

**NORTH COAST INSTREAM FLOW POLICY
RESTRICTIONS ON FLOW DIVERSIONS AND STORAGE**

**POTENTIAL INDIRECT IMPACTS ON MUNICIPAL,
INDUSTRIAL AND AGRICULTURAL WATER USE
AND RELATED INDIRECT IMPACTS ON OTHER
ENVIRONMENTAL RESOURCES**

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TABLE OF CONTENTS

1	Purpose of this Report.....	1
2	Background.....	2
2.1	Policy Applicability.....	2
2.2	Policy Alternatives.....	3
2.3	Potential Indirect Environmental Impacts.....	4
2.4	Definition of Terms.....	5
3	Future Water Diverters.....	7
3.1	Large Water Agencies.....	7
3.2	Small Water Agencies and Self-Supplied Individuals.....	9
4	Future Diversion Demand.....	10
4.1	Pending Diversion Demand.....	10
4.1.1	Pending Diversion Demand for Large Water Agencies.....	11
4.1.2	Pending Diversion Demand for Small Water Agencies and Self-Supplied Individuals.....	13
4.2	New Diversion Demand.....	14
4.2.1	New Diversion Demand for Large Water Agencies.....	14
4.2.2	New Diversion Demand for Small Water Agencies and Self-Supplied Individuals.....	16
5	Identify and Evaluate the Adequacy of Alternative Water Supplies.....	19
5.1	Riparian Rights.....	20
5.2	Groundwater.....	20
5.3	Imported Water.....	22
5.4	Desalinated Water.....	23
5.5	Recycled Water.....	23
6	Estimated Potential Indirect Environmental Impacts.....	24
6.1	Humboldt Indirect Impacts.....	24
6.2	Marin Indirect Impacts.....	24
6.3	Mendocino Indirect Impacts.....	26
6.4	Napa Indirect Impacts.....	27
6.5	Sonoma Indirect Impacts.....	29
6.6	Summary of Indirect Environmental Impacts.....	30
7	References.....	33

APPENDICES

- A. Maps
- B. Methods Used to Estimate Current and Forecasted Water Usage
- C. Fully Appropriated Streams
- D. County General Plans

LIST OF TABLES

Table 1. Policy Element Alternatives That Restrict Water Diversions..... 3
 Table 2. Potential Indirect Environmental Impacts of Policy Restrictions on Diversions 5
 Table 3. Number of Public Water Purveyors by County 7
 Table 4. Water Wholesalers in the Policy Area 8
 Table 5. Number of Water Right Applications in the Policy Area 10
 Table 6. Pending Applications for Appropriative Water Rights in the Policy Area..... 11
 Table 7. Pending Small Domestic and Livestock Stockpond Use Registrations in the Policy Area..... 11
 Table 8. Pending Applications for Appropriative Water Rights for Large Water Agencies 12
 Table 9. Pending Diversion Demand for Large Water Agencies (AF/year)..... 12
 Table 10. Pending Applications for Appropriative Water Rights for Small Water Agencies and Self-Supplied Individuals..... 13
 Table 11. Pending Diversion Demand for Small Water Agencies and Self-Supplied Individuals 13
 Table 12. Large Water Agencies with Urban Water Management Plans in the Policy Area 15
 Table 13. New Diversion Demand for Large Water Agencies (AF/year) 16
 Table 14. Forecasted Increase in Water Usage Supplied by Small Water Agencies and Self-Supplied Individuals 17
 Table 15. New Diversion Demand for Small Water Agencies and Self-Supplied Individuals .. 17
 Table 16. Future Diversion Demand (AF/year) 19
 Table 17. Groundwater Basins in the Policy Area..... 21

LIST OF FIGURES (APPENDIX A)

Figure A.1 Large Public Purveyors in Policy Area
 Figure A.2 Permitted and Pending Water Right Applications, Points of Diversion
 Figure A.3 Pending Water Right Applications, Points of Diversion
 Figure A.4 Groundwater Basins in Policy Area
 Figure A.5 DWR Detailed Analysis Units

EXECUTIVE SUMMARY

NORTH COAST INSTREAM FLOW POLICY RESTRICTIONS ON FLOW DIVERSIONS AND STORAGE

POTENTIAL INDIRECT IMPACTS ON MUNICIPAL, INDUSTRIAL AND AGRICULTURAL WATER USE AND RELATED INDIRECT IMPACTS ON OTHER ENVIRONMENTAL RESOURCES

The North Coast Instream Flow Policy (Policy) may contain restrictions on diversions of surface water that apply to diversion season, diversion rates, and diversions to storage. These Policy restrictions will apply directly to pending and new applications to appropriate water and indirectly to small domestic use registrations.

Policy restrictions on diversions could lead some of the potential future water right applicants to obtain water from alternative water supply sources or to divert water under other bases of right (alternative water supplies) if a) water diverters choose not to file for appropriative water rights because of the Policy restrictions, or b) application of the Policy to a particular water right application shows there is not surface water available to supply the applicant. This potential use of alternative water supplies to meet the future diversion demand could give rise to environmental impacts. These potential environmental impacts are referred to as ‘indirect’ impacts because they are not immediately related to adoption of the Policy but may occur as a result of the Policy being adopted.

This report estimates the future diversion demand in the Policy area and the potential indirect environmental impacts that might be caused if water supplies under other bases of right are used to meet the estimated future diversion demand.

Table ES.1 summarizes the estimated future diversion demand in the Policy area, grouped by diverter type, estimated water permit status (pending and new), and county. Pending diversion demand is estimated based on information from the State Water Board’s Water Rights Information Management System (WRIMS) database. New diversion demand is estimated based on information from the Urban Water Management Plans filed in the Policy area and projected urban and agricultural growth rates from the California Water Plan 2030 Quantified Future Scenarios (Groves et al, 2005).

Table ES.2 summarizes the potential actions that potential future water diverters in each county could take in response to the restrictions of the Policy and the potential indirect environmental impacts that could result from these actions. These estimates provide the upper limit of potential

indirect environmental impacts based on the most conservative assumption that all future diversion demands would have to be supplied from water supplies under other bases of right or, if water supplies are inadequate, not supplied at all.

Table ES.1. Estimated Future Diversion Demand (AF/year)

Diverter Group	Water Right Permit Status	County					Total
		Humboldt	Marin	Mendocino	Napa	Sonoma	
Large Water Agencies	Pending	0	0	20,557	0	30,725	51,282
	New	0	7,400	0	0	6,536	13,936
Small Water Agencies and Self-Supplied Individuals	Pending	0	5	10,210	1,131	16,348	27,694
	New	30	295	0	0	0	325
Future Diversion Demand (AF/year)		30	7,700	30,767	1,131	53,609	93,237

Table ES.2. Assessment of Potential Indirect Environmental Impacts of Policy Restrictions

County	Potential Actions in Response to Policy Giving Rise to Potential Indirect Impact	Environmental Issue Area	Potential Indirect Environmental Impact	Potential Secondary Indirect Environmental Impact
Humboldt	Pumping of groundwater up to 30 AF/year by future water diverters.	Hydrology and Water Quality	Depletion of groundwater	
	Diversion under riparian right up to 30 AF/year by potential future water diverters.	Hydrology and Water Quality	Reduction in flows, particularly summer flows	
Marin	Water conservation up to 7,700 AF/year by future water diverters.	Land Use	Likely reduction in future development of lands for urban and agricultural uses	
	Increased development of recycled water, desalination up to 7,400 AF/year by large and some small water agencies.	Utilities and Service Systems	Likely construction and operation of new water treatment and expansion of existing delivery facilities	Various impacts related to construction and operation of new water treatment and expansion of existing delivery facilities
	Pumping of groundwater up to 300 AF/year by small water agencies and self-supplied individuals.	Hydrology and Water Quality	Depletion of groundwater	

County	Potential Actions in Response to Policy Giving Rise to Potential Indirect Impact	Environmental Issue Area	Potential Indirect Environmental Impact	Potential Secondary Indirect Environmental Impact
	Diversion under riparian right up to 300 AF/year by self-supplied individuals.	Hydrology and Water Quality	Reduction in flows, particularly summer flows	
Mendocino	Water conservation up to 30,767 AF/year by future water diverters.	Land Use	Likely reduction in future development of lands for urban and agricultural uses	
	Development of recycled water, desalination up to 20,557 AF/year by large and some small water agencies.	Utilities and Service Systems	Likely construction and operation of new water treatment and potential extension of delivery facilities	Various impacts related to construction and operation of new water treatment and expansion of existing delivery facilities
	Pumping of groundwater up to 30,767 AF/year by future water diverters.	Hydrology and Water Quality	Depletion of groundwater	Reduction in flows, particularly summer flows which may harm riparian vegetation or degrade habitat for sensitive riparian and aquatic wildlife
	Diversion under riparian right up to 10,210 AF/year by self-supplied individuals.	Hydrology and Water Quality	Reduction in flows, particularly summer flows	Reduction in flows, particularly summer flows which may harm riparian vegetation or degrade habitat for sensitive riparian and aquatic wildlife
Napa	Development of imported water up to 1,131 AF/year by future water diverters.	Utilities and Service Systems	Likely construction of new water delivery facilities to access imported water and potential extension of delivery facilities	Various impacts related to construction and operation of new water treatment and expansion of existing delivery facilities
Sonoma	Water conservation up to 56,309 AF/year by future water diverters.	Land Use	Likely reduction in future development of lands for urban and agricultural uses	

County	Potential Actions in Response to Policy Giving Rise to Potential Indirect Impact	Environmental Issue Area	Potential Indirect Environmental Impact	Potential Secondary Indirect Environmental Impact
	Development of recycled water, desalination up to 30,725 AF/year by large and some small water agencies.	Utilities and Service Systems	Likely construction and operation of new water treatment and potential extension of delivery facilities	Various impacts related to construction and operation of new water treatment and expansion of existing delivery facilities
	Pumping of groundwater up to 56,309 AF/year by future water diverters.	Hydrology and Water Quality	Depletion of groundwater	Reduction in flows, particularly summer flows which may harm riparian vegetation or degrade habitat for sensitive riparian and aquatic wildlife
	Diversion under riparian right up to 16,348 AF/year by self-supplied individuals.	Hydrology and Water Quality	Reduction in flows, particularly summer flows	Reduction in flows, particularly summer flows which may harm riparian vegetation or degrade habitat for sensitive riparian and aquatic wildlife

1 Purpose of this Report

The North Coast Instream Flow Policy (Policy) may contain restrictions on diversions of surface water that apply to diversion season, diversion rates, and diversions to storage.

The purpose of this report is to identify and estimate, insofar as possible, the potential indirect environmental impacts of the Policy restrictions on diversions. The following approach is used:

1. Section 3 identifies the water right applicants that may potentially be restricted by the Policy (future water diverters);
2. Section 4 estimates the quantity of diversion demand that is pending approval or might be requested in the future through the water right permitting process by these applicants (future diversion demand);
3. Section 5 identifies alternative water supply sources or other bases of right (alternative water supplies) that could be used to satisfy the future diversion demand and evaluates the adequacy of these alternative water supplies to meet the future diversion demand;
4. Section 6 estimates the potential indirect environmental impacts related to development of the alternative water supplies to meet the future diversion demand, describes any potential inadequacies of alternative water supplies, and estimates the potential indirect environmental impacts that result if the future diversion demand cannot be met.

2 Background

For purposes of CEQA, the proposed project is the adoption of the Policy by the California State Water Resources Control Board (State Water Board). The State Water Board will not approve or disapprove any particular water diversion project through the adoption of the Policy; instead, the State Water Board will evaluate water right applications and other water right matters on a case-by-case basis, in conjunction with applicable law and the Policy, if adopted by the State Water Board.

The Policy will operate to protect the threatened and endangered anadromous salmonid species and their habitat in the Policy area by ensuring that water rights are administered in a manner designed to maintain instream flows. The Policy area includes all coastal streams from the mouth of the Mattole River southward to San Francisco and coastal streams entering northern San Pablo Bay.

2.1 Policy Applicability

The Policy may limit the amount of water available for future water diverters by placing restrictions on diversions. The Policy elements that limit water diversions are:

1. Diversion season: diversions will only be permitted during the diversion season;
2. Minimum bypass flow: water may only be diverted or stored when stream flows are above a minimum bypass flow threshold; and
3. Maximum cumulative diversion: diversions will only be permitted if the sum of total upstream permitted diversions does not exceed the maximum cumulative diversion threshold at each point of interest along the stream channel.

These restrictions will apply directly to pending and new applications to appropriate water and indirectly to pending and new small domestic and livestock stockpond use registrations. Policy restrictions on diversions do not apply to current holders of permitted appropriative water rights, certificates, and statements.

The California Department of Fish and Game (DFG) has the authority to condition registrations of small domestic use and livestock stockpond use to be consistent with some or all of the Policy restrictions. These conditions could be applied to new registrations or added to existing registrations during the 5-year certification of registration renewal process.

The State Water Board has continuing authority to protect public trust uses and to prevent the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water in the state, regardless of basis of right. The State Water Board's exercise of these authorities may require notice and an opportunity for hearing.

2.2 Policy Alternatives

Each Policy element has proposed alternatives that provide different levels of protectiveness for anadromous salmonids. Table 1 summarizes the alternatives, grouped by Policy element. The State Water Board will select the element alternatives to be incorporated into the final Policy at an upcoming Board meeting.

Table 1. Policy Element Alternatives That Restrict Water Diversions

Policy Element	Alternatives
Diversion Season (DS)	DS1: 12/15 – 3/31
	DS2: Year Round
	DS3: 10/1 – 3/31
Minimum Bypass Flow (MBF)	MBF1: February Median Daily Flow
	MBF2: 10% Exceedance Flow
	MBF3: <u>Drainage Area (DA) < 290 mi²:</u> <u>Drainage Area > 290 mi²:</u> $Q_{MBF} = 8.7 Q_m (DA)^{-0.47}$ $Q_{MBF} = 0.6 Q_m$
	MBF4: <u>Drainage Area < 0.11 mi²:</u> <u>Drainage Area = 0.11-500 mi²:</u> <u>Drainage Area > 500 mi²:</u> $Q_{MBF} = 8.7 Q_m (DA)^{-0.47}$ $Q_{MBF} = 5.1 Q_m (DA)^{-0.71}$ $Q_{MBF} = 0.06 Q$ Q_m = unimpaired mean annual flow (cfs); For streams above anadromous habitat, DA is determined at the upstream limit of anadromy
Maximum Cumulative Diversion (MCD)	MCD1 (Rate): MCD Rate = 15% of 20% Winter (12/15-3/31) Exceedance Flow
	MCD2 (Rate): MCD Rate = 5% of 1.5 yr flood peak flow (annualized series)
	MCD3 (Volume): MCD Volume = No restriction on diversion rate, stop diversion after the ratio of total cumulative diverted volume to unimpaired runoff volume = 10%
	MCD4 (Rate): MCD Rate = Diversion rate that corresponds to a half day reduction in the duration of time that flow is above the MBF during a 1.5 year flood event

The Policy sets regional criteria that are protective for anadromous salmonids and their habitat over the entire Policy area. A variance from the regional criteria may be allowed on a case-by-case basis if a site-specific study can demonstrate that a higher water diversion would still be protective of anadromous salmonids and their habitat. A watershed group may use a watershed-based approach to determine water availability and evaluate environmental impacts rather than evaluating individual projects.

2.3 Potential Indirect Environmental Impacts

Policy restrictions on diversions could lead some of the potential future water diverters to seek alternative water supply sources or to divert water under other bases of right if a) water diverters choose not to file for appropriative water rights because of the Policy restrictions, or b) application of the Policy to a particular water right application shows there is not surface water available to supply the applicant.

Alternative water supply sources or other bases of right (alternative water supplies) might include:

- direct diversion of surface water under riparian rights, for which an appropriative water right permit is not required;
- groundwater; or
- water from sources other than surface water or groundwater, including recycled water, imported water or desalinated seawater.

If alternative water supplies are inadequate to meet the full requirements of potential future water right applicants, this demand for future surface water will have to be reduced or eliminated through water conservation or reductions in future development or other future land uses that require water.

All of these actions could give rise to environmental impacts, including impacts on water resources of the State and water utilization in the Policy area. These potential environmental impacts are referred to as 'indirect' impacts because they are not immediately related to adoption of the Policy but may occur as a result of the Policy being adopted. Table 2 lists these potential indirect environmental impacts.

Table 2. Potential Indirect Environmental Impacts of Policy Restrictions on Diversions

Environmental Issue Area	Potential Actions in Response to Policy Giving Rise to Potential Indirect Impact	Potential Indirect Environmental Impact
Biological Resources	pump groundwater instead of diverting surface water or divert under riparian right	depletion of groundwater resulting in reduction in flows, particularly summer flows, which may harm riparian vegetation or degrade habitat for sensitive riparian and aquatic wildlife
Hydrology/Water Quality	pump groundwater instead of diverting surface water or divert under riparian right	depletion of groundwater resulting in reduction in flows, particularly summer flows and increased summer surface water temperature
Land Use	water conservation instead of diverting surface water	likely reduction in future development of lands for urban or agricultural uses
Utilities/Service Systems	pump groundwater or develop water supplies from other alternative sources instead of diverting surface water	construction and operation of new water treatment and/or delivery facilities

2.4 Definition of Terms

This report uses the following terms to refer to water use and water users:

- Permitted diversion:* A water right application that has been permitted by the State Water Board, as of December 20, 2006.
- Pending diversion demand:* A water right application that has been filed at the State Water Board, as of December 20, 2006, but upon which the Board has not yet acted (i.e. not yet granted nor denied).
- New diversion demand:* Water right applications that may be filed at the State Water Board in the future.
- Future diversion demand:* Water demands that may be provided through water right applications filed at the State Water Board in the future, which would be subject to the restrictions of the Policy. This includes both pending and new diversion demands.
- Current water usage:* Current water consumption from any water source, estimated for the year 2000.
- Forecasted water usage:* Total predicted water consumption from any water source in the year 2030.

<i>Forecasted increase in water usage:</i>	Total predicted increase of water consumption by the year 2030. This is the difference between the forecasted water usage and the current water usage.
<i>Future water diverters:</i>	Potential applicants for pending and new water rights that may be granted by the State Water Board in the future and would be subject to the restrictions of the Policy.
<i>Large water agencies:</i>	Large public water purveyors that serve over 3,000 connections or 3,000 acre-feet per year to municipal and industrial water users and water wholesalers.
<i>Small water agencies:</i>	Small public water purveyors that serve fewer than 3,000 connections or 3,000 acre-feet per year to municipal and industrial water users, and agricultural water purveyors
<i>Self-supplied individuals:</i>	Self-supplied individual domestic, industrial, and agricultural water users.
<i>Alternative water supplies:</i>	Water supply sources other than surface water or diversion of surface water under bases of right other than appropriative water rights.
<i>Groundwater:</i>	Used in this report, the term groundwater refers to underground water that is not subject to the water right permitting authority of the State Water Board.

3 Future Water Diverters

This report defines future water diverters as the potential applicants for pending and new water right applications. These future water diverters will be subject to the restrictions of the Policy. Future water diverters are grouped as follows:

- Large water agencies
- Small water agencies and self-supplied individuals

Small water agencies and self-supplied individuals are grouped together because the same methods are used to estimate their future diversion demand.

3.1 Large Water Agencies

Large water agencies include both large public water purveyors and water wholesalers. There are fourteen large water agencies in the Policy area.

Public water purveyors include any organization that provides water to groups of people. A list of purveyors with numbers of connections was provided by the California Department of Health Services (DHS) as part of the Department of Water Resources (DWR) Land and Water Use Database (DWR, 2006). Table 3 lists the number of purveyors in each county, sorted by number of connections.

Table 3. Number of Public Water Purveyors by County

Number of Connections	County				
	Humboldt	Marin	Mendocino	Napa	Sonoma
Fewer than 10	37	19	43	94	191
10 to 100	37	13	60	12	131
100 to 1,000	21	8	11	9	40
1,000 to 10,000	6	0	7	3	15
Greater than 10,000	0	2	0	1	2
Total for Entire County	101	42	121	119	379

Note: Water purveyors are counted for the entirety of each county. Numbers for Humboldt, Mendocino, and Napa Counties include agencies that are outside of the Policy area.

Large public purveyors are public water purveyors that serve over 3,000 connections or 3,000 acre-feet per year to municipal and industrial water users. These large public purveyors are required by DWR to submit Urban Water Management Plans (UWMPs) every five years (Water Code Sections 10610 - 10656). The names and service areas of these purveyors in the Policy area are listed and shown on Figure A.1 (U.S. Bureau of Reclamation, 2003).

Redwood Valley County Water District (RVCWD) does not currently serve more than 3,000 acre-feet per year and is not required to submit an UWMP; however, it has pending appropriative

water right applications which, if granted, could place it in the large agency category in the future. For the purpose of this analysis, RVCWD is considered to be a large water agency.

There are two water wholesalers in the Policy area: the Russian River Flood Control and Water Conservation District (RRFCWCD); and the Sonoma County Water Agency (SCWA). These two entities sell water to other retail water purveyor customers, in addition to supplying water to individual customers. Both obtain water from the Russian River watershed. RRFCWCD sells water in the Ukiah Area of Mendocino County, while SCWA sells water to customers in Sonoma County and adjacent Marin County. Table 4 summarizes the sources, service areas, and retail customers of both of the wholesalers. All listed water wholesalers' retail customers are located in the Policy area.

Table 4. Water Wholesalers in the Policy Area

Agency	Source	Service Area	Retail Customers
Russian River Flood Control and Water Conservation District	Russian River, Mendocino County	Ukiah Area, Mendocino County	Calpella County Water District City of Ukiah Hopland Public Utilities District Millview County Water District Redwood Valley County Water District River Estates Mutual Water Company Rogina Water Company Willow County Water District Calpella County Water District
Sonoma County Water Agency	Russian River, Mendocino County; Dry Creek, Sonoma County; Groundwater, Sonoma County	Sonoma County	California American Water Company
			City of Cotati
			City of Petaluma
			City of Rohnert Park
			City of Santa Rosa
			City of Sonoma
			Forestville Water District
			Kenwood Village Water Company
			Lawndale Mutual Water Company
			Penngrove Water Company
			Town of Windsor
		Valley of the Moon Water District	
		Marin County	Marin Municipal Water District North Marin Water District

3.2 Small Water Agencies and Self-Supplied Individuals

Small water agencies are public water purveyors that serve fewer than 3,000 connections to municipal and industrial water users. Self-supplied individuals include domestic, industrial, and agricultural water users. The small water agencies and self-supplied individuals are not required to file UWMPs with DWR.

Small water agencies with connections approaching 3,000 are likely to rely on the same water sources as the large agencies; namely, surface water from the Russian River, Napa River, and other substantial streams. Small water agencies with far fewer than 3,000 connections are likely to obtain water by appropriative water rights or by pumping groundwater. In most cases, large or small agencies cannot supply water diverted under riparian water rights.

There is only one agricultural irrigation purveyor in the Policy area, Potter Valley Irrigation District (PVID)¹. PVID diverts flow from the powerhouse canal below PG&E's Potter Valley Hydroelectric Project before that water enters the East Branch Russian River. PVID obtains its water by diversions from PG&E's facility under an agreement with PG&E and may not be affected by the Policy.

Supply sources for self-supplied domestic users are likely to be groundwater or surface water. Surface water could be diverted by appropriative or riparian water right or as a small domestic use or livestock stockpond use. Small domestic use is defined as "...domestic use, not to exceed 4500 gallons per day or diversion by storage of 10 acre-feet per annum" (Wat. Code, § 1228.1, subd. (b)). Livestock stockpond is defined as "a water impoundment structure constructed for livestock watering use not to exceed direct diversion of 4500 gallons per day, or diversion by storage of 10 acre-feet per year" (Wat. Code, § 1228.1, subd. (c)).

Supply for self-supplied industrial users could come from groundwater or surface water by appropriative water right.

Supply for self-supplied agricultural water users could to come from groundwater or surface water by appropriative or riparian water rights.

¹ PVID delivers water for irrigation to about 300 farms totaling about 6,000 acres for irrigation and frost protection. About half of the lands are pastures and the rest is viticulture and orchards. PVID delivers about 18,000 acre-feet of water per year, and is contracted for 19,000 acre-feet with up to 23,000 acre-feet possible. PVID's agreement with PG&E allows it to divert up to 50 cfs of water from April to November 15 for irrigation and stock watering. Downstream of the powerhouse canal, additional water is diverted by users along the East Branch Russian River under appropriative water rights permits. The remaining water discharged by the Potter Valley Hydroelectric Project flows down the East Branch and is ultimately stored by Sonoma County Water Agency in Lake Mendocino for agricultural, municipal, industrial and recreational purposes.

4 Future Diversion Demand

This report defines future diversion demand as the quantity of surface water that has been requested in pending water right applications (pending diversion demand) or that may be requested in new water right applications (new diversion demand).

Pending diversion demand is estimated based on information from the State Water Board's Water Rights Information Management System (WRIMS) database. New diversion demand is estimated based on information from the UWMPs filed in the Policy area and projected urban and agricultural growth rates from the California Water Plan 2030 Quantified Future Scenarios (Groves et al, 2005).

4.1 Pending Diversion Demand

The WRIMS database stores information on permitted and pending water right applications. There are 3,351 permitted and 284 pending water right applications in the Policy area, as of December 20, 2006. Table 5 summarizes the numbers of permitted and pending water right applications, grouped by type of water right and county. Figure A.2 shows the points of diversion for each permitted and pending water right application. Permitted water right applications are not included in the analysis of potential indirect environmental impacts of the Policy; their numbers are shown here for comparison with the number of pending water right applications.

Table 5. Number of Water Right Applications in the Policy Area

Water Right Permit Status	Water Right Type	County					Total
		Humboldt	Marin	Mendocino	Napa	Sonoma	
Permitted	Appropriative	36	160	537	492	919	2,144
	Pre-1969 Stockpond Certificates	0	12	21	52	56	141
	Small Domestic Use Registration	3	2	92	27	61	185
	Livestock Stockpond Use Registration	0	1	15	0	4	20
	Riparian or Pre-1914 Statements of Diversion and Use	10	71	253	169	358	861
Total Permitted Applications		49	246	918	740	1398	3,351
Pending	Appropriative	0	2	136	28	108	274
	Small Domestic Use Registration	0	0	2	1	4	7
	Livestock Stockpond Use Registration	0	0	0	0	3	3
Total Pending Applications		0	2	138	29	115	284
Total Water Right Applications							3,631

There are currently 274 pending applications for appropriative water rights, 7 pending applications for small domestic use registration, and 3 pending applications for livestock stockpond use registration filed at the State Water Board in the Policy area, as of December 20, 2006. Figure A.3 shows the points of diversion for each pending application.

Table 6 summarizes the numbers of pending appropriative water right applications and the total direct diversion, storage volume, and maximum annual use requested in these applications, grouped by county.

Table 7 summarizes the same information for the pending small domestic and livestock stockpond use registrations.

Table 6. Pending Applications for Appropriative Water Rights in the Policy Area

	County					Total
	Humboldt	Marin	Mendocino	Napa	Sonoma	
Number of Pending Appropriative Water Right Applications	0	2	136	28	108	274
Total Direct Diversion (cfs)	0.0	0.0	540.4	0.1	106.0	646.5
Total Storage (AF)	0	5	17,587	1,126	13,312	32,030
Total Maximum Annual Use (AF/year)	0	5	30,754	1,127	73,144	105,030

Table 7. Pending Small Domestic and Livestock Stockpond Use Registrations in the Policy Area

	County					Total
	Humboldt	Marin	Mendocino	Napa	Sonoma	
Number of Pending Small Domestic Use and Livestock Stockpond Use Registrations	0	0	2	1	7	10
Total Direct Diversion (cfs)	0.0	0.0	0.4	0.0	0.0	0.4
Total Storage (AF)	0	0	8	4	55	67
Total Maximum Annual Use (AF/year)	0	0	13	4	55	72

Pending diversion demand is estimated to be the sum of the maximum annual use requested in pending water right applications. The maximum annual use is the maximum quantity that may be withdrawn by the applicant in any one year, including both storage and direct diversion.

4.1.1 Pending Diversion Demand for Large Water Agencies

Table 8 lists the seven pending applications by large water agencies. RRFCWCD and RVCWD have requested most of the pending diversion demand in Mendocino County. SCWA has a large pending water right application in Sonoma County.

Table 8. Pending Applications for Appropriative Water Rights for Large Water Agencies

Agency	Application ID	Direct Diversion (cfs)	Storage (AF)	Maximum Annual Use (AF/year)	Source	County
Town of Windsor Water District	A029737	11.1	0	4,725	Russian River Subterranean Flow	Sonoma
SCWA	A030981	72.0	0	52,126	Russian River	Sonoma Marin
RVCWD	A031337	9.2	171	5,357	Mill Creek	Mendocino
RVCWD	A031495	50.0	5000	7,500	West Fork Russian River Subterranean Flow	Mendocino
RVCWD	A031496	50.0	0	500	West Fork Russian River Subterranean Flow	Mendocino
RVCWD	A031505	0.0	1,200	1,200	Mill Creek	Mendocino
RRFCWCD	X003542	200.0	6,000	6,000	East Fork Russian River	Mendocino
Total		392.3	12,371	77,408		

Pending diversion demand for the large water agencies is estimated as the sum of the maximum annual use requested by the applicant in the seven pending water right applications for large water agencies, except for the SCWA pending water right application (A030981). SCWA's pending appropriative water right application requests a maximum annual use of 52,126 acre-feet per year, but its 2005 UWMP indicates that only 26,000 acre-feet per year of additional surface water will be necessary to meet 2030 demands. The SCWA pending diversion demand was set to the required 26,000 acre-feet per year.

Table 9 summarizes the estimated pending diversion demand for large water agencies, grouped by county. Water diverted by Sonoma County Water Agency (SCWA) from the Russian River in Sonoma may be sold to retail water purveyors in Sonoma or Marin Counties.

Table 9. Pending Diversion Demand for Large Water Agencies (AF/year)

Agency	Application ID	County					Total
		Humboldt	Marin	Mendocino	Napa	Sonoma	
Town of Windsor Water District	A029737					4,725	4,725
SCWA	A030981					26,000	26,000
RVCWD	A031337			5,357			5,357
RVCWD	A031495			7,500			7,500
RVCWD	A031496			500			500
RVCWD	A031505			1,200			1,200
RRFCWCD	X003542			6,000			6,000
Pending Diversion Demand for Large Water Agencies		0	0	20,557	0	30,725	51,282

4.1.2 Pending Diversion Demand for Small Water Agencies and Self-Supplied Individuals

All the pending applications for pending small domestic and livestock stockpond use registrations are for self-supplied individuals.

Table 10 summarizes the numbers of pending appropriative water right applications for small water agencies and self-supplied individuals and the total direct diversion, storage volume, and maximum annual use requested by these applicants, grouped by county. This includes all the pending appropriative water right applications (summarized in Table 6) less the pending applications for large water agencies (summarized in Table 9).

Table 10. Pending Applications for Appropriative Water Rights for Small Water Agencies and Self-Supplied Individuals

	County					Total
	Humboldt	Marin	Mendocino	Napa	Sonoma	
Number of Pending Appropriative Water Right Applications for Small Municipal Water Agencies and Self-Supplied Individuals	0	2	131	28	106	267
Sum of Requested Direct Diversion (cfs)	0	0	231	0	23	254
Sum of Requested Storage (AF)	0	5	5,216	1,126	13,312	19,659
Sum of Requested Maximum Annual Use (AF/year)	0	5	10,197	1,127	16,293	27,622

Pending diversion demand for small water agencies and self-supplied individuals is estimated to be the sum of the maximum annual use listed for each of the 267 pending appropriative water right applications for small water agencies and self-supplied individuals (summarized in Table 10) and the 10 pending small domestic use and livestock stockpond use registrations (summarized in Table 7). Table 11 summarizes the pending diversion demand for small water agencies and self-supplied individuals, grouped by county.

Table 11. Pending Diversion Demand for Small Water Agencies and Self-Supplied Individuals

	County					Total
	Humboldt	Marin	Mendocino	Napa	Sonoma	
Sum of Requested Maximum Annual Use in Pending Appropriative Water Rights (AF/year)	0	5	10,197	1,127	16,293	27,622
Sum of Requested Maximum Annual Use in Pending Small Domestic Use and Livestock Stockpond Use (AF/year)	0	0	13	4	55	72
Pending Diversion Demand for Small Water Agencies and Self-Supplied Individuals (AF/year)	0	5	10,210	1,131	16,348	27,694

4.2 New Diversion Demand

New diversion demand is the amount of diversions that may be requested in water right applications filed at the State Water Board in the future. New diversion demand for large water agencies is estimated based on information provided in UWMPs. New diversion demand for small water agencies and self-supplied individuals is estimated based on the predicted increase in population and irrigated land.

4.2.1 *New Diversion Demand for Large Water Agencies*

Large water agencies are required to submit Urban Water Management Plans (UWMPs) every five years that list their planned future water use and future water sources for the next 25 years. These planned supplies include surface water obtained from both pending and new appropriative water rights. Table 12 summarizes the information on the planned additional water use and water supply sources obtained from the UWMPs for the large water agencies in the Policy area. The water supply sources may include surface water obtained under pending and new water right applications.

New diversion demand for the large water agencies is estimated to be equal to planned additional water use for the next 25 years listed in the UWMPs from both surface water and unknown supply sources (listed in Table 12) minus any pending diversion demand for these large water agencies (listed in Table 9). North Marin Water District's increased surface water supply will be diverted under existing permits and has not been included in the estimate of new diversion demand. Planned additional water use with an 'unknown' source is assumed to be supplied from surface water to provide a conservative (highest) estimate of new diversion demand. Table 13 lists the estimated new diversion demand for each large water agency and the total new diversion demand for large water agencies, grouped by county.

In Mendocino and Sonoma counties, the future diversion demand of the large water agencies (sum of pending diversion demand, Table 9, and new diversion demand, Table 13) that is estimated based on the pending water right applications and UWMPs is higher than the forecasted increase in water usage supplied by large water agencies by the year 2030 estimated based on expected growth rates (Appendix B, Table B.6). This indicates that the future diversion demand of large water agencies could be used to supply increased demands beyond 2030 or to supply an expanded service area which might include individuals who are currently self-supplied under a different basis or no basis of right.

Table 12. Large Water Agencies with Urban Water Management Plans in the Policy Area

Water Purveyor	County	Planned Additional Water Use (AF/year)	Future Water Supply Source(s)
City of American Canyon	Napa	500	Imported water (State Water Project)
		2,578	Imported water (Vallejo)
		977	Recycled water
City of Napa	Napa	5,950	Imported water (State Water Project)
City of Ukiah	Mendocino	375	Groundwater (Ukiah Valley Basin)
Sonoma County Water Agency	Marin, Sonoma	26,000	Surface water (Russian River, SCWA Water Supply, Transmission and Reliability Project; pending permit)
City of Petaluma*	Sonoma	410	Recycled water
City of Rohnert Park*	Sonoma	none	
City of Santa Rosa*	Sonoma	2,300	Groundwater (Santa Rosa Plain Subbasin)
		6,536	Unknown (possibly from additional groundwater, recycled water, or additional SCWA water)
		206	Recycled water
City of Sonoma*	Sonoma	none	
Marin Municipal Water District*	Marin	7,400	Unknown
		250	Recycled water
North Marin Water District*	Marin	1,700	Surface water (Novato Creek/Stafford Lake, existing permits)
		1,020	Recycled water
Town of Windsor*	Sonoma	Unknown	
Valley of the Moon Water District*	Sonoma	1,456	Groundwater

Note:

* This District purchases water from the Sonoma County Water Agency (SCWA). Future planned water use and sources of supply listed in this table do not include planned purchases from SCWA.

Table 13. New Diversion Demand for Large Water Agencies (AF/year)

Agency	County					Total
	Humboldt	Marin	Mendocino	Napa	Sonoma	
City of American Canyon				0		
City of Napa				0		
City of Ukiah			0			
City of Petaluma					0	0
City of Rohnert Park					0	0
City of Santa Rosa					6,536	6,536
City of Sonoma					0	0
Marin Municipal Water District		7,400				7,400
North Marin Water District ¹		0				
Town of Windsor					0	0
Valley of the Moon Water District					0	0
Russian River Flood Control and Water Conservation District			0			
Sonoma County Water Agency		0			0	0
New Diversion Demand for Large Water Agencies (AF/year)	0	7,400	0	0	6,536	13,936

4.2.2 New Diversion Demand for Small Water Agencies and Self-Supplied Individuals

Small water agencies and self-supplied individuals do not have to submit UWMPs that would list planned additional water use and could be used to estimate new diversion demand. Instead, the new diversion demand for this group of potential diverters is estimated based on the forecasted increase in water usage as follows:

1. Total current water usage in the Policy area is estimated based on year 2000 USGS estimates of water usage for public water use, self-supplied domestic and industrial water use, and agricultural water use.
2. Current water usage supplied by the small agencies and self-supplied individuals is estimated to be the total current water usage minus the estimated current water usage supplied by large agencies.
3. Forecasted water usage for the year 2030 is estimated to be the current water usage multiplied by predicted future urban and agricultural water use growth rates.
4. Forecasted increase in water usage is estimated as the forecasted water usage minus the current water usage.
5. Forecasted increase in water usage supplied from surface water is estimated as the forecasted increase in water usage multiplied by percentage of water from surface water reported by the USGS for the year 2000.
6. New diversion demand is estimated to be the forecasted increase in water usage supplied from surface water minus the pending diversion demand.

Appendix B provides a detailed description of the methods used to estimate current water usage, forecasted water usage, and forecasted increase in water usage for each county in the Policy area. The primary data sources are USGS estimates of water usage for the year 2000 by county (Hutson et al. 2004), Department of Water Resources (DWR) demographic and geographic information (DWR, 2006), and estimates of future growth from the California Water Plan (Groves et al., 2005). Table 14 summarizes the resulting estimates of forecasted increase in water usage from surface water, grouped by county.

Table 14. Forecasted Increase in Water Usage Supplied by Small Water Agencies and Self-Supplied Individuals

		County					Total
		Humboldt	Marin	Mendocino	Napa	Sonoma	
Current Water Usage (AF/year)		1,250	8,360	50,640	53,410	116,890	230,550
Forecasted Water Usage (AF/year)		1,310	8,890	53,880	56,780	130,310	251,170
Forecasted Increase in Water Usage (AF/year)	Total	60	530	3,240	3,370	13,420	20,620
	From Groundwater	30	230	2,270	2,670	7,670	12,870
	From Surface Water	30	300	970	700	5,750	7,750

It is assumed that the forecasted increase in water usage from surface water would be supplied from surface water by pending or new appropriative water rights. Table 15 summarizes the estimated new diversion demand for small water agencies and self-supplied individuals, grouped by county.

Table 15. New Diversion Demand for Small Water Agencies and Self-Supplied Individuals

	County					Total
	Humboldt	Marin	Mendocino	Napa	Sonoma	
Forecasted Increase in Water Usage from Surface Water for Small Water Agencies and Self-Supplied Individuals (AF/year)	30	300	970	700	5,750	7,750
Pending Diversion Demand for Small Water Agencies and Self-Supplied Individuals (AF/year)	0	5	10,210	1,131	16,348	27,694
New Diversion Demand for Small Water Agencies and Self-Supplied Individuals (AF/year)	30	295	0	0	0	325

In Mendocino, Napa, and Sonoma counties, the pending diversion demand for the small water agencies and self-supplied individuals is greater than the forecasted increase in water usage from surface water. The forecasted increase in water usage represents the anticipated increased demand for surface water up to the year 2030 that would be supplied by both pending and new water right applications. Where pending diversion demand is greater than the forecasted increase in water usage from surface water, it indicates that either the pending water right applications are intended to supply increased demand beyond the year 2030 and/or that the applicants for pending water rights expect future growth to be higher than the regional predictions of the California Water Plan. Both of these circumstances are likely to be true. Small water agencies may have

submitted water right applications in anticipation of any potential future growth, hoping to obtain senior water rights and secure future access to surface water. These agencies may intend to expand their service area to provide water to individuals who are currently self-supplied under a different basis or no basis of right. Regional growth rates may not capture small local ventures. In particular, the assumption of no agricultural growth in the North Coast would underestimate the growth of the wine-growing industry which is currently expanding in Mendocino and Sonoma counties.

Where pending diversion demand is greater than the forecasted increase in water usage from surface water, it is assumed that all future diversion demand would be supplied from the pending water rights and that the new diversion demand would be zero. If potential applicants do not have access to water requested in pending applications held by small water agencies, there may be some new water right applications from these self-supplied individuals, but these new water diversion demands would likely be small compared to those requested in the pending applications.

5 Identify and Evaluate the Adequacy of Alternative Water Supplies

The potential indirect environmental impacts are estimated based on the assumption that the Policy would, in effect, prohibit all future diversion demand and that the full volume of estimated future diversion demand would have to be met from an alternative supply source or under a different basis of right.

This is a very conservative assumption as some of the future diversion demand could be supplied by surface water appropriation in the following circumstances:

- Some future diversion demand may be permitted under the Policy. This amount would depend on which Policy element alternatives are selected and on the hydrology and extent of existing permitted water use at future points of diversion.
- The Policy regional restrictions may be lifted where a site-specific study can show that they are overly conservative.
- A watershed-based approach to determine water availability and evaluate environmental impacts may allow more water diversions.
- DFG might not condition small domestic and livestock stockpond registrations to meet some or all of the Policy regional restrictions.

In addition, surface water supplies may be insufficient to meet all future demands even in the absence of the Policy. Surface water resources are already limited in some regions of the Policy area and future water supplies would be limited by the natural supply availability rather than by the Policy restrictions on water diversion and storage. Some streams in the Policy are already fully appropriated for some or all of the year, Appendix C.

Nonetheless, the future diversion demand is provided as an estimate of the upper limit of the water demand that may need to be met from alternative water supplies. Table 16 summarizes the estimated future diversion demand by diverter group, water right permit status and county.

Table 16. Future Diversion Demand (AF/year)

Diverter Group	Water Right Permit Status	County					Total
		Humboldt	Marin	Mendocino	Napa	Sonoma	
Large Water Agencies	Pending	0	0	20,557	0	30,725	51,282
	New	0	7,400	0	0	6,536	13,936
Small Water Agencies and Self-Supplied Individuals	Pending	0	5	10,210	1,131	16,348	27,694
	New	30	295	0	0	0	325
Future Diversion Demand (AF/year)		30	7,700	30,767	1,131	53,609	93,237

The alternative water supplies that might be used to meet the future diversion demand are discussed below with respect to their availability in the Policy area.

5.1 Riparian Rights

Surface water may be diverted and used under a riparian water right. Any owner of a parcel immediately adjacent to a water course has the right to divert water at any time to be used directly on the land that borders and is contiguous with the stream. The water that is diverted cannot be seasonally stored. Riparian rights do not require approval from the State Water Board and are not subject to the Policy restrictions on flow and storage.

Surface water use under riparian right is naturally limited during the summer irrigation season by the availability of water during this low flow period. In some cases, water diverted under riparian right may provide an adequate alternative supply for self-supplied individuals (subset of small water agencies and self-supplied individuals as discussed in Section 3.2.2). Riparian rights can not be practicably used to supply large or small water agencies because of the land adjacency requirement.

5.2 Groundwater

Groundwater basins within the Policy area, which were defined in the California Department of Water Resources Bulletin 118 (DWR, 2003), are shown on Figure A.4 and listed in Table 17. Other groundwater resources are present, especially in coastal areas, but these regions have not been defined as basins by DWR and the extent and reliability of any such supplies is uncertain.

The range of future demands on the groundwater basins is estimated in order to assess the adequacy of groundwater as an alternative water supply source. The lower end of the demand range, the “planned usage from groundwater,” is computed as the sum of large water agencies future groundwater demand derived from their UWMPs (listed in Table 12) plus the small water agencies and self-supplied individuals estimated increase in water usage from groundwater (listed in Table 14). The upper end of demand is estimated for the most conservative case, where all future diversion demand (both pending and new) would be supplied from groundwater. The upper end is computed as the sum of the planned usage from groundwater (i.e. the low end of the range) plus all future diversion demand.

Table 17. Groundwater Basins in the Policy Area

County	Groundwater Basins	Future Groundwater Demands (AF/year)		Adequacy
		Lower	Upper	
Humboldt	Honeydew Town Area, Mattole River Valley	30	60	Likely adequate to meet upper demand. Likely adequate for small agencies and self-supplied individuals provided suitable site-specific hydrogeologic conditions. The availability of groundwater that is not subject to the water right permitting authority of the State Water Board is unknown and subject to the determinations of the State Water Board. The adequacy of groundwater as an alternative supply source may be limited by future State Water Board determinations.
Marin	Novato Valley, Ross Valley, San Rafael Valley, Sand Point Area, Wilson Grove Formation Highlands	230	7,930	Not likely adequate to meet upper demand due to limiting hydrogeologic factors. May be adequate to meet lower demand, particularly for small agencies and self-supplied individuals, provided suitable site-specific hydrogeologic conditions. The availability of groundwater that is not subject to the water right permitting authority of the State Water Board is unknown and subject to the determinations of the State Water Board. The adequacy of groundwater as an alternative supply source may be limited by future State Water Board determinations.
Mendocino	Anapolis Ohlsen Ranch, Anderson Valley, Big River Valley, Cottoneva Creek Valley, Fort Bragg Terrace Area, Fort Ross Terrace Deposits, Garcia River Valley, Little Valley, McDowell Valley, Navarro River Valley, Potter Valley, Sanel Valley, Ten Mile River Valley, Ukiah Valley	2,830	33,600	Not likely adequate to meet upper demand due to limiting hydrogeologic factors. May be adequate for to meet lower demand for large and small agencies and self-supplied individuals, provided suitable site-specific hydrogeologic conditions. The availability of groundwater that is not subject to the water right permitting authority of the State Water Board is unknown and subject to the determinations of the State Water Board. The adequacy of groundwater as an alternative supply source may be limited by future State Water Board determinations.
Napa	Napa-Sonoma Valley	2,670	3,800	May be adequate to meet upper demand. May be adequate for small agencies and self-supplied individuals provided suitable site-specific hydrogeologic conditions. The availability of groundwater that is not subject to the water right permitting authority of the State Water Board is unknown and subject to the determinations of the State Water Board. The adequacy of groundwater as an alternative supply source may be limited by future State Water Board determinations.

		Future Groundwater Demands (AF/year)		
Sonoma	Alexander Valley, Anapolis Ohlsen Ranch, Bodega Bay Area, Fort Ross Terrace Deposits, Kenwood Valley, Knights Valley, Lower Russian River Valley, Napa-Sonoma Valley, Petaluma Valley, Santa Rosa Valley, Wilson Grove Formation Highlands	11,430	65,040	Not likely adequate to meet lower demand due to limiting hydrogeologic factors. May be adequate for small agencies and self-supplied individuals provided suitable site-specific hydrogeologic conditions. The availability of groundwater that is not subject to the water right permitting authority of the State Water Board is unknown and subject to the determinations of the State Water Board. The adequacy of groundwater as an alternative supply source may be limited by future State Water Board determinations.

The use of groundwater in the Policy area is limited by hydrogeologic factors, including sea-water intrusion, thin alluvial deposits, aquifer materials of low permeability, and the quality of water. Sea-water intrusion has been identified in coastal aquifers of Napa, Sonoma, and Mendocino Counties. Overdraft, resulting from excessive pumping associated with development, could possibly occur in the future, reducing available supplies in late summer and dry years. In some site-specific cases, groundwater may be an adequate alternative supply source for low capacity wells, such as those typically associated with small water agencies, self-supplied individuals for domestic, industrial, or agricultural use. Groundwater is not a likely adequate alternative supply source for large agencies because of the above-described limiting hydrogeologic factors.

5.3 Imported Water

Large water agencies and water wholesalers in the Policy area may seek to obtain future supplies by importing them from other water purveyors outside of the Policy area. Two large water agencies in the Policy area, the City of Napa and City of American Canyon, receive imports from the State Water Project (SWP) (City of Napa, 2006; City of American Canyon, 2006). SWP water comes from the Sacramento/San Joaquin Delta. Both cities currently import SWP water and have agreements in place which allow for increases in future imports. Additionally, the City of American Canyon imports water from the City of Vallejo (Solano County) and has a contract that allows for increases in future imports. Availability of SWP water above and beyond what has been contracted by these cities is unknown.

The Sonoma County Water Agency sells water to many water districts in the Policy area, but these purchases should be considered transfers within the Policy area, not imports from outside the Policy area.

Imported water is an adequate alternative water source in Napa County for all users within the current or future service area of the two large water agencies in this county. The 9,028 acre-foot/year of planned future use of imported water use (listed in Table 12) exceeds the 1,131 acre-foot/year future diversion demand for Napa (Table 16). Imported water is not currently available in the other counties in the Policy area.

5.4 Desalinated Water

Desalinated water is a potential alternative source of supply for large or small water agencies with access to the ocean or San Francisco Bay. However, development of this water source may be infeasible due to high cost or technical factors. Usually only large water agencies have the financial and technical capabilities to implement desalination.

Marin Municipal Water District is the only known large water agency in the Policy area that is currently pursuing this source. Marin Municipal Water District has recently completed a pilot program in San Rafael, California designed to explore the use of desalinated water as a future source of supply. A concept-level plan may be developed for a full-scale desalination facility (MMWD, 2006). However, the completion date of the full-scale project is unknown, and availability of desalinated water as an alternative future source is not assured.

5.5 Recycled Water

Recycled water, sometimes called reclaimed water, is treated wastewater that is redistributed for non-potable beneficial use. A recycled water agency produces, stores, and distributes treated effluent for such beneficial uses as landscape irrigation, agricultural irrigation of certain crops, industrial water use, and toilet flushing. By using recycled water to meet the non-potable water demand, future surface water diversions can be reduced.

In order for a water agency to supply recycled water, the water agency must have access to a source of wastewater; therefore, recycled water programs most commonly exist in urbanized areas with centralized public wastewater collection and treatment systems. In the Policy area, water agencies in Marin County, Sonoma County, and Napa County utilize recycled water to a limited extent.

Recycled water is a likely alternative supply for agricultural irrigation and some industrial uses (a subset of small water agencies and self-supplied individuals as discussed in Section 3.2.2) but can not be used for domestic supply. Recycled water may be an adequate alternative supply for landscape irrigation and other non-potable uses for large water agencies with access to a source of wastewater and to individual users who are within the distribution system of these agencies. However, development of this water resource may be infeasible based on cost or technical factors.

6 Estimated Potential Indirect Environmental Impacts

This section identifies, estimates, and discusses the potential indirect environmental impacts in each county in the Policy area. The following information is provided for each county:

1. A general description of the county, including the water supply sources.
2. A description of the large water agencies in the county, if any.
3. The estimate of future diversion demand for both diverter groups.
4. The potential need for alternative water supplies.
5. Possible alternative water supplies that may be developed.
6. A summary of the indirect environmental impacts related to the Policy that would be caused by development of these alternative water supplies.

6.1 Humboldt Indirect Impacts

The area of Humboldt County within the Policy area is about 370 square miles, which represents approximately 10% of Humboldt County's total area. The population in this part of the county is small, with no major urban centers, and no large water agencies. The major river in the county Policy area is the Mattole River, and there are two defined groundwater basins (see Table 17). There are no fully appropriated streams in this area.

There are no large water agencies in the area. Future diversion demand for small water agencies and self-supplied individuals are small, 30 acre-feet per annum (listed in Table 16). If application of the Policy to specific water right applications shows that surface water is not available for appropriation, groundwater and surface water diverted under riparian right are the most likely alternative water supplies and both are likely adequate to satisfy the future diversion demand.

Thus, implementation of the Policy potentially may result in the increased development of groundwater or surface water under riparian right in Humboldt County. Any indirect environmental impacts resulting from this increased development are not likely to be substantial given the small future diversion demand in this area.

6.2 Marin Indirect Impacts

Marin County falls entirely within the Policy area. The county is a mix of undeveloped areas and urbanized areas, and has two large water agencies that serve the urban areas. The major streams are Lagunitas Creek, Corte Madera Creek, Redwood Creek, Novato Creek and Walker Creek. There are five defined groundwater basins in the county.

Marin Municipal Water District (MMWD) is the largest water purveyor in Marin County serving approximately 190,000 people. The service area of MMWD is shown in Figure A.1. MMWD currently supplies its water from seven local reservoirs (including Kent Lake) and from water purchased from SCWA (Russian River water). MMWD also has a recycled water program which is expected to grow in the future. In addition, the district recently completed a desalination pilot program, but no future supplies are guaranteed from this source. In their 2005 UWMP, MMWD estimates a deficit in future years of up to 7,400 acre-feet. They plan to manage this deficit through increased water efficiency/demand management strategies (i.e., conservation) and through enhanced supplies, which could include water from desalination, recycling, and additional water from SCWA (MMWD, 2006). Since MMWD relies upon water provided by SCWA and will continue to do so in the future, they are potentially subject to indirect impacts from the Policy. See Section 6.5 for a discussion of SCWA.

North Marin Water District (NMWD) is the other large water agency in Marin County with a service area population of approximately 57,000 people. NMWD has two separate service areas: one near the City of Novato; and one in western Marin County near Point Reyes (see Figure A.1 for service area locations). NMWD receives most of its water from SCWA but has a local source of supply from Novato Creek with storage in Stafford Lake. They also have a recycled water program. NMWD plans to meet future demands with increased recycled water usage, increased imports from SCWA, and by utilizing local supplies (NMWD, 2006). Local supplies (Novato Creek/ Stafford Lake) would be utilized under existing water rights (Permit 18800 and License 9831) and would not be affected by the Policy. However, since NMWD gets water from SCWA and may rely upon increases of SCWA purchases in the future, this portion of their water supply could be subject to impacts. See Section 6.5 for a discussion of SCWA.

The majority of the Marin County population is served by the two large water agencies described above. Current plans from their most recent UWMPs indicate that new applications from these agencies are unlikely. As stated above, NMWD will meet future demands using increased imports, recycled water, or under existing water rights. MMWD has a future deficit of 7,400 acre-feet for which the source of supply is unknown, so in order to be conservative, this quantity has been included as a possible new application. However, according to their most recent UWMP, their likely sources include conservation, desalination, recycled water, and increased purchases from SCWA (MMWD, 2006).

The small water agencies and self-supplied individuals have pending water rights of 5 acre-feet per annum and potentially an additional 295 acre-feet per annum of new water right applications in the future. If application of the Policy to specific water right applications shows that surface water is not available for appropriation under a permit or license, groundwater is the most likely source of supply for small water agencies. Groundwater basins may be adequate to meet the demands of small agencies provided suitable site-specific hydrogeologic conditions. Water diverted from surface water under riparian right or from groundwater are the most likely alternative water supplies for self-supplied individuals. Water purchases from the larger water

agencies could be a secondary source although access to this water is limited to the service areas of MMWD and NMWD.

Actions of future water diverters in Marin could include potential county-wide conservation. Large, and perhaps some small, water agencies would likely increase development of recycled water and, possibly desalination. Small water agencies and self-supplied individuals would likely seek groundwater, and self-supplied individuals may also seek to divert surface water under riparian rights. Indirect environmental impacts would likely include impacts associated with construction and operation of new water treatment and delivery facilities.

6.3 Mendocino Indirect Impacts

The total area of Mendocino County is approximately 3,500 square miles, of which about 1,900 square miles are within the Policy area. The county consists of many rural or undeveloped areas and some small cities, the largest of which is Ukiah. The major streams in the county are the Russian River, Navarro River, Garcia River, Dry Creek, Albion River, Gualala River, Big River, Noyo River and Ten Mile River. There are 14 defined groundwater basins in the portion of the county in the study area, listed in Table 17 and shown in Figure A.4. The largest source of surface water is the Russian River, which is fully appropriated from July through October along the mainstem and seasonally along some of its tributaries (see Appendix C).

All of the large retail water agencies in Mendocino County are in the Ukiah Area. Outside of Ukiah, water is supplied by small water agencies or by self-supplied individuals.

Most water agencies in the Ukiah area rely, at least in part, upon water provided by RRFCWCD. RRFCWCD is a water wholesaler that provides water from the Russian River which is stored in Lake Mendocino. RRFCWCD does not serve more than 3,000 acre-feet per year individuals and is not required to file an UWMP. Currently, RRFCWCD has rights to 8,000 acre-feet per year of Russian River surface water, and has a pending application for an additional 6,000 acre-feet per year. If the pending application is denied, specific alternative sources have not been identified, but RRFCWCD has indicated that groundwater is not a potential alternative (pers. comm., Barbara Spazek, RRFCWCD, General Manager, 1/12/2007 & 1/25/2007).

Since it is a large water agency, the City of Ukiah is the only water agency within the Mendocino County portion of the Policy area that is required to submit an UWMP. According to their UWMP, the City expects to meet future demands from current sources of surface water supply, as well as through increased groundwater from the Ukiah Valley Basin. In dry years of low natural flow, the City of Ukiah purchases water from RRFCWCD (Ukiah Utilities, 2002). The City of Ukiah is not planning to apply for future surface water rights and, therefore, will not be directly affected by the Policy. The City may be indirectly impacted if the Policy reduces water supply availability from RRFCWCD.

Small water agencies that rely on water from RRFCWCD include Millview County Water District, Calpella County Water District, Hopland Public Utilities District, River Estates Mutual Water Company, Rogina Water Company, and Willow County Water District. Additionally, the Redwood Valley County Water District also purchases water from RRFCWCD, but only when RRFCWCD has surplus water (Mendocino County, 2006). Redwood Valley County Water District has pending applications for an additional 14,557 acre-feet per year of surface water (Table 8). If RRFCWCD experiences impacts from the Policy, any water agency that purchases from them could also be impacted.

The Mendocino County Water Agency (MCWA) is part of the county government of Mendocino County. MCWA does not currently supply water to any individuals or groups but may seek to do so in the future. They are known to be exploring development of off-stream storage and may file a new application for appropriative water rights on the order of 2,000 acre-feet per year (pers. comm, Roland Sanford, MCWA, 1/24/2007).

The pending water rights in Mendocino County total an annual use of 30,767 acre-feet per year with 20,557 acre-feet per year requested by the large water agencies (listed in Table 16). The pending water rights are larger than the forecasted future demand so new water right applications are unlikely. If application of the Policy to these pending water right applications shows there is not enough water available for appropriation under permits or licenses, groundwater or surface water by riparian rights are the most likely alternative water supplies but these may be inadequate to supply the large requests for water. Conservation, recycled water or, along coastal areas, desalination, may be required if the large water agencies in Mendocino County are to supply the growth estimated in their UWMPs.

Actions of future water diverters in Mendocino could include potential county-wide conservation. Large, and perhaps some small, water agencies would likely increase development of recycled water. Coastal water agencies may seek desalination. Small water agencies and self-supplied individuals would likely seek groundwater, and self-supplied individuals may also seek to divert surface water under riparian rights. Indirect environmental impacts would likely include those associated with construction and operation of new water treatment and delivery facilities. Indirect environmental impacts of these actions are likely given the large pending diversion demand in this county.

6.4 Napa Indirect Impacts

Napa County is approximately 750 square miles, of which 380 square miles are in the Policy area. The western portion of the County, which contains the City of Napa and the Napa River, is in the Policy area, while the eastern portion, containing Lake Berryessa, is excluded. The Napa County Policy area has a single groundwater basin, Napa-Sonoma Valley (Table 17 and Figure A.4). The Napa County Policy area consists of many towns and small cities, the largest of which is the City of Napa. Napa County also has agricultural lands and some undeveloped areas.

There are two large water agencies in the Napa County portion of the Policy area. The City of Napa serves approximately 80,000 people in and near the City of Napa. They have two local storage reservoirs, Lake Hennessey and Milliken Reservoir, both on tributaries to the Napa River. In addition, they import water from the Sacramento/San Joaquin Delta through the North Bay Aqueduct under the State Water Project (SWP). The City of Napa plans to meet future demands by increasing the quantity of water imported through the SWP and also by utilizing recycled water (City of Napa, 2006). Planned additional SWP imports will be completed under existing agreements. Since the City of Napa is not planning to apply for future surface water rights, they are not expected to be directly affected by the Policy.

The other large water agency in Napa County, the City of American Canyon, serves 4,750 connections in and near the City of American Canyon (see Figure A.1 for service area location). American Canyon receives all of its water through imports from the SWP (Sacramento/San Joaquin Delta) and from the City of Vallejo. They also purchase recycled water from the City of Napa, and may purchase treated water from Napa in an emergency. The City of American Canyon plans to meet future demands by increasing the quantity of water imported through the SWP and also by utilizing recycled water (City of American Canyon, 2006). Such increases will be made under existing agreements. The City of American Canyon is not planning to apply for future surface water rights and is not expected to be directly affected by the Policy.

In Napa County, there are also a number of small water agencies, some of which rely upon the City of Napa for delivery of imports or emergency supplies. The City of Napa treats and wheels SWP water to the City of Calistoga and the Town of Yountville. In emergencies, American Canyon and St. Helena may purchase water from the City of Napa. St. Helena also has its own surface and groundwater supplies, and also has an agreement with the City of Napa for SWP water; however, they do not yet receive these imports because the required infrastructure does not yet exist (St. Helena, 2003).

The future diversion demand in Napa is 1,131 acre-feet per year, which is all expected to be supplied by small water agencies and self-supplied individuals (listed in Table 16). If this surface water is no longer available because of Policy restrictions, imported water is the most likely alternative water supply and will be adequate to satisfy the future diversion demand. Groundwater is another adequate alternative source and recycled water could also be further developed.

Actions of future water diverters in Napa could include development of imported water. Indirect environmental impacts of these actions would include those associated with construction and operation of new water delivery facilities to serve imported water to the extended service areas.

6.5 Sonoma Indirect Impacts

Sonoma County is completely contained within the Policy area and has a total land area of approximately 1,580 square miles. Sonoma County is the most populous county in the Policy area with Santa Rosa its largest city. The central portion of the county near Santa Rosa and the southern portion closer to San Francisco are urbanized areas, while the northern and coastal areas of the county are more rural and undeveloped. Sonoma County also has extensive agricultural lands.

The major large water agency in the county is the Sonoma County Water Agency (SCWA). SCWA is a wholesale purveyor that delivers water to several water districts in Sonoma County as well as Marin County. The majority of SCWA's water comes from the Russian River with storage in Lake Mendocino and Lake Sonoma. SCWA also has three groundwater wells in the Santa Rosa Plain groundwater basin (SCWA, 2006).

As of 2006, SCWA has eight main contractors and manages its relationship with these contractors under a single agreement. Main contractors in Sonoma County are the City of Cotati, City of Petaluma, City of Rohnert Park, City of Santa Rosa, City of Sonoma, Valley of the Moon Water District, and the Town of Windsor. The single main contractor in Marin County is the North Marin Water District. SCWA also sells water to other customers, including Marin Municipal Water District (SCWA, 2006).

SCWA has filed an application (A030981, Table 8) with the State Water Board to increase its diversion amount from the Russian River from 75,000 acre-feet per year to 101,000 acre-feet per year (SCWA, 2006). This application is part of SCWA's Water Supply, Transmission, and Reliability Project, which includes new facilities to support increased water. SCWA plans to have this additional water available by 2020. SCWA does not plan to rely upon increased groundwater pumping for future supplies. They do not currently supply recycled water and have no plans to in the future (SWCA, 2006).

SCWA, and therefore all its customers, may potentially be impacted by the Policy if their pending application is not approved. Therefore, impacts to large water agencies are potentially significant and may extend to Marin County. None of the SCWA main contractors in Sonoma County have their own surface water supplies. All of these contractors will rely upon SCWA for the majority of their water, so future supplies are contingent upon approval and implementation of SCWA's Water Supply, Transmission, and Reliability Project. If SCWA planned supplies are reduced, their customers with alternative water supplies may have to develop their own supplies. The City of Rohnert Park, City of Santa Rosa, City of Sonoma, and Valley of the Moon Water District (VMWD) have their own groundwater supplies, but of these, only the City of Santa Rosa and VMWD plan future increases in groundwater production (SCWA, 2000; SCWA, 2006). In addition, the Cities of Petaluma, Rohnert Park and Santa Rosa have recycled water programs (SCWA, 2006). Future water demands of SCWA's Marin County customers (NMWD, MMWD) are described in Section 6.2.

The only agency other than SCWA with a pending surface water right application is the Town of Windsor. The Town of Windsor has requested rights to 4,725 acre-feet per year of Russian River underflow. Other than SCWA and Windsor, no other agencies have future surface water projects planned, according to their most current UWMPs.

The City of Santa Rosa projects the need for approximately 6,500 acre-feet per year of new water supply for which no source is specified, but options include recycled water, additional groundwater, or additional purchases from SCWA (Santa Rosa, 2006).

Small water agencies and individual self-suppliers have pending water right applications for 16,348 acre-feet/year. This pending water demand is greater than the forecasted future demand based on growth so no new water right applications are anticipated.

Future diversion demand is large in Sonoma County with a total of 53,609 acre-feet per year for large water agencies, small water agencies and self-supplied individuals.

If the Policy restrictions reduce the water supply availability, actions of future water diverters in Sonoma could include potential increased development of groundwater or diversion of surface water under riparian rights. Indirect environmental impacts of these actions are likely given the large number of pending diversion demand. Development of recycled water or conservation may be considered as a potential alternative with lower indirect environmental impacts. If water demands cannot be met, potential urban and agricultural growth in this area may be limited without extensive conservation.

6.6 Summary of Indirect Environmental Impacts

Table 18 summarizes the potential actions that future water diverters could take if application of the Policy reduces or limits the water available for appropriation under a water right permit or license. The likelihood that these actions could give rise to potential indirect environmental impacts is assessed assuming that the total future diversion demand (Table 16) would not be available due to Policy restrictions and that all future diversion demand would have to be supplied from alternative water supplies or, if inadequate, not supplied at all.

This is a very conservative (highest; most severe) estimate of the potential actions and the indirect environmental impacts as appropriate surface water may be available to satisfy some future diversion demands. In addition, surface water supplies may already be insufficient to meet all future demands regardless of the Policy, as discussed in Section 5.0. Nonetheless, potential actions and indirect impacts are provided as an estimate of the upper limit of the potential indirect environmental impacts of the Policy.

Table 18. Assessment of Potential Indirect Environmental Impacts of Policy Restrictions

County	Potential Actions in Response to Policy Giving Rise to Potential Indirect Impact	Environmental Issue Area	Potential Indirect Environmental Impact	Potential Secondary Indirect Environmental Impact
Humboldt	Pumping of groundwater up to 30 AF/year by future water diverters.	Hydrology and Water Quality	Depletion of groundwater	
	Diversion under riparian right up to 30 AF/year by potential future water diverters.	Hydrology and Water Quality	Reduction in flows, particularly summer flows	
Marin	Water conservation up to 7,700 AF/year by future water diverters.	Land Use	Likely reduction in future development of lands for urban and agricultural uses	
	Increased development of recycled water, desalination up to 7,400 AF/year by large and some small water agencies.	Utilities and Service Systems	Likely construction and operation of new water treatment and expansion of existing delivery facilities	Various impacts related to construction and operation of new water treatment and expansion of existing delivery facilities
	Pumping of groundwater up to 300 AF/year by small water agencies and self-supplied individuals.	Hydrology and Water Quality	Depletion of groundwater	
	Diversion under riparian right up to 300 AF/year by self-supplied individuals.	Hydrology and Water Quality	Reduction in flows, particularly summer flows	
Mendocino	Water conservation up to 30,767 AF/year by future water diverters.	Land Use	Likely reduction in future development of lands for urban and agricultural uses	
	Development of recycled water, desalination up to 20,557 AF/year by large and some small water agencies.	Utilities and Service Systems	Likely construction and operation of new water treatment and potential extension of delivery facilities	Various impacts related to construction and operation of new water treatment and expansion of existing delivery facilities
	Pumping of groundwater up to 30,767 AF/year by future water diverters.	Hydrology and Water Quality	Depletion of groundwater	Reduction in flows, particularly summer flows which may harm riparian vegetation or degrade habitat for sensitive riparian and aquatic wildlife

County	Potential Actions in Response to Policy Giving Rise to Potential Indirect Impact	Environmental Issue Area	Potential Indirect Environmental Impact	Potential Secondary Indirect Environmental Impact
	Diversion under riparian right up to 10,210 AF/year by self-supplied individuals.	Hydrology and Water Quality	Reduction in flows, particularly summer flows	Reduction in flows, particularly summer flows which may harm riparian vegetation or degrade habitat for sensitive riparian and aquatic wildlife
Napa	Development of imported water up to 1,131 AF/year by future water diverters.	Utilities and Service Systems	Likely construction of new water delivery facilities to access imported water and potential extension of delivery facilities	Various impacts related to construction and operation of new water treatment and expansion of existing delivery facilities
Sonoma	Water conservation up to 56,309 AF/year by future water diverters.	Land Use	Likely reduction in future development of lands for urban and agricultural uses	
	Development of recycled water, desalination up to 30,725 AF/year by large and some small water agencies.	Utilities and Service Systems	Likely construction and operation of new water treatment and potential extension of delivery facilities	Various impacts related to construction and operation of new water treatment and expansion of existing delivery facilities
	Pumping of groundwater up to 56,309 AF/year by future water diverters.	Hydrology and Water Quality	Depletion of groundwater	Reduction in flows, particularly summer flows which may harm riparian vegetation or degrade habitat for sensitive riparian and aquatic wildlife
	Diversion under riparian right up to 16,348 AF/year by self-supplied individuals.	Hydrology and Water Quality	Reduction in flows, particularly summer flows	Reduction in flows, particularly summer flows which may harm riparian vegetation or degrade habitat for sensitive riparian and aquatic wildlife

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APPENDIX A. Maps

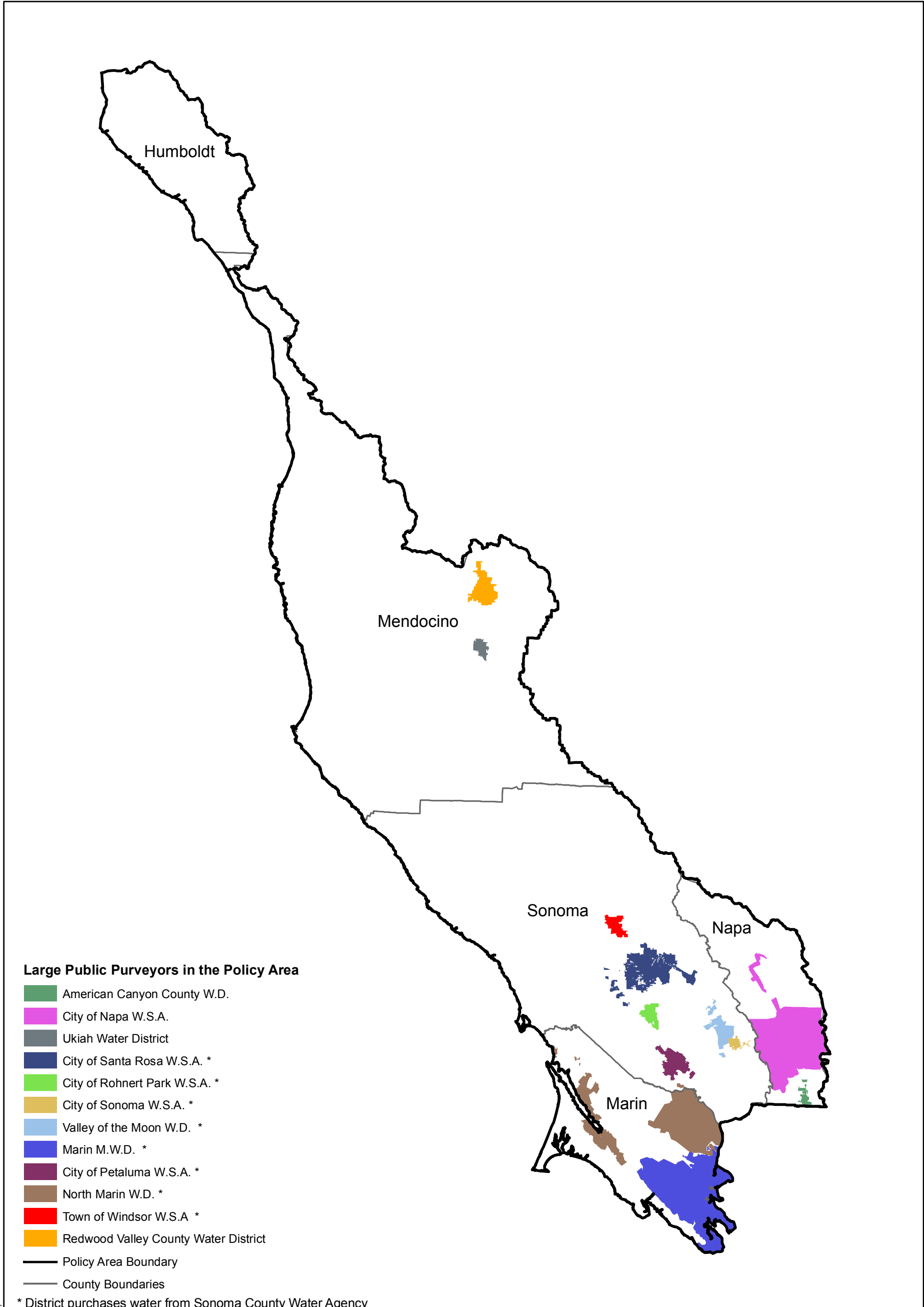
Figure A.1 Large Public Purveyors in Policy Area

Figure A.2 Permitted and Pending Water Right Applications, Points of Diversion

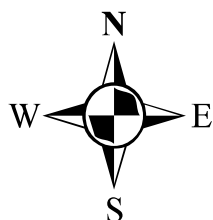
Figure A.3 Pending Water Right Applications, Points of Diversion

Figure A.4 Groundwater Basins in Policy Area

Figure A.5 DWR Detailed Analysis Units



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Large Public Purveyors in the Policy Area

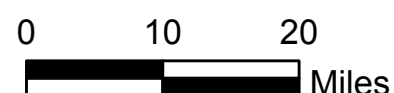
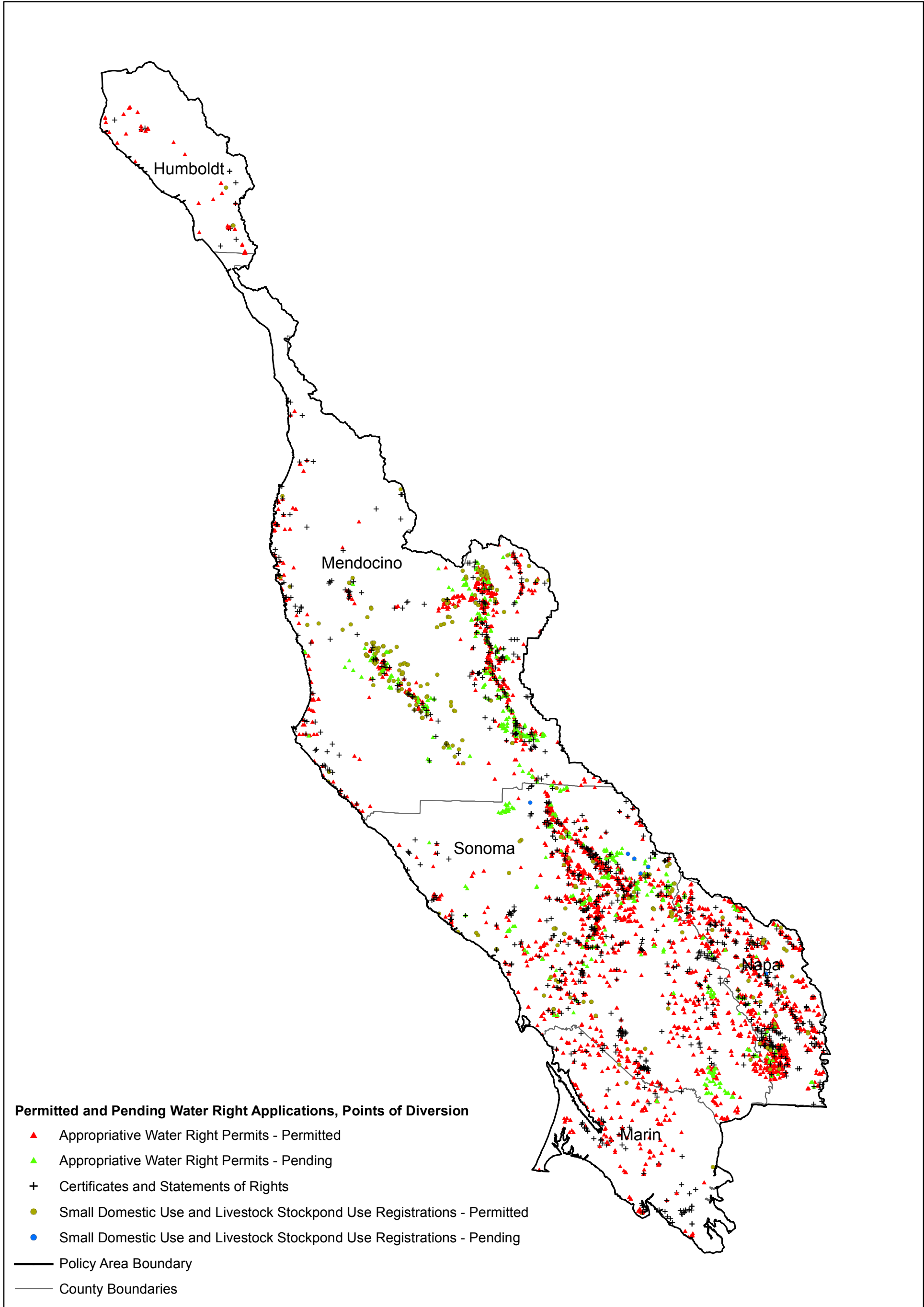


Figure A.1



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**Permitted and Pending Water Right Applications,
Points of Diversion**

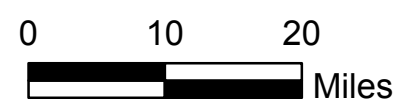
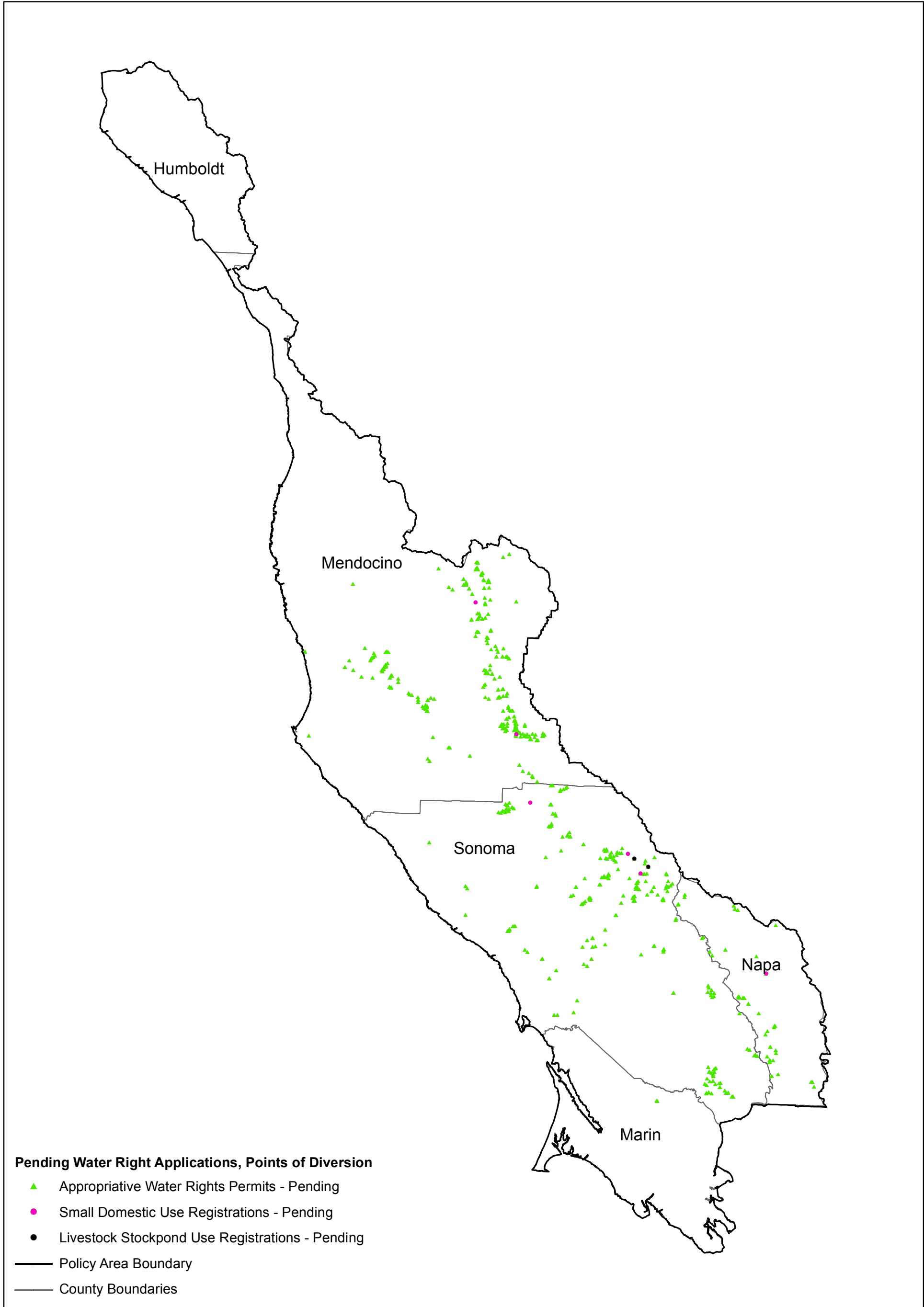
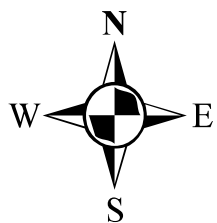


Figure A.2



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Pending Water Right Applications, Points of Diversion

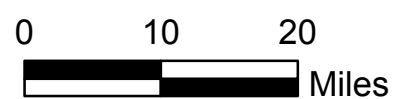
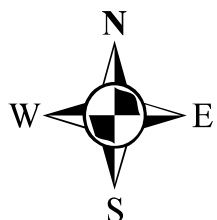
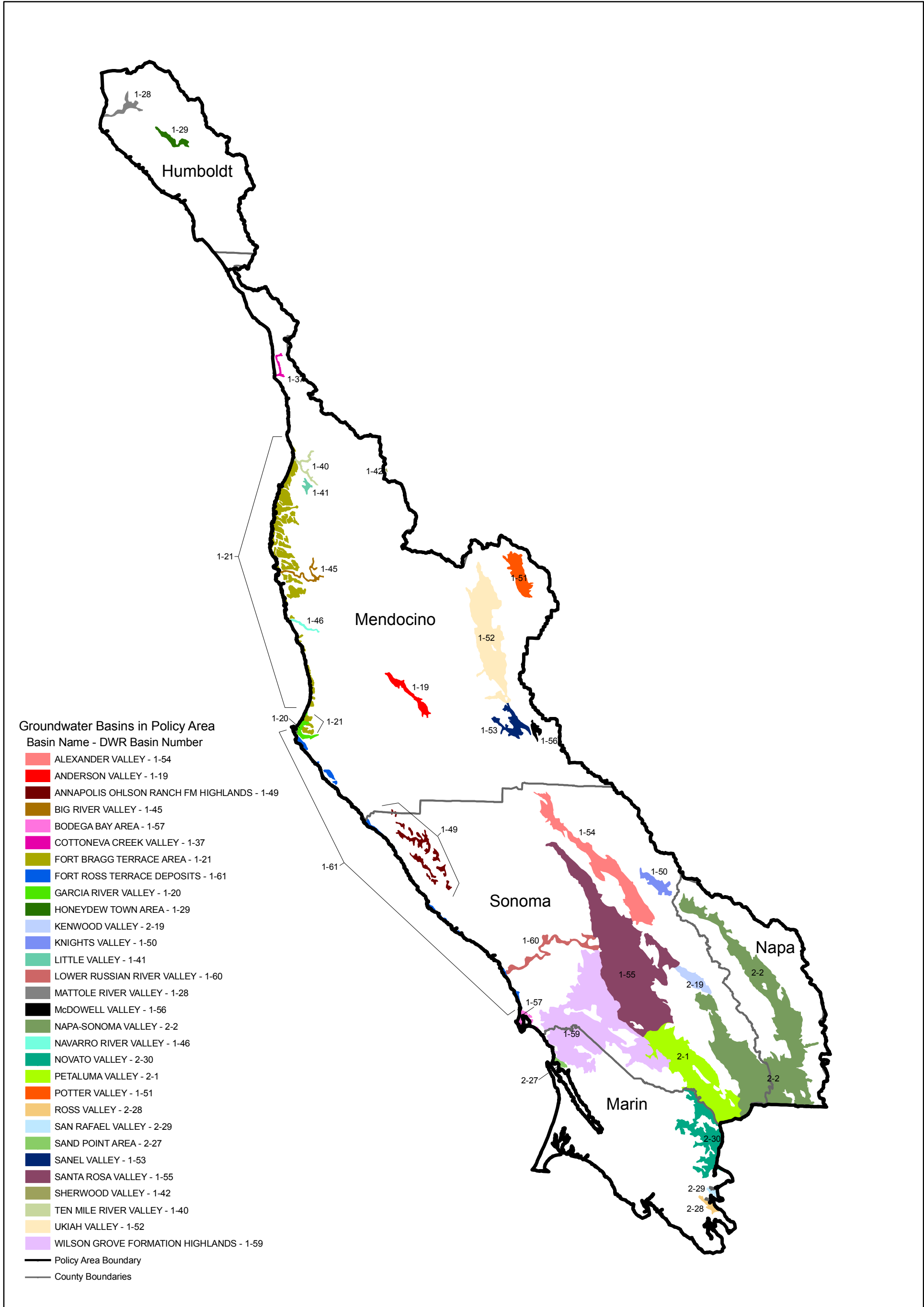
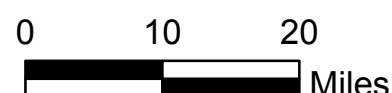
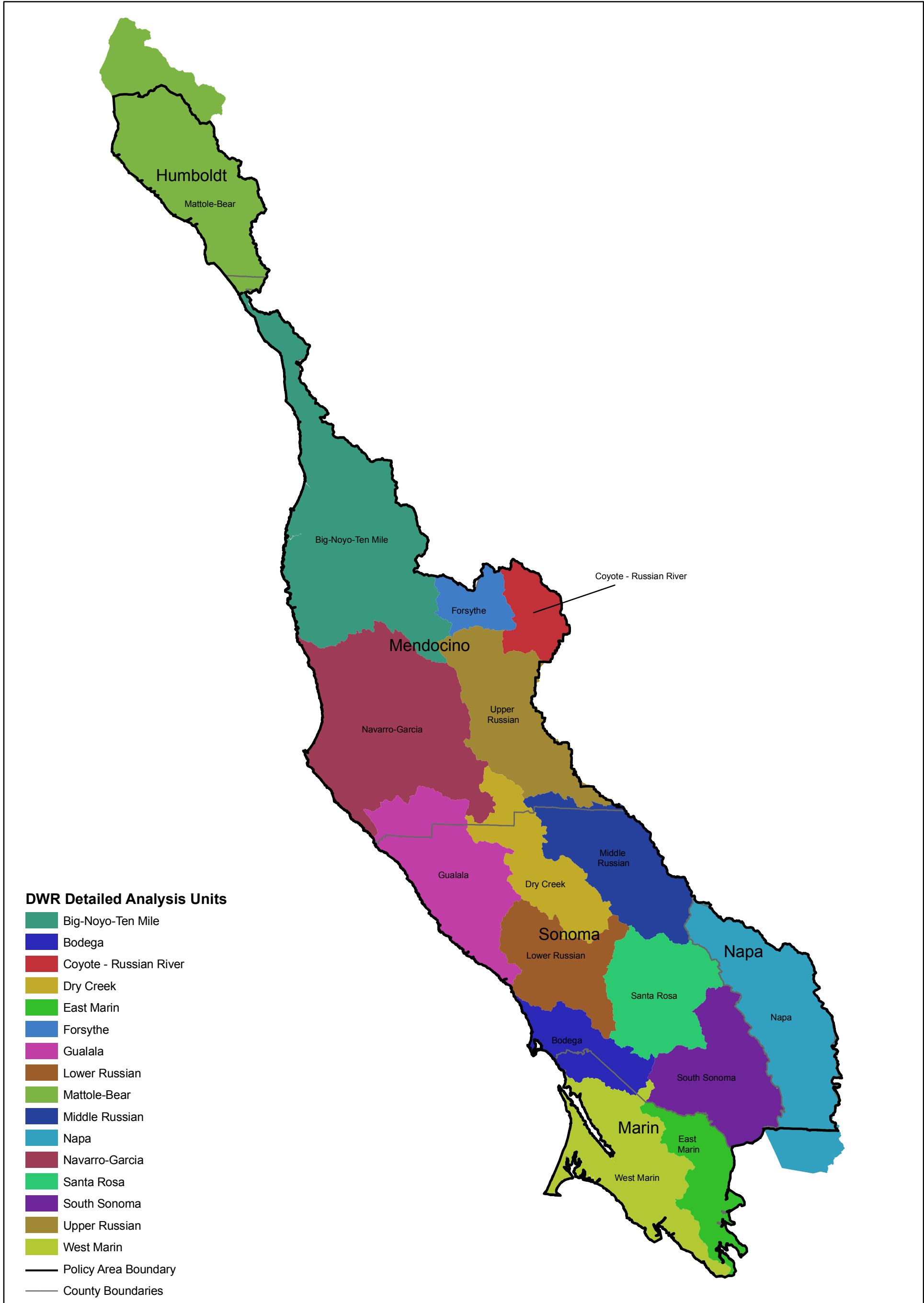


Figure A.3

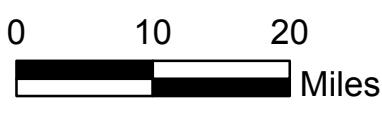
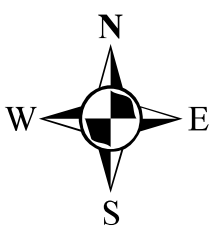


Groundwater Basins in Policy Area





DWR Detailed Analysis Units



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Figure A.5

APPENDIX B. METHODS USED TO ESTIMATE CURRENT AND FORECASTED WATER USAGE

The new diversion demand for small water agencies and self-supplied individuals is estimated based on the forecasted increase in water usage. This appendix provides a detailed description of the methods used to estimate current water usage, forecasted water usage, and forecasted increase in water usage for each county in the Policy area.

Current Water Usage

For the purposes of this report, current water usage is defined as the current water consumption from any water source, under any basis of right, estimated for the year 2000.

Data on current water usage are obtained from the USGS estimates of water usage in 2000 by county (Hutson et al. 2004). The USGS compiled water usage data in each of the five counties in the Policy area for public water users, self-supplied individual domestic and industrial users, and agricultural users. In addition, data on population served and water supply sources (either surface water or groundwater) are available from the USGS. Table B.1 summarizes the USGS data used in this analysis.

Table B.1 Summary of USGS Water Usage Data Used (from Hutson et al. 2004)

Water Use Category	Data available on source of supply?	Data available for population served?
Public use (large & small agencies)	yes	yes
Self-supplied domestic use	yes	yes
Self-supplied industrial use	yes	
Agricultural use (irrigation and livestock)	yes	

Three of the five counties (Humboldt, Mendocino, and Napa) extend beyond the Policy area. For these counties, the county-wide water usage data are apportioned using information obtained from DWR Land and Water Use Database (DWR, 2006). DWR provides population and irrigated area for Detailed Analysis Units (DAUs), which are smaller than counties. The Policy area is composed of 16 DAUs; of those, 14 are entirely within the Policy area. Figure A.5 shows the DAUs, Policy area, and county boundaries.

Population and irrigated area are estimated for each county and for the portion of the county within the Policy area (County Policy area) by summing the DWR DAU population and irrigated area. If a DAU is within the Policy area and completely within a single county, all of the DAU population and irrigated area are assigned to that county. If a DAU is in more than one county or partially outside the Policy area, DAU population and irrigated area are estimated using the relevant percentages of land area (i.e. percent of land area in each county or percent of land area within the Policy area). Total county populations calculated from the DWR DAU data were verified with figures from the United States Census Bureau. Table B.2 summarizes the irrigated land and population distributions by county.

Table B.2 Percent of Area, Population, and Irrigated Land in the Policy Area

County	Percent of Total County Area in Policy Area ¹	Percent of Total County Population in Policy Area ²	Percent of Total County Irrigated Land in Policy Area ²
Humboldt	10%	0.34%	1.3%
Marin	100%	100%	100%
Mendocino	55%	77%	90%
Napa	50%	83%	76%
Sonoma	100%	100%	100%

Note:

1. Total county area and County Policy area are measured in the GIS.
2. Total county and County Policy area population and irrigated area are estimated from DWR DAU data.

County Policy area Population and irrigated area distributions are used to apportion USGS year 2000 water usage: population distribution is used to apportion public, self-supplied domestic, and self-supplied industrial water use; and irrigated area distribution is used to apportion agricultural use. Equations [1] through [4] below describe how water usage by County Policy area is computed for each water use category:

[1] $(Public\ water\ use)_{CPA} =$

$$[(Population)_{CPA} / (Population)_{County}] * (USGS\ public\ water\ use)_{County}$$

[2] $(Self-supp.\ dom.\ water\ use)_{CPA} =$

$$[(Population)_{CPA} / (Population)_{County}] * (USGS\ self-supp.\ dom.\ water\ use)_{County}$$

[3] $(Self-supp.\ ind.\ water\ use)_{County\ Policy\ Area} =$

$$[(Population)_{CPA} / (Population)_{County}] * (USGS\ self-supp.\ ind.\ water\ use)_{County}$$

[4] $(Agricultural\ water\ use)_{CPA} =$

$$[(Irrigated\ Area)_{CPA} / (Irrigated\ Area)_{County}] * (USGS\ agricultural\ water\ use)_{County}$$

where CPA equals County Policy Area

Equations [1] – [4] use the irrigated land and population distributions for each county listed in Table B.2 and the USGS water use values from Hutston et al. (2004).

The USGS data (Hutson et al. 2004) include a single category for public water use, which includes both large and small public water agencies. USGS data also include the total public population served by that public water use category. In order to divide the USGS public water use between large (over 3,000 connections or 3,000 acre-feet per year) and small water agencies, service area population data provided in the large agencies' UWMPs is used, along with total

publicly served population provided by USGS. Large agency public water use in each County Policy area is estimated as the percentage of the public population served by large agencies, multiplied by total public water use, as described by equation [5]:

$$[5] \text{ (Large Agency Public Water Use)}_{CPA} = \frac{(\text{Population, Large Agencies})_{CPA}}{(\text{Population, Total Public})_{CPA}} \times (\text{Public Water Use})_{CPA}$$

where CPA equals County Policy Area

In equation [5], “Population, Large Agencies” is obtained from the agencies’ most recent UWMPs, “Population, Total Public” in the County Policy area is estimated based on DWR DAU data, and “Public Water Use” is obtained from equation [1].

Small agency public water use in each County Policy area is computed by subtracting large agency public water use, obtained from equation [5], from total public water use, obtained from equation [1]. Table B.3 summarizes total public water use, large agency public water use, and small agency public water use by county.

Table B.3 Public Water Use Served by Large and Small Water Agencies in 2000

County	Total Public Water Use (AF/year)	Large Agency Public Water Use (AF/ year)	Small Agency Public Water Use (AF/year)
Humboldt	128	0	128
Marin	42,213	41,462	751
Mendocino	8,659	3,896	4,763
Napa	17,869	16,942	927
Sonoma	62,910	52,925	9,985
Total	131,779	114,598	17,181

Large agency public water use can also be estimated from year 2000 water use reported in the large agencies’ UWMPs. However, this method for estimating large agency public water use was deemed less reliable than the method used in Table B.3 for a few reasons. First, UWMP reported water usage may include unaccounted for system losses and agricultural water use. In addition, due to the number of UWMPs and variety of publication dates, water usage is not always reported consistently. For example, the quantity of water purchased by MMWD from SCWA is not given and has to be estimated from 2010 projected use. Also, NMWD did not report usage for 2000, so 1999 usage has to be used to estimate 2000 usage. However, for comparison, year 2000 water use is estimated from agencies’ most recent UWMPs to be approximately 116,300 acre-feet per year for the Policy area (Humboldt 0; Marin 42,218; Mendocino 4,100; Napa 17,635; and Sonoma 52,379 acre-feet per year). These values estimated from the UWMPs reported usage compare well to the large agency public water use estimated from USGS data and reported in Table B.3. Because the calculated values in Table B.3 require fewer assumptions and

are thought to be more accurate than estimating usage from the UWMP reported values, the Table B.3 values are used to estimate the large agency public water use.

Current water usage supplied by small water agencies and individuals (Current Water Usage, Table 14) in each County Policy area is computed as the sum of small agency public water use, self-supplied domestic water use, self-supplied industrial water use, and agricultural water use as described by equation [6]:

$$[6] \text{ (Water Use, small agencies and individuals)} = \text{(Small Agency Public Water Use)} + \text{(Self-supp. dom. water use)} \\ + \text{(Self-supp. ind. water use)} + \text{(Agricultural water use)}$$

In equation [6], “Small Agency Public Water Use” is estimated using the values in Table B.3 and “Self-supp. dom. water use”, “Self-supp. ind. water use” and “Agricultural water use” are obtained from equations [2] through [4].

All agricultural use is assumed to be self-supplied. No data are available to determine the portion of agricultural water which is self-supplied or purchased from water purveyors.

Forecasted Water Usage

For the purposes of this report, forecasted water usage is defined as the total predicted water consumption from any water source, under any basis of right, estimated for the year 2030.

Forecasted water usage by small water agencies and individuals in the Policy area (Forecasted Water Usage, Table 14) is estimated from current water usage multiplied by the growth rates projected in the California Water Plan 2030 Quantified Future Scenarios (Groves et al, 2005).

The 2030 Quantified Future Scenarios include growth rates for urban water usage and agricultural water usage for all of the hydrologic regions in California for the period from 2000 to 2030. Growth rates are provided as percent growth over the 30-year period and are not annual growth rates. For example, if water use in the year 2000 was 100 acre-feet per year and the growth rate is 37%, water use in 2030 would be estimated to be 137 acre-feet per year. The Policy area falls in two hydrologic regions, the North Coast and San Francisco Bay. Three future 2030 scenarios are quantified in the California Water Plan; the largest growth rate of the three scenarios is used to provide a conservative (highest) estimate of potential growth. Table B.4 lists the growth rates for urban and agricultural water use.

Table B.4 Water Use Growth Rates from 2030 Quantified Scenarios (Groves et al. 2005)

Hydrologic Region	Maximum growth rate, urban water use	Maximum growth rate, agricultural water use
North Coast	46.7%	-1.1%
San Francisco Bay	37.2%	0.9%

Humboldt and Mendocino Counties are in the North Coast hydrologic region, while Marin and Napa are in the San Francisco Bay hydrologic region. Sonoma County is in both regions; to be conservative, the higher of the two growth rates for each region was used for Sonoma County.

Urban growth rates are applied to both current small public water usage and self-supplied domestic and industrial water usage to obtain forecasted urban usage in each county. Agricultural growth rates are applied to current agricultural water usage to obtain forecasted agricultural usage in each county. In the case of negative growth rates, no growth is assumed (i.e. forecasted water usage equals current water usage). Total forecasted water usage by small agencies and individuals is calculated from the sum of forecasted amounts for small public usage, self-supplied domestic and industrial usage, and all agricultural usage.

Forecasted Increase in Water Usage

For the purposes of this report, forecasted increase in water usage is defined as the predicted increase in water consumption from any water source, under any basis of right, estimated for the year 2030. Forecasted increase in water usage is estimated as the forecasted water usage minus the current water usage for each water use category and county.

Table B.5 shows the percentage of water supplied from groundwater for public use, self-supplied domestic and industrial, and agricultural water reported by the USGS for the year 2000 (Hutson et al. 2004). For this analysis, it is assumed that the percent of the forecasted increase in water usage provided by groundwater from each category is the same as the percentage of water supplied from groundwater as shown in Table B.5. It is also assumed that water not supplied by groundwater would be supplied from surface water.

Table B.5 Percentage of Supply from Groundwater in 2000 for Public Water Use, Self-Supplied Domestic and Industrial Water Use, and Agricultural Water Use (from Hutson et al. 2004)

County	Percent of Public Use from Groundwater	Percent of Self-Supplied Industrial & Domestic Use from Groundwater	Percent of Agricultural Use from Groundwater
Humboldt	45%	95%	55%
Marin	41%	54%	31%
Mendocino	61%	90%	37%
Napa	2%	98%	24%
Sonoma	1%	94%	22%

Summary

Table B.6 lists current, forecasted, and forecasted increase in water usage by county for the four water suppliers: public water use (large and small water agencies); self-supplied water use; and agricultural water use.

Table B.7 lists current, forecasted, and forecasted increase in water usage by county for small water agencies, self-supplied individuals and agricultural users. Forecasted increase in water usage is divided between groundwater and surface water using the percentage of supply from groundwater for each water category as shown in Table B.5.

Table B6. Summary of Current, Forecasted, and Forecasted Increase in Water Usage

County / Water Use Category	Current Water Usage (AF/year)	Forecasted Water Usage (AF/year)	Forecasted Increase in Water Usage (AF/year)
Humboldt			
Large Water Agencies	0	0	0
Small Water Agencies	128	187	59
Self-Supplied Domestic and Industrial	9	13	4
Agricultural (Irrigation and Livestock)	1,112	1,112	0
Subtotal Humboldt	1,249	1,312	63
Marin			
Large Water Agencies	41,462	56,899	15,437
Small Water Agencies	751	1,030	279
Self-Supplied Domestic and Industrial	515	707	192
Agricultural (Irrigation and Livestock)	7,090	7,154	64
Subtotal Marin	49,818	65,790	15,972
Mendocino			
Large Water Agencies	3,896	5,713	1,817
Small Water Agencies	4,763	6,986	2,223
Self-Supplied Domestic and Industrial	2,195	3,219	1,024
Agricultural (Irrigation and Livestock)	43,677	43,677	0
Subtotal Mendocino	54,531	59,595	5,064
Napa			
Large Water Agencies	16,942	23,250	6,308
Small Water Agencies	927	1,272	345
Self-Supplied Domestic and Industrial	7,018	9,630	2,613
Agricultural (Irrigation and Livestock)	45,469	45,883	413
Subtotal Napa	70,356	80,035	9,679
Sonoma			
Large Water Agencies	52,925	77,801	24,875
Small Water Agencies	9,985	14,677	4,693
Self-Supplied Domestic and Industrial	16,834	24,746	7,912
Agricultural (Irrigation and Livestock)	90,070	90,889	819
Subtotal Sonoma	169,814	208,113	38,299
Total	345,768	414,846	69,077

Table B7. Summary of Current, Forecasted, and Forecasted Increase in Water Usage by Small Water Agencies and Self-Supplied Individuals¹

County / Water Use Category	Current Water Usage (AF/year)	Forecasted Water Usage (AF/year)	Forecasted Increase in Water Usage (AF/year)	Forecasted Increase in Water Usage (AF/year)	
				From Groundwater	From Surface Water
Humboldt					
Small Water Agencies	128	187	60	27	33
Self-Supplied Domestic and Industrial	9	13	4	4	0
Agricultural (Irrigation and Livestock)	1,112	1,112	0	0	0
Subtotal Humboldt	1,249	1,312	64	31	33
Marin					
Small Water Agencies	751	1,030	280	115	165
Self-Supplied Domestic and Industrial	515	707	192	104	88
Agricultural (Irrigation and Livestock)	7,090	7,154	64	20	44
Subtotal Marin	8,356	8,891	536	239	296
Mendocino					
Small Water Agencies	4,763	6,986	2,223	1,351	872
Self-Supplied Domestic and Industrial	2,195	3,219	1,024	923	101
Agricultural (Irrigation and Livestock)	43,677	43,677	0	0	0
Subtotal Mendocino	50,635	53,882	3,247	2,275	973
Napa					
Small Water Agencies	927	1,272	345	8	337
Self-Supplied Domestic and Industrial	7,018	9,630	2,613	2,561	52
Agricultural (Irrigation and Livestock)	45,469	45,883	413	101	312
Subtotal Napa	53,414	56,785	3,371	2,670	701
Sonoma					
Small Water Agencies	9,985	14,677	4,693	38	4,654
Self-Supplied Domestic and Industrial	16,834	24,745	7,912	7,459	453
Agricultural (Irrigation and Livestock)	90,070	90,889	819	177	642
Subtotal Sonoma	116,889	130,312	13,423	7,674	5,749
Total	230,541	251,183	20,641	12,890	7,752

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APPENDIX C. FULLY APPROPRIATED STREAMS

Table C.1. Declaration of Fully Appropriated Stream Systems²

County	Decision	Stream	Tributary	Season	Critical Reach
Marin	1081	Unnamed Stream (SW ¹ / ₄ SW ¹ / ₄ , Sec 32, T5N, R9W, MDB&M)	Walker Creek thence Tomales Bay	06/01-10/31	From the confluence of Walker Creek and Keyes Creek upstream
Marin	1453	Unnamed Stream (NW ¹ / ₄ NW ¹ / ₄ , Sec 26, T1N, R8W, MDB&M)	Pacific Ocean	01/01-12/31	From the mouth of the unnamed stream at the Pacific Ocean upstream
Marin	1458	Unnamed Stream (aka Fish Hatchery Creek) (NW ¹ / ₄ NE ¹ / ₄ , Sec 34, T3N, R9W, MDB&M)	Tomales Bay	01/01-12/31	From the confluence of Fish Hatchery Creek and Tomales Bay upstream
Marin	1582	Lagunitas Creek	Tomales Bay	05/01-11/30	From the confluence of Lagunitas Creek and Tomales Bay upstream
Mendocino	*	Unnamed Stream (SE ¹ / ₄ NE ¹ / ₄ , Sec 13, T17N, R18W, MDB&M)	Pacific Ocean	06/01-09/30	From the mouth of the unnamed stream at the Pacific Ocean upstream
Mendocino	*A26951, A27929	Brush Creek	Pacific Ocean	05/01-10/31	From the mouth of Brush Creek at the Pacific Ocean upstream
Mendocino	0944	Unnamed Stream (SE ¹ / ₄ SW ¹ / ₄ , Sec 12, T14N, R17W, MDB&M)	Pacific Ocean	04/01-10/31	From the mouth of the unnamed stream at the Pacific Ocean upstream
Mendocino	1009	Unnamed Stream (Sec 12, T14N, R15W, MDB&M)	Navarro River	05/15-10/31	From the confluence of the unnamed stream and the Navarro River upstream
Mendocino	1107	Reynolds Creek	Pacific Ocean	06/01-10/31	From the mouth of Reynolds Creek at the Pacific Ocean upstream
Mendocino	1110, 1610, WR 74-30	Russian River	Pacific Ocean	07/01-10/31	Refer to footnote ³
Mendocino	1198	Unnamed Spring stream (NW ¹ / ₄ SE ¹ / ₄ , Sec 20, T16N, R11W, MDB&M)	Unnamed Stream thence Cold Creek	05/15-11/30	From the confluence of the unnamed and Cold Creek upstream

² excerpt from Water Right Order 98-09 (SWRCB 1998)

³ At the point where the boundary area of the Mendocino County Russian River Flood Control and Water Conservation Improvement District crosses the Russian River which is located a short distance north of the Mendocino/Sonoma County line upstream, excluding all tributaries with the exception of (1) the West Fork Russian River and (2) the East Fork Russian River excluding Potter Valley (refer to SWRCB Order WR 74-30). The above restrictions on the main stem of the Russian River do not apply to uses commences prior to January 28, 1949.

County	Decision	Stream	Tributary	Season	Critical Reach
Mendocino	1215	Slick Rock Creek	Pacific Ocean	07/01-10/31	From the mouth of Slick Rock Creek at the Pacific Ocean upstream
Mendocino	1281	Anderson Creek	Navarro River	08/01-09/30	From the confluence of Clow Canyon and Anderson Creek upstream
Mendocino	1516	Robinson Creek	Russian River	07/01-10/31	From the confluence of Robinson Creek and the Russian River upstream
Mendocino	1545	Feliz Creek	Russian River	08/01-10/31	From the confluence of Feliz Creek and the Russian River upstream
Mendocino	1555	Marsh Creek	Albion River	04/01-10/31	From the confluence of Marsh Creek and Albion River upstream
Napa Napa	0760	Bell Creek	Napa River	04/15-11/15	From the confluence of Bell Canyon and the Napa River upstream
	0798	Unnamed Spring (SE¼ SE¼, Sec 7, T8N, R5W, MDB&M)	Conn Creek	07/15-09/30 (f)	From the confluence of Conn Creek and Hennessey Lake upstream
	1404	Napa River	San Pablo Bay	05/15-10/31	At Trancas Street located within Section 34, T6N, R4W, MDB&M)
	0302	Mark West Creek	Russian River	05/01-10/31	Mark West Creek from where it crosses Highway 101 located in Section 29, T8N, R8W, MDB&M upstream (1)
Sonoma	0663	Green Valley Creek	Russian River	06/15-10/31	From the confluence of Green Valley Creek and the Russian River upstream (1)
Sonoma	0709	Atascadero Creek	Green Valley Creek	06/15-10/31	From the confluence of Green Valley upstream (1)
Sonoma	0852, 0691	Laguna De Santa Rosa	Mark West Creek thence Russian River	06/01-10/31	From Laguna De Santa Rosa and North of Molino (Occidental) Road located within Section 26, T7N, R9W, MDB&M upstream (1)
Sonoma	1004	Sonoma Creek	San Pablo Bay	07/01-09/30	On Sonoma Creek below the gaging station located at Boyes Hot Springs upstream (1)
Sonoma	1038	Santa Rose Creek	Laguna De	06/01-	From Santa Rosa Creek

County	Decision	Stream	Tributary	Season	Critical Reach
			Santa Rosa	10/31	located at the point within Section 18, T7N, R8W, MDB&M) upstream (1)
Sonoma	1537	Unnamed Stream (SW¼ SW¼ , Sec 5, T9N, R8W, MDB&M)	Russian River	06/01-10/31	From the point of diversion immediately downstream and upstream (1)
Sonoma	1608	Unnamed Stream (SE¼ SE¼ , Sec 36, T11N, R10W, MDB&M)	Gill Creek thence Russian River	06/01-09/30	From the confluence of Gill Creek and the unnamed stream located within Projected Section 1, T10N, R10W, MDB&M upstream (1)

APPENDIX D. COUNTY GENERAL PLANS

The General Plans of the five counties in the Policy area were consulted for information on future water use, population growth, and agricultural growth. Currently, each county is in the process of updating its General Plan. The status of each county's update, as of April 2007, is given in Table D.1.

Table D.1. Status of General Plan Updates for Five Counties in Policy Area

County	Adoption Date of Current General Plan	General Plan Update in Progress?	Projected Adoption Date of General Plan Update	Completed Items of General Plan Update				
				Background Reports	Draft EIR	Draft General Plan	Final EIR	Final General Plan
Humboldt	1985 ¹	Yes	2008	X				
Marin	1994	Yes	2007	X	X	X		
Mendocino	1981	Yes	2008	X				
Napa	1983	Yes	2007	X	X	X		
Sonoma	1989	Yes	2007	X	X	X		

¹ Volume II of the Humboldt General Plan consists of multiple Community Plans and Coastal Plans whose adoption dates vary between 1985 and 2002

For all counties in the Policy area, neither the adopted General Plan nor the General Plan Update Documents contain any water demand or use projections for the future. Information in Urban Water Management Plans (UWMPs) submitted by cities and agencies provides far more detailed information on future water use and remains the most informative planning document for future water use by cities and large agencies.

However, each county's General Plan was assessed for future population projections. Forecasted increase in water usage described in section 4.2.2 of this report is based on water use growth rates from the California Water Plan 2030 Quantified Future Scenarios (Groves et al, 2005). Here, the water use growth rates are compared to population growth rates to ensure that the estimates of forecasted increase are appropriate.

Population growth is an essential part of a county's General Plan, as it relates to all elements of the plan. Since each county's adopted General Plan is outdated (none more recent than 1994), completed items of their General Plan Update were consulted for this information.

Population Growth Estimated in General Plans

The planning horizons used in the General Plan documents of the five counties in the Policy area are not uniform. Therefore, to make meaningful comparisons of growth, annual growth rates are used in this analysis.

Estimates for Humboldt County population growth are provided by their 2004 Housing Element Update, which gives population growth between 2000 and 2010 (Humboldt, 2004). The projected annual growth rate over this period is 0.70%.

Marin County’s Revised Public Review Draft of their Countywide Plan states that “Potential growth in population in Marin County is limited. Between 2000 and 2040, the California Department of Finance projects that Marin County as a whole will grow at an average annual rate of 0.5 percent....” (Marin, 2005).

Population projections for Mendocino County are provided in one of their background reports (Pacific, 2004). Low and high estimates of population growth between 2000 and 2025 are given; the average of these estimates is an annual growth of 1.21% per year.

Napa County’s Draft General Plan states that “Between 2005 and 2030, the Association of Bay Area Governments (ABAG) projects that Napa County will add 17,000 new residents...” (Napa, 2007). Based on a 2006 population of 134,444 people, this equates to an annual future growth rate of about 0.5%. However, the 2004 Napa Housing Element (Napa, 2004) indicates the rate could be as high as 0.7% annually.

In Sonoma County’s Draft General Plan, population projections from the Land Use Element give a projected annual growth rate from 2000 to 2020 of 0.88% per year (Sonoma, 2006).

Table D.2 shows the urban water use growth rates used in this report to estimate forecasted increase in water usage, and compares these water use growth rates with the population growth rate from each county’s General Plan. Agricultural water use has not been included in this table since it is not a function of population growth. In general, growth of Domestic, Commercial, Municipal and Industrial (DCMI) water use should increase at a rate similar to population. In fact, due to improving methods of water conservation, water use is often expected to increase at lower rates than population. Table D.2 shows that in all cases, population growth rate is less than water use growth rate. This indicates that the water use growth rates used in this report’s analysis are likely conservative.

Table D.2 Comparison of 2030 Quantified Future Scenario water use growth rates (Groves et al, 2005) to population growth rates from county General Plans

County	Rates from 2030 Quantified Scenarios (Groves et al, 2005)		Projected Future Annual Population Growth Rate From County General Plan
	Urban Water Use Growth Rate, 2000 to 2030	Average Annual Urban Water Use Growth Rate	
Humboldt	46.7%	1.3%	0.70%
Marin	37.2%	1.1%	0.5 %
Mendocino	46.7%	1.3%	1.21%
Napa	37.2%	1.1%	0.7 %
Sonoma	46.7%	1.3%	0.88%

Agricultural Land Use Growth

The counties' General Plan Update documents do not provide quantitative estimates of how irrigated land is expected to change in the future. Instead, qualitative statements from each county's General Plan are given, to illustrate that, in general, growth of agricultural lands is not expected throughout the Policy area.

Statements from the Humboldt County General Plan Update, Agricultural Resources Report (Humboldt, 2003) indicate that the current trend is a loss of agricultural lands and that General Plan policies will try to prevent loss and maintain existing agricultural land. Specifically, the report states, "Conversion of farmland to other uses has been the trend in recent decades. Despite protection policies in the Framework Plan, the conversion of agricultural lands to non-agricultural uses has been occurring at an alarming rate. Approximately 3,000 to 5,000 acres of agricultural lands has been converted to non-agricultural use each year since 1964."

Marin County's draft General Plan, Natural Systems and Agriculture Element, indicates that agricultural land will decline in the future and that policies of the General Plan are designed to "protect" and "maintain" current lands. Example statements in the plan are that the "Countywide plan contains policies and programs that seek to protect agricultural land and operations and maintain agricultural use", and that "Residential demand is threatening to agriculture" (Marin, 2005).

Mendocino County's Background Report (Pacific, 2003) states that previous trends indicate that land in farms decreased by 12% from 1992 to 1997; however, irrigated land increased by 7%. Grape cropping has increased, but fruit and nut crops have decreased. Also, livestock farming is declining: "...sheep farming has been on a steep constant decline and is in danger of becoming extinct"; the report states that the same decline may occur in the future in the cattle industry. The Mendocino Draft General Plan has not been published yet and the Background Report does not clearly indicate whether overall agricultural land use is expected to increase. From the statements above, grape farming may increase, but may do so at the expense of other crops; livestock farming is very likely to decrease.

Napa County's Public Review Draft of General Plan (Napa, 2007) does not provide any specific information on historical trends of irrigated land or future predicted trends. However, the document recognizes development pressures on agricultural lands and has developed planning goals to "Preserve existing agricultural land uses". This implies that future urban, residential, and industrial growth will hinder potential growth in agricultural lands.

Sonoma County's Draft 2020 General Plan (Sonoma, 2006) is similar to Napa County's, in that it does not provide any specific information on historical future predicted trends for irrigated land. However, the Plan recognizes competing interests of urbanization and farmland and has developed policies to sustain existing agricultural lands. Most policies seem designed to protect the status quo, and not promote growth.

The agricultural water use growth used in this report to estimated forecasted water usage is obtained from Groves et al (2005). Growth rates used are 0.9% for Marin, Napa, and Sonoma counties, and 0% for Humboldt and Mendocino counties (Groves et al, 2005). These are growth rates for the period from 2000 to 2030, and are not annual growth rates. Information on agricultural lands gathered from the county General Plans indicates that agricultural growth is not expected. Therefore, the agricultural water use growth rates used in this report are consistent with the qualitative statements in the county General Plans, and are likely conservative.

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