



**Climate Change Workgroup  
Meeting No. 1**

**June 28, 2012 ○ 9:00am - 11:00am**

**County Operations Center – Forensic Center**

**5570 Overland Ave, San Diego 92123**

**MEETING NOTES**

**Attendees**

Peter Livingston, County of SD	Sarah Harvey, Equinox Center
Tim Bombardier, SDCWA	Donna Chralowicz, City of San Diego
Brendon Reed, City of Chula Vista	Anna Lowe, City of San Diego
Linda Flournoy, Planning & Engineering for Sustainability	Linda Pratt, City of San Diego
Goldy Thatch, City of San Diego	
Persephene St. Charles, Rosalyn Prickett, Dawn Flores, RMC	

**1. Workgroup Objectives**

The objectives of the climate change workgroup were presented to the group as follows:

- Summarize available information on climate change for Region
- Prioritize water-related vulnerabilities to climate change
- Prioritize strategies to mitigate/adapt given climate change impacts
- Clarify climate change in project evaluation/prioritization process
- Review Climate Change Planning Study

**2. Meeting No. 1 Objectives**

The objectives of this meeting were to:

- Understand IRWM climate change requirements
- Provide input on climate change information pertinent to Region
- Identify and prioritize water-related vulnerabilities to climate change

### 3. Workgroup Organization

- Linda Flourinoy was elected to chair the climate change workgroup. Should Linda be unavailable to present progress of the workgroup at RAC meetings, Rosalyn will present.
- Meeting rules/procedures and the project schedule were presented, and can be found in the attached PowerPoint presentation.
- The next meeting will be held July 26<sup>th</sup> from 9:00am to 11:00am at the Water Authority Library Conference Room.

### 4. IRWM Overview

An overview of the IRWM process, and how climate change will fit into the IRWM Plan update was presented. Slides can be found in the attached PowerPoint presentation.

### 5. Review of Planning Study Outline

The Planning Study outline was presented to the group. It was emphasized that the process used to develop the study is the process recommended by DWR.

### 6. Summarize Relevant Climate Change Information

Information regarding climate change as related to IRWM planning was presented to the group.

- Documents that will provide the basis for understanding how climate change may affect the Region were presented and are listed with links below:
  - Preparing California for a Changing Climate (2008),  
[http://www.ppic.org/content/pubs/report/R\\_1108LBR.pdf](http://www.ppic.org/content/pubs/report/R_1108LBR.pdf)
  - Using Future Climate Projections to Support Water Resources Decision Making in California (2009),  
[http://www.water.ca.gov/pubs/climate/using\\_future\\_climate\\_projections\\_to\\_support\\_water\\_resources\\_decision\\_making\\_in\\_california/usingfutureclimatepr ojtosuppwater\\_jun09\\_web.pdf](http://www.water.ca.gov/pubs/climate/using_future_climate_projections_to_support_water_resources_decision_making_in_california/usingfutureclimatepr ojtosuppwater_jun09_web.pdf)
  - A Multi-model Ensemble Approach to Assessment of Climate Change Impacts on the Hydrology of the Colorado River (2007),  
<https://portal.azoah.com/oedf/documents/08A-AWS001-DWR/Omnia/20070709%20Christensen%20et%20al%20Multimodel%20Approach%20Climate%20Change%20Impacts%20Colorado%20River%20Basi.pdf>
  - Regional Focus 2050 (2008),  
[http://www.cleantechsandiego.org/reports/Focus2050\\_Technical%20Assesment.pdf](http://www.cleantechsandiego.org/reports/Focus2050_Technical%20Assesment.pdf)
  - California Climate Change Adaptation Policy Guide (2012),  
[http://resources.ca.gov/climate\\_adaptation/docs/DRAFT\\_APG\\_Public\\_Review\\_April\\_2012.pdf](http://resources.ca.gov/climate_adaptation/docs/DRAFT_APG_Public_Review_April_2012.pdf)
  - Sea Level Rise Adaptation Strategy for San Diego Bay (2012),  
[http://www.icleiusa.org/climate\\_and\\_energy/Climate\\_Adaptation\\_Guidance/san-diego-bay-sea-level-rise-adaptation-strategy-1/san-diego-bay-sea-level-rise-adaptation-strategy](http://www.icleiusa.org/climate_and_energy/Climate_Adaptation_Guidance/san-diego-bay-sea-level-rise-adaptation-strategy-1/san-diego-bay-sea-level-rise-adaptation-strategy)

- Climate Mitigation and Adaptation Plans
  - i. Chula Vista, <http://www.chulavistaca.gov/clean/conservation/Climate/ccwg1.asp>
  - ii. City of San Diego, <http://www.sandiego.gov/environmental-services/sustainable/eestf.shtml>
  - iii. Port of San Diego, <http://www.portofsandiego.org/climate-mitigation-and-adaptation-plan.html>
- Climate Action Plans
  - i. County of San Diego, [http://www.sdcounty.ca.gov/dplu/advance/Draft\\_Climate\\_Action\\_Plan.pdf](http://www.sdcounty.ca.gov/dplu/advance/Draft_Climate_Action_Plan.pdf)
- Recommended to add Scripps *California Climate Extremes Workshop Report* to the documents used to develop the Region’s climate change impacts
- As a result of reviewing the above documents, a summary of effects of climate change on the Region were presented, and are shown in the below table. These effects represent changes between now and 2050.

Impact	Effect
<b>Temperature</b>	<ul style="list-style-type: none"> <li>• 1.5°F to 4.5°F average temperature increase</li> </ul>
<b>Rainfall</b>	<ul style="list-style-type: none"> <li>• Variable projections (between 35% drier and 17% wetter)</li> <li>• Increase in variability between years</li> </ul>
<b>Supply</b>	<ul style="list-style-type: none"> <li>• 7 in/yr decline in surface and groundwater</li> <li>• Up to 25% decrease in SWP supply</li> <li>• Up to 24% decrease in Colorado River supply</li> <li>• 164,000 afy shortfall in imported supply</li> </ul>
<b>Demand</b>	<ul style="list-style-type: none"> <li>• 7% increase</li> </ul>
<b>Sea level rise</b>	<ul style="list-style-type: none"> <li>• 12 to 18 inch rise in mean sea level</li> </ul>
<b>Wildfires</b>	<ul style="list-style-type: none"> <li>• 40% increase in California Coastal Shrub acreage burned</li> </ul>

## 7. Discuss and Prioritize Regional Vulnerabilities

Prior to the workgroup meeting, a vulnerability strawman based on DWR’s climate change vulnerability checklist (Box 4-1 in DWR’s Climate Change Handbook) was completed by the consultant team. The checklist consists of a series of questions that are meant to help a region determine what water resource areas are vulnerable as a result of climate change, and are shown in the first column of the attached table. The consultant team answered these questions prior to the meeting, and provided justification for the answers, as shown in the second and third columns of the table. In addition, to provide further analysis, the consultant team determined what the underlying climate change vulnerability issue is for each question; in other words, why is this question being asked? Some questions pointed to the same vulnerability issue, which is reflected in the table.

During the meeting, the workgroup was walked through the vulnerability strawman to determine whether they agreed with the answers and justification for each question. Revisions to the strawman are reflected in the attached table.

The workgroup then completed an activity to prioritize the vulnerability issues. Each member was given five “sticky notes” and asked to vote on their top climate change vulnerability issues by posting their vote on posters showing the vulnerability issues. The members were given the following instructions:

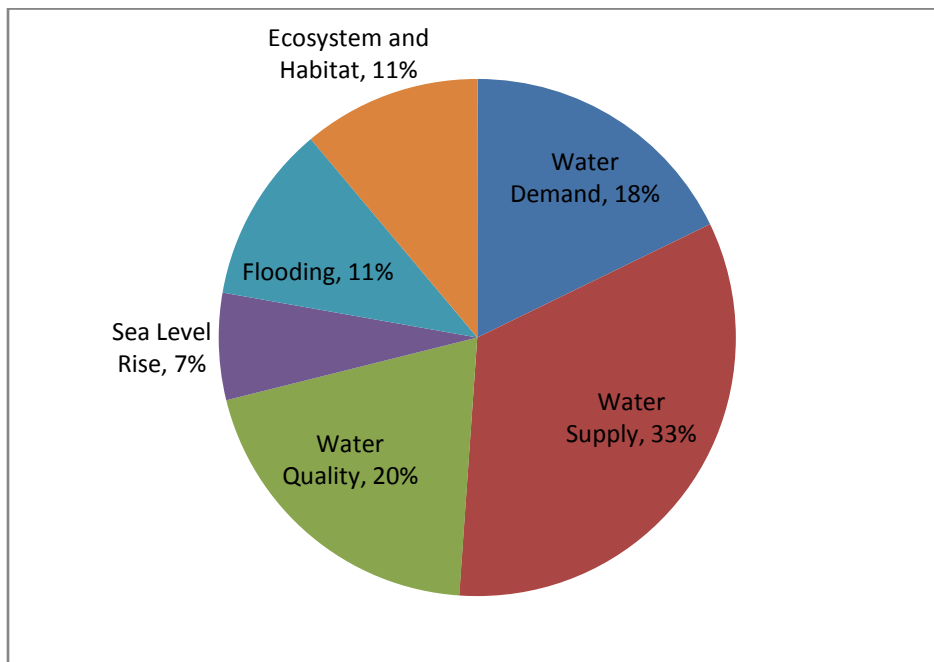
- Select your top 5 vulnerability issues
- Write the reason for your choice on the sticky note and place under the issue
- Keep in mind risk to the overall Region
- Ok to echo other’s comments
- Ok to change your mind
- Ok to emphasize your most important

In total, the nine members of the workgroup resulted in 45 votes.

### ***Results of Prioritization Activity***

The following results were compiled after the meeting by the consultant. The results of the prioritization voting are shown in the columns marked “Votes” and “Comments” of the attached table.

Votes were spread across nearly all of the categories, indicating the work group members perceived there to be a wide range of climate change vulnerabilities. In general, results indicated that water supply is of the greatest concern (receiving 33% of votes), followed by water quality (20%) and water demand (18%). Ecosystem and habitat, and flooding categories each received 11% of the votes, while sea level rise received 7%. The hydropower category received no votes. The chart below shows the breakdown of votes.



The consulting team examined the votes to determine where natural breaks existed among the ranking of each vulnerability issue, and created the following priority levels:

Priority Level	Number of Votes
Very High	9
High	3.5-4
Medium	2-3
Low	1-1.5
Very Low	0-0.5

The attached table reflects the above priority level color coding. The vulnerability issues are also listed below according to priority level.

Priority Level	Category and Vulnerability Issue
Very High	<ul style="list-style-type: none"> <li>Water Supply: Decrease in imported supply</li> </ul>
High	<ul style="list-style-type: none"> <li>Water Demand: Industrial demand would increase</li> <li>Water Supply: Sensitivity due to higher drought potential</li> <li>Water Quality: Increased constituent concentrations</li> <li>Flooding: Increases in flash flooding</li> <li>Ecosystem/Habitat: Decrease in available necessary habitat</li> </ul>
Medium	<ul style="list-style-type: none"> <li>Water Demand: Crop demand would increase</li> <li>Water Supply: Decrease in groundwater supply</li> <li>Water Quality: Increase in treatment cost</li> <li>Sea level rise: Damage to coastal infrastructure / recreation / tourism</li> </ul>
Low	<ul style="list-style-type: none"> <li>Water Supply: Lack of groundwater storage to buffer drought</li> <li>Water Supply: Limited ability to conserve further</li> <li>Water Quality: Increased eutrophication</li> <li>Flooding: Increases in inland flooding</li> <li>Ecosystem/Habitat: Increased impacts to coastal species</li> </ul>
Very Low	<ul style="list-style-type: none"> <li>Water Supply: Limited ability to meet summer demand</li> <li>Water Supply: Invasives can reduce supply available</li> <li>Water Quality: Decrease in recreational opportunity</li> <li>Sea level rise: Decrease in land</li> <li>Sea level rise: Damage to ecosystem/habitat</li> <li>Ecosystem/habitat: Decrease in environmental flows</li> <li>Hydropower: Decrease in hydropower potential</li> </ul>

The following is a discussion of those vulnerability issues ranked “very high” and “high”.

The highest rated concern in the Region in terms of climate is a decrease in imported supply. The Region is especially vulnerable to decreases in imported supply as 80% of the Region’s supplies come from imported water. In addition, a decrease in imported supply availability is expected to increase the cost of imported water, which will in turn cause rates to increase.

Following imported water concerns, the next highest ranked vulnerability issues generally relate to the effects of increasing temperatures on local supply and demand. Increasing temperatures are expected to increase industrial demand, which is expected to be compounded by industrial growth in the future.

The sensitivity of the Region to drought is also a highly ranked concern as in the past, droughts have resulted in the necessary use of water supply shortage measures by water purveyors. Since the region is anticipated to be drier in the future as a result of climate change, it would then be assumed that the need to implement even more restrictive water shortage measures in the future could be necessary.

Increased constituent concentrations in local water sources was a highly ranked vulnerability issue as well. With increased temperatures it's expected that flows in local streams will decrease, increasing concentrations of constituents, which will in turn increase treatment costs and impact compliance.

Increases in flash flooding was also a priority vulnerability. Increases in flash flooding caused by changes to precipitation patterns are a concern as there is already a lack of capacity in some flood control facilities in the Region, and cities and the county could incur the cost of liability and infrastructure due to the flooding.

Lastly, decreases in available necessary habitat are ranked highly. The Region contains numerous types of habitat that are depended upon by various endangered and threatened species. Changes to temperature, precipitation and sea level have the potential to cause habitat shifts and loss that will impact sensitive species management.

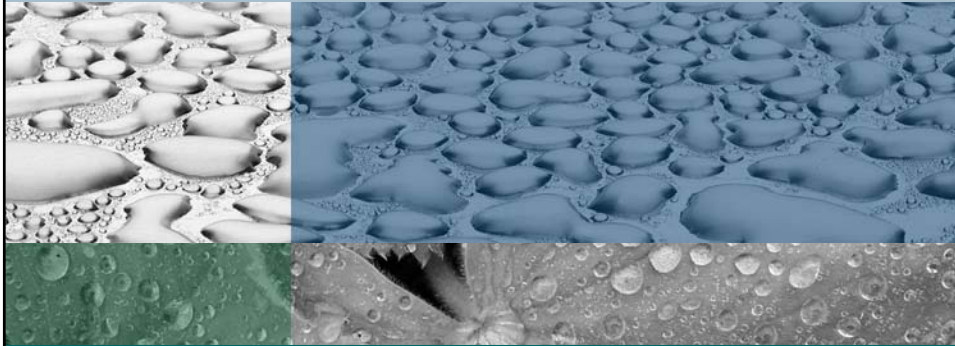
## **8. Public Comments**

There were no comments beyond those captured above.

## **9. Summary and Action Items**

- RMC will compile and email vulnerability prioritization exercise results and presentation (done as part of this summary)
- RMC will provide materials to review prior to next workgroup meeting
- Workgroup members will review/provide comments and prepare for Meeting #2

## *Climate Change Workgroup Meeting #1*



June 28, 2012

## *Agenda*

1. Welcome and Introductions
2. Workgroup Objectives
3. Meeting No. 1 Objectives
4. Workgroup Organization
5. IRWM Overview
6. Review of Planning Study Outline
7. Summarize Relevant Climate Change Information
8. Discuss and Prioritize Regional Vulnerabilities
9. Public Comments
10. Summary and Action Items

## *Workgroup Objectives*

- Summarize available information on climate change for Region
- Prioritize water-related vulnerabilities to climate change
- Prioritize strategies to mitigate/adapt given climate change impacts
- Clarify climate change in project evaluation/prioritization process
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## *Meeting No. 1 Objectives*

- Understand IRWM climate change requirements
- Provide input on climate change information pertinent to Region
- Identify and prioritize water-related vulnerabilities to climate change





## *Work Group Ground Rules*

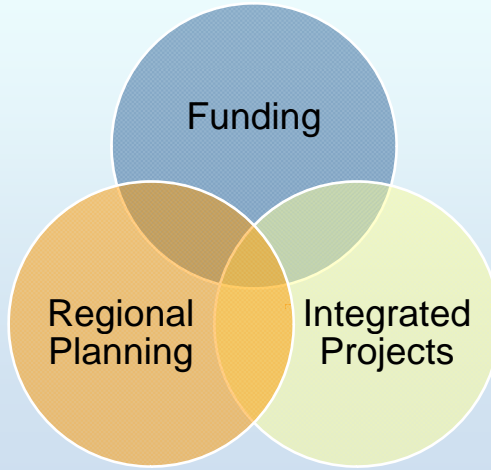
- Listen as an ally: focus on the quality of listening
- All perspectives are valued and respected: everyone has an opportunity to participate
- Focus on new input
- Be concise
- Have fun



## *Chair/Vice Chair Attributes*

- Chair: prior experience in chair role
- Vice Chair: attributes and ability to assume Chair role and responsibilities, but not as much experience as the Chair
- Chair and Vice-chair should come from different functional (e.g. water quality, water supply, environmental) areas
- Willing and able to serve
- Ability to even-handedly articulate all interests
- Consensus-builder

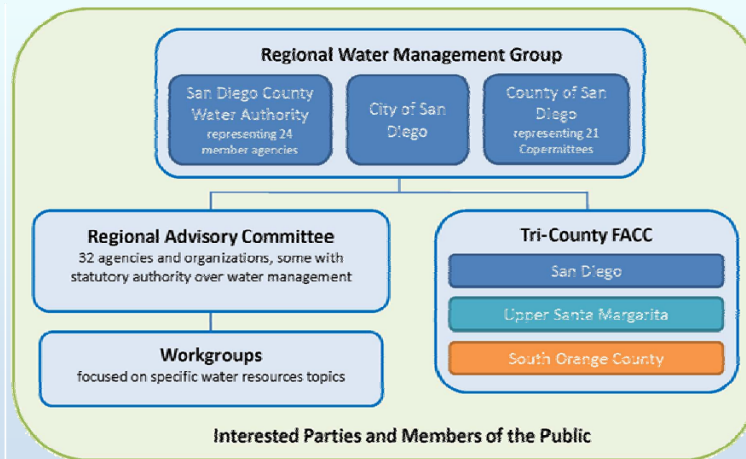
# IRWM Program



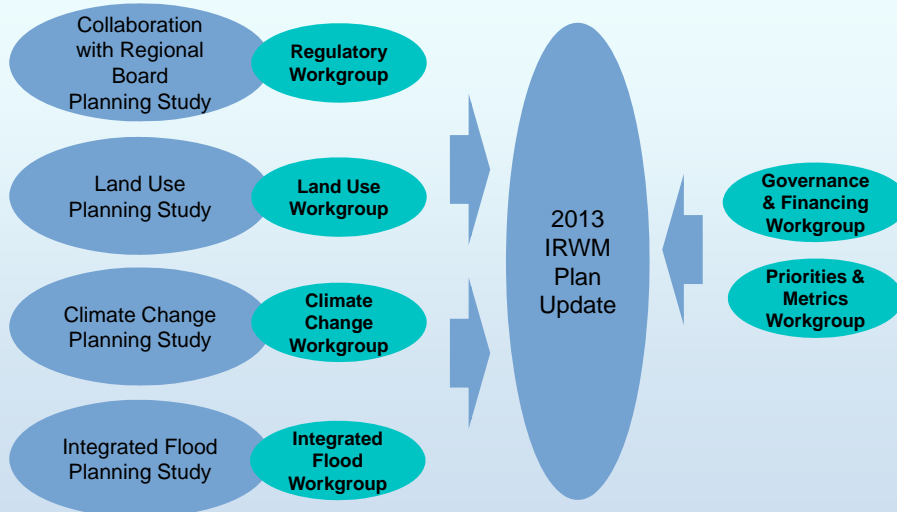
# San Diego IRWM Region



## SD IRWMP Governance Structure



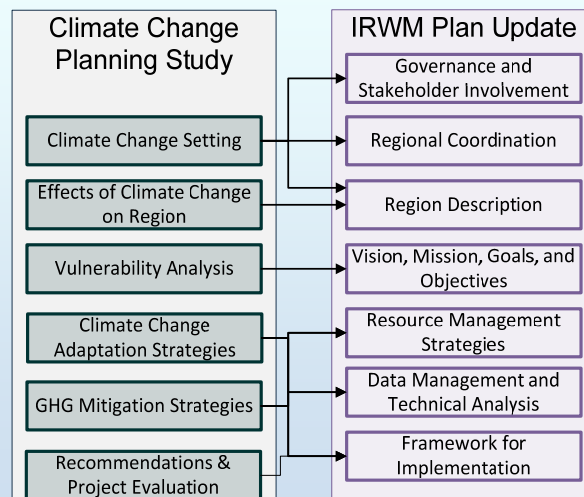
## SD IRWMP Plan Update: Workgroups



## SD IRWM Plan Update Tasks

	2011 Q4	2012 Q1	Q2	Q3	Q4	2013 Q1	Q2	Q3
Establish Planning Priorities		★ IRWM Summit						
Collaboration with Regional Board Study								
Land Use Planning Study								
Climate Change Planning Study								
Integrated Flood Planning Study								
DAC/Tribal Outreach								
Draft Plan Update			★	★	★	★ RAC Workshops		
Final Plan Update								

## IRWMP Climate Change Study Tasks



## *Work Group Meeting Scheduling*

- Workgroup 1: June 2012
  - Climate Change Effects Information
  - Vulnerabilities
- Workgroup 2: August 2012
  - Vulnerabilities and Data Needs
  - Strategies
- Workgroup 3: September/October 2012
  - Strategies
  - Project Evaluation/Prioritization
- Study Review: October/November 2012



## *Relevant Climate Change Information: State and Federal Level*

Document	Relevant Information
Preparing California for a Changing Climate (2008)	• Statewide impacts to temperature, precipitation and water resources
Using Future Climate Projections to Support Water Resources Decision Making in California (2009)	• SWP and CVP supplies
A Multi-model Ensemble Approach to Assessment of Climate Change Impacts on the Hydrology of the Colorado River (2007)	• Colorado River supplies



## Relevant Climate Change Information: Regional Level

Document	Relevant Information
Regional Focus 2050 (2008)	<ul style="list-style-type: none"> <li>Covers health, electricity, water impacts</li> <li>Projected demand and supply changes</li> </ul>
California Climate Change Adaptation Policy Guide (2012)	<ul style="list-style-type: none"> <li>South Coast impacts</li> <li>Covers water, infrastructure, health, economics, wildfire</li> </ul>
Sea Level Rise Adaptation Strategy for San Diego Bay (2012)	<ul style="list-style-type: none"> <li>Sea level rise and inundation</li> <li>Stormwater, potable water, energy, ecosystems +</li> </ul>
Climate Mitigation and Adaptation Plans (Chula Vista, City of San Diego, Port of San Diego)	<ul style="list-style-type: none"> <li>Key impacts to City and County resources</li> <li>Potential responses to climate change</li> </ul>
Climate Action Plans (County of San Diego)	<ul style="list-style-type: none"> <li>Key impacts to City and County resources</li> <li>GHG reduction strategies</li> </ul>



## Effects of Climate Change on SD Region

Impact	Effect
Temperature	<ul style="list-style-type: none"> <li>1.5°F to 4.5°F average temperature increase</li> </ul>
Rainfall	<ul style="list-style-type: none"> <li>Variable projections (between 35% drier and 17% wetter)</li> <li>Increase in variability between years</li> </ul>
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Wildfires	<ul style="list-style-type: none"> <li>40% increase in California Coastal Shrub acreage burned</li> </ul>

Note: Projections show the changes between now and 2050 unless otherwise noted



## *Vulnerability Analysis Activity*

1. Determine vulnerabilities
2. Prioritize vulnerabilities
  - Select your top 5 vulnerability issues
  - Write the reason for your choice on the sticky note and place under the issue
  - Keep in mind risk to the overall Region
  - Ok to echo other's comments
  - Ok to change your mind
  - Ok to emphasize your most important



## *Summary and Action Items*

- Public comments
- Summary and Action Items
  - RMC will compile and email vulnerability prioritization exercise results and presentation
  - RMC will provide materials to review prior to next workgroup meeting (to be scheduled)
  - Workgroup members will review/provide comments and prepare for Meeting #2



## Contact

- Climate Change contacts (310) 566-6460:
  - Persephene St. Charles, [pstcharles@rmcwater.com](mailto:pstcharles@rmcwater.com)
  - Dawn Flores, [dflores@rmcwater.com](mailto:dflores@rmcwater.com)
- San Diego IRWM contact (858) 875-7400:
  - Rosalyn Prickett, [rprickett@rmcwater.com](mailto:rprickett@rmcwater.com)



Vulnerability		Justification	Vulnerability Issue	Score	Comments
<b>Water Demand</b>					
Are there major industries that require cooling/process water in your planning region?	Y	Electronics and aerospace manufacturing, energy generation, research development, pharmaceutical. Biotech and energy growing. Room for efficiency improvements	Industrial demand would increase	4	<ul style="list-style-type: none"> <li>• Could impact companies' decision to have their plants located here</li> <li>• Increases in temperature will increase industrial (and residential) demands</li> <li>• Important for economic development</li> <li>• Industry is increasing in region – biotech</li> </ul>
Are crops grown in your region climate-sensitive? Would shifts in daily heat patterns, such as how long heat lingers before night-time cooling, be prohibitive for some crops?	Y	Primary crops include avocados and citrus which can be climate sensitive, but agricultural land use is expected to decrease. Rise in smaller agricultural/urban farms. Decrease in larger ag users.	Crop demand would increase	2	<ul style="list-style-type: none"> <li>• Large agriculture land use</li> <li>• Important to support urban farms and agriculture</li> </ul>
Do groundwater supplies in your region lack resiliency after drought events?	Y	The small groundwater basins in the Region tend to decrease resiliency. Impermeability reduces recharge. Sweetwater, Oceanside, Escondido/Vista.	Lack of groundwater storage to buffer drought	1	<ul style="list-style-type: none"> <li>• Lack of buffer</li> <li>• Little alternatives</li> </ul>
Are water use curtailment measures effective in your region?	Y	Shortage management activities currently in place were effective in meeting demands during the last major drought which began in 2007.	Limited ability to conserve further	1	<ul style="list-style-type: none"> <li>• Compared to other regions the San Diego area has done a large amount of water conservation and makes it more difficult to achieve additional savings</li> </ul>
Does water use vary by more than 50% seasonally in parts of your region?	Y	Have peaking in agricultural sector - not sure if 50%	Limited ability to meet summer demand	0	
Are some instream flow requirements in your region either currently insufficient to support aquatic life, or occasionally unmet?	N	No instream flow requirements exist in the Region - most streams are intermittent.	Habitat demand would be impacted		
<b>Water Supply</b>				<b>15</b>	
Does a portion of the water supply in your region come from snowmelt?	Y	Imported supplies (SWP, Colorado River) come from snowmelt.	Decrease in imported supply	9	<ul style="list-style-type: none"> <li>• As imported supplies before more limited the cost of alternative sources will have a large impact on rates</li> <li>• Not currently able to create enough local sources</li> <li>• Duh!</li> <li>• Water Supply Delta</li> <li>• Politics</li> <li>• Other region's uses</li> <li>• Largest supply for SD County is imported</li> <li>• Water Supply</li> <li>• Snow melt</li> <li>• Dependency on imported water in our region makes us extremely vulnerable to climate change in the Delta/Sierr snow pack</li> </ul>
Does part of your region rely on water diverted from the Delta, imported from the Colorado River, or imported from other climate-sensitive systems outside your region?	Y	Approximately 80% of the Region's supplies are imported.			
Would your region have difficulty in storing carryover supply surpluses from year to year?	N	No, the County has sufficient storage capacity, and is currently completing an emergency storage carryover project.	Decrease in reliability		
Does part of your region rely on coastal aquifers? Has salt intrusion been a problem in the past?	Y	Though there are coastal aquifers in the Region, they have not had problems with salt water intrusion in the past. Some brackish groundwater.	Decrease in groundwater supply	2	<i>No comments</i>
Has your region faced a drought in the past during which it failed to meet local water demands?	Y	Drought management plans had to be put into effect	Sensitivity due to higher drought potential	4	<ul style="list-style-type: none"> <li>• Overall CA anticipated to be drier – San Diego imports so much water droughts elsewhere makes San Diego even more vulnerable</li> <li>• No other options other than importing water</li> <li>• Drought management</li> <li>• Limited participants</li> <li>• Tourism</li> <li>• Loss of water district revenue</li> </ul>
Does your region have invasive species management issues at your facilities, along conveyance structures, or in habitat areas?	Y	Quagga, Arundo, Tamarisk	Invasives can reduce supply available	0	

Vulnerability		Justification	Vulnerability Issue	Score	Comments
<b>Water Quality</b>					
<b>9</b>					
Are increased wildfires a threat in your region? If so, does your region include reservoirs with fire-susceptible vegetation nearby which could pose a water quality concern from increased erosion?	Y	Wildfires are a common occurrence in the area, and often cause increased erosion in the Region's watersheds.	Increased erosion and sedimentation	0.5	<ul style="list-style-type: none"> <li>Increased eutrophication and sedimentation</li> </ul>
Does part of your region rely on surface water bodies with current or recurrent water quality issues related to eutrophication, such as low dissolved oxygen or algal blooms? Are there other water quality constituents potentially exacerbated by climate change?	Y	Several water bodies are 303(d) listed for water quality issues related to eutrophication including the Famosa Slough, Guajome Lake, Loma Alta Slough, Mission Bay at the mouths of Rose Creek and Tecolote Creek, lower San Diego River, Sal Elijo Lagoon, Santa Margarita Lagoon, Tijuana River, and the Tijuana River Estuary.	Increased eutrophication	1.5	<ul style="list-style-type: none"> <li>Increased eutrophication and sedimentation</li> <li>Decreased water quality due to climate change will impact the region</li> </ul>
Are seasonal low flows decreasing for some waterbodies in your region? If so, are the reduced low flows limiting the waterbodies' assimilative capacity?	Y	At times during the year, the only flow in some streams is irrigation overflow, which in turn increase the concentration of constituents. Water management strategy.	Increased constituent concentrations	4	<ul style="list-style-type: none"> <li>Causes higher treatment costs</li> <li>Decreased flows will concentrate constituents of concern requiring greater treatment</li> <li>Hard to meet water quality standards also impacts costs compliance</li> </ul>
Are there beneficial uses designated for some water bodies in your region that cannot always be met due to water quality issues?	Y	At times recreation use in some reservoirs is impacted, and beach closures occur. Habitat issues as well.	Decrease in recreational opportunity	0	
Does part of your region currently observe water quality shifts during rain events that impact treatment facility operation?	Y	TDS levels in reservoirs may increase during storm events, impacting water treatment, particularly after fires. Oils and feces show up in reservoirs as well.	Increase in treatment needs and costs	3	<ul style="list-style-type: none"> <li>Increased intensity of storm events due to climate change will degrade quality and increase treatment and costs</li> </ul>
<b>Sea Level Rise</b>					
<b>3</b>					
Has coastal erosion already been observed in your region?	Y	Coastal erosion occurs at unstable bluffs along the coast, for example: Sunset cliff, bluffs along City of San Diego. Encinitas.	Decrease in land	0	
Are there coastal structures, such as levees or breakwaters, in your region?	Y	Examples include Mission Bay, San Diego Harbor	Damage to coastal infrastructure/recreation/tourism	3	<ul style="list-style-type: none"> <li>One of the most well documented CC impacts that are already occurring</li> <li>Sea level rise</li> <li>Economic costs</li> <li>Tourism</li> </ul>
Is there significant coastal infrastructure, such as residences, recreation, water and wastewater treatment, tourism, and transportation) at less than six feet above mean sea level in your region?	Y	Beach community - wide-spread			
Is there land subsidence in the coastal areas of your region?	N	None noted			
Are there climate-sensitive low-lying coastal habitats in your region?	Y	habitat type - salt marsh	Damage to ecosystem/habitat	0	
Are there areas in your region that currently flood during extreme high tides or storm surges?	Y	Mission Valley flooded from SD river during high tidal events			
Do tidal gauges along the coastal parts of your region show an increase over the past several decades?	Y	SD Bay Adaptation has the levels and graph			
<b>Flooding</b>					
<b>5</b>					
Does critical infrastructure in your region lie within the 200-year floodplain?	Y	There is low-lying water and wastewater infrastructure. Pump stations.	Increases in inland flooding	1.5	<ul style="list-style-type: none"> <li>Storm water backflows as lack of capacity</li> <li>Related to increase in flash flooding</li> </ul>
Does aging critical flood protection infrastructure exist in your region?	Y	San Diego River Flood Improvement project SIRP - is no longer successful? Mission Valley (SDRIP)			
Have flood control facilities (such as impoundment structures) been insufficient in the past?	Y	Flooding (and flash flooding in particular) has been a danger in certain areas of the Region due to overflowing drainage channels, low lying areas with poor drainage, and debris build-up in basins. Some areas identified by the County include localized areas in Mission Valley, Moreno Valley, Ocotillo Wells, Lemon Crest, below San Vicente Reservoir, Romona, etc.			
Are wildfires a concern in parts of your region?	Y	Wildfires are a common occurrence in the Region.	Increases in flash flooding	3.5	<ul style="list-style-type: none"> <li>Storm water backflows as lack of capacity</li> <li>Related to increase in inland flooding</li> <li>City cost for liability and infrastructure due to flooding</li> <li>Wildfire</li> </ul>
Does part of your region lie within the Sacramento-San Joaquin Drainage District?	N				

Vulnerability		Justification	Vulnerability Issue	Score	Comments
<b>Ecosystem and Habitat</b>					
Does your region include inland or coastal aquatic habitats vulnerable to erosion and sedimentation issues?	Y	Erosion and sedimentation issues in Penasquitos Canyon, San Onofre, Crest Canyon, San Dieguito lagoon, Del Mar area, Encinitas area.	Increased impacts to coastal species	5	• Habitat shifts and loss will impact sensitive species management
Does your region include estuarine habitats which rely on seasonal freshwater flow patterns?	Y	A number of brackish lagoons exist along the coast including Batiquitos Lagoon, Buena Vista Lagoon, Agua Hedionda Lagoon, San Eligo Lagoon.			
Do climate-sensitive fauna or flora populations live in your region?	Y				
Do estuaries, coastal dunes, wetlands, marshes, or exposed beaches exist in your region? If so, are coastal storms possible/frequent in your region?	Y	Estuaries, coastal dunes, wetlands, marshes and exposed beaches exist along the entire coast of the region. Historically, coastal storms have caused erosion.			
Do endangered or threatened species exist in your region? Are changes in species distribution already being observed in parts of your region?	Y	A number of endangered and threatened species exist in the Region.	Decrease in available necessary habitat	4	• This plays into both issues above and below • Habitat shifts and loss will impact sensitive species management
Does the region rely on aquatic or water-dependent habitats for recreation or other economic activities?	Y	Beach tourism, reservoir recreation, river trails			
Are there areas of fragmented estuarine, aquatic, or wetland wildlife habitat within your region? Are there movement corridors for species to naturally migrate? Are there infrastructure projects planned that might preclude species movement?	Y	MSHCPs working on ensuring corridors but some need to be created			
Does your region include one or more of the habitats described in the Endangered Species Coalition's Top 10 habitats vulnerable to climate change?	Y	No, the Region is not within any of the ten listed habitats. Falls under southwest desert?			
Are there rivers in your region with quantified environmental flow requirements or known water quality/quantity stressors to aquatic life?	Y	No quantified flow requirements but there is a bacteria TMDL covers almost every water body in region. Nutrient TMDLs on lots of water bodies	Decrease in environmental flows	0	
<b>Hydropower</b>					
Is hydropower a source of electricity in your region?	Y	Approximately 10% of electricity provided by SDG&E is hydropower. Water authority.	Decrease in hydropower potential	0	
Are energy needs in your region expected to increase in the future? If so, are there future plans for hydropower generation facilities or conditions for hydropower generation in your region?	Y	Energy demand is expected to increase in the future with population increase and development. Additional hydropower was recently created at Lake Hodges/Olivenhain Reservoir, and an additional project is possible at the San Vicente Dam.			

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