Title

PLANNING FOR SPECIES ADAPTATION AND CLIMATE RESILIENCE IN CALIFORNIA'S PRIMARY SOURCE HEADWATERS

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FINAL REPORT FOR WCB GRANT WC-1835JG

THE PACIFIC FOREST TRUST

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Introduction and Summary: the purpose and context of this project

The 7-million-acre Sacramento River Headwaters Region, and its surrounding 3-million-acre buffer zone, has an extraordinarily important role for biodiversity as well as water supply in California. Delineated by three mountain ranges (the northern Sierra, southern Cascade and Klamath-Trinity) it has a widely varied topography, range of soil types and geology that support an extraordinarily wide variety of plants and habitats. The region contains over 80% of California's natural habitat types and hosts over 60% of its vertebrate species, 62 of which are imperiled. One of 33 globally recognised biodiversity "hot spots", it is also the source of the vast majority of California's utilized water, supplying the largest reservoirs which are the backbone of the state water system.

Many species and habitats are already under assault in California due to habitat loss, cover type and land use conversion and habitat degradation. Climate change is clearly exacerbating this trend. This region has more intact habitats than most in California, and presents more opportunity to stem habitat loss and reverse degradation, due to its relatively lower human settlement footprint and population. Meta-analyses show that this region has remained cooler and wetter than the rest of the state over the past 100-125 years, providing a reliable context for consistent habitat function. With such a major role in supporting California's biodiversity, the focus of this project was to evaluate how persistent this habitat service might be in the future 100 years as climate change intensifies.

We utilized the two more plausible Representative Concentration Pathway (RCP) climate change scenarios, the RPC 4.5 and the RPC 8.5, and modelled these under both of the two leading global climate change models: the MIROC—which projects a warmer and drier future- and the CRNM—which projects a wetter and warmer future—downscaled to California. Our project identified where the models agree that conditions supporting refugia—and connecting corridors/safe passage to them- will be 2040, 2070 and 2100. Specifically, we identified where there was a consensus outcome of both models identifying where temperature and precipitation regimes would continue to support the natural habitats—and the amazing array of biodiversity they contain-currently existing in the region. These are critical areas for conservation and restoration, as they will likely continue to support current habitats even under climate change.

Additionally, we identified where exposure to precipitation and temperature changes was relatively more moderate, and thus these areas have a strong potential for being able to be resilient under climate change, especially if these areas had been managed to have more natural resilience. These also have high value for conservation and restoration, as they may serve as buffers and risk mitigation allowing more opportunity for species to survive.

Finally, we identified those areas where the projected changes in precipitation and temperature will cause environmental stress so great as to likely no longer support the existing habitats, and thus the biodiversity they support. These areas may have high value for conservation for a variety of reasons, but the habitats they support currently are not projected to persist.

The overall trajectory of climate change impacts under our present pattern is indeed grim; for example, models project the virtual disappearance of some key habitat types such as wet meadows in the region by 2100. Yet the analysis also illustrated ways in which our actions in the nearer term can change that trajectory, as well as buffer the likely impacts of climate change. Importantly, we identified that the region will likely support almost 5 million acres of consensus refugia, with an additional 1.5 million acres of probable or possible refugia under moderate stress, by 2040. A clear focus on conserving and restoring the private ownerships in these areas, as well as a focus on restoration in the public lands therein, will greatly enhance the likelihood of habitat persistence and species survival. Tables containing all the data on likely persistence over the three time periods analysed (2040, 2070 and 2100) as compared to the present, by habitat type and ownership, are included Appendices.

Amongst the takeaways of particular note in the project are the following:

1) Under the RCP 8.5 scenario, we stand to lose twice as much of our current habitat area as under the RCP 4.5 scenario. We are currently on or exceeding the 8.5 scenario. A key way to reduce emissions is through land conservation and restoration, especially in forest types. Dominated as it is by forest habitat, and with much of the privately owned forest quite young relative to its natural age range and thus under its natural carbon sequestration capacity, the region is a potentially very strategic one for biodiversity conservation, increased forest carbon sequestration, and reducing the probability of continuing on the 8.5 scenario.

2) There is significant checkerboarded ownership in the region between federal and private lands. Conserving and restoring private lands will be key in ensuring these habitats persist functionally across the landscape overall. It is also essential to ensuring that there are viable connections to and from refugia on public lands, especially those in lower elevations and with high productivity and water resources, where private ownership is more prevalent. Species are already moving upslope from the Central Valley to this region.

3) While this region overall shows a higher likelihood of persistent habitats on the landscape as contrasted with the state writ large, two watersheds within it really stand out as critical refugia: the Upper Trinity and McCloud watersheds. Higher elevation areas within the Pit, Feather and Upper Sacramento watersheds are also significant refugia. Additionally there are key north-south corridor regions and areas that are identified as particularly valuable as connectors to those refugia. These include from the northern extent of the Central Valley into the Upper Trinity, Sacramento and McCloud watersheds, and east west from the Warner Mountains across to the Siskiyou Crest, Mt Shasta and the Upper Trinity and McCloud watersheds, as well as upslope west east movement from the Central Valley into the Sierra.

4) The project identifies the critical role of “microrefugia”, smaller scale areas that tend to be cooler because of their topographic positions. These microrefugia have persistent habitat conditions over time within larger landscapes that will likely no longer support those habitats, essentially providing buffering capacity under climate change. Conserving these as

spatial stepping stones to larger refugia within and across less hospitable landscapes will be a valuable conservation strategy. The project allows identification of temporal "refugia" that may shrink or potentially disappear by end century, but will be key in the nearer term decades.

5) Actions in the region for enduring species adaptation and climate resilience meet multiple state goals. Conserving and restoring those areas which rank as refugia and lower/moderate exposure regions today will meet multiple state goals in addition to those identified in the state Wildlife Action Plan and Adaptation Plan. Doing so would have an enduring impact for Governor's Executive Order N-82-20 , the "30x30". As this region includes much of the state's most productive conifer forest and forest carbon sink, this would also increase the state's chances of meeting its goals of being carbon neutral by 2045. The same actions that promote and retain resilient habitat will have a positive impact for water, extending release times for cold water in the summer months, increasing retention time during major precipitation events and increasing overall inflow as well as natural storage by hundreds of thousands of acre feet of water. These also reduce threats of catastrophic wildfire and increase net resilient carbon sequestration, amplifying the social and economic benefits of these actions further.

The project has a wide variety of applications for land managers in addition to those managing for species survival. Potential end-users include land owners and managers, land use planners, county, regional, state and federal natural resource decision-makers. A series of "use cases" are included in the report illustrating some of these applications. As the first climate change analysis that includes the impact of the intensity of climate change that a habitat is exposed to across the landscape, and with the analysis scaled down to units of 25 acres, the results are useful both on a specific property and to assess that property's habitat & biodiversity role in the larger landscape over time as well as space. This is directly applicable in developing conservation, restoration and management plans over the next several decades.

In addition to the use cases described in the report developed at the region-wide scale, PFT is currently applying this analysis and decision support tool within the region on a specific 11,000-acre property to assess key management and conservation actions, integrating property specific data. Factors we are assessing include:

- the long-term refugia role the property can play and for which species
- the likely long-term value of wet meadow restoration to historic natural extent;
- the role the property may play as a "receiving site" for specific species moving with climate change, and
- the potential to reestablish enduring functional connectivity over time within forest habitats of the property that currently show as not serving that function but provide bridges to refugia outside as well as within the property.

This analysis will aid significantly in planning for the management and conservation actions on that property, and as a template for further use.

While the project has been completed with data sets that cover the entire area, it can be customized with more specific site data, as it will be for the application noted above, which extends the applicability, and increases the fine grain of the tool. Additionally, the analysis could be extended to other regions of the state, enabling a statewide picture and allowing for broader planning for species migration.

Regional Assessments

We combined maps to identify priority areas for a range of land management objectives. The three top-level maps are: Climate refugia and areas of expected high climate stress; Landscape and climate connectivity; and potential terrestrial species richness. We also incorporated regional metrics for climate microrefugia, vegetation structure, land use intensity, and species distribution models for analyses targeting different management objectives. In turn these maps were built upon a set of input maps detailed in the methods, but including California state's vegetation map (CAL FIRE 2015), a 10 m digital elevation map, land tenure, climate data, fire metrics and hydroclimatic variables from the Basin Characterization Model (BCM; Flint & flint 2012; Flint et al. 2013; Thorne et al. 2015).

This results section features 2 categories of results – overall selection of areas in response to the 3 primary maps, and a series of use cases, demonstrating how different combinations of the assembled data can be used to address different land management questions.

The GIS layers compiled for this effort will be available in the form of 2 geodatabases, called "Hexagon Data" and "Input Data", and associated documentation that will be delivered to the Wildlife Conservation Board for further use. The structure of the GIS is intended to permit others to use the outputs to assess the regional context for both site-specific and watershed-scale climate change adaptation and mitigation planning and projects.

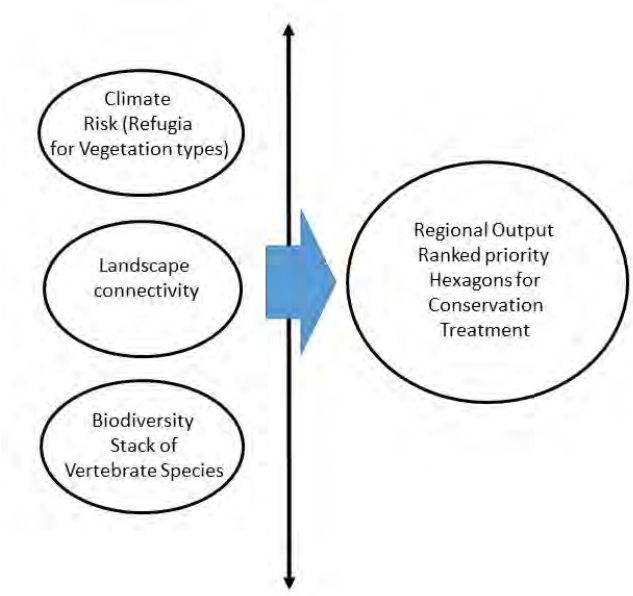
Because tables associated with the results are voluminous, we cite tables in the text as digital appendices. The appendices are a series of excel tables, most with multiple tabs. Each Excel Table has a Read Me tab, and each tab has the equivalent of a short caption listed at the top of the its page. There are 4 Digital Table Appendices:

- Climate Refugia Appendix Table 1
- WHR and Climate Exposure Appendix Table 2
- Connectivity and Climate Exposure, Appendix Table 3
- Potential Species Richness and Climate Exposure, Appendix Table 4

Finally, methods are provided in two places. The primary descriptions of analyses are in a methods section in this main body of the report, after the results. Those are further supported by a Methods appendix. These two sections follow the same data sequence, and can be related to the GIS files.

1) Regional Assessment Results

The overall rankings combine maps of end-century climate refugia based on vegetation types with high priority areas for landscape connectivity and high potential species richness to derive relative rankings for each of the >408,945 hexagons.

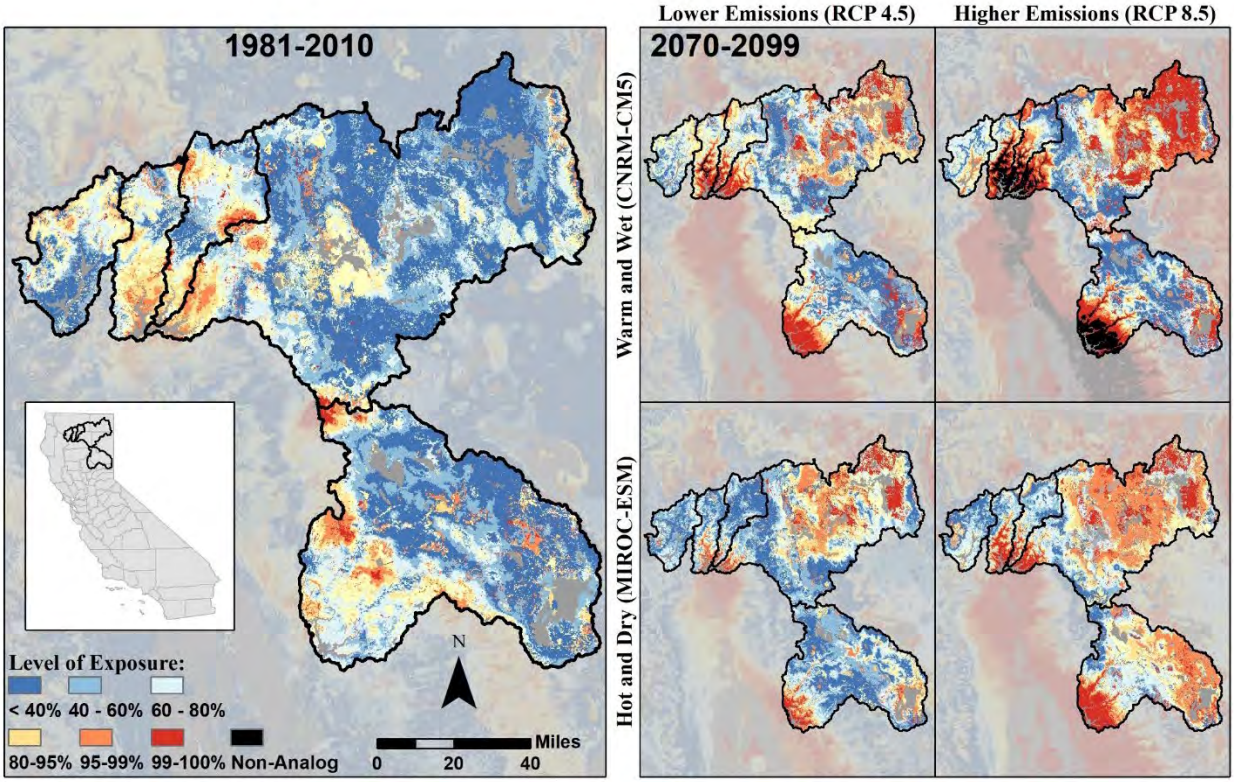


We identified climate refugia and areas of high climate stress across the region. Both biodiversity and connectivity were mapped across the entire region. These two were each ranked from 1 – 5, with higher numbers indicating either greater species richness or more critical linkages.

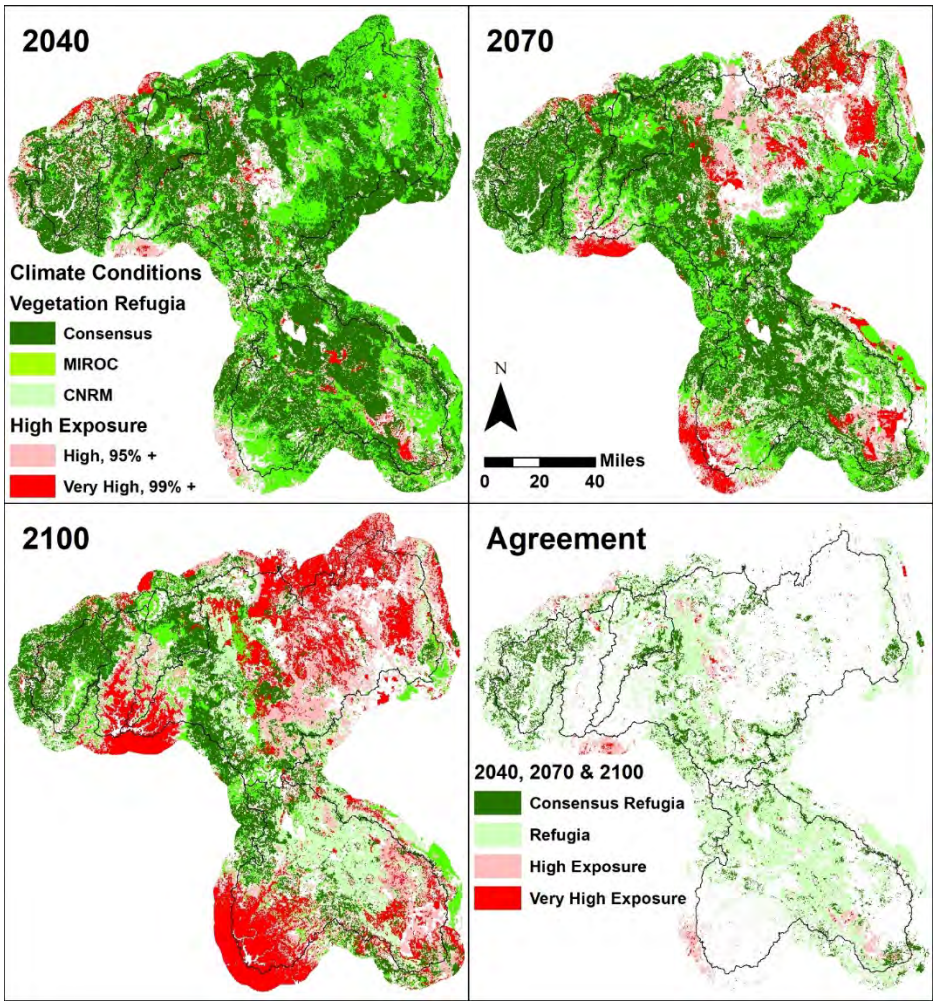
These three metrics can be combined in various ways to highlight different parts of the landscape.

Vegetation Refugia / Climate Exposure

We used a place-based climate exposure method that identifies the relative level of climatic stress across all locations of each vegetation type found in the state (Thorne et al. 2016, 2017). The level of exposure in current time (we used a baseline of 1980-2010), is then used as a classification to identify future levels of stress for the vegetation, without predicating where a vegetation type might move to. The image below shows how climatic stress is expected to change for the SRHR by the end of century under a wetter and a drier future climate projection. The column on the right shows future exposure under current rates of emissions (RCP8.5), while the left column shows future exposure if lower, near-Paris accord rates of emissions are achieved (RCP4.5). Blue areas are where the current vegetation remains in climatic conditions that it currently occupies up to 80% of the time, and are considered not-stressful. Orange and red areas are climates that the vegetation currently occupies only 5% of the time, while black areas represent future climates that do not currently occur in California (Non-analog).

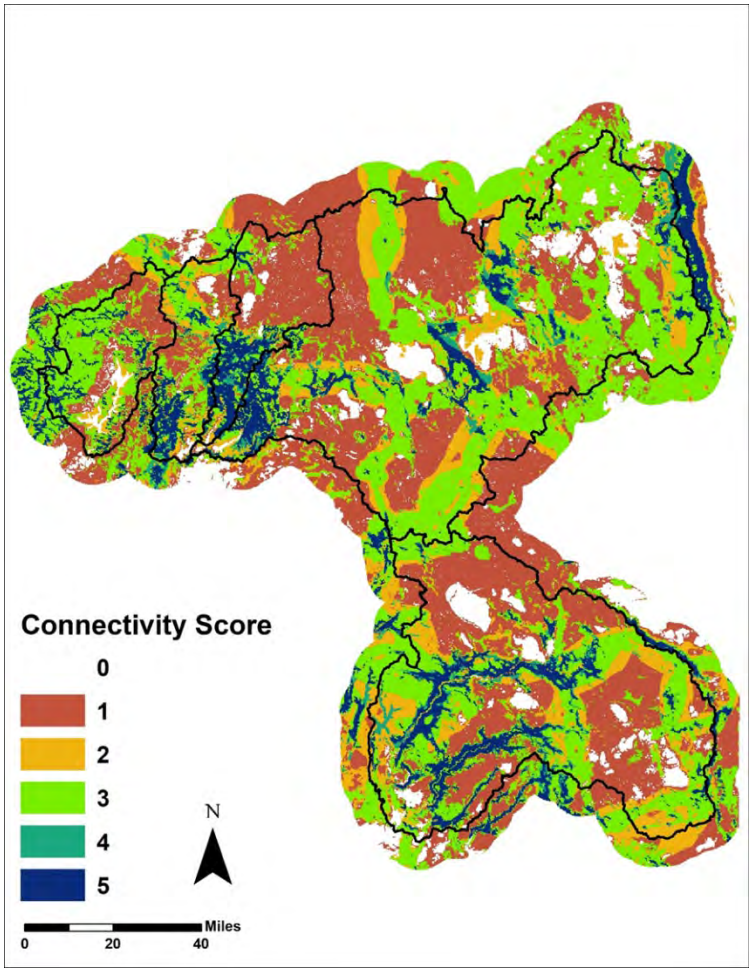


Consensus refugia are areas that are expected to remain climatically suitable for existing vegetation under both the wetter and the drier future (Thorne et al. 2020), and are the areas where we have the highest confidence that existing vegetation could be managed for retention. Consensus refugia make up 49% of the SRHR by 2040, 37% by 2070, and 19% by 2100. The consensus refugia areas that overlap in the 3 time periods occupy 706,000 acres, 7.5% of the region (Climate Refugia Appendix Table 1). The shifting location of consensus refugia suggests that a stepping stone approach for movement of populations of some species across the landscape may be a good strategy. However, some areas are consensus refugia in all three time periods, as shown in the 'Agreement' panel in the image below. The Agreement consensus refugia comprise 759,307 acres (7.6% of the SRHR) under RCP8.5, and 2,527,218 acres (24.4%) under RCP4.5. The difference is one of the largest indications of the urgency of reducing global emissions that emerged from this work.



The SRHR contains 49 CWHR landcover types, including 35 natural terrestrial vegetation types that are the focus of this paragraph (WHR and Climate Exposure Appendix Table 2). Among these, the five retaining the greatest extent in consensus refugia are: Sierran Mixed Conifer, Montane Chaparral, Klamath Mixed Conifer, Ponderosa Pine, and Douglas fir (descending order). Among the types with the greatest areas in high end-century exposure are: Eastside Pine, Low Sage, Sierran Mixed Conifer, Montane Hardwood, and Sagebrush. In some cases, types with relatively limited extent, either within the region or across the state, but that have significant habitat value appear highly exposed, including those with >90% high-to-very-high end century exposure: Alpine Dwarf Scrub, Chamise-Redshank Chaparral, Freshwater Emergent Wetland, Bitterbrush, Valley Oak Woodland, Blue Oak woodland, & Low Sage. Two types that we considered to be misclassified in the region, with very limited extents, had 100% high exposure by end century, Coastal Oak Woodland, and Coastal Scrub. Some types have relatively higher proportion within end-century consensus refugia, including Montane Riparian (80%), Montane Chaparral (64%) and Klamath Mixed Conifer (56%). Wet Meadows, an important landscape feature of limited extent show 31% in high exposure and 1% in consensus refugia by end century. The 59% in moderate levels of exposure suggest that there may be opportunities to increase the resilience of this type. A similar finding is true for Red Fir, which has 17% in high exposure and 2% in consensus refugia, meaning about 81% of its 323,261 acres may be suitable for some treatments to increase resilience.

Connectivity & Climate Risk



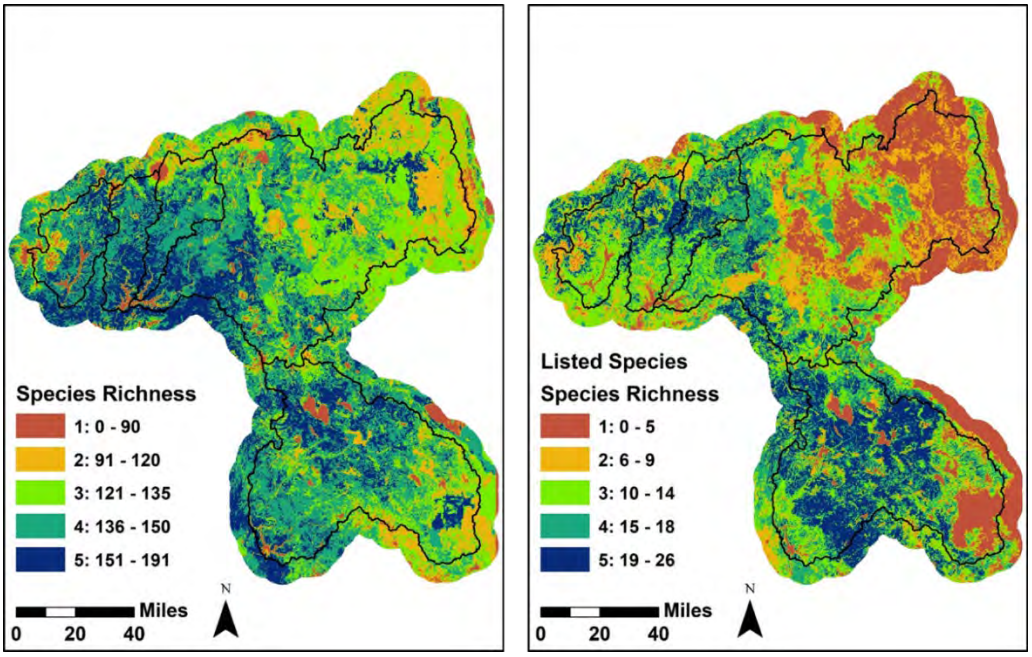
Landscape connectivity is essential for species movement, and that need is amplified as land use and climate change further disrupts the natural patterns of vegetation (Keeley et al. 2021). Natural resource managers and transportation planners need standardized measures of connectivity for their planning purposes. We reviewed connectivity models for the region, and selected two models that cover the entire region. A number of species-specific models, such as for fisher and martin, were not included because they did not cover the entire region. Those are candidates for use in conjunction with what is presented here. We used the California Essential Habitat connectivity (CEHC) model that estimates connectivity in for current time, and an Omniscape-based model produced by The Nature Conservancy, that links analog climates through time. We combined these models (Methods) and ranked the landscape from 0- 5 as a rough measure of connectivity importance with the majority value in hexagon assigned to that hexagon. About 8% of the region has the highest connectivity ranking. Much of these lands also prove to terminate in end-century climate refugia.

		Acres	%
Connectivity Ranking	**5**	826,067	8.31
	4	322,793	3.25
	3	3,302,900	33.21
	2	1,270,580	12.78
	1	3,352,438	33.71
	0	871,030	8.76
	Total:	**9,945,808**	

In 2040, 53% of the highest ranking connectivity is in consensus refugia and 5% is consensus highly exposed. However, by end-century, 15% of the highest priority connectivity ranking is in consensus refugia, 6% is in consensus moderate exposure, and 24% is in consensus high climate

exposure (Connectivity and Climate Exposure, Appendix Table 3). The decline in high-ranked connectivity areas in consensus refugia points to the need to maintain sufficient traversable space to permit access to refugia, which in some cases will call for a stepping stone approach (Albert et al. 2017).

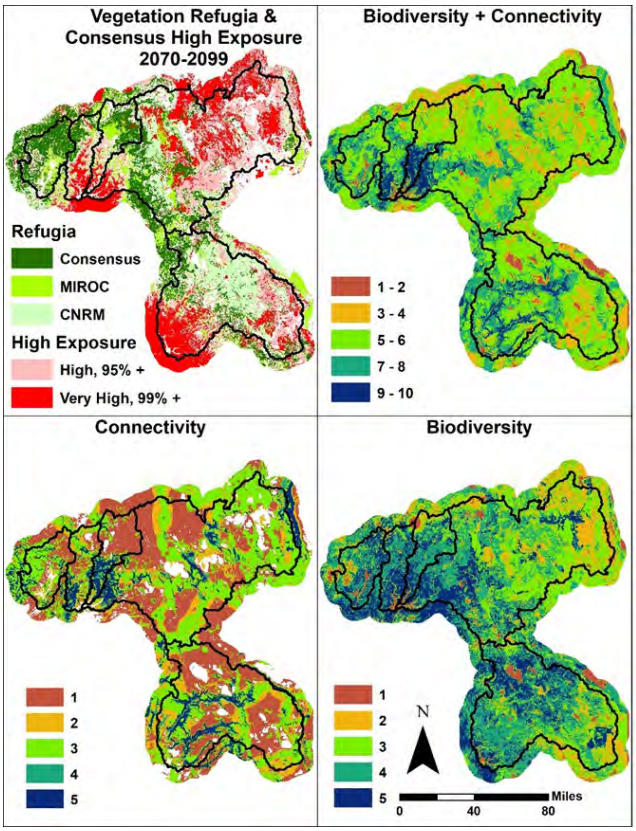
Biodiversity / Species Richness



We aligned our models of biodiversity with California Department of Fish and Wildlife (CDFW) that uses the California Wildlife Habitat Relationship (CWHR) model to identify suitable habitats for each terrestrial vertebrate in the state, and also has a range map for each species. Using the state's 30 m resolution map for CWHR types (FVeg: https://frap.fire.ca.gov/mapping/gis-data/), we mapped the suitable range for all vertebrates whose range covers any of the SRHR. We then added all species on a per grid cell basis and identified the mean potential species richness for each hexagon. We identified 417 species and 62 listed species to be potentially present in the region.

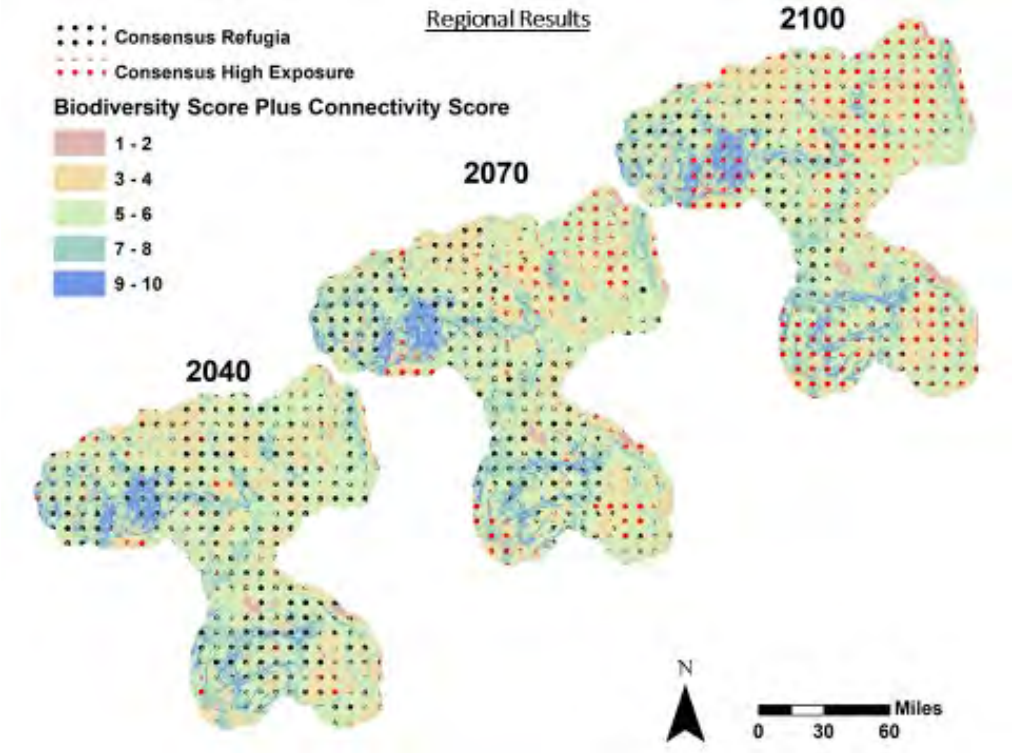
About 71% of the current extent of highest ranked potential species richness areas are in refugia zones in the baseline time period. Consensus refugia, only measurable in future conditions, contain 47% of current highest species richness areas by 2040, declining to 45% by 2070, and 25% by end-century. There is a corresponding increase in rank 5 species richness area under consensus climatic stress, from 4% by 2040, to 13% by 2070 and 21% by end-century (Potential Biodiversity and Climate Exposure, Appendix Table 4).

Climate, Connectivity & Biodiversity

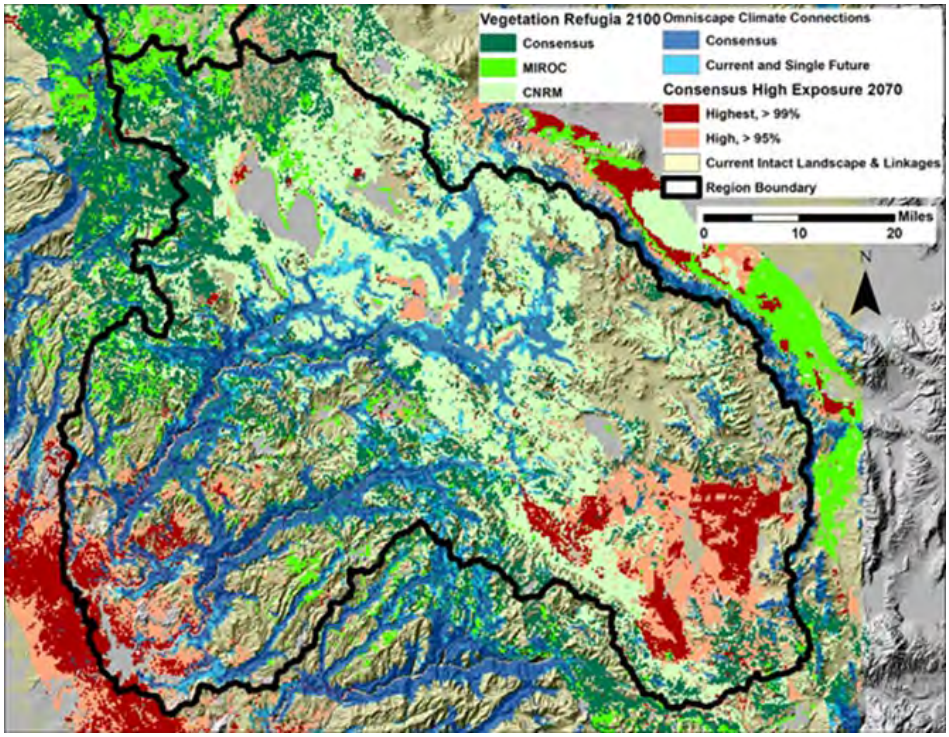


We combined the connectivity and species richness scores to rank the landscape into 5 levels. The summary layer provides a rough view of relative weighting among the hexagons of the region.

We then overlaid the consensus refugia and consensus high exposure areas as dots over the resulting map. The sequence of time shows the increasing spread of high climate exposure and is informative with regards to potential stressors on the underlying landscape. Areas in blue are highly ranked for both potential species richness and connectivity. Blue areas in the Trinity watershed show relative stability, with consensus refugia remaining in the area. However, the large blue area that lies around Lake Shasta has a different pattern. It starts with extensive refugia coverage, but by 2100, most of the highest-ranked area is under high climate exposure. Note however, that the largest consensus refugia zone in the SRHR lies in a horseshoe shape around the currently highly ranked zone. This suggests there may be suitable areas that species could move towards, out of the high potential species richness and connectivity areas, over the next 80 years.

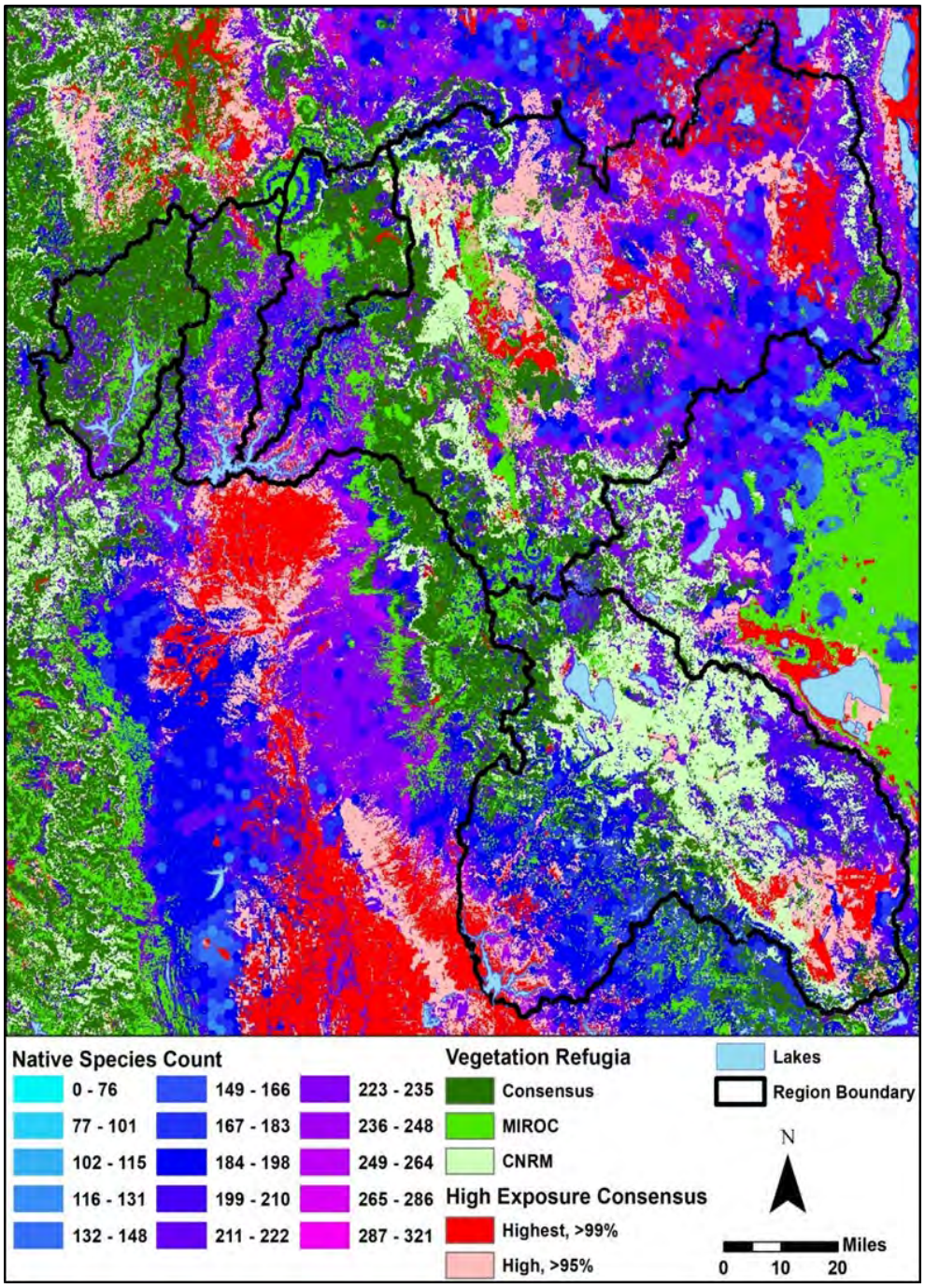


A somewhat similar pattern can be seen in the Feather River watershed to the east, where high-ranking connectivity follows the branches of the river. Much of the blues areas remain in consensus refugia condition to 2070, but by 2100, most of the refugia has disappeared. The northern central part of the watershed is not dotted in 2100, suggesting that although not a consensus refugia, the area may be somewhat amenable to current habitats and species.



The image to the left shows how climatic pressure areas in 2070 (reds) might provide some landscape level impetus to refugia areas in 2100 (in green).

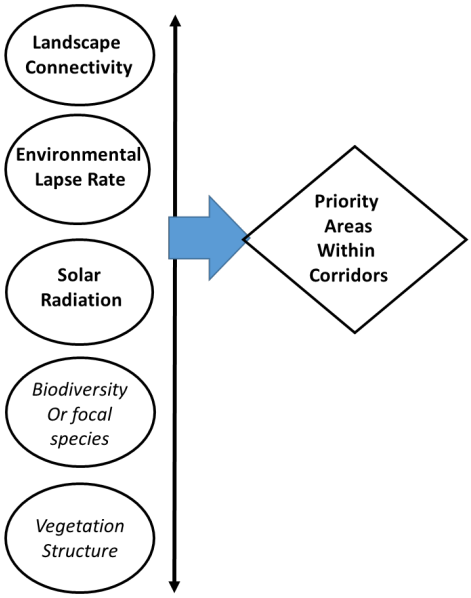
Similarly, an impetus for movement can be seen in this detail around Lake Shasta. In this case the red-to-purple hexagons are CDFW's ACE III measures of species richness (**), with purple areas showing high levels of species richness. Overlaid on their map are the 2100 measures for consensus high exposure areas (dark red) and consensus refugia areas (dark green). This again illustrates the potential for species to have to move from lower elevations around the edges of the central valley to higher ground. Indeed, this is already occurring with neotropical songbirds in our region, which are declining below 1515 m but increasing above this elevation, based on monitoring over the past 14 years (Furnas et al. 2020).



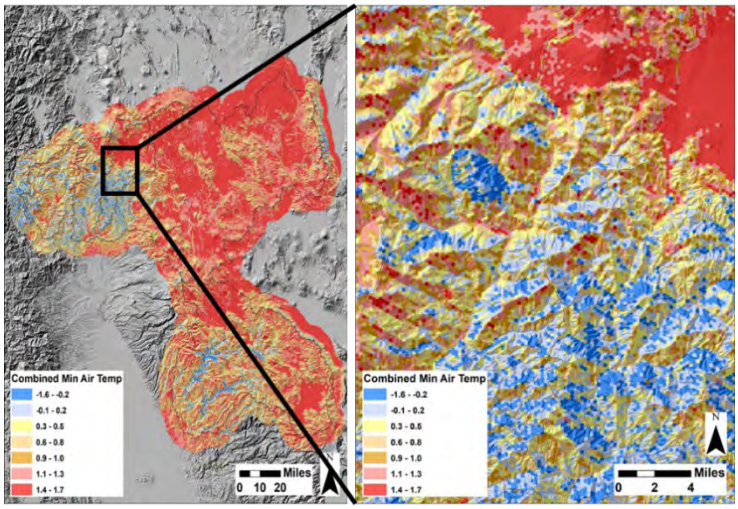
Microrefugia

We defined microrefugia as areas that due to topographic position can retain cooler temperatures longer than the surrounding landscape. We calculated the thermal buffering capacity of all hexagons in the region by calculating the level their range of air temperatures associated with environmental lapse rate, and the level of open-air warming that solar radiation will cause, as derived from transfer functions developed for a study that included parts of our region (Curtis et al. 2014). The value of a hexagon-based portrayal of microrefugia is that it permits a local assessment of when the mean conditions that plants may be adapted to within a hexagon will disappear from that hexagon. Until that happens, local populations might be able to shift within the 25 acres and still find the same mean temperatures.

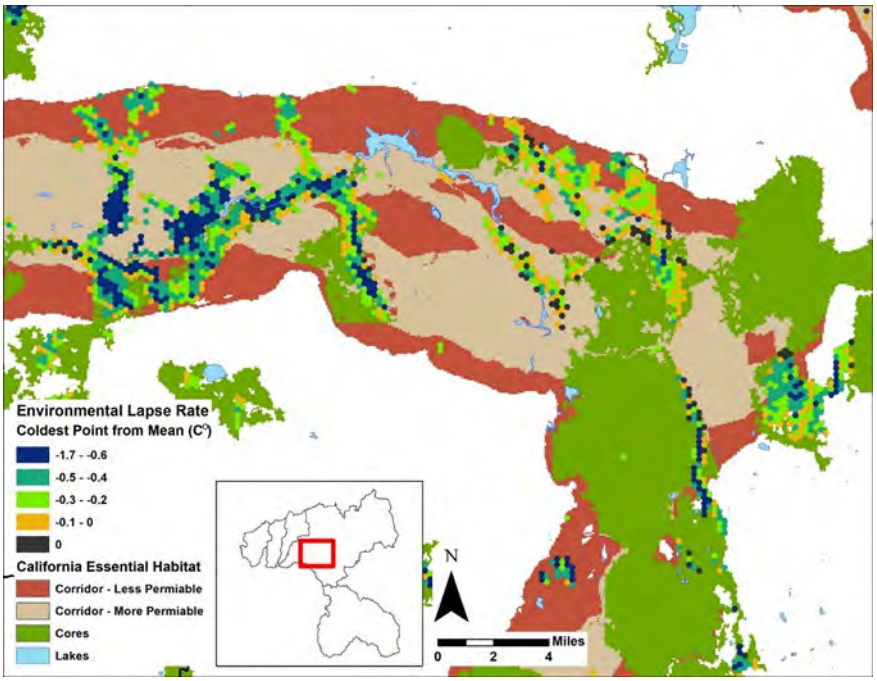
Both these values were calculated from a 10 m digital elevation model, which provided 900 values within each 25 acre hexagon. We took the mean elevation in each hexagon, and assigned the mean annual air temperature values calculated from our 1980-2010 baseline climate as the temperature at mean elevation of each hexagon. Elevations that were higher, had cooler temperatures, within the hex, and areas that were lower had warmer temperatures (Methods). The benefit of linking each hexagon to current temperatures is that it allows future warming, and the buffering microrefugia provide against such warming to be explicit.



We found that the across the region, the maximum cooling capacity within a hexagon was -1.62 ^{o}C, found in the upper Sacramento Watershed, a rock outcrop. The first hexagon with vegetation is -1.47 ^{o}C with cover type Subalpine Conifer, in the upper Trinity Watershed. Across the region, 112 hexagons have a buffer equal to or greater than 1 ^{o}C. Solar radiation never produces a negative value, and reduced the cooling capacity of many hexagons, particularly in the Modoc plateau region.



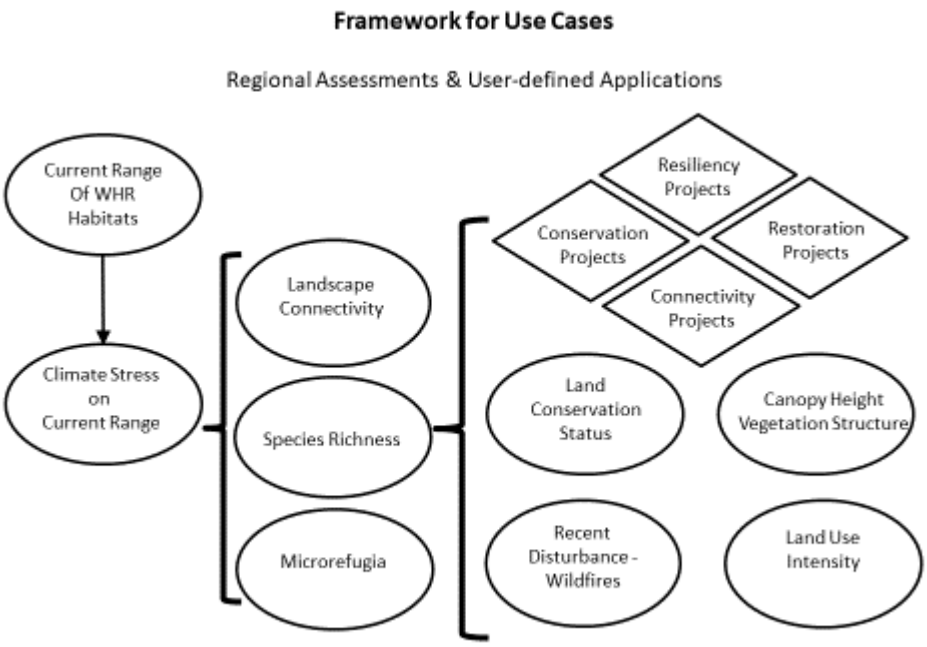
We can use the thermal buffering capacity of microrefugia to identify areas within landscape connectivity zones that will retain their mean baseline temperature the longest as the climate warms.



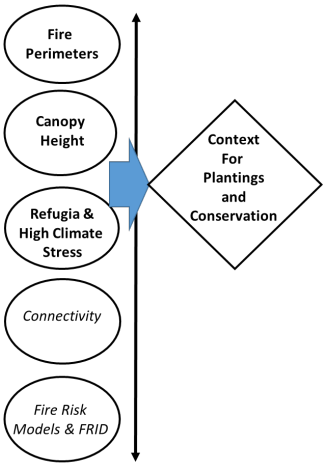
In the image on the left, a corridor in the Pit River watershed shows the hexagons for the two highest connectivity ranks (4 & 5). The hexagons are colored according to their buffering capacity. Note that our climate maps also capture cold air pooling dynamics, but they appear to seasonally and topographically dependent, so a single buffering value may not accurately portray what benefits they may provide, and we did not include a spatially explicit measure of their potential benefits under climate change.

2) Use Cases

The GIS assembled for this project is intended to be flexible, so it can be incorporated into other aspects of landscape planning or management. The image to the right illustrates how the major categories of data can be considered as data elements, and can be combined with other spatial data (circles on the right) in various sequences to provide context for a range of objectives, examples of which are shown in the diamonds. While conservation planning may seek optimal solutions, in this study we recognized that different groups in the region may have differing objectives, and the flexibility to combine the results in different ways may provide a more accessible framework for general utility. Each of the examples below can be rendered as spatially explicit maps with associated area metrics. However, we show them in graphic form only, for brevity's sake.

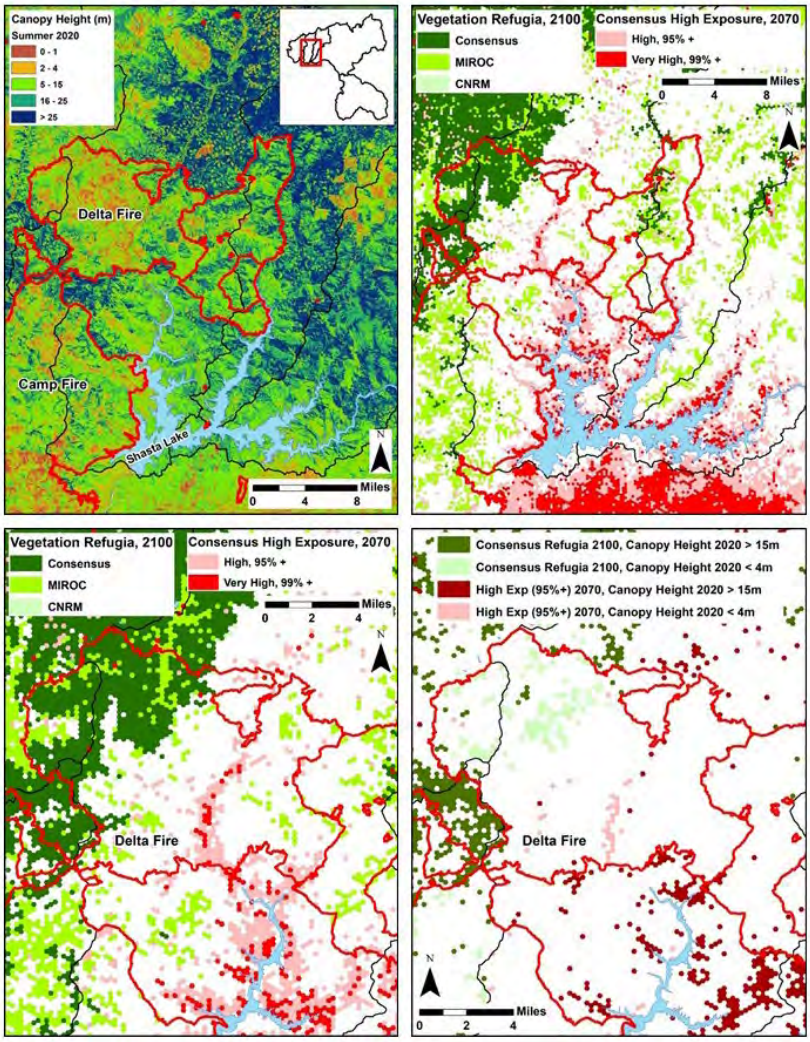


Vegetation Structure and Wildfire

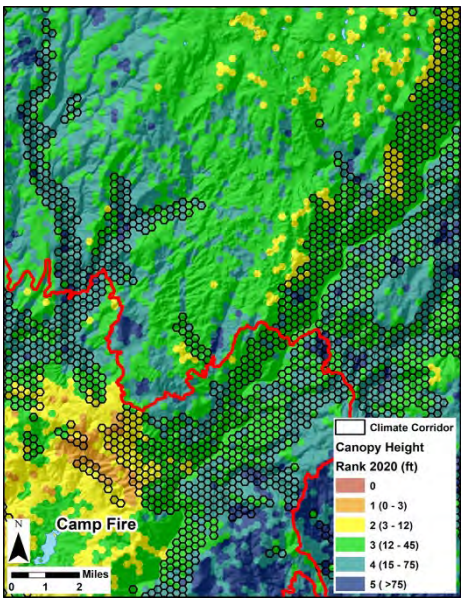


Wildfire ignitions and severity are amplified by climate change. In addition to overstocking of forest stands, this has led to communities and agencies trying to reduce risk through forest thinning, prescribed burns and improved land management, and to deploying post-fire recovery strategies that includes modified reforestation methods. Incorporating long-term perspectives of climate risk can help inform selection of strategies for these goals.

We combined wildfire perimeters with measures of canopy height and climate stress to identify potential areas with different post-wildfire optimal strategies.



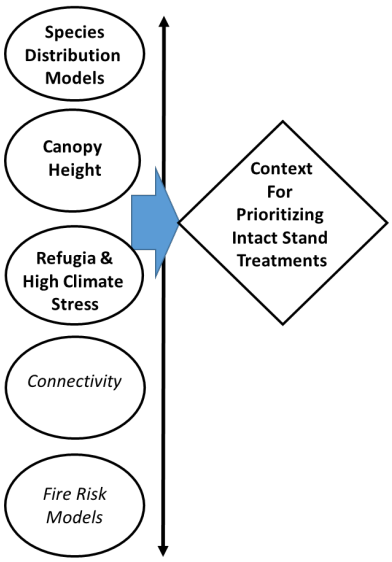
The 2018 Delta fire provides an example combining the data to identify different strategies. The upper left map shows the perimeter of the fire with canopy height as measured from summer 2020, using data from the California Forest Observatory (2020). The upper right shows the hexagons that are classes as consensus refugia and high climate stress areas by 2070. By zooming in (lower left) we see the areas within the fire footprint with the same climate exposures. The lower right image shows the climate classes now colorized by seral conditions. Several hexagons appear in dark green within the fire perimeter. These are areas predicted as climate refugia, and that have canopies >15 m. These locations could serve as seed trees or sources of natural reseeding. Areas in pale green are expected to remain climatically suitable for what was there prior to the fire, but that are in the process of early recovery. These are locations with higher potential for successful reforestation, by these metrics. Areas in bright red have copies > 15 m but are predicted to have climate stress, while areas in pale red have early seral conditions and are expected to have high climate stress, indicating they may be poorer candidates for reforestation.



One more example using wildfire perimeters comes from the Camp fire of 2019. In this case the reforestation planning is underway. Here we display vegetation canopy height from 2020, the fire perimeter, and outlined as hollow hexagons, the areas with the highest regional rank for connectivity. Plantings that target forest recovery can use their site locations to additionally consider if a planting will enhance regional connectivity.

Other data that could be used to further define areas includes landscape connectivity and models of potential risk such as the Fire Return Interval Departure (FRID; Safford & Van de Water 2014), models of potential annual tree mortality and, maps of fire severity zones and fire threat, and the locations of areas that have been treated to reduce fuel loads.

Forest Dynamics & Conservation



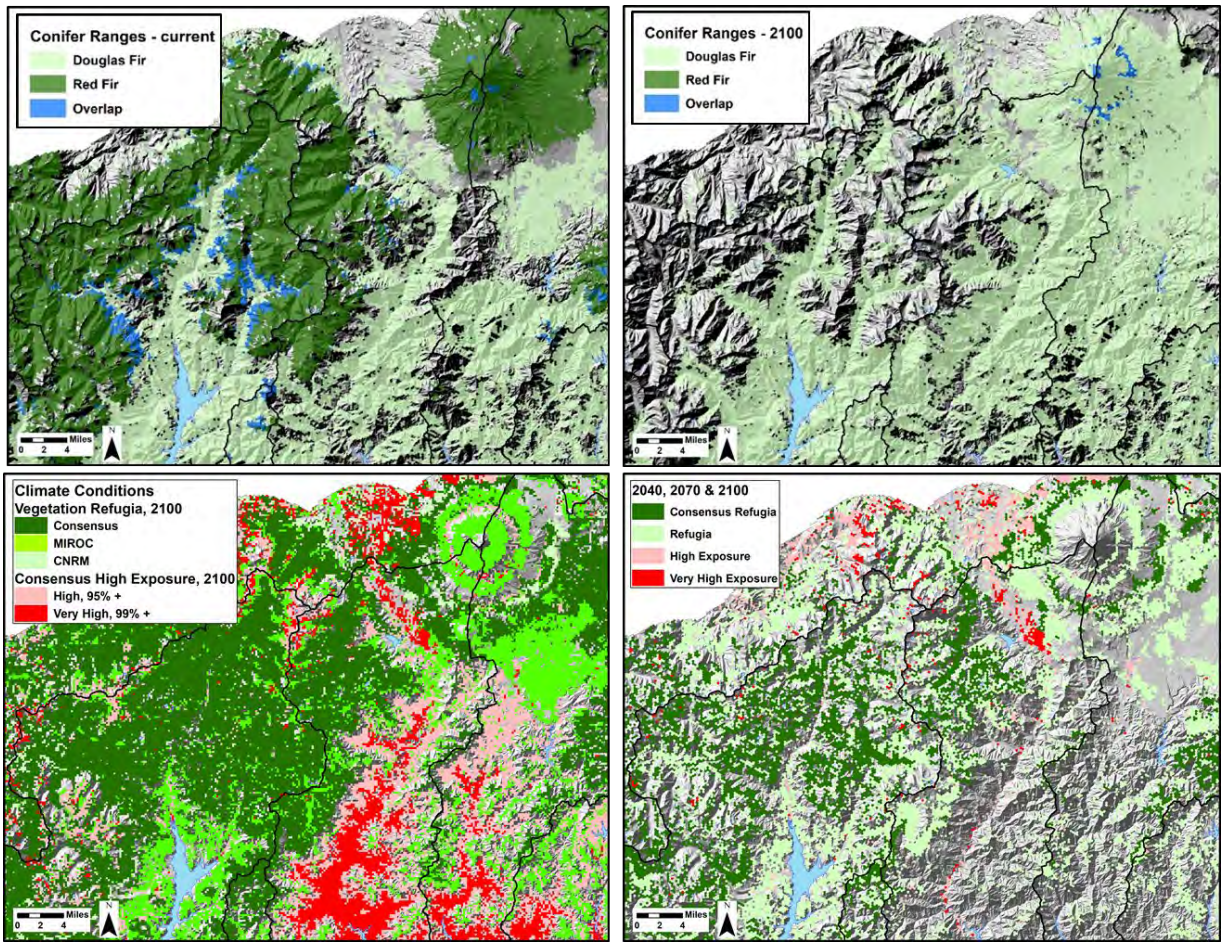
It is impractical to only plan the movement of species and habitats for logistical and other reasons. In addition, preserving existing vegetation, ecosystem functions, and habitats is a major conservation goal.

Forest management at the stand level can promote preservation, particularly when informed by climate change assessments. This use case focuses on two component tree species that make up important conifer forest types in the SRHR: Douglas fir (*Pseudotsuga menziesii*) and red fir (*Abies magnifica*).

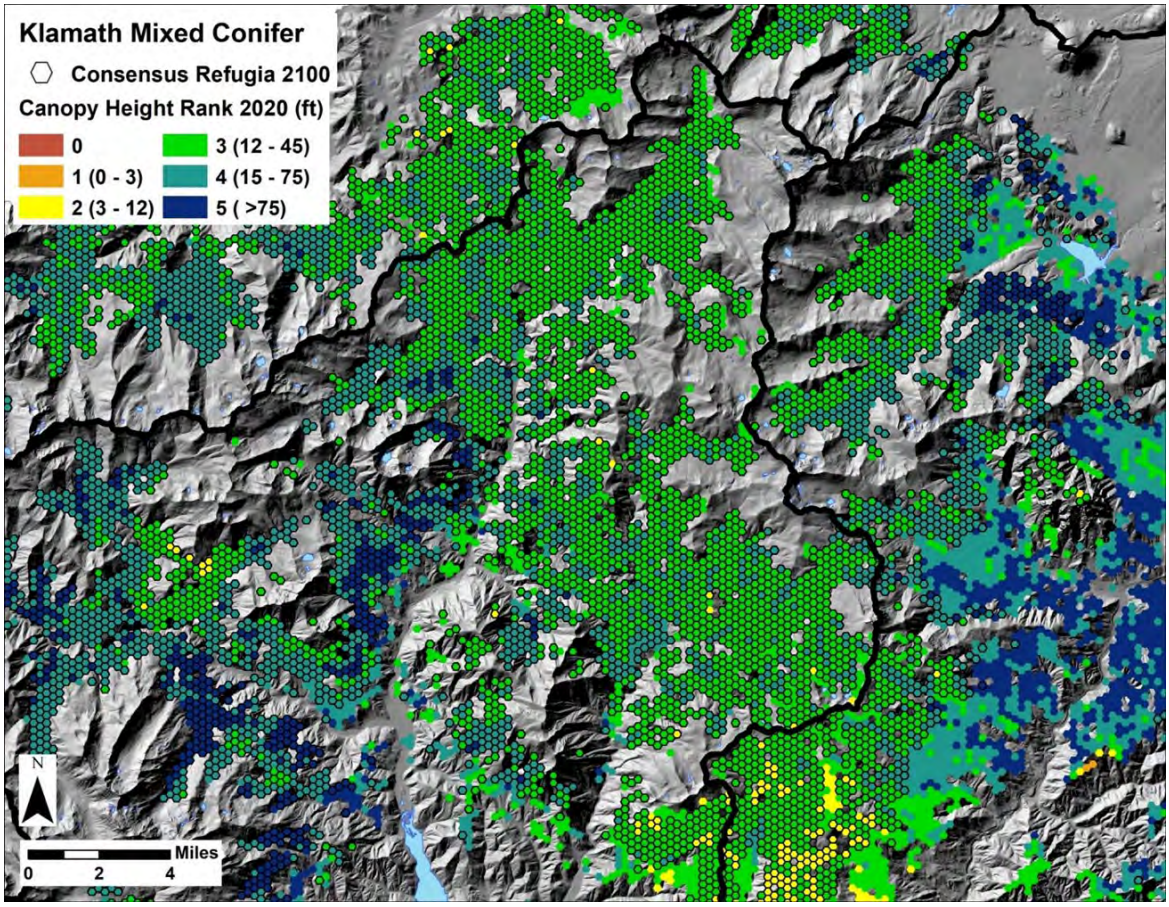
For this example, we used species distribution models, canopy height, and climate exposure to provide spatial context to identify priority areas for forest thinning treatments. The regional connectivity and fire risk models could also be brought into use to further stratify area selections.

The time series of the potential range for Douglas and red fir shows the potential for Douglas fir to move upslope, and the increasing retreat of red fir's current distribution under the hotter and drier GCM tested (upper row, image below).

However, the place-based climate exposure projections (lower row, image below) suggest a large area of consensus refugia in the region. These areas are potential areas where current forests could persist, if protected from stand-replacing disturbances. We can also consider which areas are refugia in each of the three future time periods (lower right panel image).

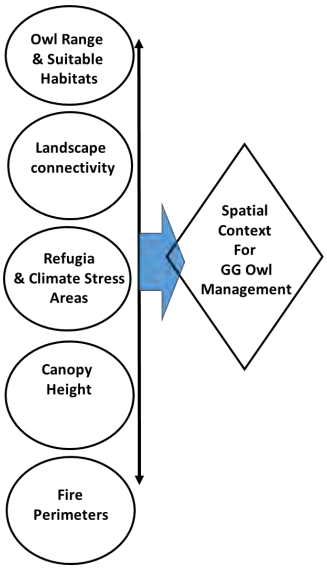


We used canopy height to examine the mixed conifer forest in this region, which includes Douglas fir, considering whether it occurs in consensus refugia areas or not. This map shows the extent of the type, colorized according to canopy height in 2019. Refugia areas are outlined by the 25 acre hexagon boundaries, while non-outlined areas are not refugia. Areas in the tallest height class are possibly areas with less accumulated fuels, if they have late seral structure. Areas in ranks 3 & 4, from 12- 75 feet tall, are candidate areas for management to promote late seral condition. Areas in yellow are early seral stands that may be recovering from recent fires. These may be areas in which successful establishment of conifer tree species could offer long-term forest stands.



Focal Species

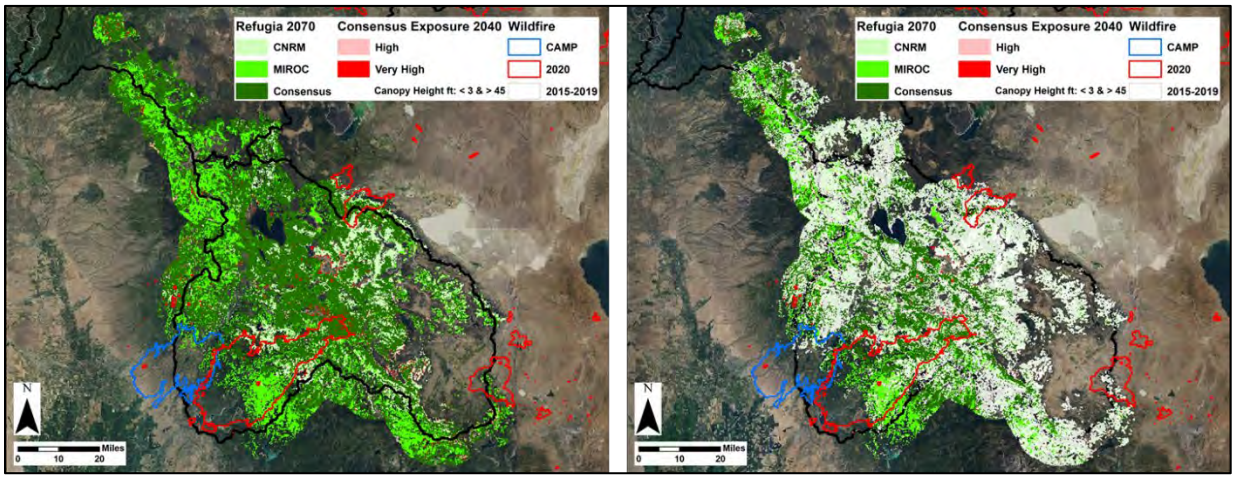
Planning for conservation or recovery of individual species has long been practice for biologists and is an integral part of the regulatory process for both federal and state agencies. This use case demonstrates how a focal species approach can use the data matrix. We selected the great grey owl (*Strix nebulosi*). This species uses late seral condition coniferous forests and wet meadows. It appears to have short-term resilience to wildfires, as it continued to occupy most meadow sites after the Rim Fire (Siegel et al. 2019). There are between 100-200 pairs in the state.



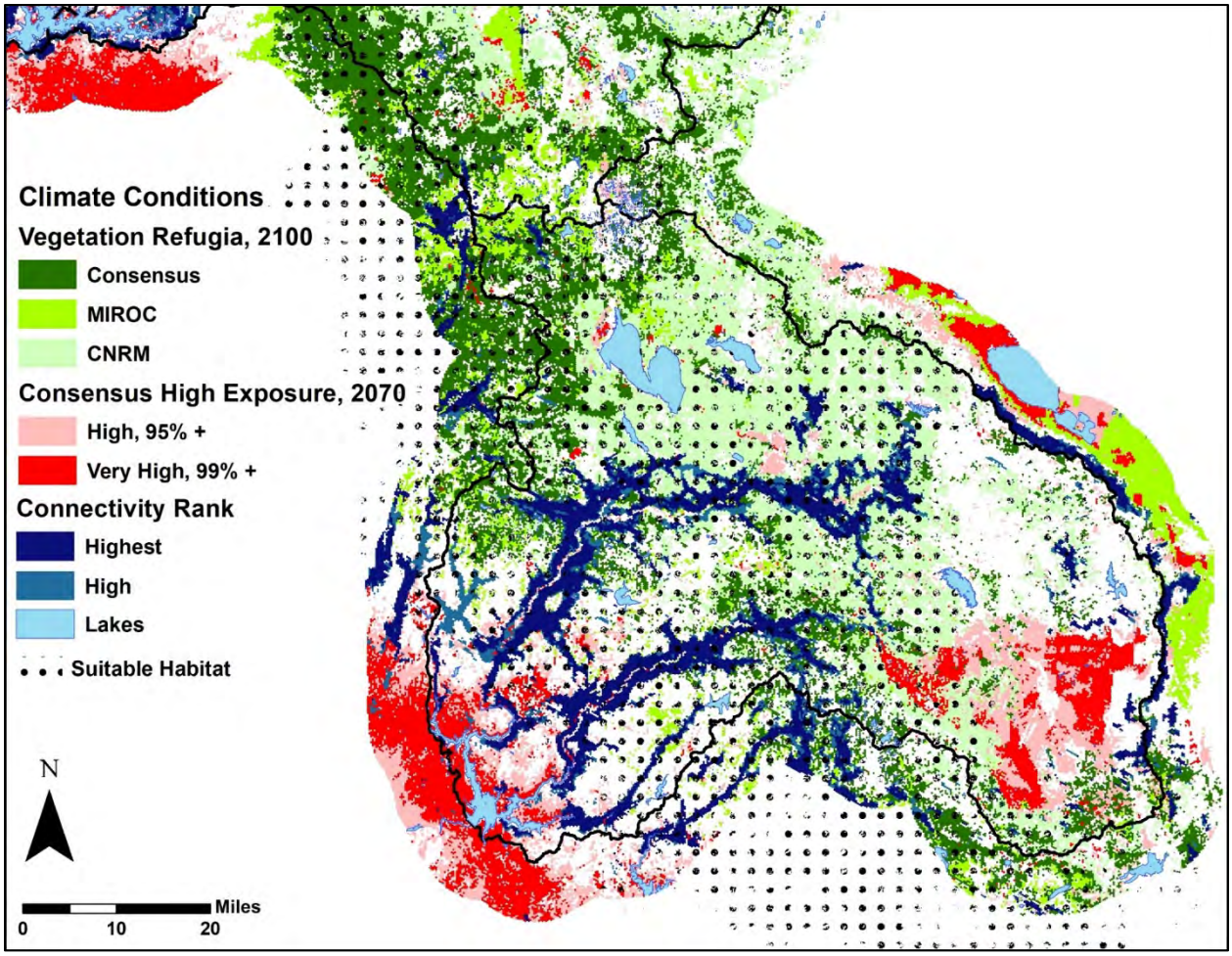
We used the CWHR range map and model to identify the suitable habitats for great grey owl in the SRHR. We examined how the potential range intersected with landscape connectivity, climate refugia, the area of recent wildfires, and measures of canopy height.

We found suitable habitat in the Feather River watershed, and 816,100 acres of it is in mid-century consensus refugia, decreasing by end century to 230,215 acres. When considering vegetation structure, consensus refugia area within the owl's range with trees over 45 feet tall total 345,775 acres by 2070 decreasing to 80,925 acres by 2100. This analysis excluded younger conifer stands (<45 feet) that could be managed for late seral condition, particularly if they are in consensus refugia areas.

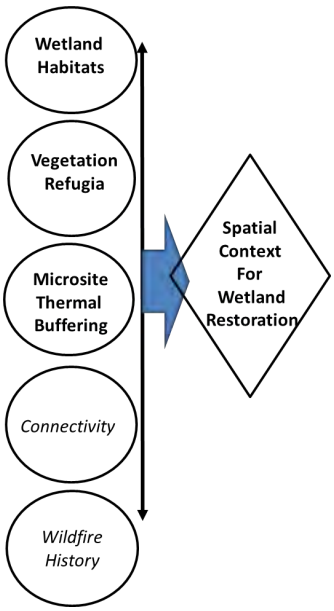
Of those, 2000 acres are remnant stands over 45 feet tall in 2070 consensus refugia, but that decreases to no >45 ft stands by end century. Additionally, within the Feather River watershed consensus refugia for 2070, 55,250 acres of canopy >45 ft occurred within the 2020 Claremont-Bear Fire (the largest part of the North Complex Fire). The canopy height data we used predated the North Complex fire, but the analysis could be updated when the next edition of the forest canopy data is released.



We also examined the ranked connectivity for the region. A number of high-ranking corridors pass through the range of the owl. By 2070, considerable climatic stress in the elevations around Lake Oroville suggest that there may be extensive species movement along these corridors. Selecting areas within them to strengthen site resilience may prove to be a good bet.


Climate Conditions
Vegetation Refugia, 2100
Consensus
MIROC
CNRM
Consensus High Exposure, 2070
High, 95% +
Very High, 99% +
Connectivity Rank
Highest
High
Lakes
Suitable Habitat
N
Miles
0
10
20

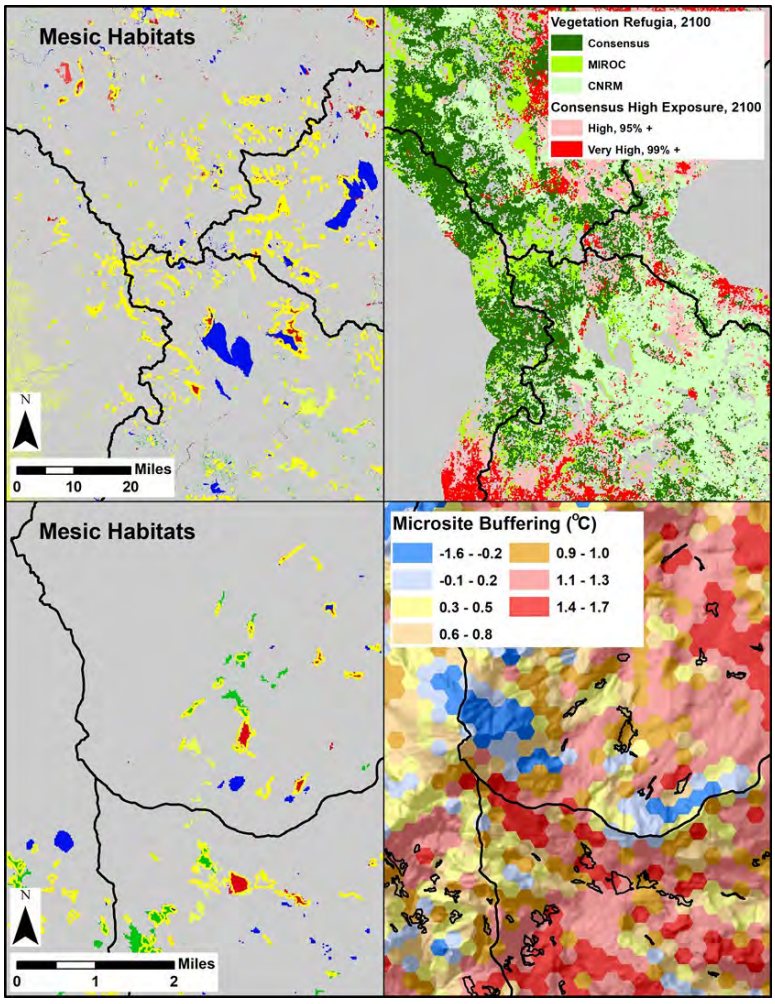
Targeting habitats for water retention



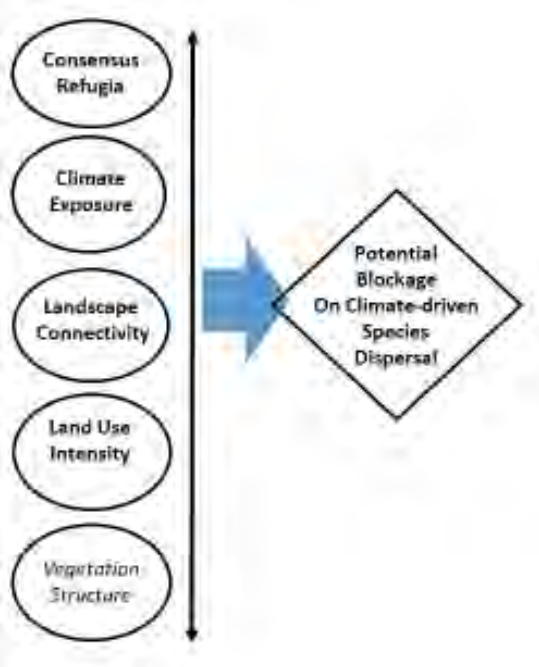
Maintaining hydrological functions is a major issue as climate change progresses, and riparian conservation and restoration is already widely practiced in the SRHR, with the Pacific Forest Trust having conserved 4209 acres in the SRHR region.

However, as snowpack declines with climate change, changes in the hydrology of the SRHR is of increasing concern. Some areas, such as the Modoc National Wildlife Refuge are already incorporating climate change projections into their water management strategies (Esralew et al. 2015). And, the volcanic soils of the Modoc Plateau may be able to provide infiltration functions for ground water for longer in each year before freezing (Thorne et al. 2015).

In this example we look at mapped wet meadows and other mesic habitats. We overlaid them with the consensus refugia maps for the area between the Feather and the Pit rivers. The panel image shows their locations and the corresponding refugia (upper row). We then zoomed in and examined the distribution of the mesic features and how they relate to thermal buffering capacity within each hexagon (lower row).

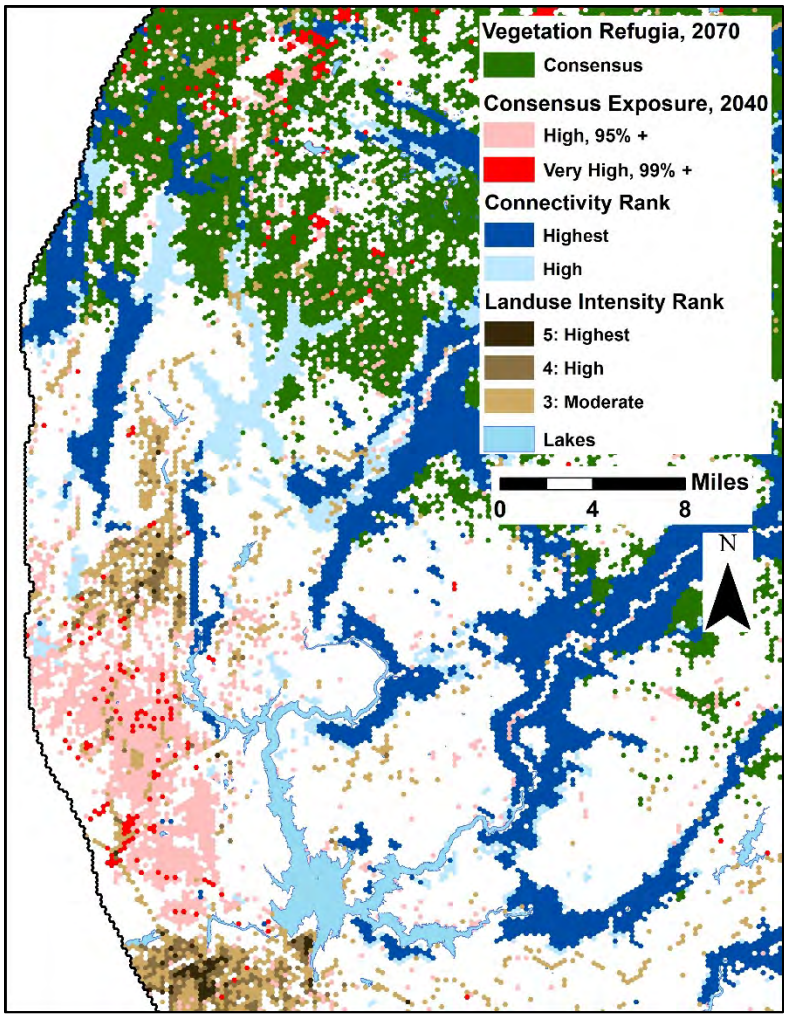


Assessing land use blockages to connectivity



While land use and connectivity are somewhat opposite, and tend not to intersect, land use is a major factor just east and north of the largest area of high climate exposure. In addition, there is a considerable amount of moderate land use shown that is interspersed within the refugia area, and at the terminus of some of the high level connectivity corridors.

Species needs for climate-driven dispersal can be blocked by human land use. This example illustrates how the assembled data can be used to evaluate impediments to movement towards mid-term climate refugia from near-term high climate exposure areas. We use the western boundary of the Feather river watershed and show the 2070 consensus refugia (areas in green) and the 2040 high climate exposure areas (areas in red). We then layered on the two highest connectivity ranks (blue colors). Finally we brought in the three highest levels of land use intensity (brown colors).



Methods

Final Report Model Description: Model description, methods, data, assumptions

The goal of this study was to identify key areas within the region for a variety of climate-adaptive conservation and resilience objectives. Particularly, we were interested in what areas ranked highly as refugia for existing vegetation; critical landscape linkages for species movement; locations of high potential biodiversity; and areas with high potential as climatic microrefugia. We also wanted to consider the current structure of existing vegetation and identify forest areas that could be treated in a climate change-anticipating way, such as managing mid-seral forests for old growth conditions in areas that are climate refugia, and priority post-wildfire areas to restore to maintain landscape connectivity for future biodiversity movement.

To accomplish these goals, we compiled a large collection of geographic data, and considered which components and what sequence of analyses were needed to answer different landscape management objectives. We selected a 25 acre (10 hectare) hexagon as the unit for spatial analyses for two reasons: first, it provides a basis for comparisons across the entire extent of the study; and second, because this level of detail is relevant for land managers considering different treatments such as riparian restoration, forest thinning, conservation easements, etc. We created a hexagon grid layer in GIS consisting of 282,687 hexes in the 5 watersheds (6,985,348 acres) and 408,948 hexes (10,105,325 acres) across the watersheds and including a 6 mile (10 km) buffer.

We sampled different data into the framework. Geographic input data resolution ranged from 10 m topography to 270 m climate data to polygon maps of different resolutions. For five primary data layers, we ranked the hexagons into 5 classes, from low to high, creating weights that could then be combined in various ways, as described below for different objectives. We also used some reference data as overlays, but without incorporating them into the hexes to evaluate or further define some objectives.

This section describes the datasets collected, how they were sampled into the hexagon framework, and the methods for prioritizing areas for the major objectives. Additional information is located in the methods appendix.

INPUT MAPS – ORIGIN AND MANUFACTURE

This section describes the creation of maps that were used in the analysis. The majority of these maps represent a compilation of existing data. Here we provide the source and steps used for the primary and secondary maps. Uses and processing of input reference maps are described in the appendix.

Primary Maps	**Secondary Maps**	**Input Reference Maps**
Vegetation Refugia / Climate Exposure	Land Use Intensity	Vegetation Map
Landscape & Climate Connectivity	Vegetation Structure & Wildfire	10 m DEM
Biodiversity /Species Richness	Future Ranges of Selected Species	Land Tenure
Microrefugia		Climate Data
		Fire Return Interval
		Hydroclimatic Model

The list above also is the order in which the map methods are presented below. The following table describes the data that went into each analysis and map, followed by

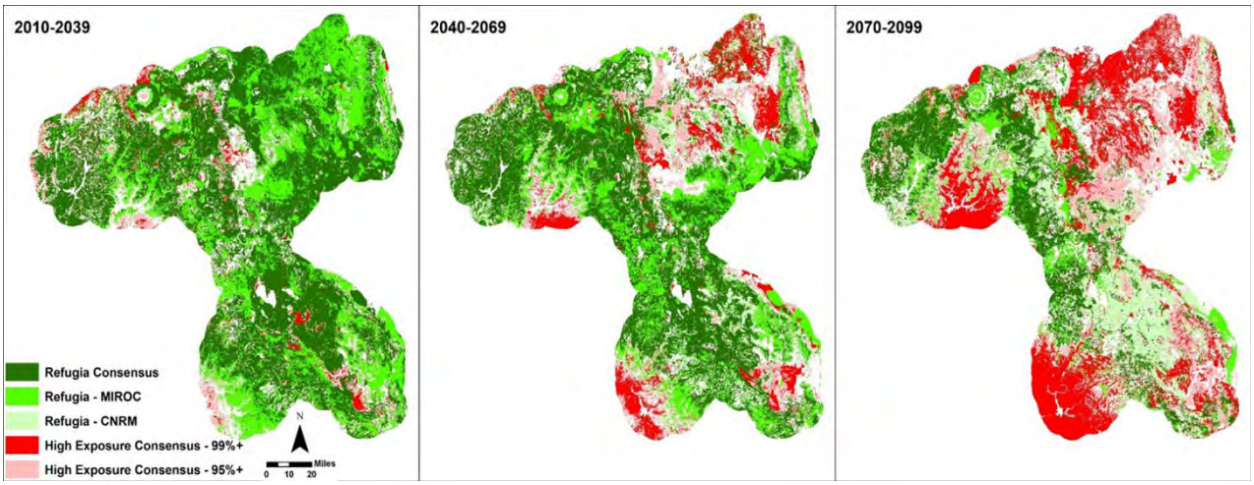
Vegetation Refugia & Climate Exposure			
	Climate and Hydrology Data	Downscaled Baseline & Future Climate (USGS)	Raster - 270m
	FVEG - CalFire (FRAP)	https://frap.fire.ca.gov/mapping/gis-data/	Rasster - 30m
	Vegetation and Climate Refugia	Vegetatiave Climate Exposure (UCD Modeling)	Raster - 270m
Landscape & Climate Connectivity			
	California Essential Connecitvity	Caltrans/CDFW	Polygon
	Omniscape Climate Connecivity	The Nature Conservancy	90 m
	CDFW Land Facet Connectivity	https://wildlife.ca.gov/data/BIOS	Polygons
Biodiversity / Species Richness			
	Habitat Suitabiltiy Within Species Range - CDFW rules	UC Davis Modelling	Raster - 30m
	Tree Species Distribution Models	UC Davis Modelling - Thorne & Choe	Raster - 270m
	California Natural Diversity Database (CNDDB) - CDFW	https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals	Point & Polygo
Microrefugia			
	National Elevation Dataset	www.usgs.gov/core-science-systems/ngp/tnm-delivery	Raster - 10m
	Solar Radiation Model	UCD - Modeling by Hollander	Raster - 25m
	Environmental Lapse Rate Model	UCD - Modeling by Boynton	Raster - 10m
	Cold Air Pooling	USGS Flint & Flint BCM Model	Rasgter - 270m
Vegetation Structure, Wildfire, and Recovery			
	Canopy Height - SALO Sciences	https://forestobservatory.com/	Raster - 10m
	FVEG - CalFire (FRAP)	https://frap.fire.ca.gov/mapping/gis-data/	Raster - 30m
	Bulk Density & Number of Canopies - SALO Sciences	https://forestobservatory.com/	Raster - 10m
	Forest Tree Mortality Model - SALO Sciences	Not public yet	Raster - 1km
	Fire Perimeters - CALFIRE, Nat'l Interagency Fire Center	https://frap.fire.ca.gov/mapping/gis-data/; https://data-nifc.opendata.arcgis.com/datasets/wildfire-perimeters	Polygon
Land Use Intensity			
	FVEG - CalFire (FRAP)	https://frap.fire.ca.gov/mapping/gis-data/	Raster - 30m
	ESRI Roads	Esri	Polyline
Initial Conservation Assessment			
	California Protected Areas Database (CPAD)	GreenInfo Network	Polygon
	Califrnia Conservation Easement Database (CCED)	GreenInfo Network	Polygon
	State Refuge Boundaries	California Department of Fish and Wildlife	Polygon
	American Indian Reservations/Federally Recognized Tribal Entities	Governer's Office of Emergency Services	Polygon
Input Reference Maps			
	National Elevation Dataset	www.usgs.gov/core-science-systems/ngp/tnm-delivery	Raster - 10m
	Landscpae Management Units	Information Center for the Environment - UCD	Raster - 30m
	Basin Characterization Model	USGS	Raster - 270m
	Fire Return Inteval Departure (FRID)	http://www.fs.usda.gov/main/r5/landmanagement/gis	Raster - 30m
	Fire Threat	https://frap.fire.ca.gov/media/9792/fthrt14_2.zip	Raster - 30m
	CalFire Priority Projects	https://frap.fire.ca.gov/media/9630/calfire_priorityprojets19_4.zip	Polygon

Primary Maps

Vegetation Refugia / Climate Exposure

We used the CAL FIRE's 2015 vegetation map to calculate what areas of each mapped vegetation type remain in frequently occupied current climate conditions. We mapped vegetation exposure by vegetation type under two GCMs - a hotter and drier (MIROC-ESM) and a warmer and wetter future (CNRMCM), and under two emission scenarios, RCP4.5 and RCP8.5 (Thorne et al. 2017a, b). Areas of vegetation refugia from the two GCMs that intersect are considered consensus vegetative refugia (Thorne et al. 2020). We mapped these areas within the SRHR for three future times 2010-2040; 2040-2070; and 2070-2100. We also mapped areas considered to have high climate stress, defined as the last

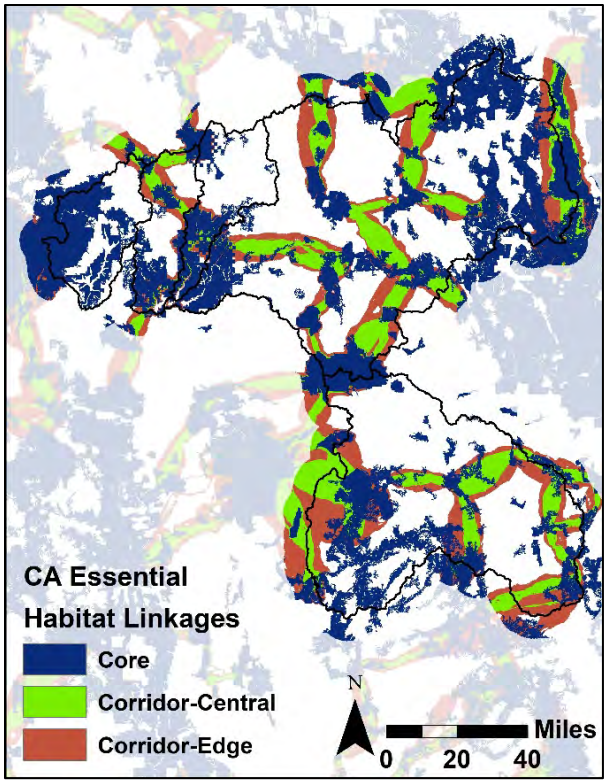
5 and 1% of the climate frequency distribution for each vegetation type (Methods Appendix). These climate exposure data are used in a wide range of analyses described below.

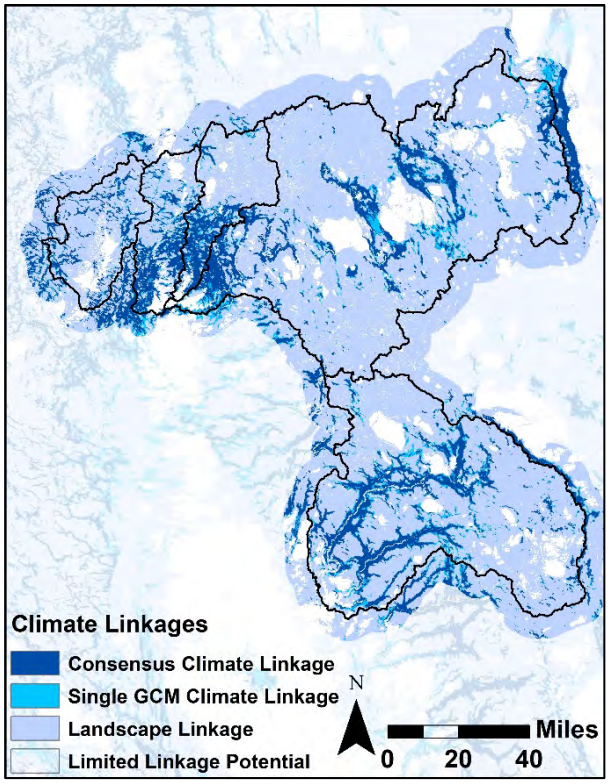


Landscape & Climate Connectivity

We examined 5 maps of connectivity, and found two that systematically covered the entire region: a version of the California Essential Connectivity (CEC) map that had been updated by CDFW; and The Nature Conservancy's climate linkages map. The other connectivity maps considered were a land facet map (CDFW) that focuses on northern Sierra foothills, and models of connectivity for Fisher and Martin.

We ranked the CEC maps by core, high-value corridor, peripheral corridor, and not-in-network. We found 13 categories of climate linkages in TNC's maps and classed them into 4 categories: limited regional potential; present-day & intact landscapes; links from current climates to their analogs under a single GCM; and links from current climates to their analogs under projections from the two future climates considered (Methods Appendix).

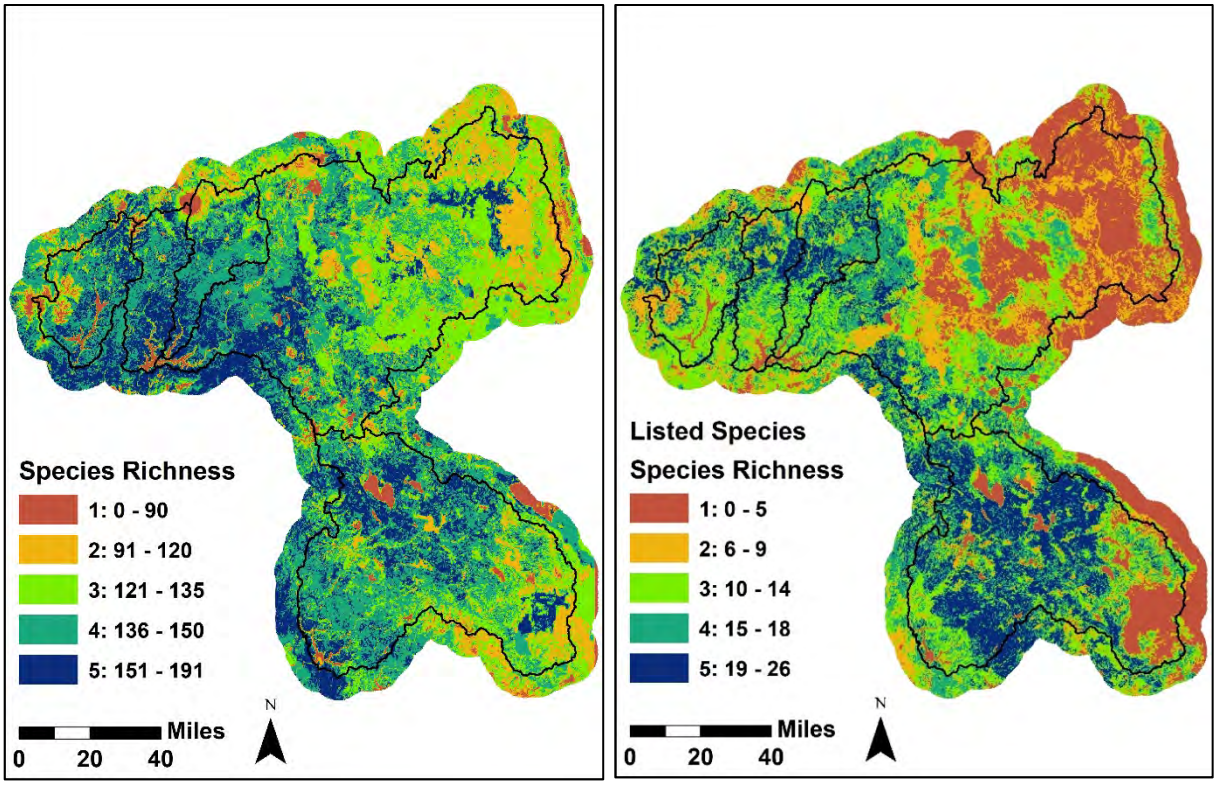




We then summarized the rank value of each connectivity map in the hexagons, combined the ranks and classed the outputs into 5 levels of connectivity priority.

Biodiversity / Species Richness

California's Wildlife Habitat Relationships model (WHR) identifies what habitats are commonly used by each vertebrate species in the state. The agency uses a statewide map developed in 2015 that provides the spatial pattern of each habitat as a way to map the potential range of each vertebrate species. We identified which vertebrate species have ranges in the study area, and we used the map of the WHRs to identify where in the SVH they may exist. We summarized the potential presence or absence of each of the species in each hexagon. We also identified the listed species and summarized those by hexagon as well. This permits an estimate of the potential vertebrate species richness by hexagon. For the full number of potential species richness (left, below) the rank numbers refer to: 1 = 0-90; 2 = 91-120; 3 = 121-135; 4 = 136-150; 5 = 151-191. For potential species richness of listed species (right, below) the rank numbers refer to: 1 = 0-5; 2 = 6-9; 3 = 10-14; 4 = 15-18; 5 = 19-26.



The species richness maps can be used with the vegetation refugia, as in the example below that shows listed species richness in vegetation refugia and in areas with high future climate exposure.

Microrefugia

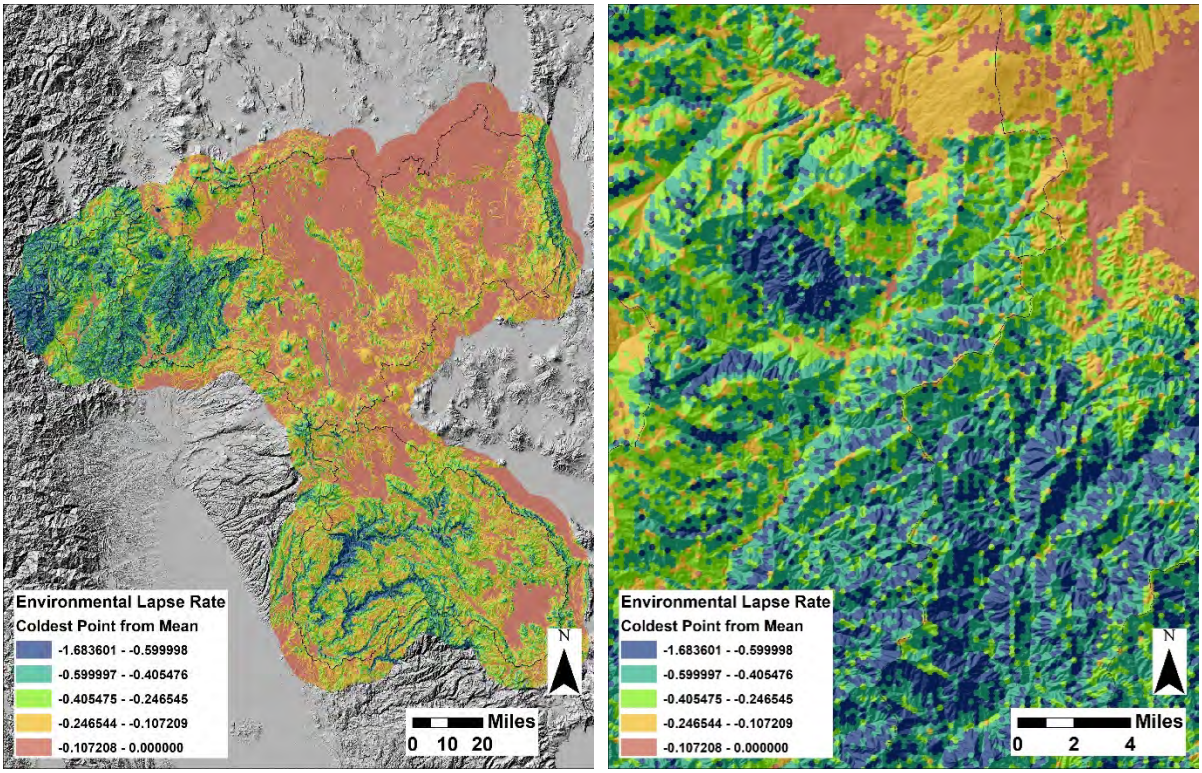
The extent to which management units may retain current climate conditions is of interest for Conservationists. A challenge for calculating the strength, or buffering capacity, of microrefugia is identify the strength of the phenomenon, and then link it to projected climate change. We were able to model two types that are occurring within a 25 acre area, which could be considered true micro-scale refugia. The third, cold air pooling, is active across larger spatial scales, but not across the entire region. We consider cold air pooling to be a meso-scale phenomenon. We mapped the extent of cold air pooling and it's relative strength across the landscape. But we did not summarize the effect into hexagons because it is fundamentally a process-driven metric, is stronger at some times of year than others, and therefore requires dynamic modeling to capture how it will perform under future warming.

We identified two types of physical microrefugia (Dobrowski 2011) that could be mapped and summarized into the hexagon framework, Environmental Lapse Rate and Solar Radiation influence on air. Additionally, cold air pooling (CAP) was observed in the air temperature, but was not quantified for regional modeling because of its temporal (seasonal) variability. Further modeling is necessary to capture the thermal buffering CAP can provide in a warming climate (Methods Appendix).

Environmental Lapse Rate

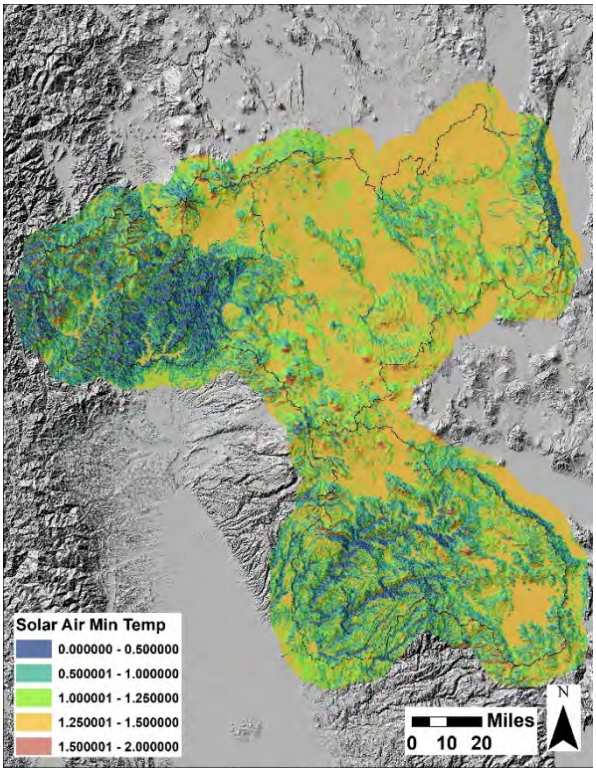
We identified the mean elevation of each hexagon using a 10 m digital elevation model, which provides an average of 976 grid cells per hexagon. We calculated and then assigned the annual mean temperature from our baseline temperature maps of annual mean minimum and maximum temperatures, 1981-2010 (Thorne et al. 2017). We used the range of elevation to identify the highest and lowest points within the hexagon and then applied the environmental lapse rate to calculate the range of temperature values within the hexagon. The highest point is cooler than the mean elevation, based on the lapse rate. That point represents the last location within a hexagon that will retain the mean temperature as climate warms.

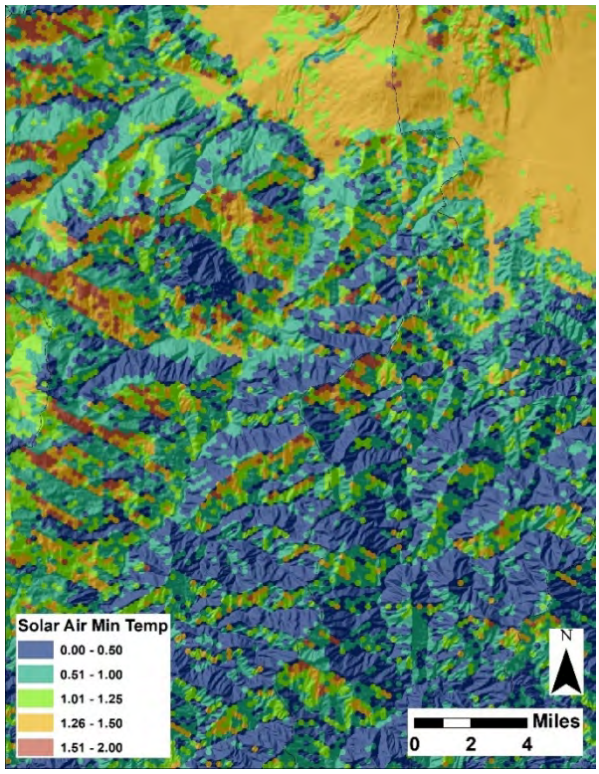
Negative effect = (Average Elevation – Maximum Elevation) x 0.00649606Areas with steep topography have the highest buffering capacity.



Solar Radiation

We modeled solar radiation using a 25 m DEM and converted the solar loading from MJ/second to degrees C using a table of conversion values determined in an independent study (Curtis et al. 2014; Methods appendix). Air temperature was never cooled by lack of solar radiation, and values ranged from 0 -2.5 ^{o}C. We use the lowest value found in each hexagon to represent the buffering (or lack thereof) from solar loading.





Secondary Maps

Vegetation Structure

Ds David Marvin and Christopher Anderson of SALO Sciences provided an early release of data they also provide via their website, the California Forest Observatory (2020; https://forestobservatory.com/). They provided gridded data at 10 m resolution for five of the metrics that they measure statewide: canopy base height, canopy bulk density, canopy cover, canopy height, and ladder fuels. We used mean canopy height in each hexagon as a rough index for forest seral condition. Bulk density and canopy layers can be used in conjunction with other data to prioritize forest thinning.

Fire Perimeters

We used two sources of data to map fire perimeters. CALFIRE's fire perimeter data was used for all years up to 2019. Fire perimeters for 2020 were downloaded from the National Interagency Fire Center.

Land Use Intensity

We summarized land use intensity in each 25 acre hexagon using the weighted linear extent of 3 types of roads (U.S. Streets – part of StreetMap USA – the "ESRI road layer") and the extent of human-altered landcover types that represent landuse.

We weighted the road types and measured the length of each road type, ranging from dirt roads to divided interstate highways within each hexagon. We classed the 3 road types into three levels of impact. Large roads were given highest impact (1 foot = 1 foot); moderate impact roads were down-weighted to 1 foot = 0.5 feet, and dirt roads were weighted to 1 foot = 0.33 feet. We then summed the overall road lengths in each hexagon. We classed the road lengths into 5 levels of road impact (Methods

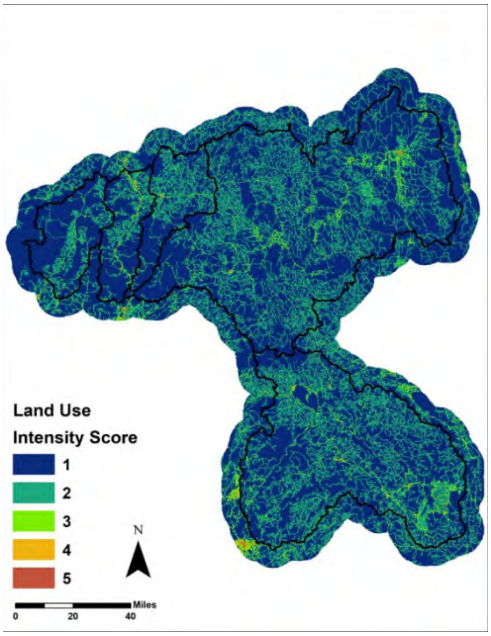
Appendix). From 0-10' length of road we considered to have no impact (weighting of 1; 65.1% of all hexagons), while the highest levels impact level were for hexagons in which road length could completely split a hexagon (weighting 4; 0.1% of all hexagons), or where hexagons could be transected two or more times by the roads within them (weighting 5; 5 hexagons).

We measured the area of landuse in each hexagon, according to the WHR classification of landcover types. We considered Urban (URB) and Eucalyptus (EUC) the most impacting. Ten types that indicate agriculture types were down-weighted to 1 square meter = 0.33 square meter, because these types are useable by some wildlife species. The ten agricultural types are:

> Crop (CRP); Dryland Grain Crops (DGR); Irrigated Grain Crops (IGR); Irrigated Hayfield (IRH) Irrigated Row and Field Crops (IRF); Rice (RIC); Orchard - Vineyard (OVN); Deciduous Orchard (DOR); Evergreen Orchard (EOR); Vineyard (VIN)

We summed the area of each type within each hexagon and multiplied it by its weightings. We classed the output values into four levels of impact: No Impact (weight 1; 93.2% of hexagons); 0.1-33% of hexagon occupied (weight 2; 4.5%); 33-65% of hexagon occupied (weight 3; 2.1%) and >65% area occupied (weight 4; 0.2%).

We combined the road and landuse metrics, creating 20 classes that we then simplified to 5 levels ranging from 1 (No Impact; combined scores 11) to 5 (High; combined scores Roads 4 & 5; Landuse 2-4) (Methods Appendix).



Future Ranges of Selected Species

We selected four species; Douglas Fir, Red Fir, Black Oak, and Ponderosa Pine, to examine for potential shifts in range.

Species distribution models for 4 species were obtained from previous work done for CAL FIRE (Thorne et al. 2016b) statewide and clipped to our region.

In the end we only used two species to examine their overlapping range dynamics: Douglas fir, with an expanding upwards range, and red fir with a retreating upslope range.

We compared their ranges in one of the use case graphics.

References

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Methods Appendix

This appendix is meant to support the methods in the primary report. It provides additional information on data sources, processing, and analyses. It has two sections.

1) How we processed material into the hexagon framework
2) Description of the input maps and how they were processed**.**

1) How we processed material into the hexagon framework

We created a hexagon map for the region to summarize a wide variety of data into spatial units that are comparable across the region and also to represent an area that is relevant for site-level plans such as restoration or forest thinning. The hexagon layer has 282,687 hexes within the 5 watersheds, and 408,948 hexes in the 5 watersheds plus the 10 km buffer area.

Integrating data into the hexes

Data from a variety of grid scales including 10, 30, 90, and 270m was added using the sample tool with Hexagon centroids for those at the 270m scale and by using the zonal statistics tool with Hexagon boundaries for the ones with smaller cell sizes.

Some data types, such as vegetation were simply sampled for the majority type found in each hexagon. Other data used for analyses, such as the digital elevation model, were sampled for mean, minimum and maximum values.

The order of data types presented is the same as in the report's main methods section. If there is no additional information, the data type name is still included, but the section is blank.

2) Description of the input maps and how they were processed

This section follows the same organization as presented in the main report's sequence of maps described, with primary, secondary and input maps documented in turn.

<u>Primary Maps</u>

Vegetation Refugia / Climate Exposure

These values were calculated for the mapped extent of each vegetation type found in the region. Exposure was based on the extent of the vegetation types as found in all California, and for two GCMs that bracket precipitation forecasts by +/- about 25% annual precipitation (Thorne et al. 2017).

What were the inputs:

1. Vegetation Map (described in Reference map section)
2. Climate Exposure data
    a. GCMs: CNRMCM & MIROC-ESM

b. RCPs: 4.5 & 8.5
c. Time periods
    i. Current: 1981-2010
    ii. Future: 2010-2039 (“2040”), 2040-2069 (“2070”), 2070-2099 (“2100”)
d. Data values sampled:
    i. We analyzed the spatial distribution of each vegetation type from the vegetation map independently, as noted below, and then reassembled the output maps for each type to visualize climate exposure across the entire region.
    ii. For all time periods
        1. Continuous climate exposure (21 frequency classes); classified exposure (5 classes) (Thorne et al. 2016; 2017; 2020);
    iii. For Future time periods
        1. refugia, high exposure, very high exposure, and moderate exposure; both consensus and single model results (10 classes)

How was each input reclassed

1. Original data has climate exposure in 21 frequency classes ranging from 0 to 100 (100 being the most exposed areas) and non-analog
    a. For all time periods we reclassified this into 5 Exposure Classes:
        i. 1: 0-80%: Non-stressful conditions
        ii. 2: 80-95%: uncertain
        iii. 3: 95-99%: stressful conditions
        iv. 4: 99-100%: very stressful conditions
        v. 5: Non-Analog: climate conditions not seen within current distribution

How were they combined

b. For future time periods we reclassified this into 10 classes:

CNRM Exposure Class	MIROC Exposure Class	Future Exposure Score	Future Exposure Score Description
1	1	A	Refugia - Consensus
1	2	D	Refugia - CNRM Only
1	3	D	Refugia - CNRM Only
1	4	D	Refugia - CNRM Only
1	5	D	Refugia - CNRM Only
2	1	E	Refugia - MIROC Only
2	2	H	Moderate Exposure - Consensus
2	3	I	Moderate Exposure - CNRM Only
2	4	I	Moderate Exposure - CNRM Only
2	5	I	Moderate Exposure - CNRM Only
3	1	E	Refugia - MIROC Only

3	2	J	Moderate Exposure - MIROC Only
3	3	B	High Exposure - Consensus
3	4	G	Very High Exposure - MIROC Only
3	5	G	Very High Exposure - MIROC Only
4	1	E	Refugia - MIROC Only
4	2	J	Moderate Exposure - MIROC Only
4	3	F	Very High Exposure - CNRM Only
4	4	C	Very High Exposure - Consensus
4	5	C	Very High Exposure - Consensus
5	1	E	Refugia - MIROC Only
5	2	J	Moderate Exposure - MIROC Only
5	3	F	Very High Exposure - CNRM Only
5	4	C	Very High Exposure - Consensus
5	5	C	Very High Exposure - Consensus

How were they inputted to the hexagons

Sample tool with Hexagon centroids to select the 270m frequency value from a climate grid, and assign the current and future climate exposure, or risk, to that cell.

Landscape & Climate Connectivity

What were the inputs

1. The Nature Conservancy (TNC): Omniscape
2. California Essential Habitat Connectivity (CEHC), a map product originally developed by Caltrans, and updated by CDFW.

How was each input reclassed

1. Omniscape/TNC
    a. Received Connectivity rasters from The Nature Conservancy (can also be viewed at https://omniscape.codefornature.org/)
        i. 90m raster with 13 categories
    b. Crosswalked the 13 categories to 4 and ranked them 0-3 (3 is high, 1 is low, 0 is limited connectivity)
        i. Connectivity Score Description
        ii. 0 Limited regional connectivity potential
        iii. 1 Intact landscape
        iv. 2 Climate linkage (HADGEM2-ES) through an intact landscape
        v. 2 Climate linkage (CNRM_CM5) through an intact landscape
        vi. 3 Climate linkage (both climate models) through an intact landscape
        vii. 1 Multiple present-day linkage options

viii. 2 Climate linkage (HADGEM2-ES) among multiple present-day linkage options
ix. 2 Climate linkage (CNRM_CM5) among multiple present-day linkage options
x. 3 Climate linkage (both climate models) among multiple present-day linkage options
xi. 1 Present-day linkage
xii. 1 Climate linkage (HADGEM2-ES) within a present-day linkage
xiii. 1 Climate linkage (CNRM_CM5) within a present-day linkage
xiv. 3 Climate linkage (both climate models) within a present-day linkage

2. CEHC
    a. Used General Natural Landscape Blocks and Essential Connectivity Areas from the 8 layers available.
    b. Core areas were defined as areas within the Natural Landscape Blocks
    c. Corridor areas were defined as areas within the Essential Connectivity Areas
        i. These areas were split into 2 groups based on permeability
            1) Permeable areas identified using layer from CDFW
                a. Layer name: ds620_EssentialConnectivityAreas_CaliforniaEssentialHabitatConnectivity
                b. Areas in the top 2 categories (score 0-33 of 100) were classified as “more permeable”.
    d. Resulting 4 categories:
        i. Core Areas
        ii. Corridor – More Permeable
        iii. Corridor – Less Permeable
        iv. All other Areas

How were they combined

1. Combining TNC and CEHC datasets
    a. Created a Connectivity Ranking scale between 0-5, with 0 being limited connectivity, and areas identified by either input layers getting a score ranging from low (1) to high (5).
    b. Crosswalk to overall Connectivity Score

		CEHC			
		Other areas	Corridor - Less Permeable	Corridor - More Permeable	core
TNC	0	**0**	**1**	**2**	**2**
	1 (low)	**1**	**2**	**3**	**3**
	2	**2**	**3**	**4**	**4**
	3 (high)	**3**	**4**	**5**	**5**

How were they inputted to the hexagons

Zonal statistics - Majority

Biodiversity / Species Richness

What was the input

1. Received species range maps and the weightings for each species of which habitat types they use. (CDFW). We selected all vertebrates whose ranges intersected with our region.

    We scored the WHR types in the 30m raster vegetation map to identify the suitable habitat of each species, within its range in our area.

How was each input reclassed

1. Resampled raster to retain only areas where habitat score > 0

    a. These are areas of suitable habitat within the range of each species

How were they combined

1. Summed up the suitable habitat for all species that overlapped with the study area, by 30 m grid cell.
    b. 261 birds, 105 mammals, 21 amphibians and 31 reptiles
2. Used natural breaks to divide the distribution into 5 groups – called Biodiversity Rankings, with 1 being low and 5 being high.
    a. 1 = 0-90
    b. 2 = 91-120
    c. 3 = 121-135
    d. 4 = 136-150
    e. 5 = 151-191

How were they inputted to the hexagons

3. Performed zonal statistics, used the average number of potential species per hexagon to assign the hexagon a Potential Species Richness (Biodiversity) Score using the table above. For example, a hexagon with an average of 160 species, get a score of 5 (high biodiversity).

Other notes:

4. Repeated the previous 3 steps for listed species only
    a. Listed species = ones from CDFW extraction
        i. 26 birds, 24 mammals, 11 amphibians and 2 reptiles

Microrefugia

What was the input

10m and 25m DEMs

How was each input reclassed

Solar radiation to Degree C

1. We ran a solar radiation model with the 25m DEM (2 days per month x 12 months)

2. Solar radiation raster units = Yearly total in watt-hours/m2

Convert yearly watt-hours to daily megajoules

$$\frac{Watt-hours}{year} \; x \; \frac{1\;year}{365\;days} \; x \; \frac{3600\;J}{Watt-hour} \; x \frac{1\;MJ}{10^6\;J}$$

3.Convert daily MJ to degree C using a conversion table from Curtis et al. (2014).

Daily MJ/sec	Degree C
< 7.5	0
7.5 - 10.5	0.25
10.5 - 12.5	0.5
12.5 - 15	0.75
15 - 17.5	1
17.5 - 20	1.25
20 - 22.5	1.5
22.5 - 25	1.75
25 - 27.5	2
27.5 - 30	2.25
> 30	2.5

Elevation range to Degree C

1) Zonal Statistics was performed on 10m DEM for each hex
    a. Range was used with environmental lapse rate to calculate "buffering capacity" within the Hex

How inputted into hexagons:

1. Solar Radiation (25m raster)
    a. The minimum solar radiation value was used with conversion table to calculate the temperature equivalent of lowest Solar Radiation load within the hex
2. Elevation (10m raster)
    a. Range of elevation within the hex was used with environmental lapse rate to calculate the coldest point within the hex
        i. (Average Elevation – Maximum Elevation) x 0.00649606
3. Microsite buffering capacity was calculated by adding the temperature equivalent of lowest Solar Radiation load with the coldest point within the hex

Secondary Maps

Vegetation Structure

Fire Perimeters

Land Use Intensity Score

1. Roads
    a. Used Esri Road Class (0-9) and converted to 3 impact ranks

ESRI Road Class	Road Class Impact Rank	Description
0	1	Major Highway
1	1	Major Highway Connector
2	1	Highway
3	1	Major Road
4	2	Local Road
5	3	Minor Road or Vehicular Trail
6	1	Special Road Features (Roundabouts, Service drives)
7	1	Ramps
8	1	Ferries
9	3	Private Road

    b. Summed road feet per hex per impervious road class (1-3)
    c. Calculated Weighted Road Length within each hexagon

i. Weighted Road Length = 1 x RoadFeet(Impervious Road Class 1) + 0.5 x RoadFeet(Impervious Road Class 2) + 0.33 x RoadFeet(Impervious Road Class 3)

d. Classified Weighted Road Lengths into 5 weight classes

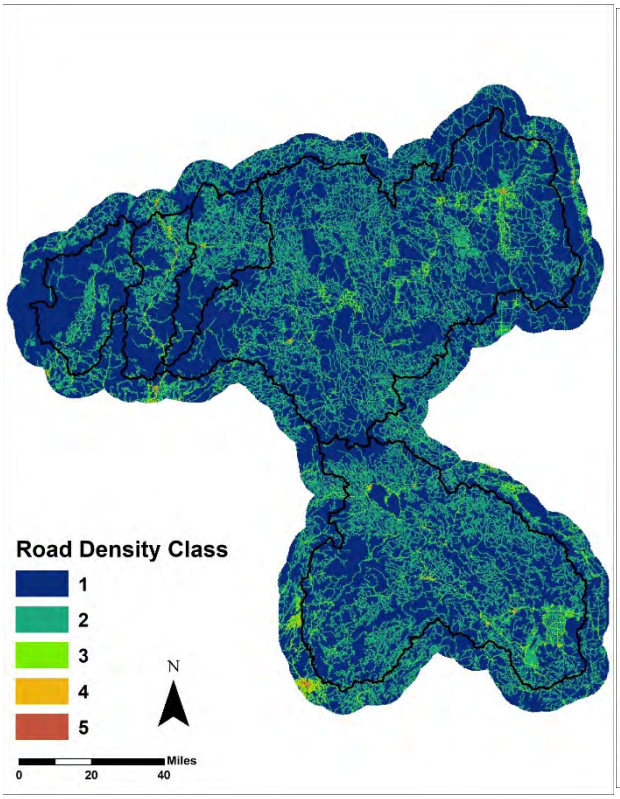
Road Weight	**WeightCls**	**label**	**# hexs**	
0-10	1	no	266288	65.1%
10-1300	2	low	134692	32.9%
1300-2600	3	med	7581	1.9%
2600-5218	4	high	382	0.1%
>5218	5	highest	5	0.0%

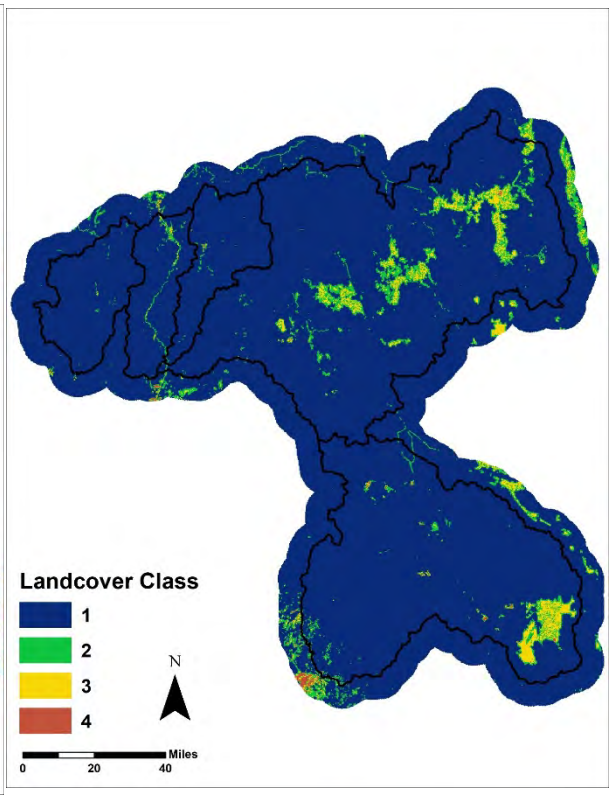
2. Landuse
    a. Have WHR percentage (0-100) by Hex
    b. Calculated Weighted Landcover Percent within each hexagon
        i. Weighted Landcover Percent =
            100% (Urban + Eucalyptus Percent Cover)
            + 33% (Cropland + Dryland Grain Crop + Deciduous Orchard + Evergreen Orchard + Irrigated Grain Crop + Irrigated Row and Field Crop + Irrigated Hayfield + Pasture + Rice + Vineyard Percent Cover)
    c. Classified Weighted Landcover Percent into 4 weight classes

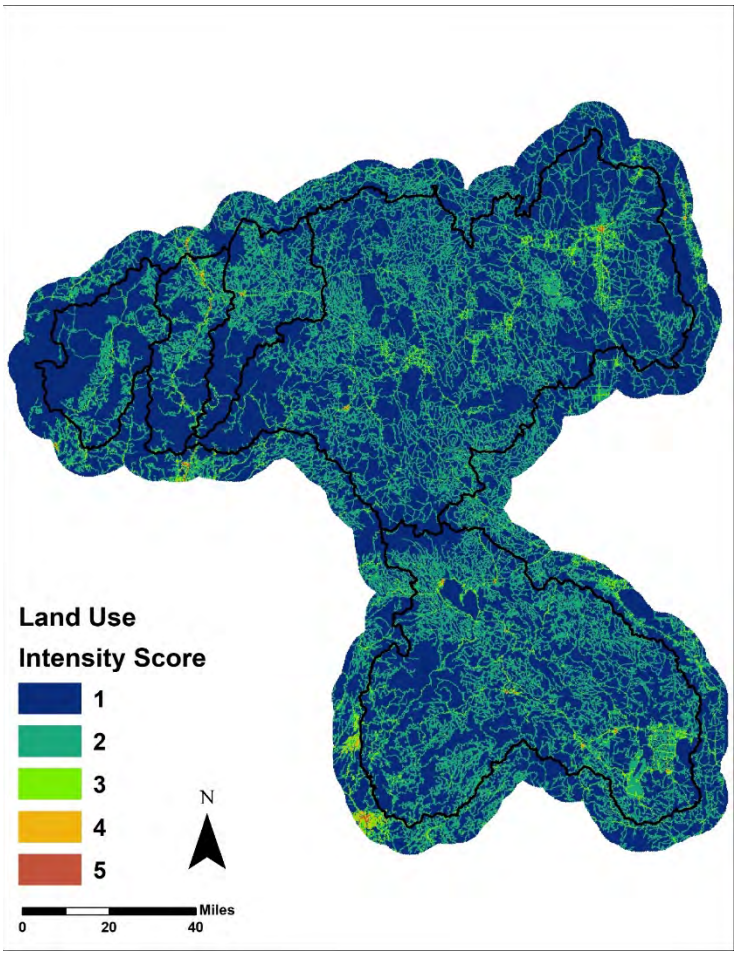
Weighted Landcover Percent	**Weighted Landcover Class**	**# hexs**	
0-0.1 %	1	381207	93.2%
.1-33 %	2	18562	4.5%
33-65 %	3	8418	2.1%
65-100 %	4	761	0.2%

3. Combined Roads and Landuse to get Land Use Intensity Score
    a. Combine Score = 10 x (Weighted Road Class) + (Weighted Landcover Class)

Combine Score	Weighted Road Class	Weighted Landcover Class	Land Use Intensity Score	# hex	
11	No Roads	Natural Lands	1	252439	61.7%
12	No Roads	Low Human Impact	1	8692	2.1%
13	No Roads	Med Human Impact	2	5127	1.3%
14	No Roads	High Human Impact	2	30	0.0%
21	Low-density Roads	Natural Lands	2	123305	30.2%
22	Low-density Roads	Low Human Impact	2	8369	2.0%
23	Low-density Roads	Med Human Impact	3	2751	0.7%
24	Low-density Roads	High Human Impact	3	267	0.1%
31	Medium-density Roads	Natural Lands	3	5373	1.3%
32	Medium-density Roads	Low Human Impact	3	1432	0.4%
33	Medium-density Roads	Med Human Impact	4	463	0.1%
34	Medium-density Roads	High Human Impact	4	313	0.1%
41	High-density Roads	Natural Lands	4	90	0.0%
42	High-density Roads	Low Human Impact	5	69	0.0%
43	High-density Roads	Med Human Impact	5	72	0.0%
44	High-density Roads	High Human Impact	5	151	0.0%
51	Highest-density Roads	Natural Lands	n/a	0	0.0%
52	Highest-density Roads	Low Human Impact	n/a	0	0.0%
53	Highest-density Roads	Med Human Impact	5	5	0.0%
54	Highest-density Roads	High Human Impact	n/a	0	0.0%


Road Density Class
1
2
3
4
5
N
Miles
0
20
40


Landcover Class
1
2
3
4
N
Miles
0
20
40



Canopy Height Score

Received Fall 2019 Canopy Height Raster from Salo Sciences (California Forest Observatory 2020). Performed zonal statistics to get the average canopy height per hexagon. Used natural breaks to classify the heights into 5 classes.

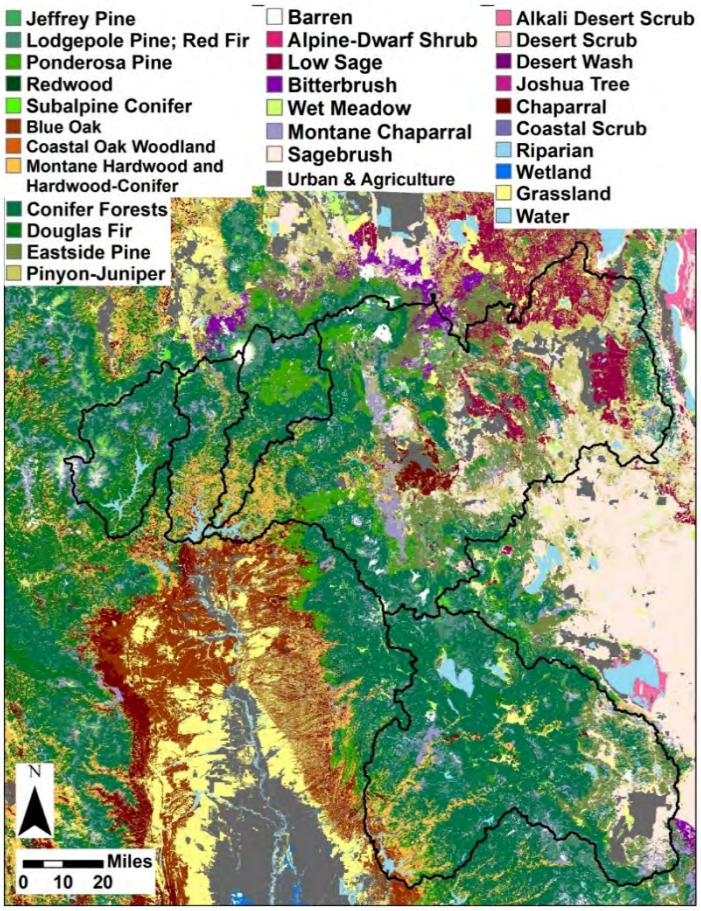
Future Ranges of Selected Species

Received the species range maps and habitat models for all vertebrate species in California from CDFW. For the xxx vertebrate species that overlapped with our study area, we selected just the suitable habitats within their range (defining suitable as having a WHR based landcover score greater than 0), then spatially added them.

Input Reference Maps

Vegetation Map

1. FVEG (30m raster) converted to polygon and unionized to Hex grid to calculate:
    a. Percentage of each WHR type within each Hexagon (0-100)
    b. The WHR type that had the majority coverage within each Hexagon



10 m DEM

Zonal statistics were performed on a 10m DEM to get the average and range of elevation within each hexagon. These statistics were used when examining the microrefugia characteristics (section XX)

Land Tenure

1. Tribal land
    a. Source: https://gis-calema.opendata.arcgis.com/datasets/23348a6fb3e44322a0c0a862aba62a24_0
    b. Description: The American Indian Reservations / Federally Recognized Tribal Entities dataset depicts feature location, selected demographics and other associated data for the 561 Federally Recognized Tribal entities in the contiguous U.S. and Alaska.

Categories included are: American Indian Reservations (AIR), Federally Recognized Tribal Entities (FRTE) and Alaska Native Villages (ANV).

2. Public Land
    a. CPAD
        i. Version: 2020a
        ii. Source: https://www.calands.org/cpad/
        iii. Description: The California Protected Areas Database (CPAD) is a GIS dataset depicting lands that are owned in fee and protected for open space purposes by over 1,000 public agencies or non-profit organizations. CPAD depicts the wide diversity of parks and open spaces in California, ranging from our largest National Forests and Parks to neighborhood pocket parks.
3. Easements
    a. CCED
        i. Version: 2020a
        ii. Source: https://www.calands.org/cced/
        iii. Description: CCED is a GIS database defining easements and deed-based restrictions on private land. These restrictions limit land uses to those compatible with maintaining it as open space. Lands under easement may be actively farmed, grazed, forested, or held as nature reserves. Easements are typically held on private lands with no public access. CCED represents California in the National Conservation Easement Database (NCED), a national inventory of lands conserved as easements. NCED is managed by a consortium of non-governmental organizations including: Ducks Unlimited, the Trust for Public Land, Defenders of Wildlife, Conservation Biology Institute, and NatureServe.
4. State Refuges
    a. Publication date: 8/21/20 by CDFW
    b. Source: https://wildlife.ca.gov/Data/GIS/Clearinghouse
    c. Description: Boundaries of California State Fish and Game Refuges, Fish Refuges, Game Refuges, Waterfowl Refuges, Quail Refuges, Marine Life Refuges, and Burro Santuary as defined in the Fish and Game Code Division 7 Chapter 2. Special rules of take and possession apply to the areas designated (see Division 7 Chapter 1).

Goal: Classify the study area into 3 Land Ownership classes: Public, Private, and Tribal

Processing steps:

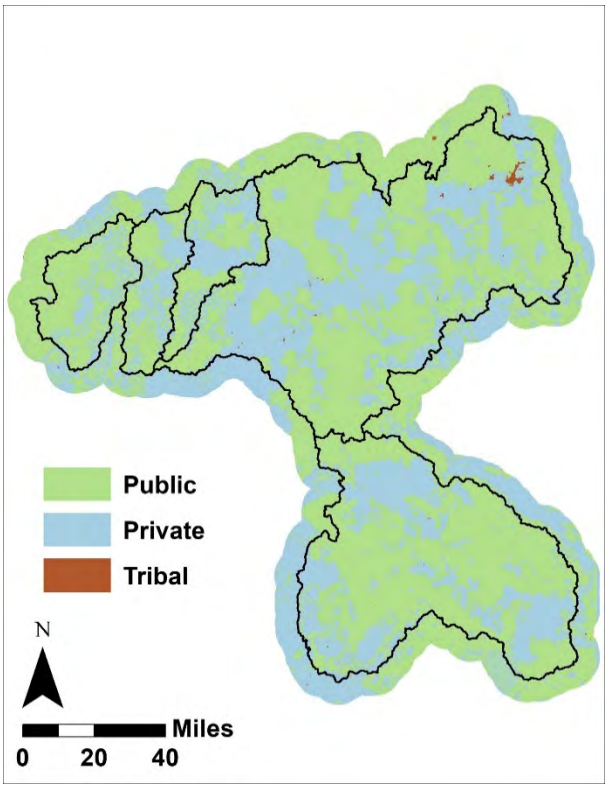
1. CPAD and State Refuge areas were added as Public
2. Easements were added as Private
3. Tribal Land was added as Tribal

Result:

PubLandCode	PubLandDesc	area_acres
1	Public	6214007
2	Private	3877791
3	Tribal	13635

Result by watershed (acres)

	Public	Private	Tribal
Feather	1515860	790184	427
McCloud	233924	201805	0
Pit	2085733	1307449	11004
Upper Sacramento	216298	162603	3
Upper Trinity	331909	128022	0
Buffer	1830283	1287729	2201



Climate Data

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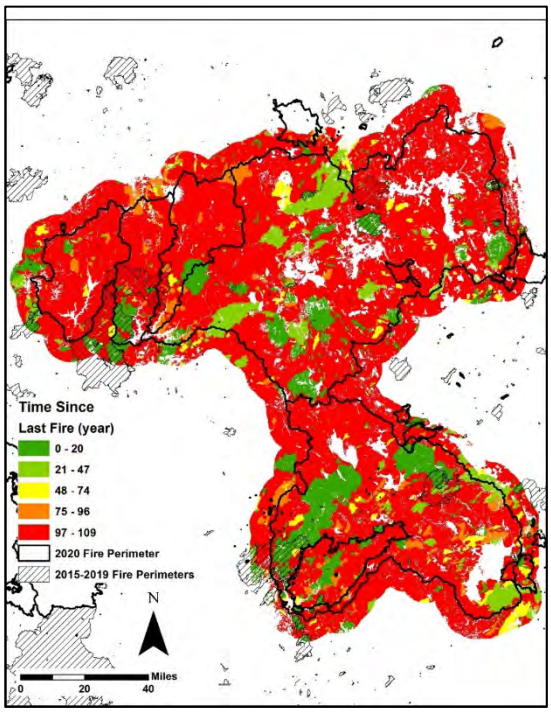
Fire Return Interval Departure



We used the Fire Return Interval Departure (FRID; Safford & Van de Water 2014) to evaluate seral condition and fire risk in some of the use cases.

Hydroclimatic Model (Basin Characterization Model)

We used the outputs from the Basin Characterization Model (BCM). The model uses downscale PRISM climate data (Tmax, Tmin, PPT) at 270 m grid scale for historical data. It then uses bias-corrected future projections also downscaled to 270 m to output a series of variables including April 1st snowpack, Runoff, Recharge, Potential Evapotranspiration, Actual Evapotranspiration, and Climatic Water Deficit (Flint & Flint 2012, Flint et al. 2013, Thorne et al. 2015). We used 30-year summaries of annual values to assess change from a baseline period of 1981-2010.

Results Table Appendices

This section is comprised of 4 Excel tables that are zipped and available as a separate download.

The values were derived in the following manner:

We converted all rasters of different grid scale to 270m and use the Combine tool.

Exported the raster value attribute tables (VAT) to MS Access to perform crosstab queries that summarize the count of cells in each category. The cell count was then converted to area using a conversion factor of:

18.013982 acres per 270m grid cell.

The results were formatted in Excel.

GIS Appendices

This section is comprised of 2 geodatabases that are available as a separate download.

The first geodatabase, “Hexagon Data”, contains the values we embedded in the hexagons.

The second geodatabase, “Input Data” contains input and contextual data.

These are the final extents of the climate exposure analysis

There are 2 tabs

SumByRefugiaAndConsensusHighExp	Refugia (both consensus and by GCM) & Consensus High Exposure
SummariesBy5ExposureClasses	Summary by the 5 Exposure Classes

		RCP8.5										RCP4.5									
	Total	Refugia - Consensus	High Exposure - Consensus	Very High Exposure - Consensus	Refugia - CNRM Only	Refugia - MIROC Only	Refugia - Consensus	High Exposure - Consensus	Very High Exposure - Consensus	Refugia - CNRM Only	Refugia - MIROC Only	Refugia - Consensus	High Exposure - Consensus	Very High Exposure - Consensus	Refugia - CNRM Only	Refugia - MIROC Only	Refugia - Consensus	High Exposure - Consensus	Very High Exposure - Consensus	Refugia - CNRM Only	Refugia - MIROC Only
				2100 - acres					2100 - percent					2100 - acres					2100 - percent		
Statewide	**100,937,908**	12,442,311	11,589,818	36,782,029	7,997,397	14,945,030	12%	11%	36%	8%	15%	31,626,193	9,938,764	15,128,466	10,209,388	16,491,783	31%	10%	15%	10%	16%
Study Area	**9,945,808**	1,879,723	1,765,803	2,205,236	1,255,466	845,432	19%	18%	22%	13%	9%	3,280,634	1,061,168	1,046,648	818,105	1,903,519	33%	11%	11%	8%	19%
5 Watersheds	**6,862,048**	1,273,372	1,321,290	1,416,692	982,248	527,035	19%	19%	21%	14%	8%	2,351,203	754,768	664,284	623,914	1,237,633	34%	11%	10%	9%	18%
Pit	**3,374,433**	489,818	754,642	803,406	350,264	222,581	15%	22%	24%	10%	7%	845,234	478,740	452,079	343,761	530,458	25%	14%	13%	10%	16%
Feather	**2,248,271**	303,554	423,833	483,838	600,244	98,807	14%	19%	22%	27%	4%	866,238	212,529	176,195	249,890	385,733	39%	9%	8%	11%	17%
McCloud	**431,507**	144,562	50,835	34,046	16,339	87,728	34%	12%	8%	4%	20%	188,967	15,168	11,295	5,927	163,045	44%	4%	3%	1%	38%
Upper Trinity	**442,171**	255,690	22,644	6,413	12,177	69,210	58%	5%	1%	3%	16%	320,757	8,593	2,342	23,742	50,385	73%	2%	1%	5%	11%
Upper Sacramento	**365,666**	79,748	69,336	88,989	3,225	48,710	22%	19%	24%	1%	13%	130,007	39,739	22,373	594	108,012	36%	11%	6%	0%	30%
				2070 - acres					2070 - percent					2070 - acres					2070 - percent		
Statewide	**100,937,908**	35,243,293	9,767,739	13,515,657	10,831,375	14,414,356	35%	10%	13%	11%	14%	43,726,509	8,647,810	7,319,333	9,796,760	13,758,701	43%	9%	7%	10%	14%
Study Area	**9,945,808**	3,673,267	933,250	859,339	784,383	1,892,675	37%	9%	9%	8%	19%	4,363,113	749,418	532,367	592,390	2,022,015	44%	8%	5%	6%	20%
5 Watersheds	**6,862,048**	2,634,635	682,730	533,214	598,947	1,218,826	38%	10%	8%	9%	18%	3,133,406	510,480	306,472	443,234	1,323,884	46%	7%	4%	6%	19%
Pit	**3,374,433**	985,581	425,292	377,069	335,204	541,068	29%	13%	11%	10%	16%	1,232,282	281,342	221,230	343,346	599,920	37%	8%	7%	10%	18%
Feather	**2,248,271**	945,302	204,783	132,024	233,840	389,859	42%	9%	6%	10%	17%	1,144,320	187,490	64,850	68,111	490,359	51%	8%	3%	3%	22%
McCloud	**431,507**	214,420	12,123	9,025	3,963	152,128	50%	3%	2%	1%	35%	246,539	9,637	8,485	522	121,252	57%	2%	2%	0%	28%
Upper Trinity	**442,171**	332,160	8,953	2,324	25,418	36,046	75%	2%	1%	6%	8%	319,910	8,971	2,936	30,552	31,488	72%	2%	1%	7%	7%
Upper Sacramento	**365,666**	157,172	31,579	12,772	522	99,725	43%	9%	3%	0%	27%	190,354	23,040	8,971	703	80,865	52%	6%	2%	0%	22%
				2040 - acres					2040 - percent					2040 - acres					2040 - percent		
Statewide	**100,937,908**	51,284,852	5,902,227	2,702,241	5,525,321	18,926,967	51%	6%	3%	5%	19%	55,102,249	6,449,312	3,213,568	4,293,002	13,959,467	55%	6%	3%	4%	14%
Study Area	**9,945,808**	4,870,332	486,504	228,417	160,703	2,795,013	49%	5%	2%	2%	28%	5,516,566	592,156	298,582	113,542	1,874,139	55%	6%	3%	1%	19%
5 Watersheds	**6,862,048**	3,483,508	274,389	140,473	86,089	1,952,734	51%	4%	2%	1%	28%	3,931,498	346,535	174,303	63,788	1,318,786	57%	5%	3%	1%	19%
Pit	**3,374,433**	1,642,371	97,546	43,864	38,730	1,115,372	49%	3%	1%	1%	33%	2,024,087	144,094	62,977	28,516	630,489	60%	4%	2%	1%	19%
Feather	**2,248,271**	1,185,338	116,550	64,940	11,205	603,270	53%	5%	3%	0%	27%	1,212,665	139,500	79,027	14,411	488,071	54%	6%	4%	1%	22%
McCloud	**431,507**	220,779	13,420	10,592	3,639	106,589	51%	3%	2%	1%	25%	225,445	13,961	11,475	6,773	93,114	52%	3%	3%	2%	22%
Upper Trinity	**442,171**	258,465	25,021	10,754	25,688	34,100	58%	6%	2%	6%	8%	275,920	25,940	10,250	7,998	33,578	62%	6%	2%	2%	8%
Upper Sacramento	**365,666**	176,555	21,851	10,322	6,827	93,402	48%	6%	3%	2%	26%	193,380	23,040	10,574	6,089	73,533	53%	6%	3%	2%	20%

RCP 8.5

CNRM

	Total Acres	Refugia (0-80m)	Moderate Exposure (80-160m)	High Exposure (160-240m)	Very High Exposure (240-320m)	Non-Analog
				2100 - acres		
Statewide	**100,937,908**	20,439,709	16,275,862	12,676,035	46,856,997	4,589,314
Study Area	**9,965,808**	3,135,189	1,531,477	1,144,662	3,290,380	844,099
5 Watersheds	**6,862,048**	2,250,621	1,078,047	744,788	2,108,438	475,155
				2100 - percent		
Statewide		20%	16%	13%	46%	5%
Study Area		32%	15%	12%	33%	8%
5 Watersheds		33%	16%	11%	34%	7%
				2070 - acres		
Statewide	**100,937,908**	46,074,668	21,791,171	12,549,855	20,444,789	81,225
Study Area	**9,965,808**	4,457,650	2,268,814	1,394,823	1,623,430	71,101
5 Watersheds	**6,862,048**	3,233,582	1,598,453	963,104	1,051,026	35,884
				2070 - percent		
Statewide		46%	22%	12%	20%	0%
Study Area		45%	24%	14%	16%	1%
5 Watersheds		47%	23%	14%	15%	1%
				2040 - acres		
Statewide	**100,937,908**	27,387,341	17,901,539	13,544,299	41,929,759	174,970
Study Area	**9,965,808**	2,725,155	2,284,630	2,177,386	2,707,665	1,171
5 Watersheds	**6,862,048**	1,800,407	1,574,656	1,472,310	1,814,504	1,171
				2040 - percent		
Statewide		27%	18%	13%	42%	0%
Study Area		27%	23%	22%	27%	0%
5 Watersheds		26%	23%	21%	26%	0%
				2010 - acres		
Statewide	**100,937,908**	80,754,141	15,136,609	4,037,420	974,989	34,749
Study Area	**9,965,808**	7,142,346	2,007,118	602,081	178,681	15,582
5 Watersheds	**6,862,048**	4,987,297	1,374,016	373,088	119,703	7,944
				2010 - percent		
Statewide		80%	15%	4%	1%	0%
Study Area		72%	20%	6%	2%	0%
5 Watersheds		73%	20%	5%	2%	0%

MIROC

	Total Acres	Refugia (0-80m)	Moderate Exposure (80-160m)	High Exposure (160-240m)	Very High Exposure (240-320m)	Non-Analog
				2100 - acres		
Statewide	**100,937,908**	41,835,582	22,197,747	13,658,293	22,932,213	314,272
Study Area	**9,965,808**	4,098,739	2,438,174	1,464,014	1,758,777	186,102
5 Watersheds	**6,862,048**	2,975,117	1,652,405	960,289	1,269,848	73,389
				2100 - percent		
Statewide		41%	22%	14%	23%	0%
Study Area		41%	25%	15%	18%	2%
5 Watersheds		43%	24%	14%	17%	1%
				2070 - acres		
Statewide	**100,937,908**	51,523,269	23,093,078	11,847,201	12,471,008	3,351
Study Area	**9,965,808**	4,955,502	2,680,733	1,239,815	1,074,457	3,351
5 Watersheds	**6,862,048**	3,576,640	1,794,139	842,514	647,170	1,585
				2070 - percent		
Statewide		51%	23%	12%	12%	0%
Study Area		50%	27%	12%	11%	0%
5 Watersheds		52%	26%	12%	9%	0%
				2040 - acres		
Statewide	**100,937,908**	59,395,251	23,479,082	10,237,836	7,821,167	4,522
Study Area	**9,965,808**	5,630,108	2,700,854	921,866	688,476	4,503
5 Watersheds	**6,862,048**	3,995,285	1,835,048	638,470	390,885	2,360
				2040 - percent		
Statewide		59%	23%	10%	8%	0%
Study Area		57%	27%	9%	7%	0%
5 Watersheds		58%	27%	9%	6%	0%
				2010 - acres		
Statewide	**100,937,908**	80,754,141	15,136,609	4,037,420	974,989	34,749
Study Area	**9,965,808**	7,142,346	2,007,118	602,081	178,681	15,582
5 Watersheds	**6,862,048**	4,987,297	1,374,016	373,088	119,703	7,944
				2010 - percent		
Statewide		80%	15%	4%	1%	0%
Study Area		72%	20%	6%	2%	0%
5 Watersheds		73%	20%	5%	2%	0%

RCP 4.5

CNRM

	Total Acres	Refugia (0-80m)	Moderate Exposure (80-160m)	High Exposure (160-240m)	Very High Exposure (240-320m)	Non-Analog
				2100 - acres		
Statewide	**100,937,908**	48,117,976	20,696,174	12,389,050	19,134,668	
Study Area	**9,965,808**	5,184,154	2,348,987	1,290,504	1,122,163	
5 Watersheds	**6,862,048**	3,588,836	1,630,067	921,775	721,370	
				2100 - percent		
Statewide		48%	21%	13%	19%	0%
Study Area		52%	24%	13%	11%	0%
5 Watersheds		52%	24%	13%	11%	0%
				2070 - acres		
Statewide	**100,937,908**	57,485,211	20,481,267	11,611,597	11,359,833	
Study Area	**9,965,808**	6,385,128	2,071,428	786,202	703,050	
5 Watersheds	**6,862,048**	4,457,290	1,460,826	540,870	403,063	
				2070 - percent		
Statewide		57%	20%	12%	11%	0%
Study Area		64%	21%	8%	7%	0%
5 Watersheds		65%	21%	8%	6%	0%
				2040 - acres		
Statewide	**100,937,908**	69,061,716	20,558,907	7,609,831	3,657,883	
Study Area	**9,965,808**	7,390,704	1,628,068	613,718	313,317	
5 Watersheds	**6,862,048**	5,250,283	1,071,490	358,550	181,725	
				2040 - percent		
Statewide		68%	20%	8%	4%	0%
Study Area		74%	16%	6%	3%	0%
5 Watersheds		77%	16%	5%	3%	0%
				2010 - acres		
Statewide	**100,937,908**	80,754,141	15,136,609	4,037,420	974,989	34,749
Study Area	**9,965,808**	7,142,346	2,007,118	602,081	178,681	15,582
5 Watersheds	**6,862,048**	4,987,297	1,374,016	373,088	119,703	7,944
				2010 - percent		
Statewide		80%	15%	4%	1%	0%
Study Area		72%	20%	6%	2%	0%
5 Watersheds		73%	20%	5%	2%	0%

MIROC

	Total Acres	Refugia (0-80m)	Moderate Exposure (80-160m)	High Exposure (160-240m)	Very High Exposure (240-320m)	Non-Analog
				2100 - acres		
Statewide	**100,937,908**	48,117,976	20,696,174	12,389,050	19,134,668	
Study Area	**9,965,808**	5,184,154	2,348,987	1,290,504	1,122,163	
5 Watersheds	**6,862,048**	3,588,836	1,630,067	921,775	721,370	
				2100 - percent		
Statewide		48%	21%	13%	19%	0%
Study Area		52%	24%	13%	11%	0%
5 Watersheds		52%	24%	13%	11%	0%
				2070 - acres		
Statewide	**100,937,908**	57,485,211	20,481,267	11,611,597	11,359,833	
Study Area	**9,965,808**	6,385,128	2,071,428	786,202	703,050	
5 Watersheds	**6,862,048**	4,457,290	1,460,826	540,870	403,063	
				2070 - percent		
Statewide		57%	20%	12%	11%	0%
Study Area		64%	21%	8%	7%	0%
5 Watersheds		65%	21%	8%	6%	0%
				2040 - acres		
Statewide	**100,937,908**	69,061,716	20,558,907	7,609,831	3,657,883	
Study Area	**9,965,808**	7,390,704	1,628,068	613,718	313,317	
5 Watersheds	**6,862,048**	5,250,283	1,071,490	358,550	181,725	
				2040 - percent		
Statewide		68%	20%	8%	4%	0%
Study Area		74%	16%	6%	3%	0%
5 Watersheds		77%	16%	5%	3%	0%
				2010 - acres		
Statewide	**100,937,908**	80,754,141	15,136,609	4,037,420	974,989	34,749
Study Area	**9,965,808**	7,142,346	2,007,118	602,081	178,681	15,582
5 Watersheds	**6,862,048**	4,987,297	1,374,016	373,088	119,703	7,944
				2010 - percent		
Statewide		80%	15%	4%	1%	0%
Study Area		72%	20%	6%	2%	0%
5 Watersheds		73%	20%	5%	2%	0%

These are the final land cover tables. They show climate exposure of the vegetation by land cover (WHR) type.

There are 6 tabs: 2 main tables and 5 appendix tabs.

Main1_WHR_ConsensusRefHighExp	Consensus Refugia & High Exposure: Summaries
Main2_WHR_ConsensusModExp	Consensus Moderate Exposure: Summaries
Apx1_WHR_ConRefHighExp_5Watshd	Consensus Refugia & High Exposure: By Watershed
Apx2_WHR_ConModExp_5Watshd	Consensus Moderate Exposure: By Watershed
Apx3_WHR_RefHighExp	Single Model Refugia & High Exposure: Summaries and by Watershed
Apx4_WHR_ModExp	Single Model Moderate Exposure: Summaries and by Watershed
Apx5_WHR_AreaByRank	Total Area by WHR Type

This is the Consensus Refugia & High Exposure by land cover (WHR) type table for use in the main text. Refugia & High Exposure by watershed tables are in appendix 1, single climate model tables are in appendix 3.

Extent = Entire Study Area (5-Watersheds plus 10km buffer)
RCP8.5 area = acres

	Land Cover Type (WHR)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	ALKALI DESERT SCRUB							522	8,917	
	ALPINE DWARF-SHRUB							594	36	
	ANNUAL GRASSLAND	306	324		15,042	15,006		7,764	56,330	54
	ASPEN				4,540	504		360	594	
	BARREN	36	18		1,603	2,270		2,576	4,107	
	BITTERBRUSH				18			72,038	19,869	144
	BLUE OAK WOODLAND	54						3,441	70,237	
	BLUE OAK-FOOTHILL PINE	1,135	1,153		18			13,024	55,681	18
	CHAMISE-REDSHANK CHAPARRAL							685	811	
	CLOSED-CONE PINE-CYPRESS	5,404	234		36			1,135	522	
	COASTAL OAK WOODLAND							54	126	
	COASTAL SCRUB								72	
	CROPLAND				1,171	28,912		126	19,329	
	DECIDUOUS ORCHARD								180	
	DOUGLAS FIR	56,942	32,317		1,946	2,216		50,079	47,197	
	DRYLAND GRAIN CROPS					54		144	7,836	
	EASTSIDE PINE				9,692	2,486		320,217	139,734	324
	EUCALYPTUS								36	
	EVERGREEN ORCHARD							18	757	
	FRESH EMERGENT WETLAND							72	558	
	IRRIGATED GRAIN CROPS								883	
	IRRIGATED HAYFIELD				18	973		2,828	94,465	180
	IRRIGATED ROW AND FIELD CROPS								414	
	JEFFREY PINE	13,456	7,980		72	36		955	90	
2100	JUNIPER				11,709	7,458		17,167	4,720	54
	KLAMATH MIXED CONIFER	191,813	73,101		20,320	21,869		8,737	6,053	
	LACUSTRINE	9,007	14,483		18	90		15,870	793	
	LODGEPOLE PINE				6,539	288		15,474	4,900	
	LOW SAGE							331,944	67,697	1,225
	MIXED CHAPARRAL	30,318	17,798		775	847		17,383	29,435	
	MONTANE CHAPARRAL	280,027	74,037		6,773	2,828		6,017	3,567	
	MONTANE HARDWOOD	32,858	21,112	72	108	126		56,582	77,514	72
	MONTANE HARDWOOD-CONIFER	31,741	24,751	18	126	54		34,947	32,443	
	MONTANE RIPARIAN	14,195	8,070							
	PASTURE		1,333		162	1,639			4,990	
	PERENNIAL GRASSLAND	13,114	4,107							
	PONDEROSA PINE	104,769	74,146	18		558		16,609	37,289	36
	RED FIR	5,728	649		21,959	3,477		27,039	3,206	
	RICE								360	
	RIVERINE		18					486	486	
	SAGEBRUSH							81,765	32,353	36
	SIERRAN MIXED CONIFER	362,910	265,022		23,436	15,330	54	70,453	61,212	
	SUBALPINE CONIFER				1,351	54		27,003	306	
	URBAN				72	558		811	23,670	90
	VALLEY FOOTHILL RIPARIAN							288	1,819	
	VALLEY OAK WOODLAND							72	1,261	
	VINEYARD								90	
	WET MEADOW	865	126		4,107	22,373	252	108	865	
	WHITE FIR	83,261	20,518		7,890	2,180		62,274	11,511	
	Total:	**1,237,939**	**641,298**	**108**	**139,500**	**132,187**	**306**	**1,267,662**	**935,322**	**2,234**

Extent = 5-Watersheds
RCP8.5 area = acres

	Land Cover Type (WHR)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	ALPINE DWARF-SHRUB							288	36	
	ANNUAL GRASSLAND	306	324		11,403	9,169		3,080	6,431	36
	ASPEN				3,387	252		252	450	
	BARREN				1,387	1,909		2,000	1,027	
	BITTERBRUSH							26,120	3,495	
	BLUE OAK WOODLAND	54						973	4,684	
	BLUE OAK-FOOTHILL PINE	1,117	919		18			7,242	15,186	18
	CLOSED-CONE PINE-CYPRESS	5,350	180		36			793	162	
	COASTAL OAK WOODLAND								18	
	CROPLAND				1,117	24,265		54	1,549	
	DOUGLAS FIR	30,354	24,949		883	72		40,946	34,353	
	DRYLAND GRAIN CROPS					54		144	6,665	
	EASTSIDE PINE				4,540	630		232,651	113,560	324
	EVERGREEN ORCHARD								36	
	FRESH EMERGENT WETLAND							72	108	
	IRRIGATED GRAIN CROPS								865	
	IRRIGATED HAYFIELD				18	973		2,828	65,175	180
	IRRIGATED ROW AND FIELD CROPS								396	
	JEFFREY PINE	6,575	4,467		72	36		901	90	
	JUNIPER				7,368	2,234		16,213	2,954	54
	KLAMATH MIXED CONIFER	117,307	56,420		17,780	20,482		8,286	5,458	
2100	LACUSTRINE	7,440	4,522		18	36		14,573	360	
	LODGEPOLE PINE				1,783			10,448	2,306	
	LOW SAGE							230,525	57,609	360
	MIXED CHAPARRAL	30,318	17,780		162	72		10,934	6,539	
	MONTANE CHAPARRAL	195,073	53,754		6,269	1,711		4,233	2,720	
	MONTANE HARDWOOD	25,346	15,096	36		18		48,710	45,251	72
	MONTANE HARDWOOD-CONIFER	21,743	16,915		54			32,551	22,788	
	MONTANE RIPARIAN	11,781	6,575							
	PASTURE		1,207			973				
	PERENNIAL GRASSLAND	8,917	1,819							
	PONDEROSA PINE	79,478	54,312	18				12,466	12,808	36
	RED FIR	2,864	90		15,870	1,351		12,772	1,225	
	RICE								360	
	RIVERINE		18					180	108	
	SAGEBRUSH							70,110	30,047	36
	SIERRAN MIXED CONIFER	234,776	167,314		19,996	10,808	54	53,249	42,117	
	SUBALPINE CONIFER				685			14,195	18	
	URBAN				54	360		504	2,882	
	VALLEY FOOTHILL RIPARIAN							108	144	
	VALLEY OAK WOODLAND								36	
	VINEYARD								36	
	WET MEADOW	594	18		3,909	16,357	252	108	865	
	WHITE FIR	50,583	16,429		6,053	1,567		56,438	9,764	
	Total:	**829,976**	**443,108**	**54**	**102,860**	**93,330**	**306**	**914,948**	**500,681**	**1,117**

	Land Cover Type (WHR)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	ALKALI DESERT SCRUB							667	10,628	
	ALPINE DWARF-SHRUB				90			90		
	ANNUAL GRASSLAND				7,530	23,472	54	10,268	43,053	18
	ASPEN				432	216		144	252	
	BARREN	883	18		1,927	4,251		757	1,531	
	BITTERBRUSH	270	54		5,080	1,117		1,459	4,594	
	BLUE OAK WOODLAND				18	90		2,864	64,166	
	BLUE OAK-FOOTHILL PINE	144			1,189	612		7,980	44,639	
	CHAMISE-REDSHANK CHAPARRAL							90	72	
	CLOSED-CONE PINE-CYPRESS	288	378		486	396		36		
	COASTAL OAK WOODLAND							54	108	
	COASTAL SCRUB									
	CROPLAND		36		3,927	54,168	504	1,567	106,499	216
	DECIDUOUS ORCHARD								180	
	DOUGLAS FIR	106,120	72,776	108	2,918	1,225		7,728	3,351	
	DRYLAND GRAIN CROPS							180	9,151	
	EASTSIDE PINE	49,863	21,851		87,530	36,046		22,734	22,391	198
	EUCALYPTUS								36	
	EVERGREEN ORCHARD							18	757	
	FRESH EMERGENT WETLAND							72	576	
	IRRIGATED GRAIN CROPS								919	
	IRRIGATED HAYFIELD				432	46,944	144	18	23,076	
	IRRIGATED ROW AND FIELD CROPS								414	
	JEFFREY PINE	33,416	15,924		126	18		36		
2070	JUNIPER	28,804	10,286					1,765	1,153	54
	KLAMATH MIXED CONIFER	216,510	138,059		1,567	1,009		829	126	
	LACUSTRINE	5,476	16,465		4,612	144		36		
	LODGEPOLE PINE	1,946	36		2,990	919		72	829	
	LOW SAGE	360	54		378	72		302,707	63,247	1,225
	MIXED CHAPARRAL	18	18		1,747	3,819		3,170	2,594	
	MONTANE CHAPARRAL	391,516	109,435	72	2,144	829		2,432	1,549	
	MONTANE HARDWOOD	43,990	32,173	54	1,657	1,207		4,413	6,737	18
	MONTANE HARDWOOD-CONIFER	58,726	44,711	18	1,333	703		649	396	
	MONTANE RIPARIAN	7,530	6,989							
	PASTURE				72	1,909			4,990	
	PERENNIAL GRASSLAND	61,428	28,930	144						
	PONDEROSA PINE	98,446	104,175	342	378	1,279		2,000	3,044	36
	RED FIR	180,068	26,823		144	54		721		
	RICE								360	
	RIVERINE					36		18	54	
	SAGEBRUSH	37,127	18,014		13,042	21,581		14,952	3,693	36
	SIERRAN MIXED CONIFER	804,000	545,175	216	3,585	3,098		12,736	6,989	
	SUBALPINE CONIFER				14,195	126		306		
	URBAN					144		757	16,573	
	VALLEY FOOTHILL RIPARIAN							108	540	
	VALLEY OAK WOODLAND								342	
	VINEYARD								90	
	WET MEADOW	16,231	20,464		54	685		90	270	
	WHITE FIR	252,844	62,869		7,368	2,180		2,360	757	
	Total:	**2,396,004**	**1,275,714**	**955**	**166,954**	**208,350**	**703**	**406,882**	**450,728**	**1,801**

	Land Cover Type (WHR)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	ALPINE DWARF-SHRUB				36			36		
	ANNUAL GRASSLAND				6,305	17,293	54	4,864	8,665	18
	ASPEN				288	108		126	252	
	BARREN	594			1,621	3,657		594	234	
	BITTERBRUSH	198	36		5,080	1,045		811	342	
	BLUE OAK WOODLAND				18	90		1,117	4,089	
	BLUE OAK-FOOTHILL PINE				1,081	540		5,260	10,502	
	CLOSED-CONE PINE-CYPRESS				468	396		18		
	COASTAL OAK WOODLAND								18	
	CROPLAND				3,116	44,711	504	1,513	82,252	216
	DOUGLAS FIR	65,157	55,951		1,063	432		6,701	2,576	
	DRYLAND GRAIN CROPS							180	7,440	
	EASTSIDE PINE	36,514	12,304		69,696	22,247		20,662	19,978	198
	EVERGREEN ORCHARD								36	
	FRESH EMERGENT WETLAND							72	126	
	IRRIGATED GRAIN CROPS								901	
	IRRIGATED HAYFIELD				432	34,947	144	18	15,132	
	IRRIGATED ROW AND FIELD CROPS								396	
	JEFFREY PINE	18,302	10,394		126	18		36		
	JUNIPER	8,881	2,864					1,711	793	54
	KLAMATH MIXED CONIFER	154,758	120,459		955	414		811	126	
2070	LACUSTRINE	2,918	2,450		4,467	144		36		
	LODGEPOLE PINE	1,801	36		2,864	901		54	36	
	LOW SAGE				216			219,825	55,879	360
	MIXED CHAPARRAL				1,063	1,477		2,738	901	
	MONTANE CHAPARRAL	298,384	82,234	72	1,819	558		1,027	1,225	
	MONTANE HARDWOOD	29,579	17,636	18	1,117	847		4,233	3,279	18
	MONTANE HARDWOOD-CONIFER	49,232	34,425		594	342		414	234	
	MONTANE RIPARIAN	6,737	6,287							
	PASTURE				72	1,369				
	PERENNIAL GRASSLAND	41,937	23,670	54						
	PONDEROSA PINE	70,471	65,571	342	216	90		1,765	883	36
	RED FIR	105,958	12,646		144	54		721		
	RICE								360	
	RIVERINE					36				
	SAGEBRUSH	2,162	1,946		13,024	20,932		11,889	2,756	36
	SIERRAN MIXED CONIFER	635,047	429,796	216	3,387	1,549		9,836	2,756	
	SUBALPINE CONIFER				6,809	18		216		
	URBAN					144		450	8,593	
	VALLEY FOOTHILL RIPARIAN							108	396	
	VALLEY OAK WOODLAND									
	VINEYARD								36	
	WET MEADOW	5,764	10,736		54	685		90	270	
	WHITE FIR	161,639	48,295		6,665	1,891		2,234	649	
	Total:	**1,696,034**	**937,736**	**703**	**132,799**	**156,938**	**703**	**300,167**	**232,110**	**937**

	Land Cover Type (WHR)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	ALKALI DESERT SCRUB							360	2,468	
	ALPINE DWARF-SHRUB				162	36				
	ANNUAL GRASSLAND				9,331	12,682	36	13,997	41,108	18
	ASPEN	3,008	180		54	72		144	108	

	Land Cover Type (WHR)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	ALPINE DWARF-SHRUB				54	36				
	ANNUAL GRASSLAND				7,386	9,187	36	10,916	31,056	
	ASPEN	2,072	72		54	72		126	108	
	BARREN	16,825	558		3,585	5,945				

	BARREN	28,894	1,405		4,485	7,224				
	BITTERBRUSH	28,822	3,585	18	1,495	793		6,413	1,171	
	BLUE OAK WOODLAND							432	2,720	
	BLUE OAK-FOOTHILL PINE	919	1,099		901	1,351		2,954	198	
	CHAMISE-REDSHANK CHAPARRAL					72			18	
	CLOSED-CONE PINE-CYPRESS	937	504		937	198		667	522	
	COASTAL OAK WOODLAND									
	COASTAL SCRUB									
	CROPLAND	180	15,132					414	19,311	
	DECIDUOUS ORCHARD								180	
	DOUGLAS FIR	113,182	98,987	180	18,861	5,440		7,836	4,359	
	DRYLAND GRAIN CROPS					36		162	5,386	
	EASTSIDE PINE	318,199	91,907	54	19,149	8,106		9,439	4,702	
	EUCALYPTUS								18	
	EVERGREEN ORCHARD							18	757	
	FRESH EMERGENT WETLAND							72	594	
	IRRIGATED GRAIN CROPS								919	
	IRRIGATED HAYFIELD				18	7,278		18	6,863	
	IRRIGATED ROW AND FIELD CROPS								414	
2040	JEFFREY PINE	33,506	20,104		54	18				
	JUNIPER	169,349	66,291	3,801	18			1,693	1,297	
	KLAMATH MIXED CONIFER	150,129	123,486		11,349	2,846		1,549	378	
	LACUSTRINE	10,322	42,081		1,369	1,027		486	594	
	LODGEPOLE PINE	31,254	1,783					18	54	
	LOW SAGE	1,387	198		1,315	18		4,540	504	
	MIXED CHAPARRAL	18	18		7,944	10,196		7,818	6,809	18
	MONTANE CHAPARRAL	395,479	115,992	90	1,783	1,279		198	54	
	MONTANE HARDWOOD	46,170	45,882	36	18,735	9,151		10,646	5,674	
	MONTANE HARDWOOD-CONIFER	64,508	55,717	54	17,239	10,214		6,395	2,486	
	MONTANE RIPARIAN	4,431	4,323							
	PASTURE				90	2,936		54	2,882	
	PERENNIAL GRASSLAND	68,885	34,659	144	252	234				
	PONDEROSA PINE	74,578	121,648	360	3,441	2,612		3,513	1,351	
	RED FIR	257,924	42,621		324	36				
	RICE								360	
	RIVERINE	36	18		18			36	162	
	SAGEBRUSH	139,698	100,320	18				10,844	4,359	36
	SIERRAN MIXED CONIFER	795,696	585,526	360	7,242	234		180	198	
	SUBALPINE CONIFER	6,053			126					
	URBAN				36	450		901	16,537	
	VALLEY FOOTHILL RIPARIAN					72		144	594	
	VALLEY OAK WOODLAND									
	VINEYARD								36	
	WET MEADOW	20,176	39,018	252	360	540		90	90	
	WHITE FIR	400,577	87,872		180	54		72		
	Total:	**3,164,318**	**1,700,358**	**5,368**	**127,269**	**85,206**	**36**	**92,105**	**136,240**	**72**

	BITTERBRUSH	4,377	342		198			288		
	BLUE OAK WOODLAND							396	108	
	BLUE OAK-FOOTHILL PINE				162	144		2,720	180	
	CLOSED-CONE PINE-CYPRESS	126	18		757	198		414	522	
	COASTAL OAK WOODLAND									
	CROPLAND	54	2,918					414	18,771	
	DOUGLAS FIR	76,866	66,183	72	7,061	4,071		3,999	2,468	
	DRYLAND GRAIN CROPS							162	4,467	
	EASTSIDE PINE	206,981	65,121	54	18,536	7,152		3,729	3,459	
	EVERGREEN ORCHARD								36	
	FRESH EMERGENT WETLAND							72	144	
	IRRIGATED GRAIN CROPS								901	
	IRRIGATED HAYFIELD				18	4,774		18	5,242	
	IRRIGATED ROW AND FIELD CROPS								396	
	JEFFREY PINE	17,942	13,943		18					
	JUNIPER	110,083	52,295	3,531				721	72	
	KLAMATH MIXED CONIFER	132,241	114,479		5,963	1,603		324	18	
2040	LACUSTRINE	7,260	4,053		1,009	937		468	594	
	LODGEPOLE PINE	16,231	396					18	36	
	LOW SAGE	54	36		432			2,828	342	
	MIXED CHAPARRAL				5,764	4,071		6,017	2,522	18
	MONTANE CHAPARRAL	303,428	87,080	90	1,171	1,135				
	MONTANE HARDWOOD	31,128	21,545	18	13,042	7,224		4,449	3,080	
	MONTANE HARDWOOD-CONIFER	55,789	43,162	36	12,358	8,016		2,288	919	
	MONTANE RIPARIAN	2,954	3,405							
	PASTURE					2,162		54	36	
	PERENNIAL GRASSLAND	44,819	27,255	54		180				
	PONDEROSA PINE	62,725	79,856	360	2,540	2,378		558	486	
	RED FIR	155,821	19,978		72					
	RICE								360	
	RIVERINE	36	18		18			18	108	
	SAGEBRUSH	56,078	27,381	18				8,503	3,693	36
	SIERRAN MIXED CONIFER	663,887	489,674	360	2,468	36		54	36	
	SUBALPINE CONIFER	2,144			72					
	URBAN					72		649	9,043	
	VALLEY FOOTHILL RIPARIAN							144	594	
	VALLEY OAK WOODLAND									
	VINEYARD								36	
	WET MEADOW	9,349	20,266	252	144	108		90	90	
	WHITE FIR	289,575	69,912		18	36		72		
	Total:	**2,268,843**	**1,209,945**	**4,846**	**82,900**	**59,536**	**36**	**50,511**	**89,926**	**54**

Land Cover Type (WHR)	Refugia	80%		< High Exposure 99%			95-	Very High Exposure > 99%		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	
ALKALI DESERT SCRUB				288	4,792			342		
ALPINE DWARF-SHRUB	72			504	36		90			
ANNUAL GRASSLAND	576	16,879	18	24,139	51,322	72	14,267	18,176		
ASPEN	4,918	468		198	306		270	126		
BARREN	29,327	6,845	18	17,762	12,087		16,879	3,369		
BITTERBRUSH	64,994	13,637	144	2,936	1,063		739	90		
BLUE OAK WOODLAND	486	13,060		594	14,429		919	6,827		
BLUE OAK-FOOTHILL PINE	4,990	30,606		9,872	6,431		3,423	2,108		
CHAMISE-REDSHANK CHAPARRAL				378	396		180	324		
CLOSED-CONE PINE-CYPRESS	1,495	721		2,036	1,117		198	108		
COASTAL OAK WOODLAND				36	36			72		
COASTAL SCRUB					54					
CROPLAND	9,367	176,159	1,441	378	7,764		18	3,098		
DECIDUOUS ORCHARD					72			108		
DOUGLAS FIR	167,800	136,204	180	7,404	3,999		1,946	667		
DRYLAND GRAIN CROPS		54		72	5,530		108	3,098		
EASTSIDE PINE	549,372	183,022	54	14,898	11,547	108	5,278	2,540		
EUCALYPTUS					36					
EVERGREEN ORCHARD					18		18	739		
FRESH EMERGENT WETLAND					198		72	396		
IRRIGATED GRAIN CROPS								919		
IRRIGATED HAYFIELD		198		18	7,152			2,180		
IRRIGATED ROW AND FIELD CROPS								414		
JEFFREY PINE	39,108	22,175		3,170	721		288	36		
2010 JUNIPER	282,063	110,083	5,620	1,459	793		540	162		
KLAMATH MIXED CONIFER	230,885	144,238		11,277	3,999		1,387	468		
LACUSTRINE	20,104	45,629		4,071	1,495		1,946	793		
LODGEPOLE PINE	49,971	5,566		3,134	1,783		1,171	414		
LOW SAGE	304,959	58,654	1,225	4,197	432		558	324		
MIXED CHAPARRAL	3,080	4,738		23,796	30,984	36	7,368	3,927		
MONTANE CHAPARRAL	355,470	106,048	90	15,204	5,296		883	108		
MONTANE HARDWOOD	66,670	83,495	198	19,257	10,971		5,566	3,675		
MONTANE HARDWOOD-CONIFER	94,285	85,837	90	11,547	4,864		3,369	919		
MONTANE RIPARIAN	8,052	6,647		2,486	883		414	18		
PASTURE				270	9,457		54	1,387		
PERENNIAL GRASSLAND	78,685	47,359	144	4,035	1,423		216	90		
PONDEROSA PINE	141,049	167,710	378	15,600	18,050	54	3,711	2,936		
RED FIR	216,168	39,252		15,258	1,351		3,333	234		
RICE								360		
RIVERINE	216	252		180	432		144	324		
SAGEBRUSH	390,957	289,935	1,855	40,153	5,314	36	4,431	1,675		
SIERRAN MIXED CONIFER	984,068	668,301	288	58,744	28,588		24,427	7,170		
SUBALPINE CONIFER	23,923	1,027		9,367	54		1,982			
URBAN		90		324	11,421		973	12,304		
VALLEY FOOTHILL RIPARIAN	126	757		18	432		162	667		
VALLEY OAK WOODLAND	72	594			306			90		
VINEYARD								90		
WET MEADOW	21,923	53,988	252	1,729	2,162		919	540		
WHITE FIR	383,193	80,955		4,053	1,279		1,603	18		
Total:	**4,528,427**	**2,601,183**	**11,997**	**330,845**	**270,876**	**306**	**109,849**	**84,432**	**0**	

Land Cover Type (WHR)	Refugia	80%		< High Exposure 99%			95-	Very High Exposure > 99%		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	
ALPINE DWARF-SHRUB				270	36		90			
ANNUAL GRASSLAND				20,572	32,515	54	11,223	12,484		
ASPEN	3,477	234		198	270		234	126		
BARREN	12,358	1,369		11,925	7,007		9,349	2,864		
BITTERBRUSH	25,652	2,954		180	18		234			
BLUE OAK WOODLAND				180	1,585		432	901		
BLUE OAK-FOOTHILL PINE	3,152	6,557		5,332	1,837		2,720	991		
CLOSED-CONE PINE-CYPRESS	180	18		1,837	1,027		180	108		
COASTAL OAK WOODLAND					18					
CROPLAND	8,485	145,481	1,441	378	5,278		18	2,216		
DOUGLAS FIR	97,888	90,736	72	5,008	3,513		1,351	558		
DRYLAND GRAIN CROPS				72	4,936		108	2,036		
EASTSIDE PINE	392,867	140,437	54	10,736	9,890	108	2,000	991		
EVERGREEN ORCHARD								36		
FRESH EMERGENT WETLAND							72	144		
IRRIGATED GRAIN CROPS								901		
IRRIGATED HAYFIELD				18	2,018			1,855		
IRRIGATED ROW AND FIELD CROPS								396		
JEFFREY PINE	22,319	14,988		2,162	198		252	36		
JUNIPER	204,026	92,646	5,314	955	180		486			
KLAMATH MIXED CONIFER	160,811	124,080		7,242	3,243		829	288		
2010 LACUSTRINE	16,195	8,503		3,297	1,261		1,477	721		
LODGEPOLE PINE	24,463	2,072		2,270	144		865	108		
LOW SAGE	214,907	51,322	360	2,000	324		126	270		
MIXED CHAPARRAL	3,026	4,630		14,789	8,917	36	6,269	3,279		
MONTANE CHAPARRAL	271,687	77,226	90	12,340	4,918		450	54		
MONTANE HARDWOOD	48,602	46,026	162	10,394	6,989		3,243	3,225		
MONTANE HARDWOOD-CONIFER	80,162	65,175	72	7,602	3,423		1,819	540		
MONTANE RIPARIAN	5,945	5,404		1,801	649		234	18		
PASTURE				18	4,251		54	144		
PERENNIAL GRASSLAND	50,619	36,532	54	306	721		36	36		
PONDEROSA PINE	111,074	107,471	378	12,358	13,565	54	2,198	2,738		
RED FIR	127,737	18,014		8,467	1,225		2,126	216		
RICE								360		
RIVERINE	54	36		144	360		90	126		
SAGEBRUSH	226,490	143,716	1,837	27,525	4,918	36	2,306	883		
SIERRAN MIXED CONIFER	770,620	519,415	288	38,208	23,004		18,140	6,899		
SUBALPINE CONIFER	13,204			5,458			937			
URBAN				180	4,197		703	7,764		
VALLEY FOOTHILL RIPARIAN					36		144	630		
VALLEY OAK WOODLAND								36		
VINEYARD								36		
WET MEADOW	10,340	34,371	252	991	594		504	324		
WHITE FIR	267,832	63,229		3,333	1,189		1,027	18		
Total:	**3,174,172**	**1,802,641**	**10,376**	**218,546**	**154,254**	**288**	**72,326**	**55,357**	**0**	

This is the Moderate Exposure by land cover (WHR) type table for use in main text. Moderate exposure by watershed tables are in appendix 2, single climate model tables are in appendix 4.

Extent = Entire Study Area (5-Watersheds plus 10km buffer)
RCP8.5 area = acres

	Land Cover Type (WHR)	Moderate Exposure - Consensus		
		Public	Private	Tribal
	ALKALI DESERT SCRUB			
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	8,016	33,974	18
	ASPEN			
	BARREN	65,949	13,186	18
	BITTERBRUSH	18		
	BLUE OAK WOODLAND	36		
	BLUE OAK-FOOTHILL PINE	937	162	
	CHAMISE-REDSHANK CHAPARRAL			
	CLOSED-CONE PINE-CYPRESS	775	324	
	COASTAL OAK WOODLAND			
	COASTAL SCRUB			
	CROPLAND		14,934	
	DECIDUOUS ORCHARD			
	DOUGLAS FIR	13,456	10,754	
	DRYLAND GRAIN CROPS			
	EASTSIDE PINE	360	90	
	EUCALYPTUS			
	EVERGREEN ORCHARD			
	FRESH EMERGENT WETLAND			
	IRRIGATED GRAIN CROPS			
	IRRIGATED HAYFIELD			
	IRRIGATED ROW AND FIELD CROPS			
	JEFFREY PINE	378	396	
2100	JUNIPER	20,464	5,152	
	KLAMATH MIXED CONIFER	31,885	31,092	
	LACUSTRINE	8,160	2,792	
	LODGEPOLE PINE			
	LOW SAGE			
	MIXED CHAPARRAL	3,333	1,513	
	MONTANE CHAPARRAL	13,763	7,404	72
	MONTANE HARDWOOD	3,225	1,441	
	MONTANE HARDWOOD-CONIFER	2,810	955	
	MONTANE RIPARIAN	1,909	162	
	PASTURE		522	
	PERENNIAL GRASSLAND	48,944	29,399	144
	PONDEROSA PINE		18	
	RED FIR	58,617	4,269	
	RICE			
	RIVERINE		18	
	SAGEBRUSH			
	SIERRAN MIXED CONIFER	31,092	21,761	
	SUBALPINE CONIFER			
	URBAN		54	
	VALLEY FOOTHILL RIPARIAN			
	VALLEY OAK WOODLAND			
	VINEYARD			
	WET MEADOW	5,891	4,359	
	WHITE FIR	22,391	12,231	
	Total:	**342,410**	**196,965**	**252**

Extent = 5-Watersheds
RCP8.5 area = acres

	Land Cover Type (WHR)	Moderate Exposure - Consensus		
		Public	Private	Tribal
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	7,206	28,318	18
	ASPEN			
	BARREN	35,614	6,737	
	BITTERBRUSH	18		
	BLUE OAK WOODLAND	36		
	BLUE OAK-FOOTHILL PINE	721		
	CLOSED-CONE PINE-CYPRESS	558	90	
	COASTAL OAK WOODLAND			
	CROPLAND		14,447	
	DOUGLAS FIR	7,692	2,270	
	DRYLAND GRAIN CROPS			
	EASTSIDE PINE			
	EVERGREEN ORCHARD			
	FRESH EMERGENT WETLAND			
	IRRIGATED GRAIN CROPS			
	IRRIGATED HAYFIELD			
	IRRIGATED ROW AND FIELD CROPS			
	JEFFREY PINE	216	90	
	JUNIPER	6,773	2,378	
	KLAMATH MIXED CONIFER	27,183	29,111	
2100	LACUSTRINE	4,918	2,270	
	LODGEPOLE PINE			
	LOW SAGE			
	MIXED CHAPARRAL	3,170	1,405	
	MONTANE CHAPARRAL	12,177	5,728	72
	MONTANE HARDWOOD	486	630	
	MONTANE HARDWOOD-CONIFER	1,045	252	
	MONTANE RIPARIAN	847	54	
	PASTURE		72	
	PERENNIAL GRASSLAND	32,533	24,481	54
	PONDEROSA PINE			
	RED FIR	34,515	1,171	
	RICE			
	RIVERINE		18	
	SAGEBRUSH			
	SIERRAN MIXED CONIFER	21,833	9,890	
	SUBALPINE CONIFER			
	URBAN		54	
	VALLEY FOOTHILL RIPARIAN			
	VALLEY OAK WOODLAND			
	VINEYARD			
	WET MEADOW	1,855	811	
	WHITE FIR	15,366	9,962	
	Total:	**214,763**	**140,239**	**144**

	Land Cover Type (WHR)	Moderate Exposure - Consensus		
		Public	Private	Tribal
	ALKALI DESERT SCRUB			
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	4,089	13,601	
	ASPEN	3,423	378	
	BARREN	83,621	16,537	36
	BITTERBRUSH	3,873	2,630	126
	BLUE OAK WOODLAND			
	BLUE OAK-FOOTHILL PINE	685	540	
	CHAMISE-REDSHANK CHAPARRAL			
	CLOSED-CONE PINE-CYPRESS	4,107	522	
	COASTAL OAK WOODLAND			
	COASTAL SCRUB			
	CROPLAND	36	2,792	
	DECIDUOUS ORCHARD			
	DOUGLAS FIR	12,610	5,512	
	DRYLAND GRAIN CROPS			
	EASTSIDE PINE	126,728	17,221	54
	EUCALYPTUS			
	EVERGREEN ORCHARD			
	FRESH EMERGENT WETLAND			
	IRRIGATED GRAIN CROPS			
	IRRIGATED HAYFIELD		2,756	
	IRRIGATED ROW AND FIELD CROPS			
	JEFFREY PINE	1,261	775	
2070	JUNIPER	101,058	71,173	5,440
	KLAMATH MIXED CONIFER	22,373	10,953	
	LACUSTRINE	5,728	8,160	
	LODGEPOLE PINE	12,322	955	
	LOW SAGE	1,513	558	

	Land Cover Type (WHR)	Moderate Exposure - Consensus		
		Public	Private	Tribal
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	3,098	10,610	
	ASPEN	2,342	198	
	BARREN	52,745	8,701	18
	BITTERBRUSH	324	54	
	BLUE OAK WOODLAND			
	BLUE OAK-FOOTHILL PINE	36	198	
	CLOSED-CONE PINE-CYPRESS	2,990	288	
	COASTAL OAK WOODLAND			
	CROPLAND		108	
	DOUGLAS FIR	2,198	1,964	
	DRYLAND GRAIN CROPS			
	EASTSIDE PINE	72,110	13,222	54
	EVERGREEN ORCHARD			
	FRESH EMERGENT WETLAND			
	IRRIGATED GRAIN CROPS			
	IRRIGATED HAYFIELD		1,873	
	IRRIGATED ROW AND FIELD CROPS			
	JEFFREY PINE	1,207	234	
	JUNIPER	79,946	65,661	5,242
	KLAMATH MIXED CONIFER	15,978	8,485	
2070	LACUSTRINE	4,341	7,548	
	LODGEPOLE PINE	6,125	180	
	LOW SAGE	180	36	
	MIXED CHAPARRAL	33,470	19,635	
	MONTANE CHAPARRAL	4,143	1,477	
	MONTANE HARDWOOD	2,270	2,756	
	MONTANE HARDWOOD-CONIFER	3,243	1,765	
	MONTANE RIPARIAN	4,377	1,081	

MIXED CHAPARRAL	33,614	19,851	
MONTANE CHAPARRAL	4,810	2,360	
MONTANE HARDWOOD	3,152	3,279	
MONTANE HARDWOOD-CONIFER	6,611	3,206	
MONTANE RIPARIAN	6,251	1,729	
PASTURE	54	2,090	
PERENNIAL GRASSLAND	5,314	6,431	
PONDEROSA PINE	811	829	
RED FIR	17,311	2,792	
RICE			
RIVERINE	36	36	
SAGEBRUSH	11,547	2,504	
SIERRAN MIXED CONIFER	8,791	10,394	
SUBALPINE CONIFER	7,980	306	
URBAN			
VALLEY FOOTHILL RIPARIAN			
VALLEY OAK WOODLAND			
VINEYARD			
WET MEADOW	360	4,323	
WHITE FIR	18,410	3,170	
Total:	**508,481**	**218,365**	**5,656**

PASTURE		1,225	
PERENNIAL GRASSLAND	1,333	4,540	
PONDEROSA PINE	739	775	
RED FIR	8,232	883	
RICE			
RIVERINE	36	36	
SAGEBRUSH	6,359	1,982	
SIERRAN MIXED CONIFER	8,214	7,170	
SUBALPINE CONIFER	5,296		
URBAN			
VALLEY FOOTHILL RIPARIAN			
VALLEY OAK WOODLAND			
VINEYARD			
WET MEADOW	306	2,900	
WHITE FIR	15,870	2,648	
Total:	**337,510**	**168,233**	**5,314**

2040	Land Cover Type (WHR)	Moderate Exposure - Consensus		
		Public	Private	Tribal
	ALKALI DESERT SCRUB			
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	1,459	5,945	18
	ASPEN	90		
	BARREN	54,276	12,826	36
	BITTERBRUSH	216	198	
	BLUE OAK WOODLAND			
	BLUE OAK-FOOTHILL PINE	3,008	15,114	
	CHAMISE-REDSHANK CHAPARRAL			
	CLOSED-CONE PINE-CYPRESS	4,612	270	
	COASTAL OAK WOODLAND			
	COASTAL SCRUB			
	CROPLAND		1,441	
	DECIDUOUS ORCHARD			
	DOUGLAS FIR	22,229	14,249	
	DRYLAND GRAIN CROPS			
	EASTSIDE PINE	7,890	2,990	
	EUCALYPTUS			
	EVERGREEN ORCHARD			
	FRESH EMERGENT WETLAND			
	IRRIGATED GRAIN CROPS			
	IRRIGATED HAYFIELD	378	65,247	180
	IRRIGATED ROW AND FIELD CROPS			
	JEFFREY PINE	2,882	1,675	
	JUNIPER	3,873	252	
	KLAMATH MIXED CONIFER	50,043	15,618	
	LACUSTRINE	21,184	5,116	
	LODGEPOLE PINE	4,377	324	
	LOW SAGE	3,008	757	
	MIXED CHAPARRAL	26,138	12,916	
	MONTANE CHAPARRAL	4,576	1,765	
	MONTANE HARDWOOD	8,881	5,782	
	MONTANE HARDWOOD-CONIFER	10,394	9,007	36
	MONTANE RIPARIAN	5,332	2,468	
	PASTURE		36	
	PERENNIAL GRASSLAND	2,738	5,188	
	PONDEROSA PINE	56,960	37,397	
	RED FIR	2,126	252	
	RICE			
	RIVERINE	72	36	
	SAGEBRUSH	12,610	396	
	SIERRAN MIXED CONIFER	98,302	39,739	
	SUBALPINE CONIFER	10,484	54	
	URBAN			
	VALLEY FOOTHILL RIPARIAN			
	VALLEY OAK WOODLAND			
	VINEYARD			
	WET MEADOW	522	2,684	
	WHITE FIR	17,257	3,405	
	Total:	**435,920**	**263,148**	**270**

2040	Land Cover Type (WHR)	Moderate Exposure - Consensus		
		Public	Private	Tribal
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	703	1,693	18
	ASPEN	72		
	BARREN	37,415	10,610	36
	BITTERBRUSH	216	198	
	BLUE OAK WOODLAND			
	BLUE OAK-FOOTHILL PINE	811	1,009	
	CLOSED-CONE PINE-CYPRESS	4,558	216	
	COASTAL OAK WOODLAND			
	CROPLAND		685	
	DOUGLAS FIR	13,943	13,204	
	DRYLAND GRAIN CROPS			
	EASTSIDE PINE	6,521	1,117	
	EVERGREEN ORCHARD			
	FRESH EMERGENT WETLAND			
	IRRIGATED GRAIN CROPS			
	IRRIGATED HAYFIELD	378	38,262	180
	IRRIGATED ROW AND FIELD CROPS			
	JEFFREY PINE	2,486	306	
	JUNIPER	3,819	216	
	KLAMATH MIXED CONIFER	32,569	11,691	
	LACUSTRINE	18,572	4,503	
	LODGEPOLE PINE	4,107	306	
	LOW SAGE	1,081	378	
	MIXED CHAPARRAL	24,391	10,376	
	MONTANE CHAPARRAL	3,279	1,063	
	MONTANE HARDWOOD	8,034	4,936	
	MONTANE HARDWOOD-CONIFER	7,908	7,242	36
	MONTANE RIPARIAN	4,648	2,234	
	PASTURE		36	
	PERENNIAL GRASSLAND	1,081	3,639	
	PONDEROSA PINE	42,711	27,796	
	RED FIR	1,027	144	
	RICE			
	RIVERINE	72		
	SAGEBRUSH	7,098	342	
	SIERRAN MIXED CONIFER	56,456	25,526	
	SUBALPINE CONIFER	7,944	18	
	URBAN			
	VALLEY FOOTHILL RIPARIAN			
	VALLEY OAK WOODLAND			
	VINEYARD			
	WET MEADOW	450	1,946	
	WHITE FIR	11,169	2,756	
	Total:	**303,518**	**172,448**	**270**

	Land Cover Type (WHR)	Moderate Exposure 80-95%		
		Public	Private	Tribal
	ALKALI DESERT SCRUB	1,873	11,853	
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	12,250	56,888	36
	ASPEN	342	198	
	BARREN	74,308	18,464	36
	BITTERBRUSH	6,323	5,638	
	BLUE OAK WOODLAND	1,837	36,154	
	BLUE OAK-FOOTHILL PINE	4,233	22,680	18

	Land Cover Type (WHR)	Moderate Exposure 80-95%		
		Public	Private	Tribal
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	6,863	26,354	36
	ASPEN	162	72	
	BARREN	51,772	14,483	36
	BITTERBRUSH	1,351	667	
	BLUE OAK WOODLAND	757	2,306	
	BLUE OAK-FOOTHILL PINE	1,855	7,476	18
	CLOSED-CONE PINE-CYPRESS	8,485	306	

	CHAMISE-REDSHANK CHAPARRAL	144	216			COASTAL OAK WOODLAND			
	CLOSED-CONE PINE-CYPRESS	9,529	685			CROPLAND	108	21,545	
	COASTAL OAK WOODLAND	18	18			DOUGLAS FIR	39,973	28,264	
	COASTAL SCRUB		18			DRYLAND GRAIN CROPS		468	
	CROPLAND	252	42,657			EASTSIDE PINE	73,947	25,544	162
	DECIDUOUS ORCHARD					EVERGREEN ORCHARD			
	DOUGLAS FIR	50,529	34,875			FRESH EMERGENT WETLAND			
	DRYLAND GRAIN CROPS		468			IRRIGATED GRAIN CROPS			
	EASTSIDE PINE	96,951	35,127	162		IRRIGATED HAYFIELD	2,828	69,660	180
	EUCALYPTUS					IRRIGATED ROW AND FIELD CROPS			
	EVERGREEN ORCHARD					JEFFREY PINE	3,783	216	
	FRESH EMERGENT WETLAND					JUNIPER	19,617	5,368	18
	IRRIGATED GRAIN CROPS					KLAMATH MIXED CONIFER	41,919	24,895	
	IRRIGATED HAYFIELD	2,828	98,915	180	2010	LACUSTRINE	17,708	8,737	
	IRRIGATED ROW AND FIELD CROPS					LODGEPOLE PINE	12,123	2,126	
	JEFFREY PINE	5,837	2,522			LOW SAGE	14,717	5,692	
2010	JUNIPER	31,380	9,331	18		MIXED CHAPARRAL	37,073	18,699	18
	KLAMATH MIXED CONIFER	54,006	28,336			MONTANE CHAPARRAL	40,712	13,150	
	LACUSTRINE	23,418	10,808			MONTANE HARDWOOD	67,606	40,712	36
	LODGEPOLE PINE	16,537	4,143			MONTANE HARDWOOD-CONIFER	34,929	22,535	18
	LOW SAGE	25,598	8,340			MONTANE RIPARIAN	5,656	1,927	
	MIXED CHAPARRAL	41,955	36,334	18		PASTURE	18	2,774	
	MONTANE CHAPARRAL	54,042	15,942			PERENNIAL GRASSLAND	2,270	5,242	
	MONTANE HARDWOOD	78,505	57,501	36		PONDEROSA PINE	51,106	44,278	
	MONTANE HARDWOOD-CONIFER	41,342	29,147	18		RED FIR	27,075	1,495	
	MONTANE RIPARIAN	6,665	2,468			RICE			
	PASTURE	18	4,828			RIVERINE	270	126	
	PERENNIAL GRASSLAND	4,359	8,340			SAGEBRUSH	79,352	15,546	
	PONDEROSA PINE	70,128	58,185			SIERRAN MIXED CONIFER	136,294	104,355	72
	RED FIR	43,089	4,485			SUBALPINE CONIFER	10,916	36	
	RICE					URBAN			
	RIVERINE	360	144			VALLEY FOOTHILL RIPARIAN			
	SAGEBRUSH	109,669	20,050			VALLEY OAK WOODLAND			
	SIERRAN MIXED CONIFER	202,081	151,065	72		VINEYARD			
	SUBALPINE CONIFER	23,995	522			WET MEADOW	1,387	3,603	
	URBAN	72	11,295	90		WHITE FIR	49,574	12,592	
	VALLEY FOOTHILL RIPARIAN	18	486			**Total:**	**842,208**	**531,250**	**594**
	VALLEY OAK WOODLAND		306						
	VINEYARD								
	WET MEADOW	2,306	5,746						
	WHITE FIR	60,275	14,087						
	Total:	**1,157,074**	**849,269**	**685**					

This is supplementary table 1 for land cover NVIM2 taxes. showing areas of consensus refugia & high exposure in each of the 5 watersheds.

Extent – PO Watershed

RCP8.5 area = acres

Land Cover Type (NVIM)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
AUGLI DESERT SCRUB									
ALPINE DWARF-SHRUB									
ANNUAL GRASSLAND									
ASPEN									
BARREN									
BITTERBRUSH									
BLUE OAK WOODLAND									
BLUE OAK-FOOTHILL PINE									
CHAMISE-REDSHANK CHAPARRAL									
CLOSED-CONE PINE-CYPRESS									
COASTAL OAK WOODLAND									
COASTAL SCRUB									
CROPLAND									
DECIDUOUS ORCHARD									
DOUGLAS-FIR									
DRYLAND GRAIN CROPS									
EASTSIDE PINE									
EUCALYPTUS									
EVERGREEN ORCHARD									
FRESH EMERGENT WETLAND									
IRRIGATED GRAIN CROPS									
IRRIGATED HAYFIELD									
IRRIGATED ROW AND FIELD CROPS									
JEFFREY PINE									
JUNIPER									
KLAMATH MIXED CONIFER									
LACUSTRINE									
LODGEPOLE PINE									
LOW SAGE									
MIXED CHAPARRAL									
MONTANE CHAPARRAL									
MONTANE HARDWOOD									
MONTANE HARDWOOD-CONIFER									
MONTANE RIPARIAN									
PASTURE									
PERENNIAL GRASSLAND									
PONDEROSA PINE									
RED FIR									
RICE									
RIVERINE									
SAGEBRUSH									
SIERRAN MIXED CONIFER									
SUBALPINE CONIFER									
URBAN									
VALLEY FOOTHILL RIPARIAN									
VALLEY OAK WOODLAND									
VINEYARD									
WET MEADOW									
WHITE FIR									
Total:									

Extent – Feather Watershed

RCP8.5 area = acres

Land Cover Type (NVIM)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
AUGLI DESERT SCRUB									
ALPINE DWARF-SHRUB									
ANNUAL GRASSLAND									
ASPEN									
BARREN									
BITTERBRUSH									
BLUE OAK WOODLAND									
BLUE OAK-FOOTHILL PINE									
CHAMISE-REDSHANK CHAPARRAL									
CLOSED-CONE PINE-CYPRESS									
COASTAL OAK WOODLAND									
COASTAL SCRUB									
CROPLAND									
DECIDUOUS ORCHARD									
DOUGLAS-FIR									
DRYLAND GRAIN CROPS									
EASTSIDE PINE									
EUCALYPTUS									
EVERGREEN ORCHARD									
FRESH EMERGENT WETLAND									
IRRIGATED GRAIN CROPS									
IRRIGATED HAYFIELD									
IRRIGATED ROW AND FIELD CROPS									
JEFFREY PINE	1,193	86					793	72	
JUNIPER							523	126	
KLAMATH MIXED CONIFER									
LACUSTRINE	1,261	86					6,413	563	
LODGEPOLE PINE				739			1,080	216	
LOW SAGE							180	216	
MIXED CHAPARRAL							1,801	4,916	
MONTANE CHAPARRAL	75,809	8,521		5,058	1,261		3,242	1,080	
MONTANE HARDWOOD	9,905	1,819					19,673	31,579	72
MONTANE HARDWOOD-CONIFER	8,268	2,752		86			32,864	11,489	
MONTANE RIPARIAN	8,988	3,152							
PASTURE									
PERENNIAL GRASSLAND	1,567	162							
PONDEROSA PINE	9,960	3,527					6,667	9,954	86
RED FIR				12,123	486		12,412	775	
RICE									
RIVERINE							180	108	
SAGEBRUSH							10,283	11,843	
SIERRAN MIXED CONIFER	119,895	41,540		36,106	8,054	54	53,141	21,600	
SUBALPINE CONIFER							1,257		
URBAN					162		162	1,962	
VALLEY FOOTHILL RIPARIAN							18	72	
VALLEY OAK WOODLAND								18	
VINEYARD									
WET MEADOW		612	8,667				36	540	
WHITE FIR	6,809	162	5,399	540			50,395	7,919	
Total:	241,531	63,050	0	53,914	45,055	54	276,623	257,371	158

Extent – Upper Trinity Watershed

RCP8.5 area = acres

Land Cover Type (NVIM)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
AUGLI DESERT SCRUB									
ALPINE DWARF-SHRUB									
ANNUAL GRASSLAND									
ASPEN									
BARREN									
BITTERBRUSH									
BLUE OAK WOODLAND									
BLUE OAK-FOOTHILL PINE									
CHAMISE-REDSHANK CHAPARRAL									
CLOSED-CONE PINE-CYPRESS	36			36					
COASTAL OAK WOODLAND									
COASTAL SCRUB									
CROPLAND									
DECIDUOUS ORCHARD									
DOUGLAS-FIR	28,426	22,662	888	72	18				
DRYLAND GRAIN CROPS									
EASTSIDE PINE							72	72	
EUCALYPTUS									
EVERGREEN ORCHARD									
FRESH EMERGENT WETLAND									
IRRIGATED GRAIN CROPS									
IRRIGATED HAYFIELD									
IRRIGATED ROW AND FIELD CROPS									
JEFFREY PINE									
JUNIPER									
KLAMATH MIXED CONIFER	76,127	33,992	2,738	2,702					
LACUSTRINE	1,278		18	18		36			
LODGEPOLE PINE									
LOW SAGE									
MIXED CHAPARRAL			54						
MONTANE CHAPARRAL	43,612	9,297	90	144					
MONTANE HARDWOOD	1,207	633							
MONTANE HARDWOOD-CONIFER	6,732	1,206							
MONTANE RIPARIAN	144	18							
PASTURE									
PERENNIAL GRASSLAND		18							
PONDEROSA PINE	1,315	633							
RED FIR	1,729		216	36	36				
RICE									
RIVERINE									
SAGEBRUSH									
SIERRAN MIXED CONIFER				378			4,095		
SUBALPINE CONIFER							1,257		
URBAN				54		90	36		
VALLEY FOOTHILL RIPARIAN									
VALLEY OAK WOODLAND									
VINEYARD									
WET MEADOW				36	90				
WHITE FIR	25,023	5,692	36				50,395	7,919	
Total:	183,599	71,860	4,752	3,439	1,891	540	55,783	7,991	0

Extent – McCloud Watershed

RCP8.5 area = acres

Land Cover Type (NVIM)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
AUGLI DESERT SCRUB									
ALPINE DWARF-SHRUB									
ANNUAL GRASSLAND									
ASPEN									
BARREN									
BITTERBRUSH									
BLUE OAK WOODLAND									
BLUE OAK-FOOTHILL PINE									
CHAMISE-REDSHANK CHAPARRAL									
CLOSED-CONE PINE-CYPRESS									
COASTAL OAK WOODLAND									
COASTAL SCRUB									
CROPLAND									
DECIDUOUS ORCHARD									
DOUGLAS-FIR									
DRYLAND GRAIN CROPS									
EASTSIDE PINE									
EUCALYPTUS									
EVERGREEN ORCHARD									
FRESH EMERGENT WETLAND									
IRRIGATED GRAIN CROPS									
IRRIGATED HAYFIELD									
IRRIGATED ROW AND FIELD CROPS									
JEFFREY PINE									
JUNIPER									
KLAMATH MIXED CONIFER	7,458	6,358	6,972	7,990	2,566	396			
LACUSTRINE							1,257		
LODGEPOLE PINE							450	775	
LOW SAGE									
MIXED CHAPARRAL			54	36	896	54			
MONTANE CHAPARRAL	5,873	6,143			198	18			
MONTANE HARDWOOD	709	775		18	5,056	2,648			
MONTANE HARDWOOD-CONIFER	1,801	1,955			6,188	1,510			
MONTANE RIPARIAN	252	878							
PASTURE									
PERENNIAL GRASSLAND		36							
PONDEROSA PINE	301,321	36			1,933	540			
RED FIR	576	90	126	576	36	288			
RICE									
RIVERINE									
SAGEBRUSH					18	36			
SIERRAN MIXED CONIFER	17,456	41,957							
SUBALPINE CONIFER			54		108				
URBAN		54			18				
VALLEY FOOTHILL RIPARIAN									
VALLEY OAK WOODLAND									
VINEYARD									
WET MEADOW					18	162			
WHITE FIR	6,828	9,547	396	893		18			
Total:	67,133	77,588	9,988	10,196	23,276	10,754			

Extent – Upper Sacramento Watershed

RCP8.5 area = acres

Land Cover Type (NVIM)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
AUGLI DESERT SCRUB									
ALPINE DWARF-SHRUB									
ANNUAL GRASSLAND									
ASPEN									
BARREN				396	703	108	288		
BITTERBRUSH									
BLUE OAK WOODLAND									
BLUE OAK-FOOTHILL PINE							955	540	
CHAMISE-REDSHANK CHAPARRAL									
CLOSED-CONE PINE-CYPRESS							288	126	
COASTAL OAK WOODLAND									
COASTAL SCRUB									
CROPLAND							18		
DECIDUOUS ORCHARD									
DOUGLAS-FIR	1,891	1,729					10,790	11,909	
DRYLAND GRAIN CROPS									
EASTSIDE PINE							594	3,098	
EUCALYPTUS									
EVERGREEN ORCHARD									
FRESH EMERGENT WETLAND									
IRRIGATED GRAIN CROPS									
IRRIGATED HAYFIELD									
IRRIGATED ROW AND FIELD CROPS				54	18	108	18		
JEFFREY PINE									
JUNIPER									
KLAMATH MIXED CONIFER	80,662	15,866	6,720	8,593	4,193	4,576			
LACUSTRINE				18	6,576	108			
LODGEPOLE PINE									
LOW SAGE									
MIXED CHAPARRAL					4,613	919			
MONTANE CHAPARRAL	6,852	2,056	721	252	1,441	703			
MONTANE HARDWOOD	288	1,065			10,745	7,710			
MONTANE HARDWOOD-CONIFER	1,801	1,909			5,160	6,161			
MONTANE RIPARIAN		18							
PASTURE									
PERENNIAL GRASSLAND									
PONDEROSA PINE	667	108			1,655	1,655			
RED FIR					252				
RICE									
RIVERINE									
SAGEBRUSH									
SIERRAN MIXED CONIFER	7,588	2,560			1,189	18			
SUBALPINE CONIFER			252		1,189	18			
URBAN				144	108	867			
VALLEY FOOTHILL RIPARIAN					72	54			
VALLEY OAK WOODLAND									
VINEYARD									
WET MEADOW					18	288			
WHITE FIR	10,016	793	108	90	18				
Total:	57,681	22,303	1,351	5,910	58,259	30,766			

Extent – Upper Trinity Watershed

RCP8.5 area = acres

Land Cover Type (NVIM)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
AUGLI DESERT SCRUB									
ALPINE DWARF-SHRUB									
ANNUAL GRASSLAND									
ASPEN									
BARREN	591		180	829					
BITTERBRUSH									
BLUE OAK WOODLAND									
BLUE OAK-FOOTHILL PINE									
CHAMISE-REDSHANK CHAPARRAL									
CLOSED-CONE PINE-CYPRESS				72	234				
COASTAL OAK WOODLAND									
COASTAL SCRUB									
CROPLAND									
DECIDUOUS ORCHARD									
DOUGLAS-FIR	51,998	42,609	847	270	18				
DRYLAND GRAIN CROPS									
EASTSIDE PINE					162	36			
EUCALYPTUS									
EVERGREEN ORCHARD									
FRESH EMERGENT WETLAND									
IRRIGATED GRAIN CROPS									
IRRIGATED HAYFIELD				8,131			180		
IRRIGATED ROW AND FIELD CROPS									
JEFFREY PINE									
JUNIPER									
KLAMATH MIXED CONIFER	68,210	41,000							
LACUSTRINE			126	99					
LODGEPOLE PINE									
LOW SAGE									
MIXED CHAPARRAL			54	18	99	18			
MONTANE CHAPARRAL	43,956	6,543			99				
MONTANE HARDWOOD	1,639	991	216	90					
MONTANE HARDWOOD-CONIFER	6,413	5,603	18	54	99				
MONTANE RIPARIAN	180	54							
PASTURE									
PERENNIAL GRASSLAND		234							
PONDEROSA PINE	576	216							
RED FIR	29,927	1,603							
RICE									
RIVERINE									
SAGEBRUSH					18				
SIERRAN MIXED CONIFER									
SUBALPINE CONIFER				2,126		99			
URBAN						99			
VALLEY FOOTHILL RIPARIAN									
VALLEY OAK WOODLAND									
VINEYARD							18		
WET MEADOW				18		36			
WHITE FIR	29,075	5,756			2,216	629			
Total:	231,157	103,649	1,575	1,833	3,193	935			

Extent – McCloud Watershed

RCP8.5 area = acres

Land Cover Type (NVIM)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
AUGLI DESERT SCRUB									
ALPINE DWARF-SHRUB					18				
ANNUAL GRASSLAND				126	1,081		2,628		
ASPEN							36		
BARREN	72	108	72	162					
BITTERBRUSH					216				
BLUE OAK WOODLAND									
BLUE OAK-FOOTHILL PINE				18	18	36			
CHAMISE-REDSHANK CHAPARRAL									
CLOSED-CONE PINE-CYPRESS				288	180	216	126		
COASTAL OAK WOODLAND									
COASTAL SCRUB									
CROPLAND							18		
DECIDUOUS ORCHARD									
DOUGLAS-FIR	11,907	5,188							
DRYLAND GRAIN CROPS									
EASTSIDE PINE				90	1,675	108			
EUCALYPTUS									
EVERGREEN ORCHARD									
FRESH EMERGENT WETLAND									
IRRIGATED GRAIN CROPS									
IRRIGATED HAYFIELD									
IRRIGATED ROW AND FIELD CROPS									
JEFFREY PINE									
JUNIPER									
KLAMATH MIXED CONIFER	36,460	33,956	18	18					
LACUSTRINE									
LODGEPOLE PINE	36	54							
LOW SAGE									
MIXED CHAPARRAL				180	180	216	126		
MONTANE CHAPARRAL	8,262	9,329	162						
MONTANE HARDWOOD	3,819	1,331	1,237	360	793	793			
MONTANE HARDWOOD-CONIFER	7,956	1,873	1,368	1,585	936	162			
MONTANE RIPARIAN	342	288							
PASTURE									
PERENNIAL GRASSLAND					162				
PONDEROSA PINE	8,064	18	756	973	144	198			
RED FIR	11,769	11,906	18						
RICE									
RIVERINE									
SAGEBRUSH									
SIERRAN MIXED CONIFER	9,900	17,582							
SUBALPINE CONIFER									
URBAN					18	522			
VALLEY FOOTHILL RIPARIAN						54			
VALLEY OAK WOODLAND									
VINEYARD									
WET MEADOW				18	18	72			
WHITE FIR	34,123	20,985							
Total:	111,908	105,617	4,230	3,505	5,532	1,260			

Extent – Upper Sacramento Watershed

RCP8.5 area = acres

Land Cover Type (NVIM)	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
AUGLI DESERT SCRUB									
ALPINE DWARF-SHRUB					36	36			
ANNUAL GRASSLAND				54	108	739	1,425		
ASPEN					36				
BARREN				414	2,252				
BITTERBRUSH									
BLUE OAK WOODLAND									
BLUE OAK-FOOTHILL PINE				54	54				
CHAMISE-REDSHANK CHAPARRAL									
CLOSED-CONE PINE-CYPRESS				288	18				
COASTAL OAK WOODLAND									
COASTAL SCRUB									
CROPLAND							18		
DECIDUOUS ORCHARD									
DOUGLAS-FIR	9,916	12,466	558	540	811	703			
DRYLAND GRAIN CROPS									
EASTSIDE PINE				612	2,072				
EUCALYPTUS									
EVERGREEN ORCHARD									
FRESH EMERGENT WETLAND									
IRRIGATED GRAIN CROPS									
IRRIGATED HAYFIELD									
IRRIGATED ROW AND FIELD CROPS							54		
JEFFREY PINE									
JUNIPER									
KLAMATH MIXED CONIFER	39,649	44,152	1,369	450	18				
LACUSTRINE				18	540	18			
LODGEPOLE PINE									
LOW SAGE									
MIXED CHAPARRAL				558	360	360	144		
MONTANE CHAPARRAL	8,467	7,206	919	216					
MONTANE HARDWOOD	7,596	5,362	883	1,909	180	36			
MONTANE HARDWOOD-CONIFER	32,250	12,213	1,401	2,268	198	54			
MONTANE RIPARIAN		18							
PASTURE									
PERENNIAL GRASSLAND									
PONDEROSA PINE	594	612	324		18				
RED FIR	5,891	5,261	54						
RICE									
RIVERINE									
SAGEBRUSH									
SIERRAN MIXED CONIFER	1,099	829							
SUBALPINE CONIFER									
URBAN				108	2,412				
VALLEY FOOTHILL RIPARIAN				90	180				
VALLEY OAK WOODLAND									
VINEYARD									
WET MEADOW				18	18				
WHITE FIR	8,639	1,203		18					
Total:	91,709	89,862	6,971	8,017	9,225	7,056			

This is supplementary table 2 for land cover (WHR) types, showing areas of consensus moderate exposure in each of the 5 watersheds

Extent = Pit Watershed
RCP8.5 area = acres

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private	Tribal
	ALKALI DESERT SCRUB			
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	3,098	6,449	18
	ASPEN			
	BARREN	21,599	5,710	
	BITTERBRUSH	18		
	BLUE OAK WOODLAND	36		
	BLUE OAK-FOOTHILL PINE	721		
	CHAMISE-REDSHANK CHAPARRAL			
	CLOSED-CONE PINE-CYPRESS	324		
	COASTAL OAK WOODLAND			
	COASTAL SCRUB			
	CROPLAND		9,385	
	DECIDUOUS ORCHARD			
	DOUGLAS FIR		72	
	DRYLAND GRAIN CROPS			
	EASTSIDE PINE			
	EUCALYPTUS			
	EVERGREEN ORCHARD			
	FRESH EMERGENT WETLAND			
	IRRIGATED GRAIN CROPS			
	IRRIGATED HAYFIELD			
	IRRIGATED ROW AND FIELD CROPS			
	JEFFREY PINE			
2100	JUNIPER	6,773	2,378	
	KLAMATH MIXED CONIFER	2,810	1,549	
	LACUSTRINE	1,585	216	
	LODGEPOLE PINE			
	LOW SAGE			
	MIXED CHAPARRAL	2,198	1,405	
	MONTANE CHAPARRAL	5,170	2,018	72
	MONTANE HARDWOOD	432	540	
	MONTANE HARDWOOD-CONIFER	739	216	
	MONTANE RIPARIAN	72		
	PASTURE		72	
	PERENNIAL GRASSLAND	32,407	24,373	54
	PONDEROSA PINE			
	RED FIR	15,816	126	
	RICE			
	RIVERINE			
	SAGEBRUSH			
	SIERRAN MIXED CONIFER	2,792	4,179	
	SUBALPINE CONIFER			
	URBAN		36	
	VALLEY FOOTHILL RIPARIAN			
	VALLEY OAK WOODLAND			
	VINEYARD			
	WET MEADOW	1,387	594	
	WHITE FIR	3,297	3,711	
	Total:	101,275	63,031	144

Extent = Feather Watershed
RCP8.5 area = acres

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private	Tribal
	ALKALI DESERT SCRUB			
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	4,053	20,932	
	ASPEN			
	BARREN	5,981	847	
	BITTERBRUSH			
	BLUE OAK WOODLAND			
	BLUE OAK-FOOTHILL PINE			
	CHAMISE-REDSHANK CHAPARRAL			
	CLOSED-CONE PINE-CYPRESS			
	COASTAL OAK WOODLAND			
	COASTAL SCRUB			
	CROPLAND		5,062	
	DECIDUOUS ORCHARD			
	DOUGLAS FIR		18	
	DRYLAND GRAIN CROPS			
	EASTSIDE PINE			
	EUCALYPTUS			
	EVERGREEN ORCHARD			
	FRESH EMERGENT WETLAND			
	IRRIGATED GRAIN CROPS			
	IRRIGATED HAYFIELD			
	IRRIGATED ROW AND FIELD CROPS			
	JEFFREY PINE	54	72	
2100	JUNIPER			
	KLAMATH MIXED CONIFER			
	LACUSTRINE	1,351	1,711	
	LODGEPOLE PINE			
	LOW SAGE			
	MIXED CHAPARRAL	883		
	MONTANE CHAPARRAL	4,702	522	
	MONTANE HARDWOOD			
	MONTANE HARDWOOD-CONIFER	288	18	
	MONTANE RIPARIAN	90		
	PASTURE			
	PERENNIAL GRASSLAND	72		
	PONDEROSA PINE			
	RED FIR	4,017		
	RICE			
	RIVERINE		18	
	SAGEBRUSH			
	SIERRAN MIXED CONIFER	18,969	5,620	
	SUBALPINE CONIFER			
	URBAN		18	
	VALLEY FOOTHILL RIPARIAN			
	VALLEY OAK WOODLAND			
	VINEYARD			
	WET MEADOW	468	216	
	WHITE FIR	5,837	1,351	
	Total:	46,764	36,406	0

Extent = Upper Trinity Watershed
RCP8.5 area = acres

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private
	ALKALI DESERT SCRUB		
	ALPINE DWARF-SHRUB		
	ANNUAL GRASSLAND	18	234
	ASPEN		
	BARREN	8,034	162
	BITTERBRUSH		
	BLUE OAK WOODLAND		
	BLUE OAK-FOOTHILL PINE		
	CHAMISE-REDSHANK CHAPARRAL		
	CLOSED-CONE PINE-CYPRESS		
	COASTAL OAK WOODLAND		
	COASTAL SCRUB		
	CROPLAND		
	DECIDUOUS ORCHARD		
	DOUGLAS FIR	7,602	2,180
	DRYLAND GRAIN CROPS		
	EASTSIDE PINE		
	EUCALYPTUS		
	EVERGREEN ORCHARD		
	FRESH EMERGENT WETLAND		
	IRRIGATED GRAIN CROPS		
	IRRIGATED HAYFIELD		
	IRRIGATED ROW AND FIELD CROPS		
	JEFFREY PINE	144	18
2100	JUNIPER		
	KLAMATH MIXED CONIFER	6,431	6,305
	LACUSTRINE	1,982	
	LODGEPOLE PINE		
	LOW SAGE		
	MIXED CHAPARRAL	90	
	MONTANE CHAPARRAL	450	522
	MONTANE HARDWOOD	54	
	MONTANE HARDWOOD-CONIFER	18	18
	MONTANE RIPARIAN	649	54
	PASTURE		
	PERENNIAL GRASSLAND		54
	PONDEROSA PINE		
	RED FIR	12,970	414
	RICE		
	RIVERINE		
	SAGEBRUSH		
	SIERRAN MIXED CONIFER		
	SUBALPINE CONIFER		
	URBAN		
	VALLEY FOOTHILL RIPARIAN		
	VALLEY OAK WOODLAND		
	VINEYARD		
	WET MEADOW		
	WHITE FIR	270	54
	Total:	38,712	10,016

Extent = McCloud Watershed
RCP8.5 area = acres

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private
	ALKALI DESERT SCRUB		
	ALPINE DWARF-SHRUB		
	ANNUAL GRASSLAND		342
	ASPEN		
	BARREN		18
	BITTERBRUSH		
	BLUE OAK WOODLAND		
	BLUE OAK-FOOTHILL PINE		
	CHAMISE-REDSHANK CHAPARRAL		
	CLOSED-CONE PINE-CYPRESS	234	90
	COASTAL OAK WOODLAND		
	COASTAL SCRUB		
	CROPLAND		
	DECIDUOUS ORCHARD		
	DOUGLAS FIR		
	DRYLAND GRAIN CROPS		
	EASTSIDE PINE		
	EUCALYPTUS		
	EVERGREEN ORCHARD		
	FRESH EMERGENT WETLAND		
	IRRIGATED GRAIN CROPS		
	IRRIGATED HAYFIELD		
	IRRIGATED ROW AND FIELD CROPS		
	JEFFREY PINE		
2100	JUNIPER		
	KLAMATH MIXED CONIFER	9,818	8,647
	LACUSTRINE		
	LODGEPOLE PINE		
	LOW SAGE		
	MIXED CHAPARRAL		
	MONTANE CHAPARRAL	991	234
	MONTANE HARDWOOD		90
	MONTANE HARDWOOD-CONIFER		
	MONTANE RIPARIAN	36	
	PASTURE		
	PERENNIAL GRASSLAND	36	54
	PONDEROSA PINE		
	RED FIR	558	540
	RICE		
	RIVERINE		
	SAGEBRUSH		
	SIERRAN MIXED CONIFER	72	90
	SUBALPINE CONIFER		
	URBAN		
	VALLEY FOOTHILL RIPARIAN		
	VALLEY OAK WOODLAND		
	VINEYARD		
	WET MEADOW		
	WHITE FIR	4,089	4,341
	Total:	15,834	14,447

Extent = Upper Sacramento Watershed
RCP8.5 area = acres

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private
	ALKALI DESERT SCRUB		
	ALPINE DWARF-SHRUB		
	ANNUAL GRASSLAND	36	360
	ASPEN		
	BARREN		
	BITTERBRUSH		
	BLUE OAK WOODLAND		
	BLUE OAK-FOOTHILL PINE		
	CHAMISE-REDSHANK CHAPARRAL		
	CLOSED-CONE PINE-CYPRESS		
	COASTAL OAK WOODLAND		
	COASTAL SCRUB		
	CROPLAND		
	DECIDUOUS ORCHARD		
	DOUGLAS FIR	90	
	DRYLAND GRAIN CROPS		
	EASTSIDE PINE		
	EUCALYPTUS		
	EVERGREEN ORCHARD		
	FRESH EMERGENT WETLAND		
	IRRIGATED GRAIN CROPS		
	IRRIGATED HAYFIELD		
	IRRIGATED ROW AND FIELD CROPS		
	JEFFREY PINE	18	
2100	JUNIPER		
	KLAMATH MIXED CONIFER	8,124	12,610
	LACUSTRINE		342
	LODGEPOLE PINE		
	LOW SAGE		
	MIXED CHAPARRAL		
	MONTANE CHAPARRAL	865	2,432
	MONTANE HARDWOOD		
	MONTANE HARDWOOD-CONIFER		
	MONTANE RIPARIAN		
	PASTURE		
	PERENNIAL GRASSLAND	18	
	PONDEROSA PINE		
	RED FIR	1,153	90
	RICE		
	RIVERINE		
	SAGEBRUSH		
	SIERRAN MIXED CONIFER		
	SUBALPINE CONIFER		
	URBAN		
	VALLEY FOOTHILL RIPARIAN		
	VALLEY OAK WOODLAND		
	VINEYARD		
	WET MEADOW		
	WHITE FIR	1,873	504
	Total:	12,177	16,339

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private	Tribal
	ALKALI DESERT SCRUB			
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	775	7,440	
	ASPEN	2,342	198	
	BARREN	39,379	6,485	18
	BITTERBRUSH	324	54	
	BLUE OAK WOODLAND			
	BLUE OAK-FOOTHILL PINE		162	
	CHAMISE-REDSHANK CHAPARRAL			
	CLOSED-CONE PINE-CYPRESS	2,648	162	
	COASTAL OAK WOODLAND			
	COASTAL SCRUB			
	CROPLAND		108	
	DECIDUOUS ORCHARD			
	DOUGLAS FIR	594	793	
	DRYLAND GRAIN CROPS			
	EASTSIDE PINE	49,971	9,079	54
	EUCALYPTUS			
	EVERGREEN ORCHARD			
	FRESH EMERGENT WETLAND			
	IRRIGATED GRAIN CROPS			
	IRRIGATED HAYFIELD		1,873	
	IRRIGATED ROW AND FIELD CROPS			
	JEFFREY PINE			
2070	JUNIPER	79,892	65,643	####
	KLAMATH MIXED CONIFER	2,504	883	
	LACUSTRINE	1,621	2,504	
	LODGEPOLE PINE	1,297	72	
	LOW SAGE	180	36	
	MIXED CHAPARRAL	33,434	19,635	
	MONTANE CHAPARRAL		90	
	MONTANE HARDWOOD	1,225	1,567	
	MONTANE HARDWOOD-CONIFER	937	937	
	MONTANE RIPARIAN	54	90	
	PASTURE		1,225	
	PERENNIAL GRASSLAND	1,297	4,395	
	PONDEROSA PINE		18	
	RED FIR		216	
	RICE			
	RIVERINE	18	18	
	SAGEBRUSH	4,738	1,891	
	SIERRAN MIXED CONIFER		54	
	SUBALPINE CONIFER	504		
	URBAN			
	VALLEY FOOTHILL RIPARIAN			
	VALLEY OAK WOODLAND			
	VINEYARD			
	WET MEADOW	234	1,153	
	WHITE FIR	594		
	Total:	224,562	######	####

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private	Tribal
	ALKALI DESERT SCRUB			
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	2,180	1,837	
	ASPEN			
	BARREN	8,989	1,675	
	BITTERBRUSH			
	BLUE OAK WOODLAND			
	BLUE OAK-FOOTHILL PINE			
	CHAMISE-REDSHANK CHAPARRAL			
	CLOSED-CONE PINE-CYPRESS			
	COASTAL OAK WOODLAND			
	COASTAL SCRUB			
	CROPLAND			
	DECIDUOUS ORCHARD			
	DOUGLAS FIR	162	378	
	DRYLAND GRAIN CROPS			
	EASTSIDE PINE	22,139	4,143	
	EUCALYPTUS			
	EVERGREEN ORCHARD			
	FRESH EMERGENT WETLAND			
	IRRIGATED GRAIN CROPS			
	IRRIGATED HAYFIELD			
	IRRIGATED ROW AND FIELD CROPS			
	JEFFREY PINE	973	144	
2070	JUNIPER	54	18	
	KLAMATH MIXED CONIFER			
	LACUSTRINE	955	4,918	
	LODGEPOLE PINE	4,828	108	
	LOW SAGE			
	MIXED CHAPARRAL			
	MONTANE CHAPARRAL	2,738	685	
	MONTANE HARDWOOD	486	324	
	MONTANE HARDWOOD-CONIFER	937	90	
	MONTANE RIPARIAN	3,747	739	
	PASTURE			
	PERENNIAL GRASSLAND	18	108	
	PONDEROSA PINE	18	198	
	RED FIR	8,070	216	
	RICE			
	RIVERINE	18	18	
	SAGEBRUSH	1,621	90	
	SIERRAN MIXED CONIFER	8,214	7,116	
	SUBALPINE CONIFER	18		
	URBAN			
	VALLEY FOOTHILL RIPARIAN			
	VALLEY OAK WOODLAND			
	VINEYARD			
	WET MEADOW	54	1,747	
	WHITE FIR	15,276	2,648	
	Total:	81,495	27,201	0

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private
	ALKALI DESERT SCRUB		
	ALPINE DWARF-SHRUB		
	ANNUAL GRASSLAND	90	829
	ASPEN		
	BARREN	3,945	216
	BITTERBRUSH		
	BLUE OAK WOODLAND		
	BLUE OAK-FOOTHILL PINE	36	36
	CHAMISE-REDSHANK CHAPARRAL		
	CLOSED-CONE PINE-CYPRESS		
	COASTAL OAK WOODLAND		
	COASTAL SCRUB		
	CROPLAND		
	DECIDUOUS ORCHARD		
	DOUGLAS FIR	919	324
	DRYLAND GRAIN CROPS		
	EASTSIDE PINE		
	EUCALYPTUS		
	EVERGREEN ORCHARD		
	FRESH EMERGENT WETLAND		
	IRRIGATED GRAIN CROPS		
	IRRIGATED HAYFIELD		
	IRRIGATED ROW AND FIELD CROPS		
	JEFFREY PINE	36	36
2070	JUNIPER		
	KLAMATH MIXED CONIFER	3,981	1,117
	LACUSTRINE	1,387	
	LODGEPOLE PINE		
	LOW SAGE		
	MIXED CHAPARRAL	36	
	MONTANE CHAPARRAL	126	180
	MONTANE HARDWOOD	180	90
	MONTANE HARDWOOD-CONIFER	486	162
	MONTANE RIPARIAN	504	54
	PASTURE		
	PERENNIAL GRASSLAND	18	
	PONDEROSA PINE	270	72
	RED FIR	90	
	RICE		
	RIVERINE		
	SAGEBRUSH		
	SIERRAN MIXED CONIFER		
	SUBALPINE CONIFER	4,558	
	URBAN		
	VALLEY FOOTHILL RIPARIAN		
	VALLEY OAK WOODLAND		
	VINEYARD		
	WET MEADOW	18	
	WHITE FIR		
	Total:	16,681	3,116

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private
	ALKALI DESERT SCRUB		
	ALPINE DWARF-SHRUB		
	ANNUAL GRASSLAND		270
	ASPEN		
	BARREN	216	324
	BITTERBRUSH		
	BLUE OAK WOODLAND		
	BLUE OAK-FOOTHILL PINE		
	CHAMISE-REDSHANK CHAPARRAL		
	CLOSED-CONE PINE-CYPRESS	18	90
	COASTAL OAK WOODLAND		
	COASTAL SCRUB		
	CROPLAND		
	DECIDUOUS ORCHARD		
	DOUGLAS FIR	108	90
	DRYLAND GRAIN CROPS		
	EASTSIDE PINE		
	EUCALYPTUS		
	EVERGREEN ORCHARD		
	FRESH EMERGENT WETLAND		
	IRRIGATED GRAIN CROPS		
	IRRIGATED HAYFIELD		
	IRRIGATED ROW AND FIELD CROPS		
	JEFFREY PINE		
2070	JUNIPER		
	KLAMATH MIXED CONIFER	4,107	811
	LACUSTRINE	72	90
	LODGEPOLE PINE		
	LOW SAGE		
	MIXED CHAPARRAL		
	MONTANE CHAPARRAL	108	126
	MONTANE HARDWOOD	288	144
	MONTANE HARDWOOD-CONIFER	576	396
	MONTANE RIPARIAN	72	180
	PASTURE		
	PERENNIAL GRASSLAND		36
	PONDEROSA PINE	306	486
	RED FIR	36	450
	RICE		
	RIVERINE		
	SAGEBRUSH		
	SIERRAN MIXED CONIFER		
	SUBALPINE CONIFER	54	
	URBAN		
	VALLEY FOOTHILL RIPARIAN		
	VALLEY OAK WOODLAND		
	VINEYARD		
	WET MEADOW		
	WHITE FIR		
	Total:	5,963	3,495

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private
	ALKALI DESERT SCRUB		
	ALPINE DWARF-SHRUB		
	ANNUAL GRASSLAND	54	234
	ASPEN		
	BARREN	216	
	BITTERBRUSH		
	BLUE OAK WOODLAND		
	BLUE OAK-FOOTHILL PINE		
	CHAMISE-REDSHANK CHAPARRAL		
	CLOSED-CONE PINE-CYPRESS	324	36
	COASTAL OAK WOODLAND		
	COASTAL SCRUB		
	CROPLAND		
	DECIDUOUS ORCHARD		
	DOUGLAS FIR	414	378
	DRYLAND GRAIN CROPS		
	EASTSIDE PINE		
	EUCALYPTUS		
	EVERGREEN ORCHARD		
	FRESH EMERGENT WETLAND		
	IRRIGATED GRAIN CROPS		
	IRRIGATED HAYFIELD		
	IRRIGATED ROW AND FIELD CROPS		
	JEFFREY PINE	198	54
2070	JUNIPER		
	KLAMATH MIXED CONIFER	5,386	5,674
	LACUSTRINE	306	36
	LODGEPOLE PINE		
	LOW SAGE		
	MIXED CHAPARRAL		
	MONTANE CHAPARRAL	1,171	396
	MONTANE HARDWOOD	90	630
	MONTANE HARDWOOD-CONIFER	306	180
	MONTANE RIPARIAN		18
	PASTURE		
	PERENNIAL GRASSLAND		
	PONDEROSA PINE	144	
	RED FIR	36	
	RICE		
	RIVERINE		
	SAGEBRUSH		
	SIERRAN MIXED CONIFER		
	SUBALPINE CONIFER	162	
	URBAN		
	VALLEY FOOTHILL RIPARIAN		
	VALLEY OAK WOODLAND		
	VINEYARD		
	WET MEADOW		
	WHITE FIR		
	Total:	8,809	7,638

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private	Tribal
	ALKALI DESERT SCRUB			
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	468	1,315	18
	ASPEN	36		
	BARREN	27,363	7,368	36
	BITTERBRUSH	216	198	
	BLUE OAK WOODLAND			
	BLUE OAK-FOOTHILL PINE			
	CHAMISE-REDSHANK CHAPARRAL			
	CLOSED-CONE PINE-CYPRESS	4,323	180	
	COASTAL OAK WOODLAND			
	COASTAL SCRUB			
	CROPLAND		685	
	DECIDUOUS ORCHARD			
	DOUGLAS FIR	847	234	
	DRYLAND GRAIN CROPS			
	EASTSIDE PINE	3,729	450	
	EUCALYPTUS			
	EVERGREEN ORCHARD			
	FRESH EMERGENT WETLAND			
	IRRIGATED GRAIN CROPS			
	IRRIGATED HAYFIELD	378	34,100	180
	IRRIGATED ROW AND FIELD CROPS			
	JEFFREY PINE			
2040	JUNIPER	3,819	216	
	KLAMATH MIXED CONIFER	18	54	
	LACUSTRINE	7,926	2,738	
	LODGEPOLE PINE	3,729	18	
	LOW SAGE	1,081	378	
	MIXED CHAPARRAL	24,337	10,376	
	MONTANE CHAPARRAL			
	MONTANE HARDWOOD	5,278	3,585	
	MONTANE HARDWOOD-CONIFER	2,540	2,252	
	MONTANE RIPARIAN	36	450	
	PASTURE		36	
	PERENNIAL GRASSLAND	685	2,792	
	PONDEROSA PINE	16,123	16,717	
	RED FIR			
	RICE			
	RIVERINE			
	SAGEBRUSH	3,243	198	
	SIERRAN MIXED CONIFER	20,446	4,071	
	SUBALPINE CONIFER	3,855		
	URBAN			
	VALLEY FOOTHILL RIPARIAN			
	VALLEY OAK WOODLAND			
	VINEYARD			

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private	Tribal
	ALKALI DESERT SCRUB			
	ALPINE DWARF-SHRUB			
	ANNUAL GRASSLAND	54	108	
	ASPEN	36		
	BARREN	9,439	2,450	
	BITTERBRUSH			
	BLUE OAK WOODLAND			
	BLUE OAK-FOOTHILL PINE	811	991	
	CHAMISE-REDSHANK CHAPARRAL			
	CLOSED-CONE PINE-CYPRESS			
	COASTAL OAK WOODLAND			
	COASTAL SCRUB			
	CROPLAND			
	DECIDUOUS ORCHARD			
	DOUGLAS FIR	2,054	2,720	
	DRYLAND GRAIN CROPS			
	EASTSIDE PINE	2,792	667	
	EUCALYPTUS			
	EVERGREEN ORCHARD			
	FRESH EMERGENT WETLAND			
	IRRIGATED GRAIN CROPS			
	IRRIGATED HAYFIELD		4,161	
	IRRIGATED ROW AND FIELD CROPS			
	JEFFREY PINE	2,162	198	
2040	JUNIPER			
	KLAMATH MIXED CONIFER			
	LACUSTRINE	1,549	1,585	
	LODGEPOLE PINE	36	18	
	LOW SAGE			
	MIXED CHAPARRAL			
	MONTANE CHAPARRAL	955	216	
	MONTANE HARDWOOD	1,099	126	
	MONTANE HARDWOOD-CONIFER	3,351	1,369	36
	MONTANE RIPARIAN	4,485	1,495	
	PASTURE			
	PERENNIAL GRASSLAND	270	667	
	PONDEROSA PINE	5,566	3,188	
	RED FIR			
	RICE			
	RIVERINE	72		
	SAGEBRUSH	3,855	144	
	SIERRAN MIXED CONIFER	31,921	10,448	
	SUBALPINE CONIFER	360		
	URBAN			
	VALLEY FOOTHILL RIPARIAN			
	VALLEY OAK WOODLAND			
	VINEYARD			

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private
	ALKALI DESERT SCRUB		
	ALPINE DWARF-SHRUB		
	ANNUAL GRASSLAND	180	162
	ASPEN		
	BARREN	396	54
	BITTERBRUSH		
	BLUE OAK WOODLAND		
	BLUE OAK-FOOTHILL PINE		
	CHAMISE-REDSHANK CHAPARRAL		
	CLOSED-CONE PINE-CYPRESS	36	
	COASTAL OAK WOODLAND		
	COASTAL SCRUB		
	CROPLAND		
	DECIDUOUS ORCHARD		
	DOUGLAS FIR	10,376	9,782
	DRYLAND GRAIN CROPS		
	EASTSIDE PINE		
	EUCALYPTUS		
	EVERGREEN ORCHARD		
	FRESH EMERGENT WETLAND		
	IRRIGATED GRAIN CROPS		
	IRRIGATED HAYFIELD		
	IRRIGATED ROW AND FIELD CROPS		
	JEFFREY PINE	108	36
2040	JUNIPER		
	KLAMATH MIXED CONIFER	24,571	8,899
	LACUSTRINE	4,017	
	LODGEPOLE PINE		
	LOW SAGE		
	MIXED CHAPARRAL	54	
	MONTANE CHAPARRAL	757	198
	MONTANE HARDWOOD	198	108
	MONTANE HARDWOOD-CONIFER	829	1,009
	MONTANE RIPARIAN	72	
	PASTURE		
	PERENNIAL GRASSLAND		144
	PONDEROSA PINE	811	522
	RED FIR	54	18
	RICE		
	RIVERINE		
	SAGEBRUSH		
	SIERRAN MIXED CONIFER		
	SUBALPINE CONIFER	2,324	
	URBAN		
	VALLEY FOOTHILL RIPARIAN		
	VALLEY OAK WOODLAND		
	VINEYARD		

	Land Cover Type (WHR)	Moderate Exposure - Consensus Public	Private
	ALKALI DESERT SCRUB		
	ALPINE DWARF-SHRUB		
	ANNUAL GRASSLAND		72
	ASPEN		
	BARREN	108	721
	BITTERBRUSH		
	BLUE OAK WOODLAND		
	BLUE OAK-FOOTHILL PINE		
	CHAMISE-REDSHANK CHAPARRAL		
	CLOSED-CONE PINE-CYPRESS	126	18
	COASTAL OAK WOODLAND		
	COASTAL SCRUB		
	CROPLAND		
	DECIDUOUS ORCHARD		
	DOUGLAS FIR	54	
	DRYLAND GRAIN CROPS		
	EASTSIDE PINE		
	EUCALYPTUS		
	EVERGREEN ORCHARD		
	FRESH EMERGENT WETLAND		
	IRRIGATED GRAIN CROPS		
	IRRIGATED HAYFIELD		
	IRRIGATED ROW AND FIELD CROPS		
	JEFFREY PINE	216	72
2040	JUNIPER		
	KLAMATH MIXED CONIFER	7,962	2,558
	LACUSTRINE	3,765	162
	LODGEPOLE PINE		
	LOW SAGE		
	MIXED CHAPARRAL		
	MONTANE CHAPARRAL	1,333	360
	MONTANE HARDWOOD	847	793
	MONTANE HARDWOOD-CONIFER	612	1,891
	MONTANE RIPARIAN		
	PASTURE		
	PERENNIAL GRASSLAND	36	
	PONDEROSA PINE	234	90
	RED FIR	198	72
	RICE		
	RIVERINE		
	SAGEBRUSH		
	SIERRAN MIXED CONIFER	1,982	1,927
	SUBALPINE CONIFER	1,315	18
	URBAN		
	VALLEY FOOTHILL RIPARIAN		
	VALLEY OAK WOODLAND		
	VINEYARD		

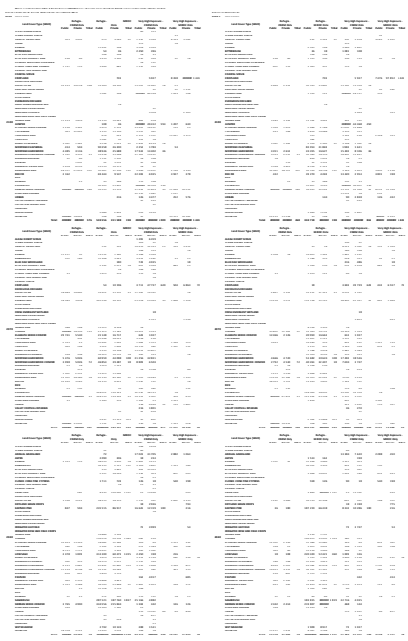
WET MEADOW		18	1,315	
WHITE FIR		2,198	1,153	
	Total:	**132,691**	**90,881**	**234**

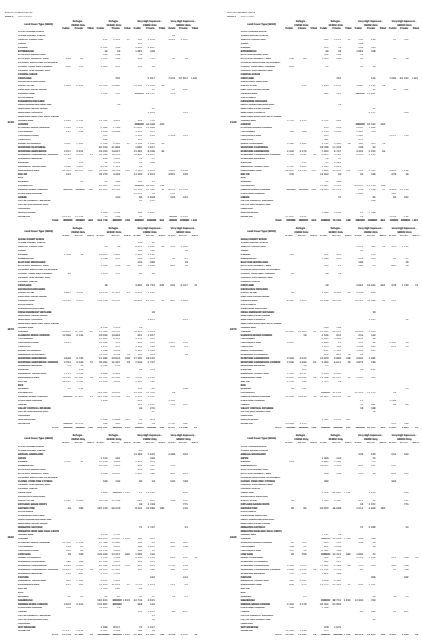
WET MEADOW		162	630	
WHITE FIR		1,783	306	
	Total:	**72,813**	**31,488**	**36**

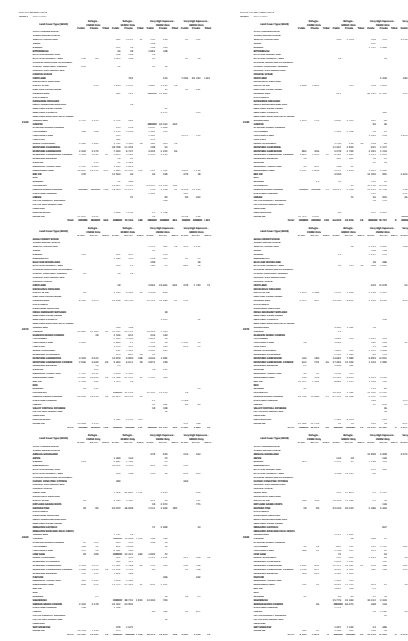
WET MEADOW		270	
WHITE FIR		4,648	1,117
	Total:	**49,701**	**22,049**

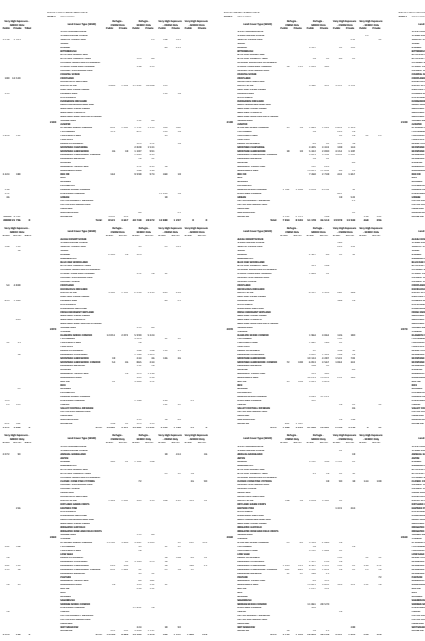
WET MEADOW			
WHITE FIR		72	18
	Total:	**26,553**	**19,365**

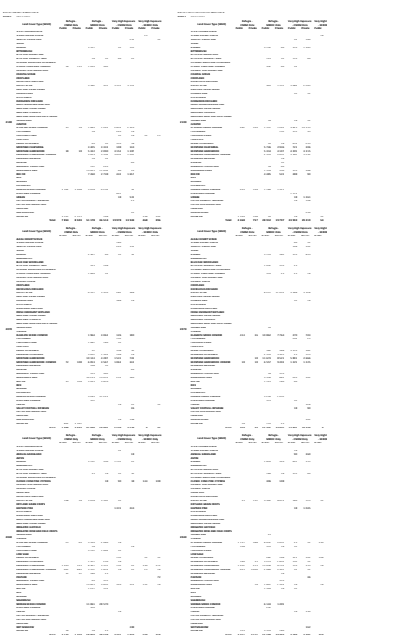
WET MEADOW			
WHITE FIR		2,468	162
	Total:	**21,761**	**8,665**











This is supplementary table 4 for land cover (WHR) types, showing areas of moderate exposure for single climate models

Extent = Entire Study Area (5-Watersheds plus 10km buffer)

RCP8.5 area = acres

2100

Land Cover Type (WHR)	Moderate Exposure - CNRM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
ALKALI DESERT SCRUB				1,549	7,656	
ALPINE DWARF-SHRUB						
ANNUAL GRASSLAND	3,729	8,178		5,909	12,520	18
ASPEN				396		
BARREN				54,528	16,357	36
BITTERBRUSH				414	126	
BLUE OAK WOODLAND				90	54	
BLUE OAK-FOOTHILL PINE	270	18		1,946	1,657	
CHAMISE-REDSHANK CHAPARRAL						
CLOSED-CONE PINE-CYPRESS	198	36		324	216	
COASTAL OAK WOODLAND						
COASTAL SCRUB						
CROPLAND	342	41,036		18	3,026	
DECIDUOUS ORCHARD						
DOUGLAS FIR	901	1,279		22,698	17,942	54
DRYLAND GRAIN CROPS						
EASTSIDE PINE				12,051	9,241	
EUCALYPTUS						
EVERGREEN ORCHARD						
FRESH EMERGENT WETLAND					18	
IRRIGATED GRAIN CROPS						
IRRIGATED HAYFIELD					144	
IRRIGATED ROW AND FIELD CROPS						
JEFFREY PINE				3,675	1,531	
JUNIPER	6,125	2,414		87,584	50,547	4,990
KLAMATH MIXED CONIFER	1,279	811		12,790	16,303	
LACUSTRINE				4,846	1,675	
LODGEPOLE PINE	8,755	36		19,023	2,288	
LOW SAGE				1,351		
MIXED CHAPARRAL				6,575	9,403	
MONTANE CHAPARRAL				25,940	10,971	18
MONTANE HARDWOOD				15,852	13,240	54
MONTANE HARDWOOD-CONIFER	414	234		18,626	14,771	18
MONTANE RIPARIAN				324	360	
PASTURE	90	1,135		18	378	
PERENNIAL GRASSLAND	5,134	1,243		3,621	2,540	
PONDEROSA PINE	5,260	16,501		1,369	8,935	36
RED FIR	15,456	721		51,232	16,141	
RICE						
RIVERINE	18	72		180	108	
SAGEBRUSH				212,853	150,291	1,585
SIERRAN MIXED CONIFER	102,752	74,452	54	13,889	24,481	
SUBALPINE CONIFER				3,134	162	
URBAN	18	1,585		90	4,972	
VALLEY FOOTHILL RIPARIAN					18	
VALLEY OAK WOODLAND						
VINEYARD						
WET MEADOW	1,711	2,666		7,602	18,608	
WHITE FIR	114,785	20,536		144		
Total:	267,237	172,952	54	590,642	416,681	6,809

2070

Land Cover Type (WHR)	Moderate Exposure - MIROC Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
ALKALI DESERT SCRUB						
ALPINE DWARF-SHRUB				18		
ANNUAL GRASSLAND	4,756	16,014		13,186	17,383	
ASPEN				1,531	72	
BARREN				19,743	13,168	18
BITTERBRUSH	324	324		43,972	5,837	18
BLUE OAK WOODLAND				216	1,982	
BLUE OAK-FOOTHILL PINE	847	288		4,359	5,350	
CHAMISE-REDSHANK CHAPARRAL				414	667	
CLOSED-CONE PINE-CYPRESS	1,531	54		4,630	937	
COASTAL OAK WOODLAND						
COASTAL SCRUB					72	
CROPLAND				216	1,387	
DECIDUOUS ORCHARD						
DOUGLAS FIR				30,155	28,300	
DRYLAND GRAIN CROPS						
EASTSIDE PINE	4,666	703		99,221	31,020	
EUCALYPTUS						
EVERGREEN ORCHARD						
FRESH EMERGENT WETLAND						
IRRIGATED GRAIN CROPS						
IRRIGATED HAYFIELD	18	15,744		2,378	13,060	36
IRRIGATED ROW AND FIELD CROPS						
JEFFREY PINE				594	360	
JUNIPER	6,377	342		7,530	2,270	
KLAMATH MIXED CONIFER	108	90		4,630	3,531	
LACUSTRINE				13,961	4,125	
LODGEPOLE PINE	20,230	1,369		9,637	4,828	
LOW SAGE	649	162		9,998	1,027	
MIXED CHAPARRAL	1,855	90		15,024	15,312	54
MONTANE CHAPARRAL				3,459	2,252	
MONTANE HARDWOOD	2,198	504		26,895	29,795	54
MONTANE HARDWOOD-CONIFER	54	18		24,409	20,716	
MONTANE RIPARIAN				126	126	
PASTURE	198	1,873			2,198	
PERENNIAL GRASSLAND	36	342		3,999	1,567	
PONDEROSA PINE	216	522		14,285	13,042	
RED FIR	576	198		7,007	667	
RICE						
RIVERINE	54	126		342	126	
SAGEBRUSH				164,396	112,551	1,855
SIERRAN MIXED CONIFER	9,655	18,662		16,879	12,952	
SUBALPINE CONIFER	2,288			22,535	793	
URBAN		18		90	7,404	54
VALLEY FOOTHILL RIPARIAN						
VALLEY OAK WOODLAND						
VINEYARD						
WET MEADOW	126	757		3,008	11,709	
WHITE FIR	14,447	3,279		18		
Total:	71,209	61,482	0	568,864	366,585	2,090

2040

Land Cover Type (WHR)	Moderate Exposure - MIROC Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
ALKALI DESERT SCRUB				1,603	9,601	
ALPINE DWARF-SHRUB				378		
ANNUAL GRASSLAND	955	6,017		5,512	44,747	54
ASPEN	18			306	198	
BARREN				12,844	7,728	
BITTERBRUSH				4,540	4,540	
BLUE OAK WOODLAND				2,288	41,432	
BLUE OAK-FOOTHILL PINE	630	739		5,440	13,312	18
CHAMISE-REDSHANK CHAPARRAL				685	793	
CLOSED-CONE PINE-CYPRESS	2,018	18		1,711	162	
COASTAL OAK WOODLAND					36	
COASTAL SCRUB					18	
CROPLAND				594	14,411	
DECIDUOUS ORCHARD						
DOUGLAS FIR	5,494	2,522		9,367	4,738	
DRYLAND GRAIN CROPS						
EASTSIDE PINE	3,693	1,333		55,123	23,310	90
EUCALYPTUS						
EVERGREEN ORCHARD						
FRESH EMERGENT WETLAND						
IRRIGATED GRAIN CROPS						
IRRIGATED HAYFIELD		2,090		2,360	22,914	
IRRIGATED ROW AND FIELD CROPS						
JEFFREY PINE				1,081	180	
JUNIPER				9,205	1,549	54
KLAMATH MIXED CONIFER	20,086	4,341		522	468	
LACUSTRINE	198	36		9,367	4,900	
LODGEPOLE PINE	54	72		2,558	2,450	
LOW SAGE	108			7,710	4,594	
MIXED CHAPARRAL	2,882	2,000		22,950	27,561	18
MONTANE CHAPARRAL	54			2,414	1,189	
MONTANE HARDWOOD	6,665	5,422		9,007	8,322	36
MONTANE HARDWOOD-CONIFER	4,431	3,080		2,036	1,585	
MONTANE RIPARIAN				108	126	
PASTURE	36	4,377			739	
PERENNIAL GRASSLAND				3,819	4,053	
PONDEROSA PINE	162	703		34,010	21,797	36
RED FIR		18		2,108	198	
RICE						
RIVERINE	54	180		270	216	
SAGEBRUSH				69,372	19,257	
SIERRAN MIXED CONIFER	2,954	558		25,130	7,566	
SUBALPINE CONIFER				7,872	144	
URBAN				18	18	
VALLEY FOOTHILL RIPARIAN				90	865	
VALLEY OAK WOODLAND					667	
VINEYARD						
WET MEADOW				2,648	8,449	
WHITE FIR	72			576	306	
Total:	50,565	33,506	0	315,623	305,139	306

This is supplementary table 4 for connectivity, showing areas of moderate exposure for single climate models

Extent = 5-Watersheds

RCP8.5 area = acres

2100

Land Cover Type (WHR)	Moderate Exposure - CNRM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
ALKALI DESERT SCRUB						
ALPINE DWARF-SHRUB						
ANNUAL GRASSLAND	3,405	6,161		4,323	9,547	
ASPEN				108		
BARREN				37,631	12,141	36
BITTERBRUSH				162	18	
BLUE OAK WOODLAND				90		
BLUE OAK-FOOTHILL PINE	270	18		1,315	216	
CHAMISE-REDSHANK CHAPARRAL						
CLOSED-CONE PINE-CYPRESS	18	36		36	108	
COASTAL OAK WOODLAND						
COASTAL SCRUB						
CROPLAND	324	26,859		18	2,918	
DECIDUOUS ORCHARD						
DOUGLAS FIR	36			20,014	15,726	54
DRYLAND GRAIN CROPS						
EASTSIDE PINE				5,224	4,377	
EUCALYPTUS						
EVERGREEN ORCHARD						
FRESH EMERGENT WETLAND					18	
IRRIGATED GRAIN CROPS						
IRRIGATED HAYFIELD					144	
IRRIGATED ROW AND FIELD CROPS						
JEFFREY PINE				3,170	144	
JUNIPER	216	270		67,210	45,990	4,828
KLAMATH MIXED CONIFER	414	126		11,943	15,870	
LACUSTRINE				3,549	1,423	
LODGEPOLE PINE	3,855			13,745	1,171	
LOW SAGE				522		
MIXED CHAPARRAL				4,359	3,333	
MONTANE CHAPARRAL				23,400	7,944	18
MONTANE HARDWOOD				12,195	8,611	54
MONTANE HARDWOOD-CONIFER	72	18		16,609	12,898	18
MONTANE RIPARIAN				144	288	
PASTURE		234		18	108	
PERENNIAL GRASSLAND	1,045	342		360	1,567	
PONDEROSA PINE	3,945	16,068		1,153	3,062	36
RED FIR	8,773	360		33,686	9,331	
RICE						
RIVERINE		18		180	72	
SAGEBRUSH				111,056	62,454	1,567
SIERRAN MIXED CONIFER	91,925	65,373	54	5,728	19,635	
SUBALPINE CONIFER				576		
URBAN	18	1,045		90	4,215	
VALLEY FOOTHILL RIPARIAN					18	
VALLEY OAK WOODLAND						
VINEYARD						
WET MEADOW	991	1,675		3,405	11,817	
WHITE FIR	90,845	17,528		144		
Total:	206,152	136,132	54	382,167	255,168	6,611

2070

Land Cover Type (WHR)	Moderate Exposure - MIROC Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
ALKALI DESERT SCRUB						
ALPINE DWARF-SHRUB				18		
ANNUAL GRASSLAND	3,044	12,412		12,376	15,330	
ASPEN				1,135	18	
BARREN				11,727	10,142	18
BITTERBRUSH	324	270		18,861	1,369	
BLUE OAK WOODLAND				18	108	
BLUE OAK-FOOTHILL PINE	829	288		2,720	2,666	
CHAMISE-REDSHANK CHAPARRAL						
CLOSED-CONE PINE-CYPRESS	1,531	54		3,855	540	
COASTAL OAK WOODLAND						
COASTAL SCRUB						
CROPLAND				216	1,153	
DECIDUOUS ORCHARD						
DOUGLAS FIR				21,473	19,797	
DRYLAND GRAIN CROPS						
EASTSIDE PINE	2,594	252		66,490	22,319	
EUCALYPTUS						
EVERGREEN ORCHARD						
FRESH EMERGENT WETLAND						
IRRIGATED GRAIN CROPS						
IRRIGATED HAYFIELD	18	4,576		2,378	11,169	36
IRRIGATED ROW AND FIELD CROPS						
JEFFREY PINE				486	18	
JUNIPER	90	90		7,043	1,495	
KLAMATH MIXED CONIFER	18			4,251	3,206	
LACUSTRINE				11,511	3,585	
LODGEPOLE PINE	9,692	252		4,323	2,090	
LOW SAGE	108	54		5,422	486	
MIXED CHAPARRAL	1,855	90		11,961	7,116	54
MONTANE CHAPARRAL				3,225	1,837	
MONTANE HARDWOOD				18,807	18,554	54
MONTANE HARDWOOD-CONIFER				20,572	14,213	
MONTANE RIPARIAN				90	72	
PASTURE		1,333			2,162	
PERENNIAL GRASSLAND				450	594	
PONDEROSA PINE				9,998	5,999	
RED FIR	216	108		3,134	126	
RICE						
RIVERINE	54	126		270	126	
SAGEBRUSH				100,842	72,182	1,837
SIERRAN MIXED CONIFER	7,638	13,691		11,223	9,331	
SUBALPINE CONIFER	126			11,943	18	
URBAN		18		36	540	
VALLEY FOOTHILL RIPARIAN						
VALLEY OAK WOODLAND						
VINEYARD						
WET MEADOW	126	540		1,639	8,106	
WHITE FIR	10,502	2,720		18		
Total:	38,766	36,875	0	368,512	236,470	2,000

2040

Land Cover Type (WHR)	Moderate Exposure - MIROC Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
ALKALI DESERT SCRUB						
ALPINE DWARF-SHRUB				216		
ANNUAL GRASSLAND	757	4,954		3,225	16,393	36
ASPEN	18			216	90	
BARREN				7,404	5,692	
BITTERBRUSH				649	198	
BLUE OAK WOODLAND				739	4,287	
BLUE OAK-FOOTHILL PINE	288	324		4,017	3,459	18
CHAMISE-REDSHANK CHAPARRAL						
CLOSED-CONE PINE-CYPRESS	2,018	18		1,621	144	
COASTAL OAK WOODLAND					18	
COASTAL SCRUB						
CROPLAND				576	8,791	
DECIDUOUS ORCHARD						
DOUGLAS FIR	1,117	2,288		8,232	3,999	
DRYLAND GRAIN CROPS						
EASTSIDE PINE	3,585	1,207		44,711	21,707	90
EUCALYPTUS						
EVERGREEN ORCHARD						
FRESH EMERGENT WETLAND						
IRRIGATED GRAIN CROPS						
IRRIGATED HAYFIELD				2,360	21,455	
IRRIGATED ROW AND FIELD CROPS						
JEFFREY PINE				540	18	
JUNIPER				9,061	1,351	54
KLAMATH MIXED CONIFER	6,737	2,234		522	468	
LACUSTRINE	72	36		8,358	4,720	
LODGEPOLE PINE	18	54		1,837	1,531	
LOW SAGE	36			5,963	4,197	
MIXED CHAPARRAL	2,756	1,261		17,402	13,799	18
MONTANE CHAPARRAL	36			1,891	847	
MONTANE HARDWOOD	5,188	3,981		7,422	3,116	18
MONTANE HARDWOOD-CONIFER	3,188	2,432		2,000	829	
MONTANE RIPARIAN				90	72	
PASTURE	36	3,945			234	
PERENNIAL GRASSLAND				594	1,495	
PONDEROSA PINE	90	162		21,995	16,375	36
RED FIR				991	144	
RICE						
RIVERINE	54	180		144	108	
SAGEBRUSH				57,465	18,392	
SIERRAN MIXED CONIFER	1,171	54		16,609	5,656	
SUBALPINE CONIFER				3,080		
URBAN						
VALLEY FOOTHILL RIPARIAN						
VALLEY OAK WOODLAND					18	
VINEYARD						
WET MEADOW				1,207	6,539	
WHITE FIR	36			414	270	
Total:	27,201	23,130	0	231,552	166,413	270

Extent = Pit Watershed

RCP8.5 area = acres

2100

Land Cover Type (WHR)	Moderate Exposure - CNRM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
ALKALI DESERT SCRUB						
ALPINE DWARF-SHRUB						
ANNUAL GRASSLAND	1,477	4,215		72	1,405	
ASPEN				108		
BARREN				20,950	4,774	36
BITTERBRUSH				162	18	
BLUE OAK WOODLAND				90		
BLUE OAK-FOOTHILL PINE	270	18		667		
CHAMISE-REDSHANK CHAPARRAL						
CLOSED-CONE PINE-CYPRESS						
COASTAL OAK WOODLAND						
COASTAL SCRUB						
CROPLAND	126	7,530		18	1,477	
DECIDUOUS ORCHARD						
DOUGLAS FIR	18			4,864	6,143	54
DRYLAND GRAIN CROPS						
EASTSIDE PINE				2,090	4,251	
EUCALYPTUS						
EVERGREEN ORCHARD						
FRESH EMERGENT WETLAND					18	
IRRIGATED GRAIN CROPS						
IRRIGATED HAYFIELD					144	
IRRIGATED ROW AND FIELD CROPS						
JEFFREY PINE						
JUNIPER	216	270		67,192	45,990	4,828
KLAMATH MIXED CONIFER				2,036	937	
LACUSTRINE				1,369	306	
LODGEPOLE PINE	3,855			8,953	90	
LOW SAGE				522		
MIXED CHAPARRAL				1,099	2,504	
MONTANE CHAPARRAL				11,457	3,999	18
MONTANE HARDWOOD				3,693	3,405	54
MONTANE HARDWOOD-CONIFER				3,080	2,594	18
MONTANE RIPARIAN						
PASTURE		216			108	
PERENNIAL GRASSLAND	1,045	342		144	522	
PONDEROSA PINE	3,945	16,068		90	1,747	36
RED FIR	4,089	18		9,205	162	
RICE						
RIVERINE		18		18	18	
SAGEBRUSH				101,617	51,412	1,567
SIERRAN MIXED CONIFER	48,980	58,744	36	1,171	9,583	
SUBALPINE CONIFER						
URBAN	18	558		18	865	
VALLEY FOOTHILL RIPARIAN						
VALLEY OAK WOODLAND						
VINEYARD						
WET MEADOW	721	793		1,477	8,142	
WHITE FIR	31,416	5,044		54		
Total:	96,177	93,835	36	242,216	150,615	6,611

2070

Land Cover Type (WHR)	Moderate Exposure - MIROC Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
ALKALI DESERT SCRUB						
ALPINE DWARF-SHRUB						
ANNUAL GRASSLAND	1,405	1,964		486	5,188	
ASPEN				1,027	18	
BARREN				3,026	3,621	18
BITTERBRUSH	324	270		18,861	1,369	
BLUE OAK WOODLAND					18	
BLUE OAK-FOOTHILL PINE	829	288		1,135	144	
CHAMISE-REDSHANK CHAPARRAL						
CLOSED-CONE PINE-CYPRESS	1,207			3,026	18	
COASTAL OAK WOODLAND						
COASTAL SCRUB						
CROPLAND				216	1,153	
DECIDUOUS ORCHARD						
DOUGLAS FIR				4,828	2,630	
DRYLAND GRAIN CROPS						
EASTSIDE PINE	234	18		50,061	14,753	
EUCALYPTUS						
EVERGREEN ORCHARD						
FRESH EMERGENT WETLAND						
IRRIGATED GRAIN CROPS						
IRRIGATED HAYFIELD	18	4,576		2,378	11,007	36
IRRIGATED ROW AND FIELD CROPS						
JEFFREY PINE						
JUNIPER	90	90		6,521	1,351	
KLAMATH MIXED CONIFER				1,153	468	
LACUSTRINE				3,405	342	
LODGEPOLE PINE	6,791	126		2,054	144	
LOW SAGE	108	54		5,314	450	
MIXED CHAPARRAL	1,855	90		4,287	3,927	36
MONTANE CHAPARRAL				216	18	
MONTANE HARDWOOD				4,431	2,774	
MONTANE HARDWOOD-CONIFER				8,052	2,684	
MONTANE RIPARIAN						
PASTURE		1,333			2,108	
PERENNIAL GRASSLAND				234	54	
PONDEROSA PINE				1,081	306	
RED FIR	18					
RICE						
RIVERINE	18	108				
SAGEBRUSH				68,381	50,691	1,837
SIERRAN MIXED CONIFER	6,773	13,456		18	126	
SUBALPINE CONIFER	18			1,783		
URBAN		18			540	
VALLEY FOOTHILL RIPARIAN						
VALLEY OAK WOODLAND						
VINEYARD						
WET MEADOW	126	540		288	2,522	
WHITE FIR	6,557	1,675				
Total:	26,372	24,607	0	192,263	108,426	1,927

2040

Land Cover Type (WHR)	Moderate Exposure - MIROC Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
ALKALI DESERT SCRUB						
ALPINE DWARF-SHRUB						
ANNUAL GRASSLAND	667	4,143		1,729	10,052	18
ASPEN	18			72	54	
BARREN				216	1,531	
BITTERBRUSH				649	198	
BLUE OAK WOODLAND				18	18	
BLUE OAK-FOOTHILL PINE	270	324		360	36	
CHAMISE-REDSHANK CHAPARRAL						
CLOSED-CONE PINE-CYPRESS	1,747			270		
COASTAL OAK WOODLAND						
COASTAL SCRUB						
CROPLAND					793	
DECIDUOUS ORCHARD						
DOUGLAS FIR	18	162		3,026	504	
DRYLAND GRAIN CROPS						
EASTSIDE PINE	2,468	270		28,750	13,006	90
EUCALYPTUS						
EVERGREEN ORCHARD						
FRESH EMERGENT WETLAND						
IRRIGATED GRAIN CROPS						
IRRIGATED HAYFIELD				2,360	18,446	
IRRIGATED ROW AND FIELD CROPS						
JEFFREY PINE						
JUNIPER				8,917	1,333	54
KLAMATH MIXED CONIFER				216	54	
LACUSTRINE	36	18		1,531	180	
LODGEPOLE PINE	18	18		1,405	144	
LOW SAGE	36			5,548	4,179	
MIXED CHAPARRAL	2,684	1,207		10,844	9,079	18
MONTANE CHAPARRAL				216		
MONTANE HARDWOOD	2,432	2,576		2,054	324	18
MONTANE HARDWOOD-CONIFER	1,063	540		468	108	
MONTANE RIPARIAN						
PASTURE	36	3,927			234	
PERENNIAL GRASSLAND				216	360	
PONDEROSA PINE		54		11,601	4,990	
RED FIR						
RICE						
RIVERINE	36	180				
SAGEBRUSH				26,697	5,098	
SIERRAN MIXED CONIFER	324			7,278	18	
SUBALPINE CONIFER				108		
URBAN						
VALLEY FOOTHILL RIPARIAN						
VALLEY OAK WOODLAND						
VINEYARD						
WET MEADOW				270	1,747	
WHITE FIR	18					
Total:	11,871	13,420	0	114,821	72,488	198

Extent = Feather Watershed

RCP8.5 area = acres

2100

Land Cover Type (WHR)	Moderate Exposure - CNRM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
ALKALI DESERT SCRUB						
ALPINE DWARF-SHRUB						
ANNUAL GRASSLAND	1,459	1,135		3,477	4,305	
ASPEN						
BARREN				7,620	4,485	
BITTERBRUSH						
BLUE OAK WOODLAND						
BLUE OAK-FOOTHILL PINE						
CHAMISE-REDSHANK CHAPARRAL						
CLOSED-CONE PINE-CYPRESS						
COASTAL OAK WOODLAND						
COASTAL SCRUB						
CROPLAND	198	19,329			1,441	
DECIDUOUS ORCHARD						
DOUGLAS FIR				36	360	
DRYLAND GRAIN CROPS						
EASTSIDE PINE				3,080	126	
EUCALYPTUS						
EVERGREEN ORCHARD						
FRESH EMERGENT WETLAND						
IRRIGATED GRAIN CROPS						
IRRIGATED HAYFIELD						
IRRIGATED ROW AND FIELD CROPS						
JEFFREY PINE				3,116	144	
JUNIPER				18		
KLAMATH MIXED CONIFER						
LACUSTRINE				937	612	
LODGEPOLE PINE				2,720		
LOW SAGE						
MIXED CHAPARRAL				1,099	108	
MONTANE CHAPARRAL				7,962	1,765	
MONTANE HARDWOOD				1,747	1,297	
MONTANE HARDWOOD-CONIFER	72	18		6,989	4,269	
MONTANE RIPARIAN				36	54	
PASTURE		18		18		
PERENNIAL GRASSLAND				18	54	
PONDEROSA PINE				829	1,135	
RED FIR	4,323	306		9,385	1,405	
RICE						
RIVERINE				162	54	
SAGEBRUSH				9,439	11,043	
SIERRAN MIXED CONIFER	42,945	6,629	18	4,540	8,683	
SUBALPINE CONIFER						
URBAN		486		72	2,900	
VALLEY FOOTHILL RIPARIAN						
VALLEY OAK WOODLAND						
VINEYARD						
WET MEADOW	270	883		1,009	3,567	
WHITE FIR	56,762	7,782				
Total:	106,030	36,586	18	64,310	47,809	0

2070

Land Cover Type (WHR)	Moderate Exposure - MIROC Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
ALKALI DESERT SCRUB						
ALPINE DWARF-SHRUB						
ANNUAL GRASSLAND	1,549	9,187		11,655	8,737	
ASPEN				108		
BARREN				5,512	4,107	
BITTERBRUSH						
BLUE OAK WOODLAND				18	90	
BLUE OAK-FOOTHILL PINE				396	1,855	
CHAMISE-REDSHANK CHAPARRAL						
CLOSED-CONE PINE-CYPRESS						
COASTAL OAK WOODLAND						
COASTAL SCRUB						
CROPLAND						
DECIDUOUS ORCHARD						
DOUGLAS FIR				7,296	7,584	
DRYLAND GRAIN CROPS						
EASTSIDE PINE	2,360	234		16,411	7,566	
EUCALYPTUS						
EVERGREEN ORCHARD						
FRESH EMERGENT WETLAND						
IRRIGATED GRAIN CROPS						
IRRIGATED HAYFIELD					162	
IRRIGATED ROW AND FIELD CROPS						
JEFFREY PINE				468		
JUNIPER				522	144	
KLAMATH MIXED CONIFER						
LACUSTRINE				4,540	2,342	
LODGEPOLE PINE	2,900	126		1,117	973	
LOW SAGE				108	36	
MIXED CHAPARRAL				3,783	1,837	18
MONTANE CHAPARRAL				2,432	1,369	
MONTANE HARDWOOD				7,512	10,718	54
MONTANE HARDWOOD-CONIFER				6,053	6,233	
MONTANE RIPARIAN				90	54	
PASTURE					18	
PERENNIAL GRASSLAND				108	18	
PONDEROSA PINE				1,675	3,513	
RED FIR	198	108		3,008	90	
RICE						
RIVERINE	36	18		270	126	
SAGEBRUSH				32,461	21,491	
SIERRAN MIXED CONIFER	865	234		11,205	9,205	
SUBALPINE CONIFER				198		
URBAN				36		
VALLEY FOOTHILL RIPARIAN						
VALLEY OAK WOODLAND						
VINEYARD						
WET MEADOW				721	4,882	
WHITE FIR	3,945	1,045		18		
Total:	11,853	10,953	0	117,721	93,150	72

2040

Land Cover Type (WHR)	Moderate Exposure - MIROC Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
ALKALI DESERT SCRUB						
ALPINE DWARF-SHRUB						
ANNUAL GRASSLAND		144		1,459	6,143	18
ASPEN				144	36	
BARREN				2,108	2,792	
BITTERBRUSH						
BLUE OAK WOODLAND				721	4,269	
BLUE OAK-FOOTHILL PINE				1,819	2,648	18
CHAMISE-REDSHANK CHAPARRAL						
CLOSED-CONE PINE-CYPRESS						
COASTAL OAK WOODLAND					18	
COASTAL SCRUB						
CROPLAND				576	7,998	
DECIDUOUS ORCHARD						
DOUGLAS FIR	432	1,765		1,675	1,333	
DRYLAND GRAIN CROPS						
EASTSIDE PINE	1,117	937		15,888	8,611	
EUCALYPTUS						
EVERGREEN ORCHARD						
FRESH EMERGENT WETLAND						
IRRIGATED GRAIN CROPS						
IRRIGATED HAYFIELD					3,008	
IRRIGATED ROW AND FIELD CROPS						
JEFFREY PINE				504	18	
JUNIPER				144	18	
KLAMATH MIXED CONIFER						
LACUSTRINE	36	18		4,089	4,125	
LODGEPOLE PINE		36		324	883	
LOW SAGE				414	18	
MIXED CHAPARRAL				1,603	3,819	
MONTANE CHAPARRAL				1,081	558	
MONTANE HARDWOOD	1,531	360		2,684	2,288	
MONTANE HARDWOOD-CONIFER	1,729	973		630	270	
MONTANE RIPARIAN				90	72	
PASTURE						
PERENNIAL GRASSLAND				72		
PONDEROSA PINE		36		2,198	2,036	36
RED FIR				360		
RICE						
RIVERINE	18			144	108	
SAGEBRUSH				30,768	13,294	
SIERRAN MIXED CONIFER	847	54		8,737	4,846	
SUBALPINE CONIFER				72		
URBAN						
VALLEY FOOTHILL RIPARIAN						
VALLEY OAK WOODLAND					18	
VINEYARD						
WET MEADOW				630	3,909	
WHITE FIR				342	144	
Total:	5,710	4,323	0	79,280	73,281	72

Extent = Upper Trinity Watershed

RCP8.5 area = acres

2100

Land Cover Type (WHR)	Moderate Exposure -		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
ALKALI DESERT SCRUB				
ALPINE DWARF-SHRUB				
ANNUAL GRASSLAND	54	90	216	2,036
ASPEN				
BARREN			3,098	360
BITTERBRUSH				
BLUE OAK WOODLAND				
BLUE OAK-FOOTHILL PINE				
CHAMISE-REDSHANK CHAPARRAL				
CLOSED-CONE PINE-CYPRESS			18	72
COASTAL OAK WOODLAND				
COASTAL SCRUB				
CROPLAND				
DECIDUOUS ORCHARD				
DOUGLAS FIR	18		5,026	1,891
DRYLAND GRAIN CROPS				
EASTSIDE PINE			54	
EUCALYPTUS				
EVERGREEN ORCHARD				
FRESH EMERGENT WETLAND				
IRRIGATED GRAIN CROPS				
IRRIGATED HAYFIELD				
IRRIGATED ROW AND FIELD CROPS				
JEFFREY PINE				
JUNIPER				
KLAMATH MIXED CONIFER	360	108	1,045	1,153
LACUSTRINE			1,153	18
LODGEPOLE PINE			18	
LOW SAGE				
MIXED CHAPARRAL			414	288
MONTANE CHAPARRAL			306	288
MONTANE HARDWOOD			18	
MONTANE HARDWOOD-CONIFER			144	
MONTANE RIPARIAN				18
PASTURE				
PERENNIAL GRASSLAND			54	630
PONDEROSA PINE				
RED FIR	342		5,981	378
RICE				
RIVERINE				
SAGEBRUSH				
SIERRAN MIXED CONIFER				
SUBALPINE CONIFER			198	
URBAN				
VALLEY FOOTHILL RIPARIAN				
VALLEY OAK WOODLAND				
VINEYARD				
WET MEADOW			811	72
WHITE FIR	450	36		
Total:	1,225	234	18,554	7,206

2070

Land Cover Type (WHR)	Moderate Exposure -		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
ALKALI DESERT SCRUB				
ALPINE DWARF-SHRUB				
ANNUAL GRASSLAND	36	576	90	576
ASPEN				
BARREN			811	594
BITTERBRUSH				
BLUE OAK WOODLAND				
BLUE OAK-FOOTHILL PINE			126	54
CHAMISE-REDSHANK CHAPARRAL				
CLOSED-CONE PINE-CYPRESS	54		90	54
COASTAL OAK WOODLAND				
COASTAL SCRUB				
CROPLAND				
DECIDUOUS ORCHARD				
DOUGLAS FIR			1,783	1,369
DRYLAND GRAIN CROPS				
EASTSIDE PINE			18	
EUCALYPTUS				
EVERGREEN ORCHARD				
FRESH EMERGENT WETLAND				
IRRIGATED GRAIN CROPS				
IRRIGATED HAYFIELD				
IRRIGATED ROW AND FIELD CROPS				
JEFFREY PINE			18	
JUNIPER				
KLAMATH MIXED CONIFER	18			72
LACUSTRINE			612	18
LODGEPOLE PINE			72	
LOW SAGE				
MIXED CHAPARRAL			252	306
MONTANE CHAPARRAL			18	
MONTANE HARDWOOD			288	90
MONTANE HARDWOOD-CONIFER			991	108
MONTANE RIPARIAN				
PASTURE				
PERENNIAL GRASSLAND			18	144
PONDEROSA PINE			54	54
RED FIR			36	
RICE				
RIVERINE				
SAGEBRUSH				
SIERRAN MIXED CONIFER				
SUBALPINE CONIFER	108		7,314	18
URBAN				
VALLEY FOOTHILL RIPARIAN				
VALLEY OAK WOODLAND				
VINEYARD				
WET MEADOW			522	90
WHITE FIR				
Total:	216	576	13,114	3,549

2040

Land Cover Type (WHR)	Moderate Exposure -		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
ALKALI DESERT SCRUB				
ALPINE DWARF-SHRUB				
ANNUAL GRASSLAND	36	360	18	18
ASPEN				
BARREN			468	126
BITTERBRUSH				
BLUE OAK WOODLAND				
BLUE OAK-FOOTHILL PINE	18			
CHAMISE-REDSHANK CHAPARRAL				
CLOSED-CONE PINE-CYPRESS			108	18
COASTAL OAK WOODLAND				
COASTAL SCRUB				
CROPLAND				
DECIDUOUS ORCHARD				
DOUGLAS FIR	667	216	757	721
DRYLAND GRAIN CROPS				
EASTSIDE PINE				
EUCALYPTUS				
EVERGREEN ORCHARD				
FRESH EMERGENT WETLAND				
IRRIGATED GRAIN CROPS				
IRRIGATED HAYFIELD				
IRRIGATED ROW AND FIELD CROPS				
JEFFREY PINE			36	
JUNIPER				
KLAMATH MIXED CONIFER	5,170	1,873	36	18
LACUSTRINE			1,549	18
LODGEPOLE PINE			72	
LOW SAGE				
MIXED CHAPARRAL	72	54	18	
MONTANE CHAPARRAL	18			
MONTANE HARDWOOD	108	270		
MONTANE HARDWOOD-CONIFER	54	144	198	72
MONTANE RIPARIAN				
PASTURE				
PERENNIAL GRASSLAND			180	739
PONDEROSA PINE	72	54	90	162
RED FIR				
RICE				
RIVERINE				
SAGEBRUSH				
SIERRAN MIXED CONIFER				
SUBALPINE CONIFER			1,189	
URBAN				
VALLEY FOOTHILL RIPARIAN				
VALLEY OAK WOODLAND				
VINEYARD				
WET MEADOW			198	90
WHITE FIR	18		54	108
Total:	6,233	2,972	4,972	2,090

Extent = McCloud Watershed

RCP8.5 area = acres

2100

Land Cover Type (WHR)	Moderate Exposure -		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
ALKALI DESERT SCRUB				
ALPINE DWARF-SHRUB				
ANNUAL GRASSLAND	378	667	360	721
ASPEN				
BARREN			3,711	1,675
BITTERBRUSH				
BLUE OAK WOODLAND				
BLUE OAK-FOOTHILL PINE			54	72
CHAMISE-REDSHANK CHAPARRAL				
CLOSED-CONE PINE-CYPRESS	18	36		36
COASTAL OAK WOODLAND				
COASTAL SCRUB				
CROPLAND				
DECIDUOUS ORCHARD				
DOUGLAS FIR			5,981	2,666
DRYLAND GRAIN CROPS				
EASTSIDE PINE				
EUCALYPTUS				
EVERGREEN ORCHARD				
FRESH EMERGENT WETLAND				
IRRIGATED GRAIN CROPS				
IRRIGATED HAYFIELD				
IRRIGATED ROW AND FIELD CROPS				
JEFFREY PINE				
JUNIPER				
KLAMATH MIXED CONIFER		18	5,188	7,043
LACUSTRINE			54	414
LODGEPOLE PINE			2,054	1,081
LOW SAGE				
MIXED CHAPARRAL			775	54
MONTANE CHAPARRAL			2,018	504
MONTANE HARDWOOD			3,261	1,153
MONTANE HARDWOOD-CONIFER			3,098	1,225
MONTANE RIPARIAN			108	216
PASTURE				
PERENNIAL GRASSLAND			108	216
PONDEROSA PINE			18	
RED FIR	18	36	7,512	6,773
RICE				
RIVERINE				
SAGEBRUSH				
SIERRAN MIXED CONIFER				1,351
SUBALPINE CONIFER			234	
URBAN				
VALLEY FOOTHILL RIPARIAN				
VALLEY OAK WOODLAND				
VINEYARD				
WET MEADOW				18
WHITE FIR	2,108	4,540	90	
Total:	2,522	5,296	34,623	25,220

2070

Land Cover Type (WHR)	Moderate Exposure -		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
ALKALI DESERT SCRUB				
ALPINE DWARF-SHRUB				
ANNUAL GRASSLAND	18	90	54	432
ASPEN				
BARREN			1,171	1,279
BITTERBRUSH				
BLUE OAK WOODLAND				
BLUE OAK-FOOTHILL PINE			306	126
CHAMISE-REDSHANK CHAPARRAL				
CLOSED-CONE PINE-CYPRESS	162	54	396	360
COASTAL OAK WOODLAND				
COASTAL SCRUB				
CROPLAND				
DECIDUOUS ORCHARD				
DOUGLAS FIR			2,252	1,946
DRYLAND GRAIN CROPS				
EASTSIDE PINE				
EUCALYPTUS				
EVERGREEN ORCHARD				
FRESH EMERGENT WETLAND				
IRRIGATED GRAIN CROPS				
IRRIGATED HAYFIELD				
IRRIGATED ROW AND FIELD CROPS				
JEFFREY PINE				
JUNIPER				
KLAMATH MIXED CONIFER			1,063	198
LACUSTRINE			865	324
LODGEPOLE PINE			1,081	973
LOW SAGE				
MIXED CHAPARRAL			649	126
MONTANE CHAPARRAL			162	18
MONTANE HARDWOOD			2,468	1,459
MONTANE HARDWOOD-CONIFER			1,927	937
MONTANE RIPARIAN				18
PASTURE				
PERENNIAL GRASSLAND			54	378
PONDEROSA PINE			6,377	1,495
RED FIR				36
RICE				
RIVERINE				
SAGEBRUSH				
SIERRAN MIXED CONIFER				
SUBALPINE CONIFER			1,081	
URBAN				
VALLEY FOOTHILL RIPARIAN				
VALLEY OAK WOODLAND				
VINEYARD				
WET MEADOW				54
WHITE FIR				
Total:	180	144	19,905	10,160

2040

Land Cover Type (WHR)	Moderate Exposure -		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
ALKALI DESERT SCRUB				
ALPINE DWARF-SHRUB			162	
ANNUAL GRASSLAND	18	270		18
ASPEN				
BARREN			2,702	576
BITTERBRUSH				
BLUE OAK WOODLAND				
BLUE OAK-FOOTHILL PINE			486	144
CHAMISE-REDSHANK CHAPARRAL				
CLOSED-CONE PINE-CYPRESS	72		955	72
COASTAL OAK WOODLAND				
COASTAL SCRUB				
CROPLAND				
DECIDUOUS ORCHARD				
DOUGLAS FIR			504	216
DRYLAND GRAIN CROPS				
EASTSIDE PINE			72	72
EUCALYPTUS				
EVERGREEN ORCHARD				
FRESH EMERGENT WETLAND				
IRRIGATED GRAIN CROPS				
IRRIGATED HAYFIELD				
IRRIGATED ROW AND FIELD CROPS				
JEFFREY PINE				
JUNIPER				
KLAMATH MIXED CONIFER			18	108
LACUSTRINE			540	378
LODGEPOLE PINE			36	504
LOW SAGE				
MIXED CHAPARRAL			522	72
MONTANE CHAPARRAL			216	18
MONTANE HARDWOOD	703	216	360	54
MONTANE HARDWOOD-CONIFER	216	288	378	162
MONTANE RIPARIAN				
PASTURE		18		
PERENNIAL GRASSLAND			90	396
PONDEROSA PINE	18	18	7,170	9,115
RED FIR			396	
RICE				
RIVERINE				
SAGEBRUSH				
SIERRAN MIXED CONIFER			522	757
SUBALPINE CONIFER			901	
URBAN				
VALLEY FOOTHILL RIPARIAN				
VALLEY OAK WOODLAND				
VINEYARD				
WET MEADOW				18
WHITE FIR				
Total:	1,027	811	16,032	12,682

Extent = Upper Sacramento Watershed

RCP8.5 area = acres

2100

Land Cover Type (WHR)	Moderate Exposure -		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
ALKALI DESERT SCRUB				
ALPINE DWARF-SHRUB				
ANNUAL GRASSLAND	36	54	198	1,081
ASPEN				
BARREN			2,252	847
BITTERBRUSH				
BLUE OAK WOODLAND				
BLUE OAK-FOOTHILL PINE			594	144
CHAMISE-REDSHANK CHAPARRAL				
CLOSED-CONE PINE-CYPRESS			18	
COASTAL OAK WOODLAND				
COASTAL SCRUB				
CROPLAND				
DECIDUOUS ORCHARD				
DOUGLAS FIR			4,107	4,666
DRYLAND GRAIN CROPS				
EASTSIDE PINE				
EUCALYPTUS				
EVERGREEN ORCHARD				
FRESH EMERGENT WETLAND				
IRRIGATED GRAIN CROPS				
IRRIGATED HAYFIELD				
IRRIGATED ROW AND FIELD CROPS				
JEFFREY PINE			54	
JUNIPER				
KLAMATH MIXED CONIFER	54		3,675	6,737
LACUSTRINE			36	72
LODGEPOLE PINE				
LOW SAGE				
MIXED CHAPARRAL			973	378
MONTANE CHAPARRAL			1,657	1,387
MONTANE HARDWOOD			3,477	2,756
MONTANE HARDWOOD-CONIFER			3,297	4,810
MONTANE RIPARIAN				
PASTURE				
PERENNIAL GRASSLAND			36	144
PONDEROSA PINE			216	180
RED FIR			1,603	612
RICE				
RIVERINE				
SAGEBRUSH				
SIERRAN MIXED CONIFER			18	18
SUBALPINE CONIFER			144	
URBAN				450
VALLEY FOOTHILL RIPARIAN				18
VALLEY OAK WOODLAND				
VINEYARD				
WET MEADOW			108	18
WHITE FIR	108	126		
Total:	198	180	22,463	24,319

2070

Land Cover Type (WHR)	Moderate Exposure -		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
ALKALI DESERT SCRUB				
ALPINE DWARF-SHRUB			18	
ANNUAL GRASSLAND	36	594	90	396
ASPEN				
BARREN			1,207	540
BITTERBRUSH				
BLUE OAK WOODLAND				
BLUE OAK-FOOTHILL PINE			757	486
CHAMISE-REDSHANK CHAPARRAL				
CLOSED-CONE PINE-CYPRESS	108		342	108
COASTAL OAK WOODLAND				
COASTAL SCRUB				
CROPLAND				
DECIDUOUS ORCHARD				
DOUGLAS FIR			5,314	6,269
DRYLAND GRAIN CROPS				
EASTSIDE PINE				
EUCALYPTUS				
EVERGREEN ORCHARD				
FRESH EMERGENT WETLAND				
IRRIGATED GRAIN CROPS				
IRRIGATED HAYFIELD				
IRRIGATED ROW AND FIELD CROPS				
JEFFREY PINE				18
JUNIPER				
KLAMATH MIXED CONIFER			2,036	2,468
LACUSTRINE			2,090	558
LODGEPOLE PINE				
LOW SAGE				
MIXED CHAPARRAL			2,990	919
MONTANE CHAPARRAL			396	432
MONTANE HARDWOOD			4,107	3,513
MONTANE HARDWOOD-CONIFER			3,549	4,251
MONTANE RIPARIAN				
PASTURE				36
PERENNIAL GRASSLAND			36	
PONDEROSA PINE			811	630
RED FIR			90	
RICE				
RIVERINE				
SAGEBRUSH				
SIERRAN MIXED CONIFER				
SUBALPINE CONIFER			1,567	
URBAN				
VALLEY FOOTHILL RIPARIAN				
VALLEY OAK WOODLAND				
VINEYARD				
WET MEADOW			108	558
WHITE FIR				
Total:	144	594	25,508	21,184

2040

Land Cover Type (WHR)	Moderate Exposure -		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
ALKALI DESERT SCRUB				
ALPINE DWARF-SHRUB			54	
ANNUAL GRASSLAND	36	36	18	162
ASPEN				
BARREN			1,909	667
BITTERBRUSH				
BLUE OAK WOODLAND				
BLUE OAK-FOOTHILL PINE			1,351	630
CHAMISE-REDSHANK CHAPARRAL				
CLOSED-CONE PINE-CYPRESS	198	18	288	54
COASTAL OAK WOODLAND				
COASTAL SCRUB				
CROPLAND				
DECIDUOUS ORCHARD				
DOUGLAS FIR		144	2,270	1,225
DRYLAND GRAIN CROPS				
EASTSIDE PINE				18
EUCALYPTUS				
EVERGREEN ORCHARD				
FRESH EMERGENT WETLAND				
IRRIGATED GRAIN CROPS				
IRRIGATED HAYFIELD				
IRRIGATED ROW AND FIELD CROPS				
JEFFREY PINE				
JUNIPER				
KLAMATH MIXED CONIFER	1,567	360	252	288
LACUSTRINE			649	18
LODGEPOLE PINE				
LOW SAGE				
MIXED CHAPARRAL			4,413	829
MONTANE CHAPARRAL	18		378	270
MONTANE HARDWOOD	414	558	2,324	450
MONTANE HARDWOOD-CONIFER	126	486	324	216
MONTANE RIPARIAN				
PASTURE				
PERENNIAL GRASSLAND			36	
PONDEROSA PINE			937	72
RED FIR			234	144
RICE				
RIVERINE				
SAGEBRUSH				
SIERRAN MIXED CONIFER			72	36
SUBALPINE CONIFER			811	
URBAN				
VALLEY FOOTHILL RIPARIAN				
VALLEY OAK WOODLAND				
VINEYARD				
WET MEADOW			108	775
WHITE FIR			18	18
Total:	2,360	1,603	16,447	5,873

This is supplementary table 5 for landcover, showing total area in each WHR type

area = acres

WHR Description	Study Area	5-Watersheds	Pit	Feather	Upper Trinity	McCloud	Upper Sacramento
ALKALI DESERT SCRUB	19,149						
ALPINE DWARF-SHRUB	703	396				252	144
ANNUAL GRASSLAND	194,623	110,101	30,282	67,661	4,684	4,431	3,044
ASPEN	6,827	4,774	4,017	721		36	
BARREN	179,095	111,164	54,078	24,895	13,150	10,124	8,917
BITTERBRUSH	95,564	31,056	30,822			234	
BLUE OAK WOODLAND	74,308	6,161	540	5,620			
BLUE OAK-FOOTHILL PINE	84,359	29,939	6,665	19,491	252	865	2,666
CHAMISE-REDSHANK CHAPARRAL	1,639						
CLOSED-CONE PINE-CYPRESS	15,888	12,141	7,350		775	2,648	1,369
COASTAL OAK WOODLAND	180	18		18			
COASTAL SCRUB	72						
CROPLAND	241,135	184,950	114,371	70,561			18
DECIDUOUS ORCHARD	180						
DOUGLAS FIR	403,603	267,364	41,072	38,172	115,596	25,994	46,530
DRYLAND GRAIN CROPS	9,331	7,620	7,242	378			
EASTSIDE PINE	899,060	656,736	452,241	196,803	360	3,567	3,765
EUCALYPTUS	36						
EVERGREEN ORCHARD	775	36	18	18			
FRESH EMERGENT WETLAND	667	216	144	72			
IRRIGATED GRAIN CROPS	919	901	901				
IRRIGATED HAYFIELD	111,471	76,559	66,832	9,674			54
IRRIGATED ROW AND FIELD CROPS	414	396	396				
JEFFREY PINE	73,857	43,954	21,923	21,275	414		342
JUNIPER	441,451	328,611	327,818	793			
KLAMATH MIXED CONIFER	474,596	363,306	27,760		140,743	78,289	116,514
LACUSTRINE	108,264	57,897	26,733	17,383	5,909	2,306	5,566
LODGEPOLE PINE	82,720	44,170	25,472	14,105	90	4,503	
LOW SAGE	404,288	289,719	289,016	703			
MIXED CHAPARRAL	152,236	96,735	72,344	13,006	1,333	1,837	8,214
MONTANE CHAPARRAL	553,083	420,626	197,848	124,657	51,070	20,968	26,084
MONTANE HARDWOOD	325,873	226,994	71,479	79,442	4,035	25,886	46,152
MONTANE HARDWOOD-CONIFER	271,417	216,276	59,842	75,875	11,061	24,535	44,963
MONTANE RIPARIAN	27,633	21,635	5,530	14,051	937	1,081	36
PASTURE	16,014	7,260	7,043	90		90	36
PERENNIAL GRASSLAND	144,652	95,816	89,529	2,936	1,964	1,081	306
PONDEROSA PINE	477,803	345,220	212,061	54,132	2,504	70,273	6,251
RED FIR	323,171	186,355	47,701	66,724	33,614	29,219	9,097
RICE	360	360	360				
RIVERINE	2,054	1,207	396	811			
SAGEBRUSH	864,077	502,608	376,186	126,350	18	54	
SIERRAN MIXED CONIFER	2,124,803	1,617,295	567,080	957,155		79,478	13,583
SUBALPINE CONIFER	60,869	30,552	8,899	1,549	16,032	1,351	2,720
URBAN	36,568	12,844	2,378	6,881	198	558	2,828
VALLEY FOOTHILL RIPARIAN	2,666	811	234	252		54	270
VALLEY OAK WOODLAND	1,369	36	18	18			
VINEYARD	90	36	18		18		
WET MEADOW	89,566	52,367	30,606	19,113	1,153	414	1,081
WHITE FIR	545,463	398,794	89,457	217,086	35,812	41,288	15,150
Total:	**9,944,943**	**6,862,012**	**3,374,703**	**2,248,469**	**441,721**	**431,417**	**365,702**

These are the final connectivity tables. They cross rank connectivity with climate exposure of the vegetation.

There are 6 tabs: 2 main tables and 5 appendix tabs.

Main1_Conn_ConsensusRefHighExp	Consensus Refugia & High Exposure: Summaries
Main2_Conn_ConsensusModExp	Consensus Moderate Exposure: Summaries
Apx1_Conn_ConRefHighExp_5Watshd	Consensus Refugia & High Exposure: By Watershed
Apx2_Conn_ConModExp_5Watshd	Consensus Moderate Exposure: By Watershed
Apx3_Conn_RefHighExp	Single Model Refugia & High Exposure: Summaries and by Watershed
Apx4_Conn_ModExp	Single Model Moderate Exposure: Summaries and by Watershed
Apx5_Conn_AreaByRank	Total Area by Connectivity Rank

This is the Consensus Refugia & High Exposure by Connectivity Ranking table for use in the main text. Refugia & High Exposure by watershed tables are in appendix 1, single climate model tables are in appendix 3.

Extent = Entire Study Area (5-Watersheds plus 10km buffer)
RCP8.5 area = acres

	Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
2100	5: High	109,345	13,727		21,365	3,621		133,069	42,063	18
	4	41,864	7,368		6,251	2,234		41,666	25,310	
	3	503,022	106,571		47,863	25,868	54	568,035	191,218	1,243
	2	162,450	74,073		18,374	19,383	36	171,079	144,652	126
	1: Low	389,534	375,826	54	42,639	51,502	54	323,729	285,468	432
	0: Not Selected	31,723	63,733	54	3,008	29,579	162	30,083	246,611	414
	Total:	**1,237,939**	**641,298**	**108**	**139,500**	**132,187**	**306**	**1,267,662**	**935,322**	**2,234**
2070	5: High	259,041	46,260		14,483	4,828		14,862	6,125	18
	4	101,779	26,913	36	5,368	3,243		5,620	4,395	
	3	917,740	242,612	144	49,899	17,005		256,069	89,638	1,081
	2	304,400	161,657	18	26,066	19,419		43,936	73,587	126
	1: Low	759,001	681,127	432	63,860	64,382	234	75,262	109,759	360
	0: Not Selected	54,042	117,145	324	7,278	99,473	468	11,133	167,224	216
	Total:	**2,396,004**	**1,275,714**	**955**	**166,954**	**208,350**	**703**	**406,882**	**450,728**	**1,801**
2040	5: High	352,065	84,972	90	24,391	3,999		9,583	1,315	
	4	139,338	49,953	54	6,647	1,585		3,513	937	
	3	1,260,546	360,784	1,045	44,927	15,024		32,785	17,239	36
	2	388,183	211,016	450	16,447	11,511		15,096	18,212	
	1: Low	958,092	806,342	2,414	31,759	30,119		27,633	38,604	
	0: Not Selected	66,093	187,291	1,315	3,098	22,968	36	3,495	59,933	36
	Total:	**3,164,318**	**1,700,358**	**5,368**	**127,269**	**85,206**	**36**	**92,105**	**136,240**	**72**
2010	5: High	420,915	99,978	162	56,942	9,313		20,194	3,333	
	4	164,233	59,680	72	18,194	5,476		5,530	1,711	
	3	1,857,980	544,779	2,486	146,111	52,277	126	50,547	15,150	
	2	567,512	321,910	829	43,216	40,387	54	13,997	12,250	
	1: Low	1,409,000	1,158,155	5,224	60,437	84,053	54	17,780	27,129	
	0: Not Selected	108,786	416,681	3,225	5,945	79,370	72	1,801	24,859	
	Total:	**4,528,427**	**2,601,183**	**11,997**	**330,845**	**270,876**	**306**	**109,849**	**84,432**	**0**

Extent = 5-Watersheds
RCP8.5 area = acres

	Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
2100	5: High	66,291	10,448		17,744	2,450		107,850	31,651	
	4	27,507	5,620		5,134	1,765		34,839	17,726	
	3	345,977	71,642		36,172	13,601	54	382,761	110,678	360
	2	116,424	44,026		14,988	14,105	36	129,232	71,281	126
	1: Low	249,494	267,976		26,607	38,874	54	241,712	157,712	324
	0: Not Selected	24,283	43,396	54	2,216	22,535	162	18,554	111,633	306
	Total:	**829,976**	**443,108**	**54**	**102,860**	**93,330**	**306**	**914,948**	**500,681**	**1,117**
2070	5: High	189,831	34,064		10,898	3,765		11,205	4,197	
	4	76,289	21,401	36	4,540	2,090		4,576	2,288	
	3	645,009	147,913	72	35,019	13,042		184,445	46,818	342
	2	237,334	120,964		23,256	14,663		33,560	36,262	126
	1: Low	509,525	527,738	270	53,970	40,351	234	58,023	58,185	252
	0: Not Selected	38,046	85,656	324	5,116	83,026	468	8,358	84,359	216
	Total:	**1,696,034**	**937,736**	**703**	**132,799**	**156,938**	**703**	**300,167**	**232,110**	**937**
2040	5: High	271,993	66,273		14,249	3,243		4,972	991	
	4	111,092	40,604	54	4,215	1,243		2,198	486	
	3	871,120	218,311	775	24,175	11,403		18,014	9,457	36
	2	310,363	150,417	432	12,069	7,818		8,467	11,061	
	1: Low	658,501	627,895	2,270	25,778	20,698		14,123	23,094	
	0: Not Selected	45,774	106,445	1,315	2,414	15,132	36	2,738	44,837	18
	Total:	**2,268,843**	**1,209,945**	**4,846**	**82,900**	**59,536**	**36**	**50,511**	**89,926**	**54**
2010	5: High	302,671	76,451		32,191	6,053		11,709	2,108	
	4	129,214	48,332	72	10,700	3,747		3,243	757	
	3	1,281,785	338,285	1,333	97,960	30,660	126	32,407	9,295	
	2	442,946	215,501	811	30,372	22,265	54	10,016	6,953	
	1: Low	942,005	847,900	4,954	43,360	51,268	54	13,583	19,851	
	0: Not Selected	75,551	276,172	3,206	3,963	40,261	54	1,369	16,393	
	Total:	**3,174,172**	**1,802,641**	**10,376**	**218,546**	**154,254**	**288**	**72,326**	**55,357**	**0**

	Connectivity Ranking	Refugia 80%			< High Exposure 99%			95- Very High Exposure > 99%		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
2010	5: High	420,915	99,978	162	56,942	9,313		20,194	3,333	
	4	164,233	59,680	72	18,194	5,476		5,530	1,711	
	3	1,857,980	544,779	2,486	146,111	52,277	126	50,547	15,150	
	2	567,512	321,910	829	43,216	40,387	54	13,997	12,250	
	1: Low	1,409,000	1,158,155	5,224	60,437	84,053	54	17,780	27,129	
	0: Not Selected	108,786	416,681	3,225	5,945	79,370	72	1,801	24,859	
	Total:	**4,528,427**	**2,601,183**	**11,997**	**330,845**	**270,876**	**306**	**109,849**	**84,432**	**0**

	Connectivity Ranking	Refugia 80%			< High Exposure 99%			95- Very High Exposure > 99%		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
2010	5: High	302,671	76,451		32,191	6,053		11,709	2,108	
	4	129,214	48,332	72	10,700	3,747		3,243	757	
	3	1,281,785	338,285	1,333	97,960	30,660	126	32,407	9,295	
	2	442,946	215,501	811	30,372	22,265	54	10,016	6,953	
	1: Low	942,005	847,900	4,954	43,360	51,268	54	13,583	19,851	
	0: Not Selected	75,551	276,172	3,206	3,963	40,261	54	1,369	16,393	
	Total:	**3,174,172**	**1,802,641**	**10,376**	**218,546**	**154,254**	**288**	**72,326**	**55,357**	**0**

This is the Moderate Exposure by Connectivity Ranking table for use in main text. Moderate exposure by watershed tables are in appendix 2, single climate model tables are in appendix 4.

Extent = Entire Study Area (5-Watersheds plus 10km buffer)
RCP8.5 area = acres

	Connectivity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2100	5: High	43,071	6,287	18
	4	12,051	2,954	36
	3	164,233	42,009	144
	2	38,424	27,940	18
	1: Low	68,165	70,579	36
	0: Not Selected	16,465	47,197	
	Total:	**342,410**	**196,965**	**252**
2070	5: High	59,122	12,610	144
	4	17,402	6,575	18
	3	253,871	57,807	1,063
	2	56,762	29,939	594
	1: Low	111,326	66,273	2,810
	0: Not Selected	9,998	45,161	1,027
	Total:	**508,481**	**218,365**	**5,656**
2040	5: High	41,558	5,746	
	4	15,438	2,612	
	3	190,912	41,919	18
	2	56,384	29,453	
	1: Low	115,289	111,344	108
	0: Not Selected	16,339	72,074	144
	Total:	**435,920**	**263,148**	**270**
2010	5: High	175,006	40,117	
	4	50,998	16,861	
	3	474,578	158,523	108
	2	150,345	120,045	
	1: Low	277,884	312,254	234
	0: Not Selected	28,264	201,468	342
	Total:	**1,157,074**	**849,269**	**685**

Extent = 5-Watersheds
RCP8.5 area = acres

	Connectivity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2100	5: High	23,382	4,774	
	4	8,521	2,360	36
	3	105,022	24,049	72
	2	26,553	20,860	
	1: Low	42,117	50,475	36
	0: Not Selected	9,169	37,721	
	Total:	**214,763**	**140,239**	**144**
2070	5: High	35,397	9,655	
	4	13,943	5,224	18
	3	165,999	43,035	865
	2	41,738	22,572	594
	1: Low	72,470	49,863	2,810
	0: Not Selected	7,962	37,883	1,027
	Total:	**337,510**	**168,233**	**5,314**
2040	5: High	22,121	4,485	
	4	9,619	1,747	
	3	137,915	25,562	18
	2	41,324	16,519	
	1: Low	80,000	72,740	108
	0: Not Selected	12,538	51,394	144
	Total:	**303,518**	**172,448**	**270**
2010	5: High	127,449	33,794	
	4	38,190	13,330	
	3	351,074	96,159	108
	2	111,903	68,849	
	1: Low	194,641	200,279	234
	0: Not Selected	18,951	118,838	252
	Total:	**842,208**	**531,250**	**594**

This is supplementary table 1 for connectivity. showing areas of consensus refugia & high exposure in each of the 5 watersheds

Extent = Pit Watershed
RCP8.5 area = acres

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	16,141	4,954		1,333	685		37,189	9,936	
4	6,755	2,866		558	360		19,068	5,314	
3	115,470	35,488		15,132	4,900	54	273,885	47,395	342
2	53,760	23,418		6,089	2,918	36	76,975	30,696	108
1: Low	79,424	130,874		7,116	10,070	54	146,886	81,856	306
0: Not Selected	8,467	22,049	54	865	5,710	108	13,889	68,381	216
Total:	**280,045**	**209,719**	**54**	**31,993**	**24,643**	**252**	**568,902**	**243,567**	**973**

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	36,586	10,538		5,476	2,234		9,098	1,747	
4	19,978	7,512	36	2,864	1,207		2,648	1,188	
3	244,630	70,417	72	21,094	7,872		168,863	24,571	324
2	104,085	49,755		15,582	10,376		24,679	13,042	108
1: Low	172,052	224,562	270	45,738	28,984	234	43,990	26,588	234
0: Not Selected	15,888	29,075	234	3,963	67,733	468	6,683	57,068	198
Total:	**593,218**	**391,858**	**612**	**94,718**	**118,406**	**703**	**251,962**	**124,206**	**865**

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	75,154	31,074		2,738	1,027		1,333	432	
4	44,296	18,318	54	883	414		576	162	
3	435,794	129,791	775	5,080	3,621		7,818	1,549	36
2	135,479	69,282	432	5,440	2,756		4,968	1,909	
1: Low	272,624	327,836	2,270	8,395	7,350		4,287	4,954	
0: Not Selected	23,778	54,400	1,171	721	8,016	36	685	15,132	
Total:	**1,007,126**	**630,742**	**4,702**	**23,256**	**23,184**	**36**	**19,689**	**24,139**	**36**

Connectivity Ranking	Refugia < 80%			High Exposure 80-90%			Very High Exposure > 90%		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	86,503	34,875		10,502	2,108		2,810	757	
4	56,654	23,112	72	3,801	1,657		540	450	
3	786,004	203,396	1,315	28,282	9,565	136	5,873	3,152	
2	237,280	110,246	793	11,187	8,377	54	3,729	1,531	
1: Low	642,802	428,571	4,936	6,035	20,230	54	3,639	9,674	
0: Not Selected	41,432	166,071	2,972	1,045	16,221	54	522	6,917	
Total:	**1,650,675**	**966,270**	**10,088**	**60,851**	**58,257**	**288**	**17,113**	**22,481**	**0**

Extent = Feather Watershed
RCP8.5 area = acres

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	21,671	955		12,250	667		45,611	13,709	
4	13,024	1,063		3,235	667		11,943	9,367	
3	96,645	10,160		15,168	5,548		84,377	51,304	18
2	41,126	11,907		6,088	8,773		44,350	33,166	18
1: Low	63,697	121,101		16,177	16,915		84,936	60,869	18
0: Not Selected	5,368	5,873		1,059	12,466	54	5,404	38,638	90
Total:	**241,531**	**62,058**	**0**	**53,916**	**45,035**	**54**	**276,623**	**207,071**	**144**

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	92,448	7,854		3,801	865		4,467	2,198	
4	39,054	5,764		1,008	703		1,401	1,081	
3	207,539	27,579		10,232	3,711		12,141	21,491	18
2	95,852	47,089		5,638	3,837		6,089	21,130	18
1: Low	240,234	145,607		6,467	8,647		9,583	27,651	18
0: Not Selected	10,628	25,706	90	757	14,321		1,261	23,490	18
Total:	**685,756**	**259,599**	**90**	**27,904**	**32,083**	**0**	**34,947**	**97,041**	**72**

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	118,244	12,466		6,467	775		1,189	252	
4	47,179	10,934		2,198	396		739	198	
3	263,202	28,118		9,746	3,837		4,720	5,602	
2	123,612	55,771		4,213	3,459		2,648	7,260	
1: Low	307,264	169,169		10,574	4,648		5,008	11,169	
0: Not Selected	12,754	26,679	144	995	3,765		1,369	24,769	18
Total:	**872,255**	**313,137**	**144**	**34,209**	**16,879**	**0**	**15,672**	**49,250**	**18**

Connectivity Ranking	Refugia < 80%			High Exposure 80-90%			Very High Exposure > 90%		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	138,239	21,058		9,818	1,747		3,206	450	
4	52,060	13,637		4,143	1,099		1,401	162	
3	301,464	81,081	18	48,620	15,204		17,762	4,233	
2	163,653	77,262	18	14,681	11,061		5,008	3,675	
1: Low	383,788	251,944	18	25,868	14,789		6,539	3,999	
0: Not Selected	20,716	78,919	234	1,837	17,167		324	6,521	
Total:	**1,059,871**	**523,901**	**288**	**104,967**	**61,067**	**0**	**34,245**	**19,041**	**0**

Extent = Upper Trinity Watershed
RCP8.5 area = acres

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	21,419	2,000		306	90		829	18	
4	3,351	450					362		
3	101,653	15,024		2,198	504		4,017	72	
2	5,674	3,549		558	198		378		
1: Low	46,224	44,386		1,477	1,982		450	306	
0: Not Selected	5,278	6,431		252	865		54	144	
Total:	**183,599**	**71,840**		**4,792**	**3,639**		**5,891**	**540**	

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	25,111	3,152		540	18		216	36	
4	3,441	775		216	18				
3	130,601	23,094		2,216	396		1,009	72	
2	15,330	7,368		216	54		126	18	
1: Low	49,016	53,087		378	955		198	432	
0: Not Selected	7,638	13,168		108	360		90	126	
Total:	**231,137**	**100,644**		**3,675**	**1,801**		**1,639**	**685**	

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	22,121	2,324		2,072	144		1,099	90	
4	3,026	432		396	54		270		
3	109,057	16,915		6,503	1,783		3,603	1,063	
2	13,258	6,143		883	396		198	126	
1: Low	33,128	35,794		3,927	2,747		1,189	2,360	
0: Not Selected	5,855	10,160		450	937		234	540	
Total:	**186,445**	**71,768**		**14,231**	**7,061**		**6,593**	**4,179**	

Connectivity Ranking	Refugia < 80%			High Exposure 80-90%			Very High Exposure > 90%		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	22,445	3,026		2,736	234		667	36	
4	3,513	649		540	36		90		
3	120,658	23,364		10,160	1,657		2,234	360	
2	15,430	7,296		612	396		252	36	
1: Low	49,611	55,411		2,124	3,170		594	1,099	
0: Not Selected	7,800	13,430		216	1,261		198	198	
Total:	**219,446**	**103,166**		**16,591**	**6,755**		**4,035**	**1,729**	

Extent = McCloud Watershed
RCP8.5 area = acres

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	3,729	1,964		2,144	414		8,683	4,071	
4	1,405	432		901	288		2,036	1,891	
3	7,548	6,035		1,909	937		4,828	1,495	
2	1,081	1,441		198	865		3,352	937	
1: Low	48,674	60,293		739	5,764		4,269	1,909	
0: Not Selected	4,684	7,224		18	1,927		306	450	
Total:	**67,120**	**77,388**		**5,909**	**10,196**		**23,274**	**10,754**	

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	21,869	7,512		342	72		360	54	
4	7,188	2,360		162	54		234		
3	25,256	12,808		306	144		667	108	
2	3,621	5,837		504	18		558	198	
1: Low	35,307	77,694		757	1,153		3,477	2,018	
0: Not Selected	3,152	11,781		144	252		198	1,153	
Total:	**96,393**	**117,992**		**2,216**	**1,693**		**5,494**	**3,531**	

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	22,974	10,808		1,171	378		847	162	
4	9,313	3,639		378	162		342	90	
3	26,841	13,673		847	414		739	414	
2	4,035	6,071		162	234		36	72	
1: Low	34,353	65,805		1,495	1,711		3,024	3,036	
0: Not Selected	2,792	9,621		180	685		342	1,495	
Total:	**111,308**	**109,417**		**4,233**	**3,585**		**5,332**	**5,260**	

Connectivity Ranking	Refugia < 80%			High Exposure 80-90%			Very High Exposure > 90%		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	23,866	9,511		4,197	880		2,504	288	
4	9,079	4,287		1,297	360		775	18	
3	25,400	10,971		5,746	1,585		2,612	252	
2	4,738	5,981		757	306		324	198	
1: Low	49,430	76,920		7,098	9,457		2,486	3,333	
0: Not Selected	4,558	13,006		630	2,504		306	1,009	
Total:	**127,071**	**120,676**		**19,725**	**15,096**		**9,007**	**5,098**	

Extent = Upper Sacramento Watershed
RCP8.5 area = acres

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	3,333	576		1,711	594		15,528	3,827	
4	2,972	739		450	450		2,630	1,353	
3	24,661	4,936		1,765	1,711		15,654	10,412	
2	14,753	3,711		1,353	1,351		10,376	6,485	
1: Low	11,475	10,322		1,099	4,143		5,170	12,772	
0: Not Selected	486	1,819		72	1,567		901	3,999	
Total:	**57,681**	**22,103**		**6,251**	**9,818**		**50,259**	**38,748**	

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	13,817	5,008		739	576		1,063	162	
4	6,629	4,990		288	108		288	18	
3	36,983	14,015		1,171	919		1,765	576	
2	18,446	10,916		1,315	378		2,108	1,873	
1: Low	12,916	26,787		630	612		775	1,495	
0: Not Selected	739	5,927		144	360		126	2,522	
Total:	**89,529**	**67,643**		**4,287**	**2,954**		**6,125**	**6,647**	

Connectivity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	22,499	9,601		1,801	919		504	54	
4	7,278	7,440		450	216		270	36	
3	36,226	19,815		2,000	1,747		1,135	829	
2	13,979	13,150		1,261	973		594	1,693	
1: Low	11,133	29,291		1,387	3,243		612	1,585	
0: Not Selected	594	5,584		72	1,729		108	2,900	
Total:	**91,709**	**84,882**		**6,971**	**8,827**		**3,225**	**7,098**	

Connectivity Ranking	Refugia < 80%			High Exposure 80-90%			Very High Exposure > 90%		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
5: High	21,617	7,980		4,936	1,081		2,522	576	
4	7,908	6,647		919	594		432	126	
3	48,259	19,473		5,152	2,648		3,927	1,297	
2	21,905	14,717		3,134	2,126		703	1,513	
1: Low	16,375	35,055		2,036	3,621		324	1,747	
0: Not Selected	1,045	6,755		234	3,008		18	1,747	
Total:	**117,109**	**90,628**		**16,411**	**13,078**		**7,926**	**7,007**	

This is supplementary table 2 for connectivity, showing areas of consensus moderate exposure in each of the 5 watersheds

Extent = Pit Watershed
RCP8.5 area = acres

	Connectivity Ranking	Moderate Exposure - Consensus Public	Private	Tribal
2100	5: High	6,269	1,891	
	4	2,234	685	36
	3	59,860	12,069	72
	2	14,285	8,340	
	1: Low	13,853	21,022	36
	0: Not Selected	4,774	19,023	
	Total:	**101,275**	**63,031**	**144**
2070	5: High	17,077	7,728	
	4	8,431	2,972	18
	3	126,548	35,884	865
	2	26,048	15,510	594
	1: Low	41,126	36,604	2,810
	0: Not Selected	5,332	28,084	1,027
	Total:	**224,562**	**126,782**	**5,314**
2040	5: High	7,242	2,558	
	4	3,513	991	
	3	70,399	14,159	18
	2	21,383	10,214	
	1: Low	26,030	25,886	108
	0: Not Selected	4,125	37,073	108
	Total:	**132,691**	**90,881**	**234**
2010	5: High	46,026	14,916	
	4	14,591	4,666	
	3	160,937	43,396	108
	2	50,709	28,444	
	1: Low	59,644	80,378	234
	0: Not Selected	5,350	81,081	198
	Total:	**337,258**	**252,880**	**540**

Extent = Feather Watershed
RCP8.5 area = acres

	Connectivity Ranking	Moderate Exposure - Consensus Public	Private	Tribal
2100	5: High	6,323	216	
	4	2,540	180	
	3	14,267	5,638	
	2	5,764	7,170	
	1: Low	16,375	8,178	
	0: Not Selected	1,495	15,024	
	Total:	**46,764**	**36,406**	**0**
2070	5: High	10,898	937	
	4	3,477	1,585	
	3	25,886	4,413	
	2	12,934	5,296	
	1: Low	26,751	7,512	
	0: Not Selected	1,549	7,458	
	Total:	**81,495**	**27,201**	**0**
2040	5: High	8,322	630	
	4	4,035	198	
	3	36,190	5,458	
	2	8,593	4,612	
	1: Low	14,411	13,817	
	0: Not Selected	1,261	6,773	36
	Total:	**72,813**	**31,488**	**36**
2010	5: High	38,352	4,666	
	4	15,150	3,783	
	3	113,452	28,912	
	2	43,756	31,795	
	1: Low	79,081	57,591	
	0: Not Selected	4,377	24,121	54
	Total:	**294,168**	**150,867**	**54**

Extent = Upper Trinity Watershed
RCP8.5 area = acres

	Connectivity Ranking	Moderate Exposure - Consensus Public	Private
2100	5: High	5,170	594
	4	721	36
	3	21,815	2,000
	2	3,639	919
	1: Low	4,954	5,080
	0: Not Selected	2,414	1,387
	Total:	**38,712**	**10,016**
2070	5: High	2,504	180
	4	396	
	3	9,061	757
	2	1,369	288
	1: Low	2,450	1,387
	0: Not Selected	901	504
	Total:	**16,681**	**3,116**
2040	5: High	4,017	649
	4	775	216
	3	22,770	3,963
	2	3,693	703
	1: Low	14,357	13,943
	0: Not Selected	4,089	2,576
	Total:	**49,701**	**22,049**
2010	5: High	10,394	667
	4	1,243	126
	3	42,675	3,044
	2	4,341	739
	1: Low	12,033	9,169
	0: Not Selected	4,161	1,405
	Total:	**74,848**	**15,150**

Extent = McCloud Watershed
RCP8.5 area = acres

	Connectivity Ranking	Moderate Exposure - Consensus Public	Private
2100	5: High	4,035	1,315
	4	1,891	450
	3	4,540	2,054
	2	775	1,081
	1: Low	4,251	8,791
	0: Not Selected	342	757
	Total:	**15,834**	**14,447**
2070	5: High	3,026	270
	4	811	180
	3	1,171	342
	2	162	180
	1: Low	667	1,711
	0: Not Selected	126	811
	Total:	**5,963**	**3,495**
2040	5: High	1,009	342
	4	234	90
	3	1,873	685
	2	919	324
	1: Low	20,104	14,069
	0: Not Selected	2,414	3,855
	Total:	**26,553**	**19,365**
2010	5: High	14,357	7,656
	4	3,279	2,378
	3	14,303	6,143
	2	3,134	1,855
	1: Low	33,632	35,361
	0: Not Selected	4,251	8,395
	Total:	**72,957**	**61,788**

Extent = Upper Sacramento Watershed
RCP8.5 area = acres

	Connectivity Ranking	Moderate Exposure - Consensus Public	Private
2100	5: High	1,585	757
	4	1,135	1,009
	3	4,540	2,288
	2	2,090	3,351
	1: Low	2,684	7,404
	0: Not Selected	144	1,531
	Total:	**12,177**	**16,339**
2070	5: High	1,891	540
	4	829	486
	3	3,333	1,639
	2	1,225	1,297
	1: Low	1,477	2,648
	0: Not Selected	54	1,027
	Total:	**8,809**	**7,638**
2040	5: High	1,531	306
	4	1,063	252
	3	6,683	1,297
	2	6,737	667
	1: Low	5,098	5,026
	0: Not Selected	649	1,117
	Total:	**21,761**	**8,665**
2010	5: High	18,320	5,891
	4	3,927	2,378
	3	19,707	14,663
	2	9,962	6,017
	1: Low	10,250	17,780
	0: Not Selected	811	3,837
	Total:	**62,977**	**50,565**

This is supplementary table 8 for connectivity, showing area of moderate exposure for single climate models.

Extent = Entire Study Area (9 Watersheds plus 10km buffer)

RCP8.5 area = acres

Connectivity Ranking	Moderate Exposure - CMIM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
5: High	92,681	7,564		79,189	22,055	90
4	19,941	3,302		20,308	10,560	18
2100 3	87,958	29,916		106,322	107,066	973
2	81,738	35,855		94,066	52,763	612
1: Low	45,726	19,406		56,102	31,716	1,003
0: Not Selected	6,779	3,109	54	7,010	10,881	1,903
Total:	**297,197**	**172,952**	**54**	**393,642**	**434,981**	**6,809**

Connectivity Ranking	Moderate Exposure - CMIM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
5: High	11,169	4,668		78,866	20,916	
4	4,359	1,801		22,912	10,070	
2070 3	28,165	9,575		231,681	83,659	108
2	8,683	3,737		72,272	28,683	54
1: Low	16,518	10,810		161,419	129,196	1,261
0: Not Selected	1,135	21,851		15,854	73,866	667
Total:	**71,339**	**61,452**	**0**	**585,998**	**966,585**	**2,090**

Connectivity Ranking	Moderate Exposure - CMIM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
5: High	9,367	2,828		26,569	6,631	
4	1,711	811		10,136	5,987	
2080 3	22,752	5,216		117,541	44,040	
2	4,161	5,458		50,124	42,909	86
1: Low	11,166	9,752		96,153	102,968	126
0: Not Selected	1,126	16,893		15,817	85,356	140
Total:	**50,948**	**65,556**	**0**	**316,425**	**405,139**	**354**

Extent = 5: Watersheds

RCP8.5 area = acres

Connectivity Ranking	Moderate Exposure - CMIM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
5: High	20,788	7,057		55,321	15,978	
4	15,474	5,116		15,082	7,998	18
2100 3	65,661	25,611		205,268	88,568	893
2	67,212	34,316		97,769	62,517	612
1: Low	40,888	20,603		71,012	43,865	1,499
0: Not Selected	5,168	37,483	54	7,252	61,661	5,609
Total:	**255,312**	**130,132**	**54**	**452,157**	**293,588**	**8,631**

Connectivity Ranking	Moderate Exposure - CMIM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
5: High	4,730	2,109		56,780	21,168	
4	2,596	1,279		16,591	8,250	
2070 3	31,432	9,341		188,962	58,708	72
2	6,467	3,765		49,917	25,653	54
1: Low	9,116	9,562		96,467	78,703	1,261
0: Not Selected	402	14,169		9,971	26,188	612
Total:	**58,766**	**50,375**	**0**	**418,710**	**218,470**	**2,000**

Connectivity Ranking	Moderate Exposure - CMIM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
5: High	5,476	2,414		18,358	3,729	
4	973	721		6,881	1,707	
2080 3	32,412	3,675		91,467	31,980	
2	2,630	3,603		42,514	19,365	86
1: Low	6,751	6,755		69,968	62,659	328
0: Not Selected	956	9,965		7,964	47,949	176
Total:	**49,198**	**27,133**	**0**	**251,152**	**168,413**	**270**

Extent = 9: PCWatershed

RCP8.5 area = acres

Connectivity Ranking	Moderate Exposure - CMIM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
5: High	9,408	5,870		13,526	5,303	
4	9,420	4,864		5,991	2,706	18
2100 3	35,432	14,027		101,154	49,413	869
2	18,608	9,329		22,167	16,903	612
1: Low	12,662	47,720		17,487	44,860	1,499
0: Not Selected	11,103	7,713	36	12,995	61,382	5,609
Total:	**96,177**	**89,835**	**36**	**243,316**	**180,615**	**9,611**

Connectivity Ranking	Moderate Exposure - CMIM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
5: High	3,099	6,341		21,599	5,278	
4	2,050	1,353		8,509	3,315	
2070 3	11,112	2,303		76,613	21,756	72
2	3,999	2,700		26,661	12,502	54
1: Low	3,783	8,160		54,690	35,992	1,261
0: Not Selected	288	5,999		3,981	27,343	583
Total:	**24,372**	**26,857**	**0**	**192,243**	**106,186**	**1,967**

Connectivity Ranking	Moderate Exposure - CMIM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
5: High	2,186	1,675		5,658	669	
4	899	602		2,852	576	
2080 3	6,522	2,356		48,764	12,556	
2	1,101	2,352		23,076	5,277	18
1: Low	1,659	2,168		23,977	20,343	18
0: Not Selected	140	4,186		1,241	24,818	99
Total:	**12,571**	**13,420**	**0**	**114,521**	**72,488**	**336**

Extent = Feather Watershed

RCP8.5 area = acres

Connectivity Ranking	Moderate Exposure - CNRM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
5: High	32,644	1,099		53,537	5,870	
4	5,870	252		2,527	1,261	
2100 3	29,201	6,467		26,318	9,547	
2	18,536	6,430		9,169	32,126	
1: Low	43,966	17,705		9,169	31,778	
0: Not Selected	5,870	8,328	18	1,009	36,179	
Total:	**136,088**	**39,586**	**18**	**64,153**	**47,809**	**0**

Connectivity Ranking	Moderate Exposure - CNRM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
5: High	1,567	198		18,717	5,080	
4	686	198		3,954	3,098	
2070 3	2,162	630		61,702	26,300	
2	2,432	955		14,807	13,276	
1: Low	5,082	1,162		31,579	30,498	
0: Not Selected	126	7,420		3,963	16,898	72
Total:	**11,810**	**10,563**	**0**	**117,721**	**95,150**	**72**

Connectivity Ranking	Moderate Exposure - CNRM Only			Moderate Exposure - MIROC Only		
	Public	Private	Tribal	Public	Private	Tribal
5: High	1,567	270		6,057	2,126	
4	198	72		2,558	997	
2080 3	1,675	414		30,303	16,539	
2	806	997		13,583	8,370	18
1: Low	1,659	2,168		23,977	20,343	18
0: Not Selected	270	910		1,396	37,206	99
Total:	**6,710**	**5,323**	**0**	**79,268**	**75,191**	**72**

Extent = Upper Trinity Watershed

RCP8.5 area = acres

Connectivity Ranking	Moderate Exposure - CNRM Only		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
5: High	198	18	1,935	72
4	198		216	72
2100 3	576	72	10,786	5,475
2			8,634	864
1: Low	180	126	1,917	1,665
0: Not Selected	72	18	1,917	1,665
Total:	**1,224**	**256**	**26,555**	**9,359**

Connectivity Ranking	Moderate Exposure - CNRM Only		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
5: High	54		1,855	198
4			324	18
2070 3	72	90	8,631	1,099
2			864	234
1: Low	162	90	6,775	5,035
0: Not Selected	234	378	936	
Total:	**216**	**576**	**11,110**	**6,585**

Connectivity Ranking	Moderate Exposure - CNRM Only		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
5: High	414	72	396	162
4	288	18	90	
2080 3	8,298	612	1,818	306
2	342	288	918	90
1: Low	2,826	1,821	756	1,125
0: Not Selected	126	864	1,899	396
Total:	**4,216**	**2,973**	**6,972**	**2,090**

Extent = McCloud Watershed

RCP8.5 area = acres

Connectivity Ranking	Moderate Exposure - CNRM Only		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
5: High	18	18	10,870	4,233
4			36	5,134	1,279
2100 3	216	216	8,759	3,666
2	18	108	1,895	1,333
1: Low	2,052	1,602	721	1,099
0: Not Selected	180	810	721	1,099
Total:	**2,522**	**5,398**	**36,623**	**25,220**

Connectivity Ranking	Moderate Exposure - CNRM Only		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
5: High	18	18	3,151	1,099
4			3,837	973
2070 3		18	3,837	973
2			1,077	668
1: Low	162	90	6,775	5,035
0: Not Selected	18	36	709	1,765
Total:	**180**	**180**	**19,905**	**10,160**

Connectivity Ranking	Moderate Exposure - CNRM Only		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
5: High	378	198	6,163	540
4	72	198	829	270
2080 3	919	216	6,667	1,423
2	693	90	2,747	1,621
1: Low	360	667	937	1,621
0: Not Selected			270	540
Total:	**2,902**	**1,420**	**16,467**	**6,973**

Extent = Upper Sacramento Watershed

RCP8.5 area = acres

Connectivity Ranking	Moderate Exposure - CNRM Only		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
5: High			8,469	6,297
4			1,891	2,680
2100 3	99	18	8,981	6,689
2	54	36	1,801	3,062
1: Low	90	108	1,801	5,062
0: Not Selected	36	18	567	1,053
Total:	**388**	**180**	**22,865**	**24,839**

Connectivity Ranking	Moderate Exposure - CNRM Only		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
5: High			5,957	2,216
4	18	18	1,459	721
2070 3	72	18	8,368	6,539
2	36	90	3,909	2,972
1: Low	18	318	2,909	7,060
0: Not Selected		180	613	1,477
Total:	**144**	**558**	**23,215**	**21,185**

Connectivity Ranking	Moderate Exposure - CNRM Only		Moderate Exposure - MIROC Only	
	Public	Private	Public	Private
5: High	378	198	6,163	540
4	72	198	829	270
2080 3	919	216	6,667	1,423
2	693	90	2,747	1,621
1: Low	360	667	937	1,621
0: Not Selected			270	540
Total:	**2,902**	**1,420**	**16,467**	**6,973**

This is supplementary table 5 for biodiversity, showing total area in each biodiversity rank

area = acres

Connectivity Ranking	Study Area	5-Watersheds	Pit	Feather	Upper Trinity	McCloud	Upper Sacramento
5: High	825,959	592,426	198,496	217,537	40,207	73,263	62,923
4	322,757	247,584	105,544	91,439	6,197	21,473	22,932
3	3,302,665	2,239,192	1,242,154	610,746	204,152	67,012	115,127
2	1,270,544	909,670	452,349	350,858	29,093	17,293	60,077
1: Low	3,352,204	2,318,129	1,056,196	823,617	133,412	217,717	87,188
0: Not Selected	870,814	555,011	319,964	154,272	28,660	34,659	17,456
Total:	**9,944,943**	**6,862,012**	**3,374,703**	**2,248,469**	**441,721**	**431,417**	**365,702**

These are the final biodiversity tables. They cross rank biodiversity with climate exposure of the vegetation.

There are 6 tabs: 2 main tables and 5 appendix tabs.

Main1_Bio_ConsensusRefHighExp	Consensus Refugia & High Exposure: Summaries
Main2_Bio_ConsensusModExp	Consensus Moderate Exposure: Summaries
Apx1_Bio_ConRefHighExp_5Watshd	Consensus Refugia & High Exposure: By Watershed
Apx2_Bio_ConModExp_5Watshd	Consensus Moderate Exposure: By Watershed
Apx3_Bio_RefHighExp	Single Model Refugia & High Exposure: Summaries and by Watershed
Apx4_Bio_ModExp	Single Model Moderate Exposure: Summaries and by Watershed
Apx5_Bio_AreaByRank	Total Area by Biodiversity Rank

This is the Consensus Refugia & High Exposure by Biodiversity Ranking table for use in the main text. Refugia & High Exposure by watershed tables are in appendix 1, single climate model tables are in appendix 3.

Extent = Entire Study Area (5-Watersheds plus 10km buffer)

RCP8.5 area = acres

	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
2100	5: High	322,648	286,945	72	15,798	46,278	270	187,129	246,828	180
	4	489,836	233,894	18	43,828	44,981		265,598	272,624	288
	3	337,888	86,665	18	29,309	19,707	36	228,940	234,506	306
	2	69,120	13,961		44,350	15,906		532,746	142,869	1,459
	1: Low	18,446	19,833		6,215	5,314		53,249	38,496	
	Total:	**1,237,939**	**641,298**	**108**	**139,500**	**132,187**	**306**	**1,267,662**	**935,322**	**2,234**
2070	5: High	550,742	523,180	667	41,054	63,463	486	20,338	176,447	324
	4	913,453	483,964	234	30,912	27,075	36	38,766	92,178	36
	3	662,464	187,201	18	47,701	85,260	180	19,527	57,951	126
	2	242,720	56,348	36	27,165	23,562		322,288	90,917	1,315
	1: Low	26,625	25,021		20,122	8,989		5,963	33,236	
	Total:	**2,396,004**	**1,275,714**	**955**	**166,954**	**208,350**	**703**	**406,882**	**450,728**	**1,801**
2040	5: High	591,777	542,401	1,027	38,388	25,562		14,681	15,960	
	4	1,030,796	606,080	468	43,432	19,617		25,184	35,271	18
	3	1,027,644	378,762	3,116	23,778	22,283	36	12,718	18,644	18
	2	446,098	120,207	757	14,519	5,981		36,208	51,448	36
	1: Low	68,003	52,907		7,152	11,763		3,315	14,916	
	Total:	**3,164,318**	**1,700,358**	**5,368**	**127,269**	**85,206**	**36**	**92,105**	**136,240**	**72**

	Biodiversity Ranking	Refugia < 80%			High Exposure 95-99%			Very High Exposure > 99%		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
2010	5: High	809,584	883,460	2,360	69,174	75,857	126	19,869	16,591	
	4	1,340,565	774,817	649	82,072	71,516	36	30,426	20,986	
	3	1,405,055	621,356	6,485	51,052	42,189	72	13,979	12,700	
	2	870,976	248,989	2,468	91,529	45,431	72	22,752	22,229	
	1: Low	102,247	72,560	36	37,019	35,884		22,824	11,925	
	Total:	**4,528,427**	**2,601,183**	**11,997**	**330,845**	**270,876**	**306**	**109,849**	**84,432**	**0**

Extent = 5-Watersheds

RCP8.5 area = acres

	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
2100	5: High	234,812	200,460	18	13,150	36,857	270	154,992	107,489	180
	4	325,044	171,277	18	35,415	33,668		196,226	127,377	198
	3	214,222	57,699	18	21,293	11,979	36	170,088	149,336	270
	2	42,207	5,548		28,714	7,314		358,118	103,580	468
	1: Low	13,691	8,124		4,287	3,513		35,524	12,898	
	Total:	**829,976**	**443,108**	**54**	**102,860**	**93,330**	**306**	**914,948**	**500,681**	**1,117**
2070	5: High	434,695	398,523	576	36,118	50,313	486	16,123	82,072	324
	4	687,215	383,950	108	19,131	12,250	36	28,138	33,560	36
	3	431,003	121,648	18	41,468	66,868	180	16,393	34,353	108
	2	125,954	25,148		23,670	20,302		235,929	71,029	468
	1: Low	17,167	8,467		12,412	7,206		3,585	11,097	
	Total:	**1,696,034**	**937,736**	**703**	**132,799**	**156,938**	**703**	**300,167**	**232,110**	**937**
2040	5: High	482,937	417,312	955	24,355	15,762		9,223	9,493	
	4	806,000	465,932	306	25,562	13,006		11,637	20,824	18
	3	701,645	244,738	2,918	18,194	17,365	36	6,539	12,195	18
	2	237,785	71,029	667	9,728	4,035		21,094	40,351	18
	1: Low	40,477	10,934		5,062	9,367		2,018	7,061	
	Total:	**2,268,843**	**1,209,945**	**4,846**	**82,900**	**59,536**	**36**	**50,511**	**89,926**	**54**

	Biodiversity Ranking	Refugia < 80%			High Exposure 95-99%			Very High Exposure > 99%		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
2010	5: High	644,234	649,080	2,270	45,611	37,091	126	15,690	9,800	
	4	955,101	545,788	486	58,401	42,045	36	20,014	13,979	
	3	975,385	414,051	6,215	29,273	21,905	72	8,683	8,827	
	2	539,411	172,376	1,387	61,157	34,443	54	15,150	15,456	
	1: Low	60,041	21,347	18	24,103	18,771		12,790	7,296	
	Total:	**3,174,172**	**1,802,641**	**10,376**	**218,546**	**154,254**	**288**	**72,326**	**55,357**	**0**

This is the Moderate Exposure by Biodiversity Ranking table for use in main text. Moderate exposure by watershed tables are in appendix 2, single climate model tables are in appendix 4.

Extent = Entire Study Area (5-Watersheds plus 10km buffer)
RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2100	5: High	48,151	37,865	18
	4	99,689	82,756	162
	3	54,438	30,083	18
	2	64,706	27,958	36
	1: Low	75,425	18,302	18
	Total:	**342,410**	**196,965**	**252**

	Biodiversity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2070	5: High	60,545	25,310	36
	4	123,882	58,599	180
	3	142,941	75,244	4,215
	2	81,928	30,912	1,171
	1: Low	99,185	28,300	54
	Total:	**508,481**	**218,366**	**5,656**

	Biodiversity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2040	5: High	116,118	85,566	18
	4	145,013	64,256	54
	3	51,610	84,432	162
	2	35,884	8,719	
	1: Low	87,296	20,176	36
	Total:	**435,920**	**263,148**	**270**

	Biodiversity Ranking	Moderate Exposure 80-95%		
		Public	Private	Tribal
2010	5: High	237,496	271,543	72
	4	338,519	262,662	342
	3	214,907	195,488	198
	2	234,974	66,021	36
	1: Low	131,178	53,556	36
	Total:	**1,157,074**	**849,269**	**685**

Extent = 5-Watersheds
RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2100	5: High	31,831	21,238	18
	4	72,650	64,760	108
	3	38,820	22,752	18
	2	29,831	20,932	
	1: Low	41,630	10,556	
	Total:	**214,763**	**140,239**	**144**

	Biodiversity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2070	5: High	47,287	19,563	36
	4	78,505	46,116	180
	3	107,778	63,211	4,053
	2	40,423	21,383	1,009
	1: Low	63,517	17,960	36
	Total:	**337,510**	**168,233**	**5,314**

	Biodiversity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2040	5: High	81,315	55,645	18
	4	97,167	47,305	54
	3	36,010	48,350	162
	2	24,355	4,684	
	1: Low	64,670	16,465	36
	Total:	**303,518**	**172,448**	**270**

	Biodiversity Ranking	Moderate Exposure 80-95%		
		Public	Private	Tribal
2010	5: High	189,075	166,197	72
	4	268,697	163,891	252
	3	144,941	131,196	198
	2	154,380	39,252	36
	1: Low	85,116	30,714	36
	Total:	**842,208**	**531,250**	**594**

This is supplementary table 1 for biodiversity. showing areas of consensus refugia & high exposure in each of the 5 watersheds

Extent = Pit Watershed
RCP8.5 area = acres

	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	75,587	88,539	18	4,071	7,007	216	89,187	26,643	144
	4	110,192	85,206	18	9,331	6,900		52,349	26,966	144
2100	3	72,668	26,751	18	6,377	7,638	36	100,734	99,833	234
	2	15,438	2,414		10,412	3,585		303,770	78,487	450
	1: Low	6,161	6,809		1,801	1,513		14,862	9,637	
	Total:	**280,045**	**209,719**	**54**	**31,993**	**26,643**	**252**	**558,902**	**240,567**	**973**
	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	102,067	142,292	486	33,038	48,043	486	6,755	30,101	288
	4	224,851	170,394	108	7,620	7,656	36	9,475	5,476	36
2070	3	204,261	62,130	18	33,614	54,060	180	7,440	19,978	90
	2	54,456	12,087		15,312	5,314		226,418	58,816	450
	1: Low	7,584	4,954		5,134	3,233		1,873	9,816	
	Total:	**593,218**	**391,858**	**612**	**94,718**	**118,406**	**703**	**251,962**	**124,206**	**865**
	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	160,198	174,213	819	7,764	6,143		4,512	5,710	
	4	278,406	223,662	288	6,521	4,107		2,288	3,585	
2040	3	416,069	172,898	2,918	6,377	9,007	36	2,234	6,305	18
	2	131,340	52,673	667	2,054	847		9,565	3,495	18
	1: Low	21,112	7,296		540	3,080		1,081	5,044	
	Total:	**1,007,126**	**630,742**	**4,702**	**23,256**	**23,184**	**36**	**19,689**	**24,139**	**36**
	Biodiversity Ranking	Refugia			High Exposure < 80%			SS- 99%	Very High Exposure > 99%	
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	224,562	274,245	2,108	16,195	17,257	126	4,035	4,810	
	4	337,150	243,477	396	14,699	15,222	36	4,287	7,548	
2010	3	638,668	306,598	6,179	7,566	11,277	72	2,900	4,467	
	2	412,304	124,675	1,387	18,374	3,585	54	3,513	1,855	
	1: Low	37,991	15,276	18	4,017	10,916		2,378	3,801	
	Total:	**1,650,675**	**964,270**	**10,088**	**60,851**	**58,257**	**288**	**17,113**	**22,481**	**0**

Extent = Feather Watershed
RCP8.5 area = acres

	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	64,886	20,404		7,530	27,796	54	33,240	58,293	36
	4	75,659	15,816		13,168	11,007		115,938	77,064	54
2100	3	74,758	10,790		14,357	3,225		67,643	47,053	36
	2	23,264	1,657		17,816	2,504		51,502	22,317	18
	1: Low	2,864	360		1,045	594		8,250	2,144	
	Total:	**241,532**	**62,028**	**0**	**53,916**	**45,035**	**54**	**276,623**	**207,071**	**144**
	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	231,642	150,615	90	1,964	1,621		6,251	51,124	36
	4	265,472	74,560		9,305	3,549		14,177	25,220	
2070	3	138,005	27,760		7,710	11,907		7,872	11,331	18
	2	46,674	4,756		7,656	14,051		5,286	8,413	18
	1: Low	3,963	1,909		1,369	955		1,261	955	
	Total:	**685,756**	**259,600**	**90**	**27,904**	**32,083**	**0**	**34,947**	**97,041**	**72**
	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	242,765	157,748	126	4,269	1,495		360	1,369	
	4	340,987	305,652	18	9,295	3,909		4,179	13,492	18
2040	3	201,919	39,847		10,538	6,917		2,972	2,036	
	2	79,496	7,962		6,791	2,684		7,548	30,876	
	1: Low	6,089	1,927		3,315	1,873		612	1,477	
	Total:	**870,255**	**313,137**	**144**	**34,209**	**16,879**	**0**	**15,672**	**49,250**	**18**
	Biodiversity Ranking	Refugia			High Exposure < 80%			SS- 99%	Very High Exposure > 99%	
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	297,231	252,970	162	15,096	12,304		5,638	2,594	
	4	400,487	155,983	90	27,381	13,943		12,340	3,639	
2010	3	254,339	74,200	36	15,456	5,656		4,413	1,531	
	2	100,500	36,857		39,523	26,174		8,178	9,439	
	1: Low	7,314	3,891		7,512	2,990		3,675	1,827	
	Total:	**1,059,871**	**523,901**	**288**	**104,968**	**61,067**	**0**	**34,245**	**19,041**	**0**

Extent = Upper Trinity Watershed
RCP8.5 area = acres

	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	57,022	43,540	847	768			54		
	4	75,983	21,965	2,954	2,108			72		126
2100	3	44,837	5,188	180	72			198		36
	2	1,657	667	126	36			1,189		306
	1: Low	4,089	450	685	630			4,377		72
	Total:	**183,599**	**71,840**	**4,792**	**3,639**			**5,891**		**540**
	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	58,780	55,105	324	252			36		18
	4	93,835	36,208	829	162			144		54
2070	3	61,121	7,242	54	162			180		18
	2	12,754	1,459	90	360			1,171		576
	1: Low	4,648	630	2,378	865			108		18
	Total:	**231,137**	**100,644**	**3,675**	**1,801**			**1,639**		**685**
	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	36,316	36,298	6,451	3,333			1,603	1,271	
	4	67,498	27,327	6,539	1,765			3,008	991	
2040	3	56,816	6,521	649	414			486	252	
	2	13,258	1,153	126	234			1,351	1,675	
	1: Low	12,556	468	486	1,315			144	90	
	Total:	**186,445**	**71,768**	**14,251**	**7,061**			**6,593**	**4,179**	
	Biodiversity Ranking	Refugia			High Exposure < 80%			Very High Exposure SS- 99%		Very High Exposure > 99%
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	
	5: High	56,636	56,582	2,855	1,747			757	432	
	4	93,889	36,604	3,513	1,027			1,063	324	
2010	3	49,574	7,818	3,170	721			450	108	
	2	12,105	1,567	270	1,693			1,261	811	
	1: Low	7,242	594	5,782	1,567			504	54	
	Total:	**219,446**	**103,166**	**16,591**	**6,755**			**4,035**	**1,729**	

Extent = McCloud Watershed
RCP8.5 area = acres

	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	12,610	25,146	144	540			9,223	4,359	
	4	35,001	37,361	5,044	7,674			9,385	4,503	
2100	3	18,248	13,655	306	847			504	775	
	2	991	721	306	1,117			2,468	973	
	1: Low	270	306	108	18			1,693	144	
	Total:	**67,120**	**77,188**	**5,909**	**10,196**			**23,274**	**10,754**	
	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	12,970	30,137	468	180			1,153	234	
	4	54,186	59,572	234	378			1,441	450	
2070	3	19,167	21,229	54	630			432	667	
	2	9,655	6,485	522	324			2,360	2,108	
	1: Low	414	468	937	180			108	72	
	Total:	**96,393**	**117,992**	**2,216**	**1,693**			**5,494**	**3,531**	
	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	16,213	23,184	2,108	1,333			1,783	630	
	4	63,625	54,600	1,261	1,045			1,117	703	
2040	3	19,589	22,157	306	829			450	1,089	
	2	11,547	8,935	324	126			1,909	2,612	
	1: Low	324	540	234	252			72	216	
	Total:	**111,308**	**109,417**	**4,233**	**3,585**			**5,332**	**5,260**	
	Biodiversity Ranking	Refugia			High Exposure < 80%			Very High Exposure SS-99%		Very High Exposure > 99%
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	
	5: High	26,030	32,551	3,405	2,378			2,324	667	
	4	62,923	56,114	7,206	7,422			1,207	1,153	
2010	3	24,499	22,247	2,108	2,702			522	811	
	2	12,033	8,935	2,306	1,603			1,441	2,324	
	1: Low	1,585	829	4,702	991			3,513	144	
	Total:	**127,071**	**120,676**	**19,725**	**15,096**			**9,007**	**5,098**	

Extent = Upper Sacramento Watershed
RCP8.5 area = acres

	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	24,697	9,601	558	721			23,238	18,194	
	4	28,210	10,898	4,918	7,980			18,482	16,717	
2100	3	3,711	1,315	72	198			1,009	1,639	
	2	757	90	54	72			1,189	1,297	
	1: Low	306	198	549	847			6,341	901	
	Total:	**57,681**	**22,103**	**6,251**	**9,818**			**50,259**	**38,748**	
	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	29,237	20,374	324	216			1,927	594	
	4	48,872	43,216	1,243	504			2,900	2,160	
2070	3	8,449	3,188	36	108			468	2,360	
	2	2,414	360	90	252			594	1,117	
	1: Low	558	504	2,594	1,873			234	216	
	Total:	**89,529**	**67,643**	**4,287**	**2,954**			**6,125**	**6,647**	
	Biodiversity Ranking	Refugia - Consensus			High Exposure - Consensus			Very High Exposure - Consensus		
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
	5: High	26,445	25,868	3,783	3,459			955	612	
	4	55,483	54,690	1,946	2,180			1,045	2,054	
2040	3	7,242	3,315	324	198			396	2,504	
	2	2,144	306	432	144			721	1,693	
	1: Low	396	703	486	2,846			108	234	
	Total:	**91,709**	**84,882**	**6,971**	**8,827**			**3,225**	**7,098**	
	Biodiversity Ranking	Refugia			High Exposure < 80%			Very High Exposure SS-99%		Very High Exposure > 99%
		Public	Private	Tribal	Public	Private	Tribal	Public	Private	
	5: High	39,775	32,731	7,061	3,405			2,936	1,297	
	4	60,653	53,410	5,602	4,431			1,117	1,315	
2010	3	8,304	3,188	973	1,549			396	1,909	
	2	2,468	342	685	1,287			757	1,027	
	1: Low	5,909	757	2,090	2,306			2,730	1,459	
	Total:	**117,109**	**90,428**	**16,411**	**13,078**			**7,926**	**7,007**	

This is supplementary table 2 for biodiversity, showing areas of consensus moderate exposure in each of the 5 watersheds

Extent = Pit Watershed
RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2100	5: High	15,852	11,385	18
	4	26,445	27,814	108
	3	20,176	13,709	18
	2	15,276	3,188	
	1: Low	23,526	6,935	
	Total:	**101,275**	**63,031**	**144**

	Biodiversity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2070	5: High	35,055	11,223	36
	4	40,045	29,723	180
	3	83,837	58,077	4,053
	2	22,842	17,329	1,009
	1: Low	42,783	10,430	36
	Total:	**224,562**	**126,782**	**5,314**

	Biodiversity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2040	5: High	27,615	20,536	18
	4	36,316	20,608	18
	3	13,330	35,488	162
	2	16,105	3,261	
	1: Low	39,325	10,989	36
	Total:	**132,691**	**90,881**	**234**

	Biodiversity Ranking	Moderate Exposure		
		Public	Private	Tribal
2010	5: High	77,478	71,047	72
	4	84,594	58,581	216
	3	61,770	88,323	198
	2	74,848	18,771	18
	1: Low	38,568	16,159	36
	Total:	**337,258**	**252,880**	**540**

Extent = Feather Watershed
RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2100	5: High	8,953	3,423	
	4	14,627	8,503	
	3	8,845	5,242	
	2	6,845	16,375	
	1: Low	7,494	2,864	
	Total:	**46,764**	**36,406**	**0**

	Biodiversity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2070	5: High	6,233	5,080	
	4	25,598	8,701	
	3	22,914	4,125	
	2	16,843	2,666	
	1: Low	9,908	6,629	
	Total:	**81,495**	**27,201**	**0**

	Biodiversity Ranking	Moderate Exposure - Consensus		
		Public	Private	Tribal
2040	5: High	18,662	9,151	
	4	25,039	9,277	36
	3	11,277	8,340	
	2	6,287	649	
	1: Low	11,547	4,071	
	Total:	**72,813**	**31,488**	**36**

	Biodiversity Ranking	Moderate Exposure		
		Public	Private	Tribal
2010	5: High	42,225	38,982	
	4	109,885	52,637	36
	3	54,961	30,065	
	2	70,705	18,266	18
	1: Low	16,393	10,916	
	Total:	**294,168**	**150,867**	**54**

Extent = Upper Trinity Watershed
RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure -	
		Public	Private
2100	5: High	4,810	3,891
	4	10,484	4,702
	3	6,485	973
	2	6,413	252
	1: Low	10,520	198
	Total:	**38,712**	**10,016**

	Biodiversity Ranking	Moderate Exposure -	
		Public	Private
2070	5: High	4,107	1,441
	4	2,000	504
	3	594	288
	2	180	630
	1: Low	9,800	252
	Total:	**16,681**	**3,116**

	Biodiversity Ranking	Moderate Exposure -	
		Public	Private
2040	5: High	17,942	13,835
	4	21,365	6,485
	3	2,990	1,081
	2	432	396
	1: Low	6,971	252
	Total:	**49,701**	**22,049**

	Biodiversity Ranking	Moderate	
		Public	Private
2010	5: High	17,329	8,449
	4	17,510	3,675
	3	13,853	1,909
	2	2,432	721
	1: Low	23,724	396
	Total:	**74,848**	**15,150**

Extent = McCloud Watershed
RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure -	
		Public	Private
2100	5: High	721	1,189
	4	11,799	10,232
	3	2,468	2,126
	2	793	793
	1: Low	54	108
	Total:	**15,834**	**14,447**

	Biodiversity Ranking	Moderate Exposure -	
		Public	Private
2070	5: High	829	649
	4	4,612	1,225
	3	108	540
	2	36	558
	1: Low	378	522
	Total:	**5,963**	**3,495**

	Biodiversity Ranking	Moderate Exposure -	
		Public	Private
2040	5: High	8,142	6,827
	4	8,557	8,322
	3	7,188	2,990
	2	1,063	324
	1: Low	1,603	901
	Total:	**26,553**	**19,365**

	Biodiversity Ranking	Moderate	
		Public	Private
2010	5: High	22,211	22,896
	4	31,615	27,255
	3	11,205	8,737
	2	4,666	1,153
	1: Low	3,261	1,747
	Total:	**72,957**	**61,788**

Extent = Upper Sacramento Watershed
RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure -	
		Public	Private
2100	5: High	1,495	1,351
	4	9,295	13,510
	3	847	703
	2	504	324
	1: Low	36	450
	Total:	**12,177**	**16,339**

	Biodiversity Ranking	Moderate Exposure -	
		Public	Private
2070	5: High	1,063	1,171
	4	6,251	5,963
	3	324	180
	2	522	198
	1: Low	649	126
	Total:	**8,809**	**7,638**

	Biodiversity Ranking	Moderate Exposure -	
		Public	Private
2040	5: High	8,953	5,296
	4	5,891	2,612
	3	1,225	450
	2	468	54
	1: Low	5,224	252
	Total:	**21,761**	**8,665**

	Biodiversity Ranking	Moderate	
		Public	Private
2010	5: High	29,831	24,823
	4	25,093	21,743
	3	3,152	2,162
	2	1,729	342
	1: Low	3,170	1,495
	Total:	**62,977**	**50,565**

Data is a summary of conservation priorities for the 8-digit HUC watersheds — the natural areas where all results will be most concentrated. Most watersheds will have some variation.

Dataset: Carbon Sequestration Watershed Boundaries (Albers Equal Area)

Watersheds ranked by carbon sequestration potential. Higher ranks indicate greater opportunity for carbon storage and climate mitigation.

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
2	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
3	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
4	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
5–Low	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
Total	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
2	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
3	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
4	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
5–Low	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
Total	320,000	312,385	20,000	541,215	522,750	4,000	312,660	300,000	2,610	20,000	19,755	360

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
2	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
3	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
4	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
5–Low	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
Total	208,790	208,240	10,000	270,608	261,375	2,000	208,830	200,000	1,305	10,000	9,875	180

Dataset: Ecosystem Vulnerability Watershed Boundaries (Albers Equal Area)

Watersheds ranked by ecosystem vulnerability. Higher ranks indicate greater opportunity for ecosystem protection and restoration.

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
2	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
3	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
4	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
5–Low	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
Total	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
2	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
3	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
4	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
5–Low	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
Total	320,000	312,385	20,000	541,215	522,750	4,000	312,660	300,000	2,610	20,000	19,755	360

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
2	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
3	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
4	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
5–Low	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
Total	208,790	208,240	10,000	270,608	261,375	2,000	208,830	200,000	1,305	10,000	9,875	180

Dataset: Flood Risk Reduction Watershed Boundaries (Albers Equal Area)

Watersheds ranked by flood risk reduction potential. Higher ranks indicate greater opportunity for flood mitigation and natural infrastructure.

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
2	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
3	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
4	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
5–Low	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
Total	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
2	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
3	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
4	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
5–Low	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
Total	320,000	312,385	20,000	541,215	522,750	4,000	312,660	300,000	2,610	20,000	19,755	360

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
2	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
3	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
4	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
5–Low	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
Total	208,790	208,240	10,000	270,608	261,375	2,000	208,830	200,000	1,305	10,000	9,875	180

Dataset: Habitat Connectivity Watershed Boundaries (Albers Equal Area)

Watersheds ranked by habitat connectivity. Higher ranks indicate greater opportunity for wildlife corridor protection and restoration.

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
2	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
3	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
4	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
5–Low	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
Total	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
2	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
3	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
4	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
5–Low	64,000	62,477	4,000	108,243	104,550	800	62,532	60,000	522	4,000	3,951	72
Total	320,000	312,385	20,000	541,215	522,750	4,000	312,660	300,000	2,610	20,000	19,755	360

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
2	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
3	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
4	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
5–Low	41,758	41,648	2,000	54,122	52,275	400	41,766	40,000	261	2,000	1,975	36
Total	208,790	208,240	10,000	270,608	261,375	2,000	208,830	200,000	1,305	10,000	9,875	180

Dataset: Fluvial Refugia Watershed Boundaries (Albers Equal Area)

Watersheds ranked by fluvial refugia potential. Higher ranks indicate greater opportunity for aquatic habitat protection and restoration.

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
2	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
3	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
4	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
5–Low	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
Total	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	46,386	43,783	90	82,717	80,665	90	43,956	42,000	1,045	4,000	3,945	0
2	46,386	43,783	90	82,717	80,665	90	43,956	42,000	1,045	4,000	3,945	0
3	46,386	43,783	90	82,717	80,665	90	43,956	42,000	1,045	4,000	3,945	0
4	46,386	43,783	90	82,717	80,665	90	43,956	42,000	1,045	4,000	3,945	0
5–Low	46,386	43,783	90	82,717	80,665	90	43,956	42,000	1,045	4,000	3,945	0
Total	231,930	218,914	450	413,585	403,325	450	219,780	210,000	5,225	20,000	19,725	0

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	1,677	1,675	0	3,000	3,000	0	2,000	2,274	0	0	0	0
2	3,044	414	0	57,343	53,254	0	4,267	1,804	0	0	0	0
3	1,677	1,675	0	3,000	3,000	0	2,000	2,274	0	0	0	0
4	410	0	0	4,267	1,803	0	1,489	1,803	0	0	0	0
5–Low	8,212	3,764	0	69,610	61,057	0	11,756	7,881	0	0	0	0
Total	14,020	7,528	0	137,220	122,114	0	21,512	15,756	0	0	0	0

Dataset: Upper Thirty Watershed Boundaries (Albers Equal Area)

Watersheds ranked by upper thirty potential. Higher ranks indicate greater opportunity for upper thirty protection and restoration.

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
2	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
3	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
4	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
5–Low	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
Total	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	6,441	5,999	5,331	6,198	590	452						
2	6,441	5,999	5,331	6,198	590	452						
3	495	495	1,043	2,278	270	72						
4	198	0	1,267	450	90	252						
5–Low	1,134	495	2,310	2,728	360	324						
Total	14,709	12,988	15,282	17,852	1,900	1,552	0	0	0	0	0	0

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	17,566	8,068	27,904	8,709	720	1,021	1,009	556				
2	17,566	8,068	27,904	8,709	720	1,021	1,009	556				
3	17,566	8,068	27,904	8,709	720	1,021	1,009	556				
4	17,566	8,068	27,904	8,709	720	1,021	1,009	556				
5–Low	17,566	8,068	27,904	8,709	720	1,021	1,009	556				
Total	87,830	40,340	139,520	43,545	3,600	5,105	5,045	2,780	0	0	0	0

Dataset: Old Growth Watershed Boundaries (Albers Equal Area)

Watersheds ranked by old growth potential. Higher ranks indicate greater opportunity for old growth protection and restoration.

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
2	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
3	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
4	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
5–Low	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
Total	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
2	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
3	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
4	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
5–Low	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
Total	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220

Dataset: Upper Sacramento Watershed Boundaries (Albers Equal Area)

Watersheds ranked by upper sacramento potential. Higher ranks indicate greater opportunity for upper sacramento protection and restoration.

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
2	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
3	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
4	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
5–Low	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
Total	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220

Watershed Ranking	Ecological Integrity (CONUS Units)			Ecological Integrity (HUC8 Units)			Very High Exposure to Urban Development			Very High Exposure to Wildfire		
	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal	Public	Private	Tribal
1–High	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
2	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
3	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
4	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
5–Low	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44	1,000	1,000	44
Total	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220	5,000	5,000	220

This is supplementary table 4 for biodiversity, showing area of moderate exposure for single climate models

Extent = Entire Study Area (9 Watersheds plus 10km buffer)

RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure - CNRM Only			Moderate Exposure - MIROC Only		
		Public	Private	Tribal	Public	Private	Tribal
2100	9: High	86,856	66,761	56	82,263	57,611	226
	8	82,146	62,408		89,367	69,007	72
	3	79,964	64,669		281,308	188,556	9,366
	2	91,956	22,189		211,965	54,256	991
	1: Low	5,338	1,252		89,167	27,819	1,456
	Total:	367,247	177,302	56	693,442	414,665	6,809
2070	9: High	2,612	3,152		77,892	69,625	86
	8	12,502	11,673		102,626	92,358	109
	3	25,130	29,643		182,466	160,313	1,909
	2	20,635	17,562		107,865	93,865	18
	1: Low	8,560	2,402		58,816	22,815	18
	Total:	71,289	64,452	0	569,864	438,585	2,290
2080	9: High	16,925	8,757		62,565	107,615	56
	8	21,707	7,993		85,301	84,382	109
	3	8,178	10,556		58,257	69,516	109
	2	6,281	5,957		99,805	95,002	91
	1: low	556	4,918		34,685	26,156	
	Total:	53,646	38,186	0	331,613	382,199	365

Extent = 9 Watersheds

RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure - CNRM Only			Moderate Exposure - MIROC Only		
		Public	Private	Tribal	Public	Private	Tribal
2100	9: High	83,542	62,788	56	72,202	49,386	126
	8	68,922	50,902		66,319	60,962	72
	3	62,725	60,712		170,338	99,301	5,456
	2	29,966	17,474		73,927	39,266	955
	1: Low	3,113	1,252		39,375	14,771	1,456
	Total:	256,152	193,128	56	422,160	263,686	8,011
2070	9: High	1,821	955		63,175	61,356	86
	8	8,250	8,150		68,918	53,309	54
	3	11,639	10,980		130,966	86,369	1,891
	2	14,519	15,258		88,210	66,371	
	1: Low	2,756	1,737		37,181	17,391	18
	Total:	39,766	36,979	0	388,112	284,470	2,050
2080	9: High	10,070	5,765		47,611	81,956	56
	8	8,971	5,312		52,475	62,992	109
	3	5,116	6,197		42,569	49,992	90
	2	2,752	1,173		75,164	25,168	86
	1: Low	324	2,435		28,952	11,765	
	Total:	27,231	20,100	0	251,312	181,413	270

Extent = Pit Watershed

RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure - CNRM Only			Moderate Exposure - MIROC Only		
		Public	Private	Tribal	Public	Private	Tribal
2100	9: High	9,958	20,830	56	9,306	17,690	126
	8	22,860	23,998		25,454	29,919	72
	3	35,201	34,161		108,111	87,368	5,456
	2	22,135	14,209		55,758	32,759	955
	1: Low	1,990	1,252		30,788	13,618	1,456
	Total:	92,177	93,855	56	252,216	190,614	8,011
2070	9: High	703	739		37,181	14,958	86
	8	4,412	7,035		22,107	13,006	
	3	7,566	9,652		87,152	68,057	1,873
	2	10,916	5,588		55,456	5,456	
	1: Low	2,938	1,463		16,070	6,791	18
	Total:	26,573	24,497	0	192,366	108,426	1,927
2080	9: High	6,639	1,675		27,868	14,057	18
	8	5,891	6,203		26,913	16,605	90
	3	2,036	3,729		16,877	16,992	72
	2	2,166	979		51,305	7,854	18
	1: Low	162	6,201		2,918	2,702	
	Total:	16,874	18,435	0	124,881	72,408	198

Extent = Feather Watershed

RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure - CNRM Only			Moderate Exposure - MIROC Only		
		Public	Private	Tribal	Public	Private	Tribal
2100	9: High	83,256	21,956	18	2,256	7,079	
	8	44,905	8,429		15,042	12,466	
	3	21,309	6,351		17,685	6,319	
	2	4,041	2,142		22,971	16,771	
	1: Low	1,990	1,252		8,977	3,618	
	Total:	156,259	36,786	18	66,930	45,253	0
2070	9: High	1,091	236		6,955	13,853	
	8	9,699	1,309		26,976	27,169	54
	3	5,855	866		20,950	18,430	18
	2	5,235	8,775		50,955	29,227	
	1: Low	54	90		10,066	9,757	
	Total:	11,854	10,910	0	115,731	98,336	72
2080	9: High	1,265	560		8,088	23,488	18
	8	1,747	1,297		13,503	15,316	18
	3	2,558	1,936		14,880	13,150	18
	2	906	468		35,602	19,177	18
	1: Low	54	72		6,755	7,116	
	Total:	6,710	4,333	0	79,088	78,285	72

Extent = Upper Trinity Watershed

RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure - CNRM Only		Moderate Exposure - MIROC Only	
		Public	Private	Public	Private
2100	9: High	981	96	6,933	2,054
	8	709	108	5,549	1,513
	3	180		4,017	1,369
	2	216	90	6,068	1,783
	1: Low			4,648	1,296
	Total:	1,205	294	18,599	7,204
2070	9: High	18		1,783	1,171
	8			1,657	865
	3	18	216	864	90
	2	72	216	216	757
	1: Low	108	18	8,667	847
	Total:	216	576	13,116	3,929
2080	9: High	2,864	2,138	486	522
	8	2,918	678	667	558
	3	978	198	978	378
	2	18	198	252	468
	1: low	54		5,166	342
	Total:	6,258	2,972	6,972	2,268

Extent = McCloud Watershed

RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure - CNRM Only		Moderate Exposure - MIROC Only	
		Public	Private	Public	Private
2100	9: High	72	261	7,079	6,179
	8	252	1,611	11,799	9,670
	3	1,765	2,932	6,221	5,261
	2	414	739	8,477	5,875
	1: Low	108	54	1,693	1,026
	Total:	2,610	5,596	35,269	28,010
2070	9: High			6,359	2,866
	8			7,214	2,936
	3	18	1,603	1,369	
	2	144	108	1,495	1,332
	1: Low	36	18	6,225	1,729
	Total:	180	144	19,805	10,160
2080	9: High	837	450	3,675	6,505
	8	72	54	6,576	2,270
	3	36	288	1,801	2,432
	2	36		5,077	926
	1: Low	36	18	4,505	1,260
	Total:	1,017	811	24,012	12,440

Extent = Upper Sacramento Watershed

RCP8.5 area = acres

	Biodiversity Ranking	Moderate Exposure - CNRM Only		Moderate Exposure - MIROC Only	
		Public	Private	Public	Private
2100	9: High	86		8,631	9,565
	8	126	126	9,675	11,295
	3			1,117	1,405
	2	36	54	991	905
	1: Low			1,693	1,026
	Total:	198	180	22,010	26,318
2070	9: High			10,916	10,322
	8			8,773	8,899
	3	72		878	252
	2	161	501	496	342
	1: Low	36	18	4,954	1,369
	Total:	144	594	25,508	21,186
2080	9: High	1,675	1,171	7,054	2,156
	8	612	360	6,595	2,486
	3	126	36	612	162
	2	198	36	558	126
	1: Low	18		3,567	703
	Total:	2,560	1,605	18,567	5,573

This is supplementary table 5 for biodiversity, showing total area in each biodiversity rank

area = acres

Biodiversity Ranking	Study Area	5-Watersheds	Pit	Feather	Upper Trinity	McCloud	Upper Sacramento
5: High	2,386,132	1,759,245	691,935	667,202	145,787	112,461	141,860
4	2,922,588	2,068,690	766,207	776,421	157,604	194,893	173,565
3	2,563,480	1,740,745	1,128,018	440,658	77,604	72,831	21,635
2	1,605,478	1,033,102	659,384	309,660	20,860	34,461	8,737
1: Low	467,265	260,230	129,160	54,528	39,865	16,771	19,905
Total:	**9,944,943**	**6,862,012**	**3,374,703**	**2,248,469**	**441,721**	**431,417**	**365,702**