × Species Info Single Condition Two Condition Element Info Habitat Info **BioView** Window Help File Habitat Information • **X** Habitat: BLUE OAK WOODLAND • Summaries Description Classification Rules 20 1(1/4) 🚽 - 📘 ᆗ 👳 👌 👌 ì hit ۲ P California Wildlife Habitat Relationships System **California Department of Fish and Game** California Interagency Wildlife Task Group 7 Blue Oak Woodland Lyman V. Ritter ß Vegetation Structure-- Generally these woodlands have an overstory of scattered trees, although the canopy can be nearly closed on better quality sites (Pillsbury and De Lasaux 1983). 2 The density of blue oaks on slopes with shallow soils is directly related to water stress (Griffin 1973). The canopy is dominated by broad-leaved trees 5 to 15 m (16 to 50 ft) tall, commonly forming open savanna-like stands on dry ridges and gentle slopes. Blue 1 oaks may reach 25 m (82 ft) in height (McDonald 1985); the tallest tree, found in Alameda County, measured 28.7 m (94 ft) high and had a crown spread of 14.6 m (48 ft) (Pardo 1978). Shrubs are often present but rarely extensive, often occurring on rock outcrops. Typical understory is composed of an extension of Annual Grassland vegetation. Composition -- Blue oak is the dominant species, comprising 85 to 100 percent of the trees present. Common associates in the canopy are coast live oak in the Coast Range, - 🖸 😔 🦛 95.34% • (-) (\pm) A 1/4 ***** If the habitat description or range maps do not open, the documents can be access through the CWHR website at https://www.wildlife.ca.gov/Data/CWHR/Wildlife-Habitats *****

Classification Rules

Select the Classification Rules tab to view the revised habitat classification guidelines from "A guide to wildlife habitats of *California*" (Mayer and Laudenslayer 1988). The revised guidelines allow for the habitats added since publication of the guide.



BIOVIEW

Bioview uses habitat suitability ratings from the CWHR database for selected species and applies them to a userprovided habitat data file. The habitat data file is generally a list of polygons in a Geographic Information System (GIS) data set representing habitats and stages for a forest or project area. However, the habitat data file need not necessarily represent a GIS layer. Bioview only requires a unique identifier for each habitat and stage for which a user wants a habitat suitability value for a given species. One advantage of Bioview is that the user can provide habitat and stage selections in an input file rather than selecting them one-by-one as in a conventional CWHR query.

Bioview produces two types of output. Both types of output reports are produced are .csv files per species, with columns showing input habitat information, suitability values for reproduction (REPRO), cover (COVER), and feeding (FEEDING), and the arithmetic mean (ARITH_MEAN) and geometric mean (GEOM_MEAN) of those values.

One output contains *Standard Habitat Suitability Values* for a given species. Values provided are the CWHR expert opinion suitability ranking for reproduction, cover, and feeding (0.33 for low suitability, 0.66 for medium suitability and 1.0 for high suitability) and the arithmetic and geometric means of these three numbers are given.

The second output contains *Habitat Suitability Values Using Fuzzy Logic*. See <u>Appendix B</u> for more information on fuzzy logic. Note that fuzzy logic outputs are given as integers rather than decimals – 0 or 1 for no suitability*, 33 for low suitability, 66 for medium suitability and 100 for high suitability.

*Note that in the Fuzzy Logic Bioview output, the value for no suitability may be a 0 or a 1. A value of 1 is assigned when a habitat and stage has value for one or two of the life requisites, but not for all three. This convention was adopted to distinguish a habitat that provides some habitat value to a species, from one that does not have any. When a location has no value for any of the three life requisites, then a value of 0 is assigned. If you were to produce a Bioview GIS display of information for a species that has high value for cover (value of 100), low value for forage (numeric value of 33), and no value for reproduction, the display for reproduction would show that the location had value for one or more of the other life requisites because of the presence of "1"s in the display.

Opening Bioview

To open BioView, click on the BioView tab and choose "Create/Edit Habitat Data File", or if you already have a habitat/data file in csv format, choose "Run Bioview".

Configuring Your Data for Bioview

Bioview requires a single input file: a list of habitats, along with their size and cover classes/values, that it will return habitat suitability values for. Bioview can only accept data in a .csv ("comma-separated values") format. This is a common export format from database and spreadsheet software programs. Microsoft Excel works well for both importing data in a variety of formats and exporting it as a .csv file. You may create a Habitat Data file within the "Create/Edit Habitat Data File" tab in Bioview, or import an existing file, such as the attribute table of a GIS layer. Please check your Habitat Data file carefully. To ensure the Bioview output is correct, the file must be correctly formatted and the appropriate data must be entered for each column.

The Habitat Data file must contain four columns of data (see <u>Appendix A</u> for a list of the codes and numeric values). If you use the names shown below in green as the column headings, Bioview will automatically recognize what data the column contains when you load the Habitat Data file.

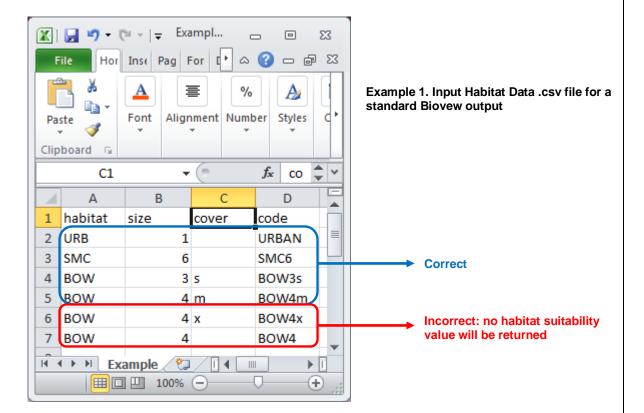
- 1. HAB_CODE: The <u>three-character habitat code</u>. (RIC is an exception. See fuzzy logic table in Appendix A.)
- SIZE: The size class code (for standard output) or dbh measurement (in inches, for fuzzy logic output). Note that Bioview needs a value in this field, even for habitats that have no size classes such as URB and BAR. Insert a "1" where this is the case, even when using the numeric values/fuzzy logic option. If this field is left blank, no suitability output will be given for that row.

- COVER: The cover class code (standard output) or percent cover value (as an integer, for fuzzy logic output). Note that for habitats with no defined cover classes, such as URB and BAR, as well as tree habitats of size class 6, the cover class field should be left blank.
- 4. **SELECTION**: The <u>selection ID</u>, a user-defined unique code representing the habitat, size, and cover class combination. This may be the polygon ID in a GIS coverage.

Bioview will only produce an output value for those habitat cover and size classes that are defined in CWHR for a given habitat type, and for those habitat types rated for a given species. Before running BioView, ensure that your Habitat Data file meets the following criteria:

 For each habitat type, a size class and cover class must be defined using the appropriate code (see <u>Appendix A</u> for a list of codes). If cells in the table are blank (except for cover class in certain circumstances, see below) or contain incorrect codes, no habitat suitability value will be returned for that row. In the example below, rows 6 and 7 (codes BOW4x and BOW4), which include a blank cell and an undefined cover class code "x", will not return a habitat suitability value, even if the species of interest has high suitability in size class 4 at any cover value.

Note that for habitats with no defined cover classes (BAR, URB, DGR, IGR, IRH, IRF, VIN, DOR, EOR), the cover class field must be left blank. In addition, size class 6, defined for many tree-dominated habitats, does not have any corresponding cover classes and the cover class must be left blank in this case. For types with no size class (BAR, URB, DGR, IGR, IRH, IRF, VIN), a "1" should be entered in the size class field.



Note: When importing a Habitat Data file from another source, such as an ArcGIS attribute table, check the values in all cells carefully to ensure that no missing or incorrect codes are present. The user may choose to replace missing or incorrect codes with a default code. For example, some GIS vegetation layers may contain blank "size class" or "cover class" cells for some polygons if the size or cover class could not be determined during vegetation mapping, or may contain codes not recognized by CWHR. The user may choose to assign these polygons the mean or median size or cover class value for that type, to ensure that a generalized suitability result is obtained for that polygon. If the cells are left blank, Bioview will return no suitability rating for that polygon, which, when translated back to the map, would be seen as 0 suitability.

2. Ensure that the habitat table only includes size and cover classes/values that are defined for each habitat type. For example, size class 6 (multi-storied tree) is defined for Redwood habitat but not Coastal Live Oak habitat. If a Habitat Data table contained a row with Coastal Live Oak, size class 6, no output value would be given by Bioview and this row would not be included in the Bioview output table. A list of habitat stages and size classes defined for a habitat type can be found on the "Summaries" tab of the Habitat Info window.

Pa	ile Hor ile III Hor ile IIIII Hor ile III Hor ile IIII Ho	Inse Pag	ample For D → △			Example 2: Input Habitat Data .csv file for a fuzzy logic Biovew output
	A3	•	· (=	<i>f</i> ∗ SM	÷~	
	А	В	С	D		
1	habitat	size	cover	code		
2	URB	1		101		
3	SMC	36	40	102		Correct
4	BOW	10	15	103		
5	BOW	20	50	104)	
6	BOW	15	0	105		Incorrect: no habitat suitability
7	BOW	18		106		value will be returned
8		ample_fuzz ge: 59.333333		···· ·	▼ 1 78	

Note: Compare the input for Sierra Mixed Conifer (SMC) in Examples 1 and 2. Size class 6, multi-storied tree with no defined cover class, does not have an equivalent category when using fuzzy logic. Fuzzy logic is based on tree diameter and percent cover only. In this example, SMC is coded as size class 6 with no cover class for the Bioview standard output. For the fuzzy logic output, the user must include not only tree size but also a percent cover value.

Create/Edit Habitat Data File

Click on Bioview, "Create/Edit Habitat Data File" to open a window that allows the user to create a Habitat Data file by selecting habitat types from a list and entering the size and cover class/value, or to load and modify a previously saved table.

Create Habitat Data File

Choose Habitats

Click "Full Habitat List" to generate a list of all available CWHR habitats. Double-click on a habitat type from that list, and the 3-letter code for that type will be added to the HAB_CODE field in the list below. Alternatively, the user can type the 3-letter code into the HAB_CODE field.

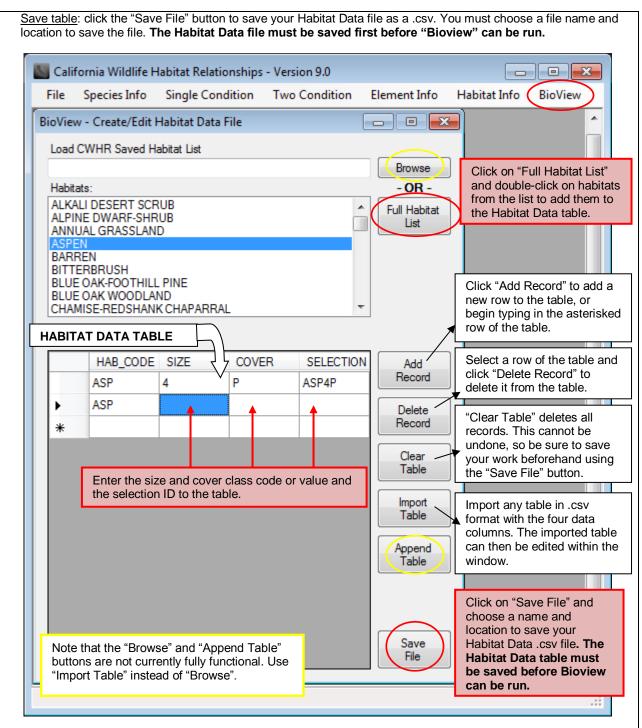
Define Size and Cover Classes/Values

The size and cover classes/values must be manually typed into the table by the user. There is no pick list available. Bioview will only produce a result if the codes or range of values entered is recognized by the program. See <u>Appendix A</u> for the list of codes and numerical values to be entered in these fields.

The "Size" field contains information on tree size, shrub decadence, or herb height. This is a numerical code for the standard Bioview output, or actual value for the fuzzy logic output. The "Cover" field contains information on canopy cover or crown closure. The cover code is a letter representing the cover class, or the actual percent cover value.

Define Selection ID

The selection ID is a user-defined alphanumeric code that identifies the habitat, size and cover class combination.



Edit Habitat Data File

Import an existing habitat data file using the "Import Table" button. Use "Import Table" instead of the "Browse" button. Once the table has been imported, it can be edited within the window. Then re-save the table using the "Save File" button.

IMPORTANT!: Check that your habitat file is correctly formatted and includes the appropriate data in each column, as described in "<u>Configuring your Data for Bioview</u>".

Running Bioview

Configure Habitat Data File

This window allows you to select an existing habitat data file. The Habitat Data file must be in .csv format and contain the appropriate four columns of data. Please review "<u>Configuring your Data for Bioview</u>" to ensure that your data is formatted correctly before proceeding with Bioview. You can modify your Habitat Data file using "<u>Create/Edit Habitat</u> <u>Data File</u>".

Click the **Browse** button to search for and select the Habitat Data file you wish to use. When you have done so, the selected file and its pathway will appear in the window. If the file is in the proper format, the columns below will fill in with data.

If the file is formatted with the default column headings, Bioview will automatically recognize the data in each column. If not, you must use the drop-down boxes below the table to identify which column contains each piece of required data.

Finally, select the type of data that is contained in the file – class data or numeric values. This is an important selection because fuzzy logic calculations can only be performed correctly on actual numeric values representing size and cover. Running fuzzy logic on size class codes will produce an erroneous result. For a description of what fuzzy logic is and how it is applied here, click on the button "What is fuzzy logic?"

Cali [.] ile		Wildlife H cies Info		Relationship e Condition	s - Version 9.0 Two Conditio	n Fler	ment Info	Habitat Info	BioView	Window	Help
			Singi	condition	Two containe		nent into	Thabitat Info	DIOVICIO	Willdow	
ioVie	w										
Con	figure l	Habitat Da	ta File	Select Specie	s						
	Hat	bitat Da	ata Fil	e:							
	D:\C\	WHR\Exa	mple.csv	1							Browse
C	Columr	n Selection									
ſ		habitat		size	cove	r	code				
	•	URB		1			URBA	N			
		SMC		6			SMC6				
		BOW		3	s		BOW3	s			
		BOW		4	m		BOW4	m			
		BOW		4	x		BOW4	x			
		BOW		4			BOW4				
	Identif				following data:						
			oitat C		Size		(Cover	Se	lection IC)
			Column		size	•	Select C	olumn	- Select	Column	•
		 Select (habitat 	Column		⊂Class Data or N	lumeric V	alues?				
		size cover			Class Data of F			eric Values			
		code			© 0033 D		0	c Will Be Used)			
						What is F	uzzy Logic?				N
											Next

Note that Bioview will allow the import of a Habitat Data file with incorrect codes, such as those used in Habitat Data Table Example 1 (pg 36), which was imported in the example shown here. The user must ensure that all codes used in the Habitat Data table are correct before running Bioview. Any rows of the table with incorrect codes will produce no result in the Bioview output table.

File Sp BioView	nia Wildlife Hal pecies Info	Single Con		Version 9.0 Two Condition	Element Info	Habitat Info	BioView	Window	Help
	A1-1-			Sel	ect Specie				
	Available AMERICA WESTERN STRIPED 3 MOUNTAI BOBCAT FERAL AS WILD PIG ELK AXIS DEEI FALLOW [I SPOTTED SI SKUNK IN LION DRSE SS	KUNK	•	_	ielected			
	MULE DE SAMBAR PRONGHO BARBARY HIMALAY FERAL GO BIGHORN	DEER DRN 'SHEEP AN TAHR DAT		Alphabetic					

Once your species selection is complete, click the "Run" button to run Bioview. You will be prompted to browse for a location to save the output report(s). A separate report (.csv file) will be generated for each species selected, named with the 4- character alphanumeric CWHR code. Note that these files will overwrite any existing files with the same name in the folder location selected.

Bioview Reports

You will be prompted to choose a folder location for your Bioview report output file. A separate .csv output file is generated for each species, named with the species 4-character CWHR code. NOTE: Each time a new output file is generated, it will over-write any other files with the same name within the selected output folder. If running different scenarios for the same species, make sure to save the outputs into different folders.

The Bioview report will only contain habitat suitability information for habitats with suitability for a given species. If habitats were included in the Habitat Data file but do not appear in the output file, this may be because 1) the excluded habitats provide no habitat suitability for the species, or 2) there was an error in the habitat, size, or cover class code in the table.

Example Bioview report for mule deer (M181) based on the Example 1 (see pg 39) Habitat Data file. Note that the habitat types from Example 1 that had incorrect cover class codes are not included in the output table.

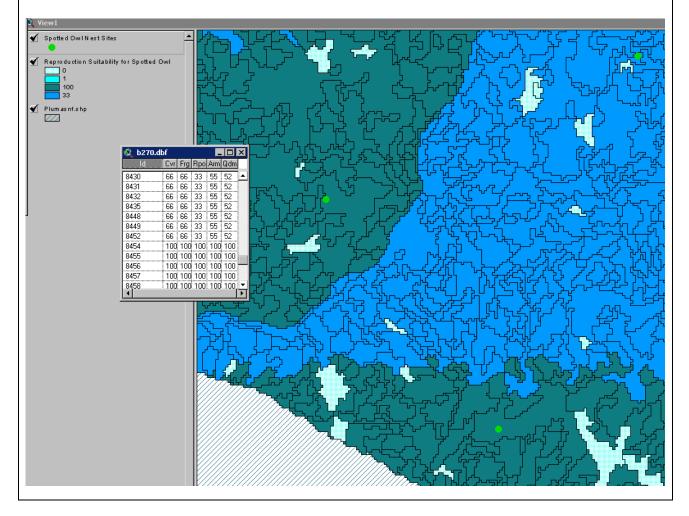
	🚽 🤊 - ((≈ - ∓		M18	1.csv - M	licrosoft E	cel		- 0	53
F	ile Ho	me Insert	t Page La	yout Fo	rmulas	Data R	leview V	iew Foxit PDF	∝ 🕜 🗆	₽ XX
-	}	Calibri BI <u>U</u>					%,	▲ ■ Inser Styles ■ Delet		27 - ₽1 -
Pas Clip	board 🖬	For	_	🖬 👔		5.0 ÷ ⊡ Num	00	 Form Cells 		ng
A2 - <i>f</i> x							~			
	А	В	С	D	E	F	G	Н	I.	J
1	SELECTIO	HAB_COD	HAB_SIZE	HAB_CC	REPRO	COVER	FEEDING	ARITH_MEAN	GEOM_ME	AN
2		BOW	3	S	1	0.66	0.66	0.77	0.76	_
3		BOW	4	M	1	0.66	0.66	0.77	0.76	
4	SMC6	SMC	6		0.33	0.66	0.33	0.44	0.42	
5	URBAN	URB	1		0.33	0.33	0.66	0.44	0.42	
6										-
H 4	I 🕨 🕅 📶	181 / 🞾 /					[◀			
Rea	dy							I 100% ⊖		-• ";

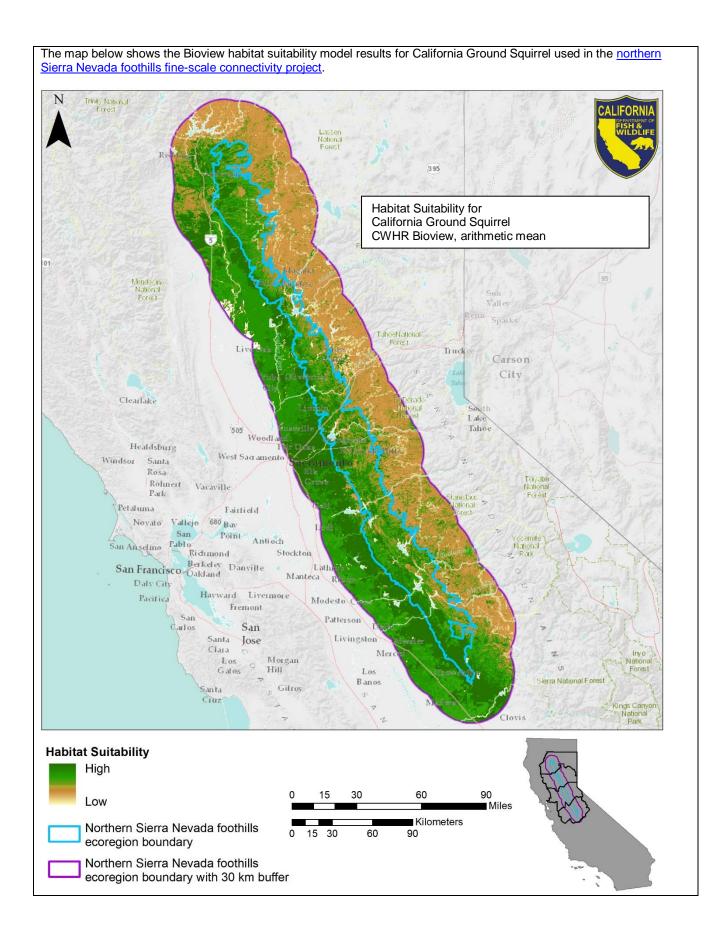
Example Bioview report for mule deer (M181) based on the Example 2 (see pg 40) Habitat Data file with fuzzy logic. Note that the habitat types from Example 1 that had incorrect cover class codes are not included in the output table.

	🔒 il) - (© - ∓			M18	1.csv - Mic	rosoft Excel			_ 6		23
F	ile Ho	me Ir	nsert	Page La	yout For	mulas D	ata Revie	w View	Foxit PDF	- (?) ⊂	- e	23
Pas	ste	Calibri BJ	<u>U</u> (3)	• 11 • • A A • A •] ≡ ≡ ≣ ≡ ≇ ≇		General \$ ≁ % .00 .00	• A	¦ ← Insert →	_		
Clip	board G	_	Font		Alignm	ent 🕞	Number	G .	Cells	Editing		~
	A	В		c	Jx SELE	CTION_ID	F	G	н	1	1	Ē
1	SELECTIO	1	CODH	-	-	REPRO	COVER	FEEDING		GEOM_MEA	N J	
2	101	URB		1		33	33	66	44	41.58		
3	102	SMC		36	40	66	66	49.5	60.5	59.96		
4	103	BOW		10	15	86.4	66	66	72.8	72.2		
5	104	BOW		20	50	100	66	66	77.33	75.8		
6	IFFI M1	181 🧷					[] ◀				•	-
Rea			æ /						100% 🗩		-+	

Displaying Output Data from Bioview using GIS

Displaying the results of your query spatially is beyond the programming language of CWHR Version 9.0 or Bioview. However, Bioview output is designed so that, for each species of interest, all habitat suitability values will appear in a single table. Because the table contains the unique identifier for each polygon or habitat code in your habitat data file, it can be joined to the attribute table in ArcGIS and used to "attribute" the spatial data. This is a simple process if you are familiar with GIS software programs. A variety of habitat suitability maps can then be created for each species showing the range of values across a forest or region or project area, be it for reproduction, cover, feeding or an average of all three. Below, the Bioview output table is used to attribute a polygon coverage of habitats in an ArcView session to create a reproduction suitability map for the Spotted Owl in a section of Plumas National Forest.





LITERATURE CITED

Mayer, K.E. and W.F. Laudenslayer, Jr., eds. 1988. A guide to wildlife habitats of California. State of California, The Resources Agency, Department of Fish and Game, Sacramento, California.

Sawyer, J.O. and T. Keeler-Wolf. 1995. A manual of California vegetation. California Native Plant Society, Sacramento, California.

Klir, G. J. and B. Yuan. 1995. Fuzzy Sets and fuzzy logic: theory and applications. Prentice-Hall Inc., New Jersey.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988. California's wildlife Volume I: amphibians and reptiles. State of California, The Resources Agency, Department of Fish and Game, Sacramento, California.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1990a. California's wildlife Volume III: mammals. State of California, The Resources Agency, Department of Fish and Game, Sacramento, California.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1990b. California's wildlife Volume II: birds. State of California, The Resources Agency, Department of Fish and Game, Sacramento, California.

DEFINITIONS

Activity Codes

Movement/Migration: Identifies random or periodic movements to different habitats.

Unpredictable Movements (U) – Individuals perform irregular, unpredictable movements.

Local Migrator (L) – Regular seasonal migrations generally limited to less than 100 miles travel distance; generally implies within-state migrations as the norm.

Distant Migrator (D) –Regular seasonal migrations generally longer than 100 miles travel distance; generally implies interstate migrations as the norm.

Non-migratory (-) – Do not engage in predictable movements away from normal home range during the year. Dispersal of juveniles is not considered a migration.

Daily Activity: Indicates the time periods when the species is active (not just most active) foraging, traveling, etc. Animals that are most active at dawn and dusk but are also active throughout the day and night (e.g. deer) are circadian, not crepuscular.

Circadian I – Active during all parts of 24-hour period. **Diurnal (D)** –Active only during daylight.

Nocturnal (N) - Active only during darkness.

Crepuscular (P) - Active only at dawn and dusk.

Seasonal Activity: Identifies seasonal activity in the broadest sense (i.e., Hibernators include facultative hibernators such as raccoons and bears.)

Yearlong (Y) - Active during all months.

Hibernate (H) – Inactive during winter.

Aestivate (A) - Inactive during summer.

Calculation Methods for Average Habitat Suitability Value

Where:

 $\begin{array}{ll} \mathsf{R} = \mbox{suitability value for Reproduction} \\ \mathsf{C} = \mbox{suitability value for Cover} \\ \mathsf{F} = \mbox{suitability value for Feeding} \\ \mathsf{SI} = \mbox{mean habitat suitability index} \\ \mathsf{N} = \mbox{number of habitat/stage combinations within a single study area} \\ \mbox{weight} = \mbox{weight (i.e., acres, percent of area, etc.) of individual habitats in query} \end{array}$

Arithmetic Mean: the arithmetic average of the numeric scores given to the habitat suitability ratings for the reproduction,

$$SI = \frac{(R+C+F)}{3}$$

cover, and feeding life requisites within an individual habitat stage. The formula is:

Therefore, a stage where reproduction suitability was rated as High=1.00, cover was rated as Medium=0.66, and feeding was rated as Low=0.33 would have an average suitability value = 0.66.

Geometric Mean: the geometric average of the numeric scores given to habitat suitability ratings for the reproduction, cover,

and feeding life requisites within an individual habitat stage. The formula is:

λī

Therefore, a stage where reproduction suitability was rated as High=1.00, cover was rated as Medium=0.66, and feeding was rated as Low=0.33 would have an average suitability value = 0.60. Using the geometric mean results in habitat suitability values of 0.00 when at least one life requisite is unsuitable.

Weighted Habitat Value Comparison Report:

Weighted Arithmetic Mean:

$$SI = \sum_{i=1}^{N} \left(\left(\frac{(R_i + C_i + F_i)}{3} \right)^* (weight_i) \right)$$

Weighted Geometric Mean:

$$SI = \sum_{i=1}^{N} \left(\sqrt[3]{R_i * C_i * F_i} * weight_i \right)$$

Element Importance Ratings

Essential: habitat element importance rating where the element is required for the species to exist; element must be present in habitat if species is to be present.

Secondarily Essential: Habitat element importance rating where the element must be present in the habitat unless its absence is compensated by presence of other secondarily essential elements in the same life requisite category.

Preferred: Habitat element importance rating where the element is marginally helpful for survival; it is preferred because use exceeds availability, and the presence of the element enhances habitat suitability, but is not essential for species to be present.

Habitat Suitability Levels

High: Habitat suitability rating where habitat is optimal for species occurrence; habitat can support relatively high population densities at high frequencies. Suitability index value = 1.00.

Medium: Habitat suitability rating where habitat is suitable for species occurrence; habitat can support relatively moderate population densities at moderate frequencies. Suitability index value = 0.66.

Low: Habitat suitability rating where habitat is marginal for species occurrence; habitat can support relatively low population densities at low frequencies. Suitability index value = 0.33

Unsuitable: Habitat stage is unsuitable for species occurrence, and the species where habitat is rated unsuitable is not expected to reliably occur in the habitat. Suitability index value = 0.00.

Harvest Species

Harvest species are defined as Game Birds (Fish and Game Code § 3500), Game Mammals (Fish and Game Code § 3950), and Furbearing mammals and Nongame animals as designated in the <u>California Code of Regulations</u>. Amphibians and reptiles designated as harvest species in CWHR are those species that are non-native and can be collected with no limit under a fishing license. See the <u>California Code of Regulations</u>, <u>Title 14</u>, Sections 5.05 and 5.60 for a full list of Harvest amphibians and reptiles.

APPENDIX A: CWHR Habitat Codes

CWHR habitats are classified using dominant existing vegetation. The major CWHR habitat subdivisions are:

- 1. Tree-dominated: Tree canopy \geq 10% cover
- 2. Shrub-dominated: Shrub canopy \geq 10% cover, and tree canopy < 10% cover
- 3. Herbaceous- dominated: Herbaceous \geq 2% cover, and <10% tree or shrub cover
- 4. Barren: Does not have canopy cover to meet Tree-, Shrub-, or Herbaceous-dominated
- 5. Aquatic: Open water > 98.0% of surface

Habitat Stages (size and cover classes):

Habitat Size Classes

Stem diameter is the primary attribute used to determine tree size with the CWHR system. Stem diameter is the quadratic mean diameter of all woody stems in the sample plot or with measurement unit >= 5 inches in diameter at breast height (4.5 ft). Shrub size classes are defined by shrub age (i.e., decadence). Herb size classes are defined by plant height of dominant herb at maturity.

	CWHR Tree Size Classes					
Size Code	Description	Diameter at Breast Height				
1	1 Seedling Less Than 1 inch					
2	2 Sapling 1 to 6 inches					
3	Pole	6 to 11 inches				
4	Small Tree	11 to 24 inches				
5	Medium/Large	Tree Greater Than 24 inches				
6	Multi-Layered	Size 5 Over Size 4 Or 3; Total Tree Crown Closure Greater Than 60%				

	CWHR Shrub Size Classes						
Size Code	Description	WHR Shrub Crown Decadence					
1	Seedling Shrub	Seedlings or sprouts < 3 years					
2	Young Shrub	None					
3	Mature Shrub	1 – 25%					
4	Decadent Shrub	> 25%					

	CWHR Herbaceous Size Classes						
Size Code Description Plant Height at Maturity							
1	Short Herb	<12 inches					
2	Tall Herb	>12 inches					

Habitat Cover Classes

Canopy cover or crown closure is another structural attribute used to classify CWHR habitat stages. For tree-dominated habitats, the % cover by overstory trees contributing to the canopy is measured. This can be done from the ground or from remotely sensed information. For shrub types the total shrub canopy is measured, and for herb types the total herb canopy is estimated.

	CWHR Cover Classes for Trees, Shrubs, and Herbs							
Cover								
Code		Closure*	(for herbaceous types and desert shrub types DSS, DSC, ASC)					
S	Sparse	10 to 24%	2-9%					
Р	Open	25 to 39%	10-39%					
М	Moderate	40 to 59%	40 to 59%					
D	Dense	60 to 100%	60 to 100%					
	for herbaceous ali desert scrub		b types including desert succulent scrub (DSS), desert scrub (DSC),					

CWHR Habitat Names

R Hab	oitat	Names				
COI	DE	CWHR NAME	Dominant/Associated Species	Type**		
ADS	S	Alpine-Dwarf Shrub	Oceanspray, Greene Goldenweed, Mountain Heather	S		
AGS	S	Annual Grassland	Wild Oats, Soft Chess, Brome Species	Н		
ASC	С	Alkali Desert Scrub	Allscale, Saltbush Species, Shadscale	S		
ASF		Aspen	Aspen, Willows, Alders	Т		
BAF		Barren	Rock, Gravel, Soil	В		
BBF		Bitterbrush	Bitterbrush Species, Big Sagebrush, Rubber Rabbitbrush	S		
BOF		Blue Oak-Foothill Pine	Foothill Pine, Blue Oak, Interior Live Oak	T		
BO		Blue Oak Woodland	Blue Oak, Interior Live Oak, California Buckeye	T		
CO		Coastal Oak Woodland	Coast Live Oak, Engelmann Oak, Island Oak	T		
CPC		Closed-Cone Pine-Cypress	Sargent Cypress, Monterey Cypress, Monterey Pine	T		
CRC		Chamise-Redshank Chaparral	Chamise, Redshank, Ceanothus Species	S		
CSC		Charlise-Redshark Chapartai		S		
			Coyotebush, California Buckwheat, Sage Species	T		
DFF		Douglas Fir	Douglas Fir, Tanoak, Ponderosa Pine			
DG		Dryland Grain Crops	Cereal Rye, Barley, Wheat	D		
DO		Deciduous Orchard	Almonds, Walnuts, Peaches	D		
DRI		Desert Riparian	Tamarisk, Mesquite, Fremont Cottonwood	Т		
DSC		Desert Scrub	Creosotebush, Catclaw Acacia, Desert Agave	S		
DSS		Desert Succulent Shrub	Octillo, Mojave Yucca, Desert Agave	S		
DSV		Desert Wash	Paloverde Species, Desert Ironwood, Mesquite	S		
EOF		Evergreen Orchard	Oranges, Avocados, Lemons	D		
EPN	N	Eastside Pine	Ponderosa Pine, Jeffrey Pine, White Fir	Т		
EST	Г	Estuarine	Plankton, Algae, Eel Grass	Α		
EUC	С	Eucalyptus	Blue Gum, Red Gum	Т		
FEV	N	Freshwater Emergent Wetland	Cattail, Bulrush, Redroot Nutgrass	Н		
IGR		Irrigated Grain Crops	Corn, Dry Beans, Safflower	D		
IRF		Irrigated Row and Field Crops	Tomatoes, Cotton, Lettuce	D		
IRH		Irrigated Hayfield	Alfalfa, Hay	D		
JPN		Jeffrey Pine	Jeffrey Pine, Ponderosa Pine, Sugar Pine	T		
JST		Joshua Tree	Joshua Tree, Juniper Species, Mojave Yucca	T		
JUN		Juniper	Juniper Species, White Fir, Jeffrey Pine	T		
KMC		Klamath Mixed Conifer	White Fir, Douglas-Fir, Ponderosa Pine	T		
LAC		Lacustrine	Plankton, Duckweed, Water Lilies	A		
LPN				T		
		Lodgepole Pine	Lodgepole Pine, Aspen, Mountain Hemlock	S		
LSG		Low Sage	Low Sagebrush, Black Sagebrush, Rabbitbrush Species			
MAF		Marine	Plankton, Algae, Kelp	A		
MCI		Mixed Chaparral	Scrub Oak, Ceanothus Species, Manzanita Species	S		
MCI		Montane Chaparral	Ceanothus Species, Manzanita Species, Bitter Cherry	S		
MH		Montane Hardwood-Conifer	Ponderosa Pine, Incense Cedar, California Black Oak	Т		
MH\		Montane Hardwood	Canyon Live Oak, California Black Oak, Oregon White Oak	Т		
MRI		Montane Riparian	Black Cottonwood, Bigleaf Maple, White Alder	Т		
PAS		Pasture	Bermuda Grass, Ryegrass, Tall Fescue	Н		
PGS		Perennial Grassland	California Oatgrass, Hairgrass, Sweet Vernalgrass	Н		
PJN		Pinyon-Juniper	Pinyon Species, Juniper Species, Mountain Mahogany Species	Т		
POS		Palm Oasis	Fan Palm, Velvet Ash, California Sycamore	Т		
PPN	N	Ponderosa Pine	Ponderosa Pine, Jeffrey Pine, Douglas Fir	Т		
RDV	W	Redwood	Redwood, Grand Fir, Sitka Spruce	Т		
RFF		Red Fir	Red Fir, White Fir, Lodgepole Pine	Т		
RIC		Rice	Rice	D		
RIV		Riverine	Water Moss, Algae, Duckweed	Ā		
SCN		Subalpine Conifer	Engelmann Spruce, Subalpine Fir, Mountain Hemlock	T		
SEV		Saline Emergent Wetland	Cordgrass, Pickleweed, Bulrush	H		
SGE		Sagebrush	Sagebrush Species, Rabbitbrush Species, Horsebrush	S		
SMO		Sierran Mixed Conifer	Douglas Fir, Ponderosa Pine, White Fir	T		
		Urban	Grass Lawns, Ornamental Trees, Hedges	D		
	<u>ں</u>			D		
		Vinevard	I Granas KIWI Fruit Kovsannarries			
VIN		Vineyard Valley Oak Woodland	Grapes, Kiwi Fruit, Boysenberries	_		
VIN VOV	l W	Valley Oak Woodland	Valley Oak, California Walnut, California Sycamore	T		
VIN VOV VRI	W	Valley Oak Woodland Valley Foothill Riparian	Valley Oak, California Walnut, California Sycamore Cottonwood, Sycamore, Valley Oak	T		
VIN VOV	W R	Valley Oak Woodland	Valley Oak, California Walnut, California Sycamore	T		

**T = tree-dominated, S = shrub-dominated, H = herbaceous-dominated, A = aquatic, D = developed, B = barren

Discontinued Types

These habitat types were used in previous versions of CWHR, but have been replaced with new types.

<u> </u>	abilat typee were deed in previewe versione of evening bachave been replaced mariner typee.							
	Old Code	Old Type Name	Replaced by					
	CRP	Cropland	DGR, IGR, IRH, IRF, RIC					
	OVN	Orchard and Vineyard	DOR, EOR, VIN					

Using Numeric Values with the Fuzzy Logic Option

Below is a guide to the numeric values which should appear in the size and cover fields if you are using the fuzzy logic option.

Habitats	Size Column	Cover Column
Tree Habitats	dbh or QMD ¹	% cover ²
Tree Habitats with No Cover Class (DOR,EOR)	dbh or QMD ¹	
Shrub Habitats	% decadence ²	% cover ²
Herb Habitats	height ¹	% cover ²
Aquatic Habitats	% time exposed ²	
Habitats with One Class (BAR, URB,DGR,IGR,IRH,IRF,VIN)	any value between 0 and 100	
Rice (RIC)		
This is a special case as cover values are defined for non-flooded rice habitat and depth values for flooded rice habitat.	Please note: habitat suitability values for rice are not currently available using the fuzzy logic option in Bioview.	

¹ Diameter at breast height (dbh) or quadratic mean diameter (QMD) should be in inches. ² Percentages should be entered as an integer between 1 and 100.

APPENDIX B: FUZZY LOGIC AND ITS APPLICATION TO CWHR

Robert J. Laacke, United States Forest Service Pacific Southwest Research Station

Some Background – Fuzzy Logic or Fuzzy Thinking?

Fuzzy Logic is a semi-popular term referring to an emerging branch of mathematics that is sometimes called multi-valued set theory. This section is an attempt to describe the concepts and applications of this mathematics of uncertainty as it applies to wildlife habitat evaluations. The theoretical and mathematical underpinnings for fuzzy logic are clearly beyond the scope of this document. Although, for those with a serious interest in mathematical theory, the treatise "Fuzzy Sets and Fuzzy Logic: Theory and Applications" by George J. Klir and Bo Yuan (published by Prentice-Hall Inc. of New Jersey) is highly recommended.

In the simplest terms, fuzzy sets represent the mathematics of uncertainty, an emerging response to the recognition that little in the real, physical, and especially in the biological world is clear-cut and unambiguous. That the real world is only defined with uncertain, ambiguous, and incomplete data should be no surprise to those who regularly attempt to understand, explain, and/or manage natural systems. However, in many ways, such a reality is a recent discovery in the field of mathematics. From this recognition, and the "first" formalizations of a mathematics of uncertainty (fuzzy mathematics) by Lotfi Zadeh in the 1960's, has grown a respectable body of theory, proofs, and practice.

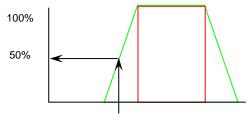
Fuzzy logic is not confused thinking, but a recognition that little in the world is clearly one thing or another. Fuzziness (not error) arises from classes of objects the boundaries of which cannot be well defined. A can of paint that contains no color but green is a member of the fuzzy class "green paint". As the proportion of green is reduced by the addition of blue dyes, the paint slowly begins to turn color. When is it not green? When is it "sea foam green" or cyan or turquoise? It could be conceived that when there is only green dye, membership in the class green paint is 100% and membership in the class blue paint is 0%. As blue dyes are added, the "blueness" of the paint increases (membership in class blue increases above 0) and at some point membership in the class green decreases. Turquoise, for example, could be described as a 65% member of the class blue and a 35% member of the class green.

Why Apply Fuzzy Logic to CWHR?

Fuzzy logic is ideally suited for application to the biological world where the differences (boundaries) between "things" are, at best, unclear. When is an erect woody plant a tree rather than a bush? When is a forest great habitat, versus good habitat or poor habitat? The kind of habitat represented by a forest with an average stand diameter of 45 inches and a crown cover of 90% is very different from a dense thicket of young trees whose average diameter is 4 inches, and crown cover 90%. But, does a forest with an average stand diameter of 12 inches represent a different quality of habitat than one with a diameter of 10 inches? Probably not, at least in the real world. This question identifies the fuzzy nature of the CWHR habitat suitability models.

The CWHR models use environmental variables expressed as classes (crown decadence and percent ground cover for shrub habitats), with a suitability rating for each combination. These classes are fuzzy sets with unclear and ambiguous boundaries. Bioview applies fuzzy logic to these classes to provide a more realistic evaluation of habitat suitability.

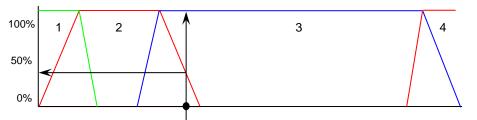
The figure to the right represents a single CWHR class (of any variable) with the vertical lines the CWHR class boundaries. Maximum membership is 100% and all values of the variable on the x-axis between the vertical lines are 100% members in the class. Values that fall between the vertical and the slanting lines are partial members of the class. Their degree of membership is determined by where their vertical extension intersects the diagonal line. In this example degree of membership in this specific class is just less than 50%. Values outside the slanted lines have zero membership in the class. Any value can have partial or complete membership in one or more additional classes as explained below.



How is Fuzzy Logic Applied to CWHR in Bioview?

Bioview applies a linear boundary for the fuzziness although any shape, including logarithmic and sigmoid, is appropriate as long as it represents the change in uncertainty with closeness to the boundary. For many sets the fuzziness can be calculated or measured and the best shape derived.

By extending the previous diagram to cover the full range of a variable (e.g., size class for forests) it becomes obvious that every point is a member in at least one class. Points that fall in the fuzzy regions, defined by the slanted lines, are members in two classes. The point illustrated is a full member of Size Class 3 and about a 40% member of Size Class 2. If, in this example, the habitat value



for Northern Goshawk is high in Class 3 and medium in class 2 the actual value of the habitat lies somewhere between medium and high. Size Class 3 contributes a full membership in a set of high habitat value and Size Class 2 contributes a 35% membership in a medium value. The net value (from size alone) is a balance of the two.

However, CWHR does not use just one variable for determining habitat suitability. In the case of forests there are two, size and cover. And there is a CWHR model for every combination of those two variables. Because fuzzy sets can be combined in any number, Bioview evaluates the variation in habitat suitability with size and cover independently, and then combines them in one "unfuzzied" value.