Appendix X

Regional Treatment Plant Wastewater Flow Projection Report

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June 16, 2014

Mr. Keith Israel
General Manager
Monterey Regional Water Pollution Control Agency
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Monterey CA 9

Subject: RTP Wastewater Flow Projection Report

Mr. Israel:
This report presents the results of Brezack & Associates Planning, LLC (B&AP) development of forty-year wastewater flow projections to the Regional Treatment Plant (RTP). The purpose of this investigation has been to rationalize, quantify and extrapolate the observations by MRWPCA that influent to the RTP has been decreasing for the last several years.

Key to our analysis was the assistance of several MRWPCA staff including Mr. Robert Holden and Mrs. Jennifer Gonzales to whom we are grateful for their reviews of draft documents and provision of vital data.

Factors contributing to reduced wastewater flows have previously been assumed to include: the economic downturn to the regional economy; the high cost of urban water throughout the Monterey Peninsula; and, increased use of interior water conservation best management practices.

Rather than speculate on the future impact of potential causes, it was agreed that the project would base its forecasts of wastewater flows on the following two key data: population and per capita wastewater generation in the service area. A spreadsheet model was developed using historical population and flow data to produce a range of potential projections through the year 2055.

RTP flow is projected to decrease to a range of 19.2 to 17.1 mgd. After 2030, flows may increase to a range of highs between 24.3 and 22.7 mgd. The model included in this report facilitate MRWPCA's testing of data input values and the development of additional flow scenarios.

Sincerely,

James M. Brezack
President & Project Director

MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY

40-Year Wastewater Flow Projections Report 2014 - 2054

June 2014

Prepared by Brezack & Associates Planning, LLC

Monterey Regional Water Pollution Control Agency 40-Year Wastewater Flow Projections Report
Brezack & Associates Planning
40-Year Flow Projections Report.docx
JN: 14-002

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LIST OF ABBREVIATIONS

AWWARF .....American Water Works Association Research Foundation (Water Research Foundation)

B&AP.....Brezack & Associates Planning

CDP.....Census Designated Place

EMC.....EMC Planning Group Incorporated

GPCD.....Gallons per Capita per Day

mgd .....Million Gallons per Day

MRWPCA.....Monterey Regional Water Pollution Control Agency

RTP .....Regional Treatment Plant

EXECUTIVE SUMMARY

The Monterey Regional Water Pollution Control Agency (MRWPCA) engaged Brezack & Associates Planning (B&AP) to produce a forty-year projection of wastewater flows to the MRWPCA Regional Treatment Plant (RTP). This report details the development and results of those projections.

MRWPCA staff has observed the trend of decreasing wastewater flows influent to the RTP. If this condition continues, available capacity at the RTP can become a valuable benefit to the service area in the following ways:

- New wastewater treatment capacity that can be allocated to new and planned development projects.
- Wastewater treatment capacity that can be reallocated to member entities with the greatest need.
- Treatment of dry weather flows from storm drains and the reduction or elimination of nuisance discharges.
- Treatment of wet weather flows from storm drains and a decrease in discharges to the ocean and to Areas of Special Biological Significance (ASBS).
- Increases in wastewater and storm water that can be recycled to serve as source waters for agricultural and landscape irrigation and groundwater replenishment.

Accurate predictions of long-term capacity availability at the RTP is a critical first step in planning for these and other benefits.

The estimation of long-range projections in wastewater flows is an imprecise science subject to numerous variables. The longer the planning horizon is, the more difficult it becomes to make reliable projections. Typically, wastewater projections in California are made within the ten-year horizon of a City's General Plan and or the twenty-year horizon of an Urban Water Management Plan. This investigation attempts to estimate projected wastewater flows forty years into the future, past the anticipated build-out of the service area.

Demographics, employment, water use and conservation trends, as well as local and regional economic factors all play a role in determining the volume of wastewater generated by any community. The MRWPCA service area is not a homogenous community that can be easily characterized. The economic and demographic characteristics of each of the twelve communities that comprise the MRWPCA regional wastewater service area results in additional challenges in predicting the total influent flows to the RTP.

Therefore, one important element of this investigation was the development of a simple process to regularly review and update its conclusions. This was done by the preparation of a spreadsheet model presented in Appendix G of this report.

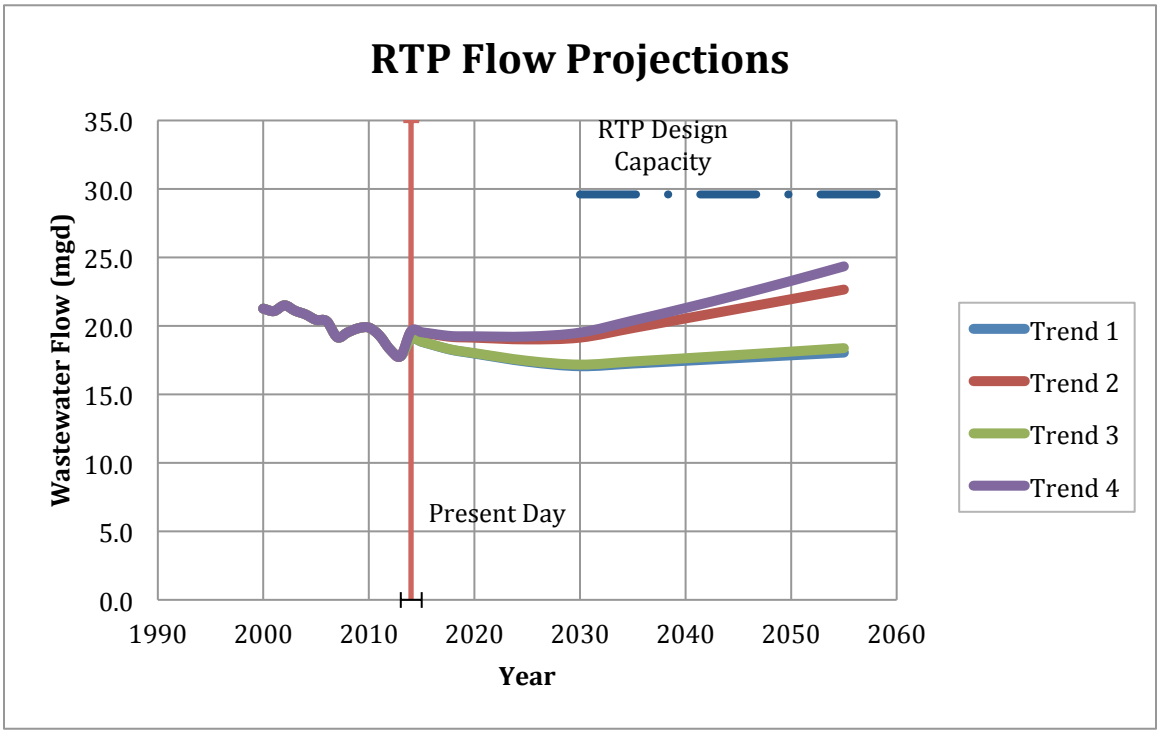
Historical population and wastewater flow data was used to create a spreadsheet model to calculate a range of potential wastewater flow projections. Using recorded pump station data, average wastewater flow generated per person in units of gallons per capita per day (GPCD) was calculated for the years 2000 through 2012. Trends in population and GPCD were projected forward to the year 2055. Wastewater flow projections for each community in MRWPCA's service area were calculated from these trends.

The conclusion of this investigation is that wastewater flows to the RTP are projected to decrease to a minimum value in the year 2030. This decease is predicted as the result of increased water conservation, raising water rates and regional economic factors. Wastewater flows to the RTP may then range between 17.1 and 19.2 mgd. This investigation projected four trends of population growth based on data (Table ES-1). The high RTP wastewater flow trends that may occur in 2055 due to projected population growth are 22.7 and 24.3 mgd. The forty-year projected wastewater flows to the RTP are shown in Figure ES - 1. By 2055, the high trend values of average wastewater flows to the RTP are projected to range from 82% to 77% of design capacity, leaving 23% to 18% capacity availability at the RTP for treatment of additional wastewater, dry weather, or storm water flows.

Table ES - 1: Description of Population Trends Used to Produce Range of Wastewater Flow Projections

Legend Entry	Description
Trend 1	A linear curve is fitted to data from year 2000 to 2012
Trend 2	A linear curve is fitted to data from year 2006 to 2012
Trend 3	An exponential curve is fitted to data from year 2000 to 2012
Trend 4	An exponential curve is fitted to data from year 2006 to 2012

Figure ES - 1: RTP Wastewater Flow Projections



The following recommendations are made to further refine the wastewater projections for the RTP and the service area communities:

1. Routinely make updates to the flow projections by recording and projecting pump station flows and the populations by community. This should be done on a three to five year cycle.
2. Recalibrate the models as new data becomes available.
3. Use a Geographic Information System (GIS) to refine service area populations and sewershed boundaries to determine precisely any differences in the boundaries of MRWPCA service areas, areas contributing flow to each pump station, and the city and census designated place (CDP) boundaries defined by the U.S. Census Bureau.
4. Conduct wastewater flow monitoring and acquire potable water service connection information at the Seaside and Moss Landing pump stations to validate wastewater flow data.
5. Conduct wastewater flow monitoring for various land use types to acquire flow data per sewer connection by land use type.
6. Consult a demographer with knowledge of regional trends to produce additional population and GPCD projections.

7. Perform a study of the Fort Ord Pump Station, to refine its contributing sewershed. This will allow for the projection of population growth, GPCD decline, and wastewater flow specific to the Ord Pump Station.

1 PURPOSE

The Monterey Regional Water Pollution Control Agency (MRWPCA) retained Brezack & Associates Planning (B&AP) to prepare a 40-year projection of wastewater flow from its service area to the Regional Treatment Plant (RTP) in Marina, California. The RTP has a permitted treatment capacity of 29.6 mgd. Influent flow to the RTP has been decreasing over the past several years and is believed to be the result of regional economic conditions and water conservation factors. This report presents the development and results of the 40-year wastewater flow projections to the RTP.

A spreadsheet model was created to calculate future wastewater flows based on service area populations and per capita wastewater generation rates.

MRWPCA manages a regional wastewater system that provides centralized wastewater treatment for cities and communities throughout portions of Monterey County as shown in Figure 1. A network of wastewater pump stations and pressure pipelines convey wastewater to the RTP for treatment and recycling. Figure 2 is a schematic diagram of the relationship between the major service area pumping facilities. Many of the pump stations are located at former wastewater treatment plants and were repurposed when the regional system was developed.

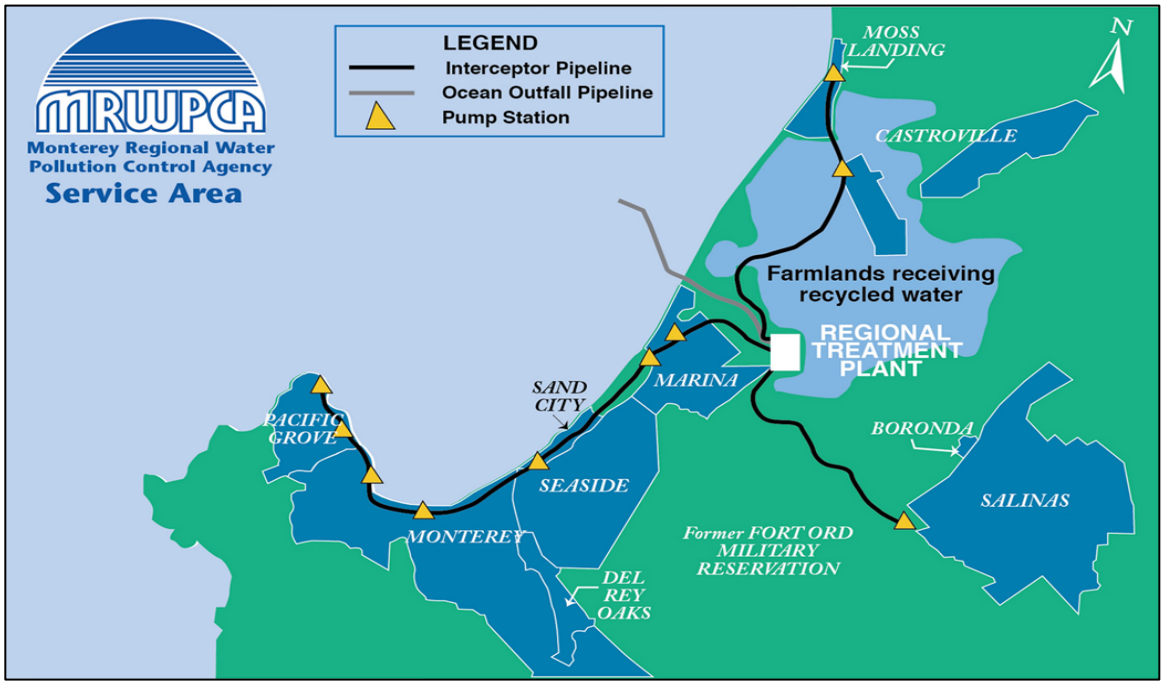
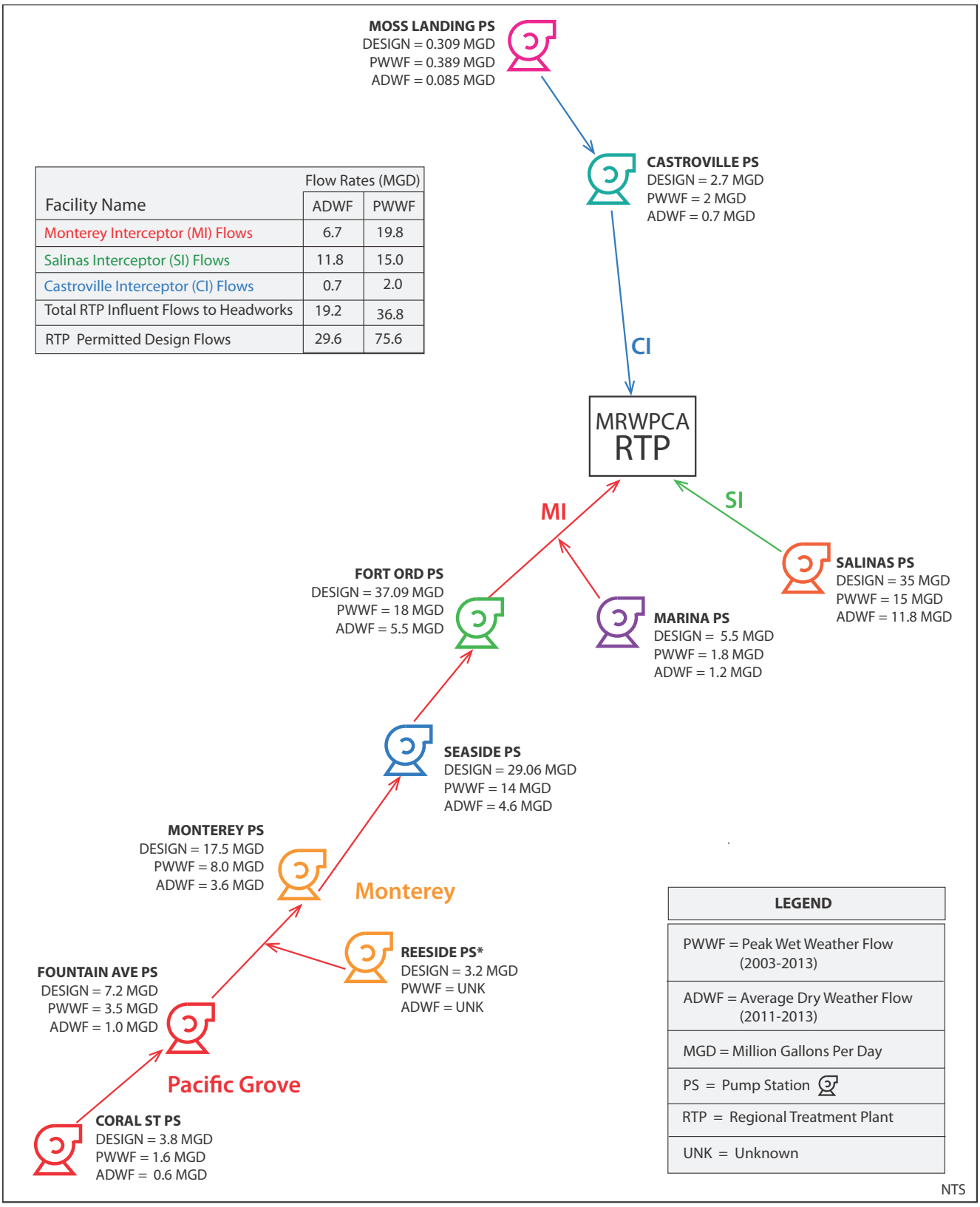


Figure 1: MRWPCA Service Area



Facility Name	Flow Rates (MGD) ADWF	PWWF
Monterey Interceptor (MI) Flows	6.7	19.8
Salinas Interceptor (SI) Flows	11.8	15.0
Castroville Interceptor (CI) Flows	0.7	2.0
Total RTP Influent Flows to Headworks	19.2	36.8
RTP Permitted Design Flows	29.6	75.6

Brezack&Associates Planning

*No flow Meter at Reeside; PWWF & ADWF are Unknown.

SOURCE: Jennifer Gonzalez, MRWPCA September 12, 2013

MRWPCA Pump Station Network Diagram

Figure 1 | Existing Discharges | Sept 2013

Figure 2: MRWPCA Pump Station Network Diagram

2 METHODOLOGY

The following wastewater projection methods were considered:

1. Analyzing trends in potable water prices.
2. Correlating economic trends and predictions of water use with assistance from a demographer.
3. Analyzing economic and tourism indicators such as hotel occupancy and ticket sales to the Monterey Bay Aquarium.
4. Using curve-fitting techniques to model future wastewater flow projections based on historical flows.

MRWPCA provided an extensive record of daily wastewater flows from 1999 to 2013 at each of its regional pump stations. This data was used to determine the daily flow of wastewater generated by the communities associated with each pump station, and to aid in choosing a projection method.

The U.S. Census Bureau classifies most of the service areas members as cities. Boronda, Castroville, and Moss Landing are classified as census designated places (CDP). This report uses the word *community* to refer to either designation.

Some communities in the MRWPCA service area lack a designated pump station: Boronda wastewater flows to the Salinas Pump Station, and wastewater from the Cities of Sand City and Del Rey Oaks both flow to the Seaside Pump Station. The Cities of Pacific Grove and Monterey each have two MRWPCA owned pump stations. Only the pump station that collects and pumps the city's total wastewater flow was used in this analysis.

The daily flow record was analyzed as monthly and annual averages to visualize data at different levels of detail. Approximately 47,000 individual data points were used in this investigation, and the few outliers that were identified were reconciled. A memorandum was developed to present the initial analysis and the methods being considered for making flow projections. A workshop meeting was held with MRWPCA staff to review the project and select the method used to complete this analysis. The curve-fitting method was chosen due to the availability of pertinent data.

A spreadsheet model was developed to analyze and project future wastewater flow to the RTP. Trends in historical community populations and wastewater flows produced a range of potential wastewater flow projections. Population data were acquired for each community from the U.S. Census Bureau website. Most cities have a continuous annual record of total population from 2000 to 2012. Data availability for Boronda, Castroville, and Moss Landing was limited to the years 2000 and 2010. Therefore, linear interpolation was used to estimate the populations of Boronda, Castroville, and Moss Landing for the

years 2001 through 2009. For simplicity, it was assumed that each community's entire census population contributes to the regional wastewater system. That is, no individual septic or satellite reuse systems were known or evaluated as a part of this work.

The former Fort Ord Military Reservation is not a place recognized by the U.S. Census Bureau for population purposes. Therefore,, data for the populations typically associated with the Ord Community (and therefore the Ford Ord Pump Station) are represented in census counts of the communities with designated jurisdiction, i.e. Seaside, Marina, Del Rey Oaks, and Monterey County.

The population and historical wastewater flow data were used to calculate average flow generated per person in units of gallons per capita per day (GPCD) for the years 2000 through 2012. Trends in population and GPCD in each community were projected forward to the year 2055, and wastewater flow projections were calculated from these trends. Because Seaside, Marina, and Del Rey Oak's population projections account for the population changes attributable to Ord, likewise their flow projections also account for changes in Ord's flow.

A minimum value for GPCD was developed for the purposes of establishing goals for making wastewater flow projections. This minimum GPCD is based in part on the results of an American Water Works Association Research Foundation (AWWARF) residential end use water study (1999). That study found that interior water use on a per capita basis appears to have a theoretical minimum of 69 GPCD. In consideration of the aggressive water conservation measures already in use in many parts of the MRWPCA service area, and the regional value of water, this report adopted a lower minimum value of 59 GPCD. Projections for wastewater flow to the RTP were calculated as summations of community wastewater projections.

3 RESULTS

3.1 Analysis of Historical Wastewater Flow Data

Average annual wastewater flows to the RTP for years 1999 through 2013 are shown in Figure 3. Wastewater flows to the RTP have been steadily decreasing since 2002. The latest year of record shows the average annual wastewater flow of 17.8 mgd. Relative contributions of each pump station to the RTP changed between 1999 and 2013. Figure 4 and Figure 5 are pie charts representing these relative changes. Noticeably, the Salinas Pump Station contributed the majority of flow, and it increased its relative contribution by 9% for the years of record. The next largest contributor was the Monterey Pump Station, but its relative contribution decreased by 7% for the years on record. Charts presenting individual pump station wastewater flows from 1999 to 2013 are provided in Appendix A.

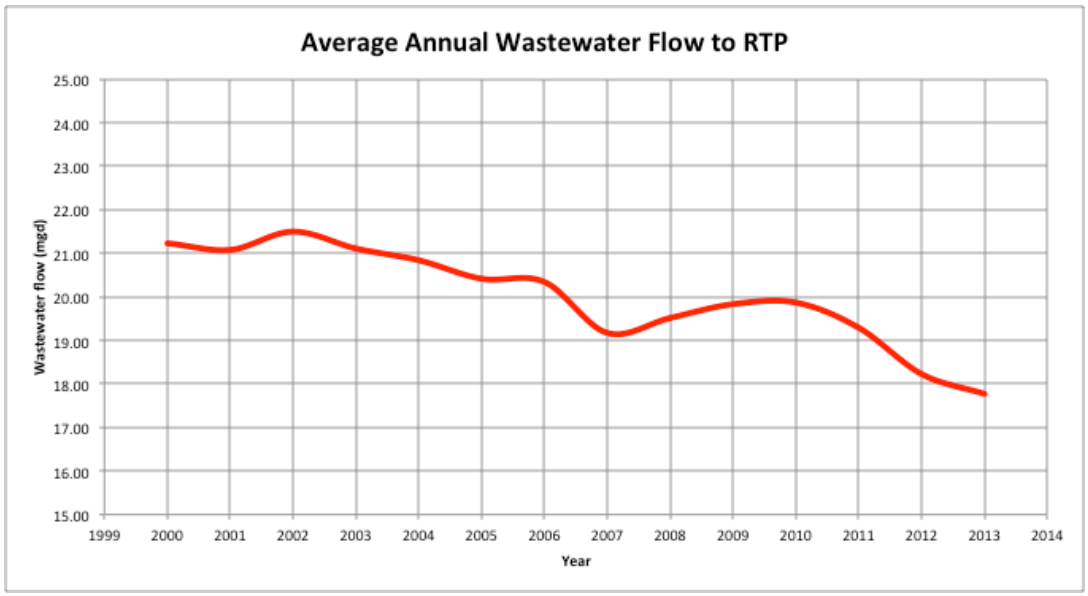


Figure 3: Average Annual Wastewater Flow to RTP

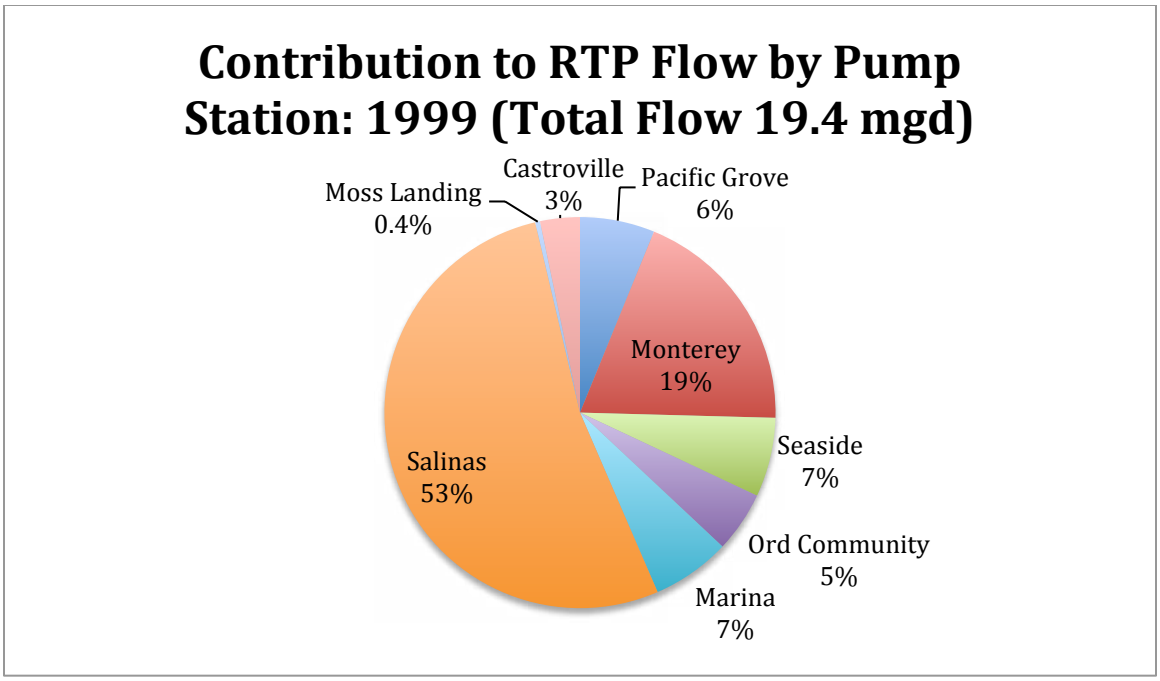


Figure 4: Contribution to RTP Flow by Pump Station: 1999 (Total Flow 19.4 mgd)

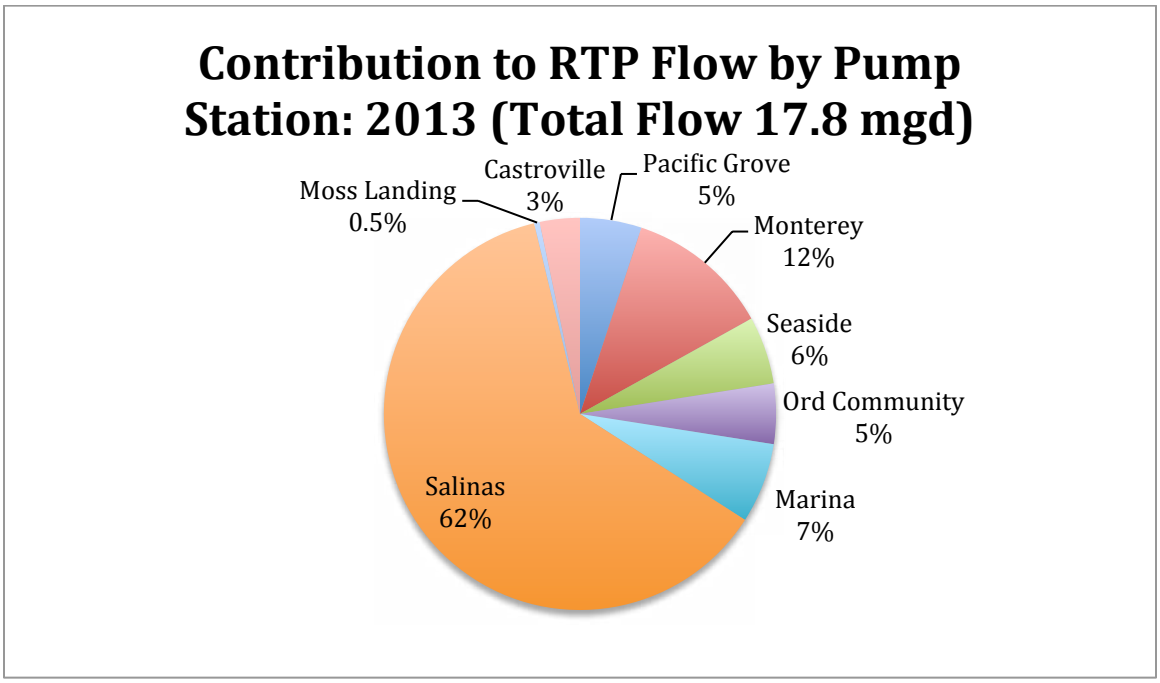


Figure 5: Contribution to RTP Flow by Pump Station: 2013 (Total Flow 17.8 mgd)

3.1.1 Statistical Validity of Flow Data

A linear regression analysis performed on flow data at the RTP shows a poor fit and large degree of uncertainty for making flow projections (Figure 6). Population data and GPCD were analyzed to determine whether better flow projections could be calculated.

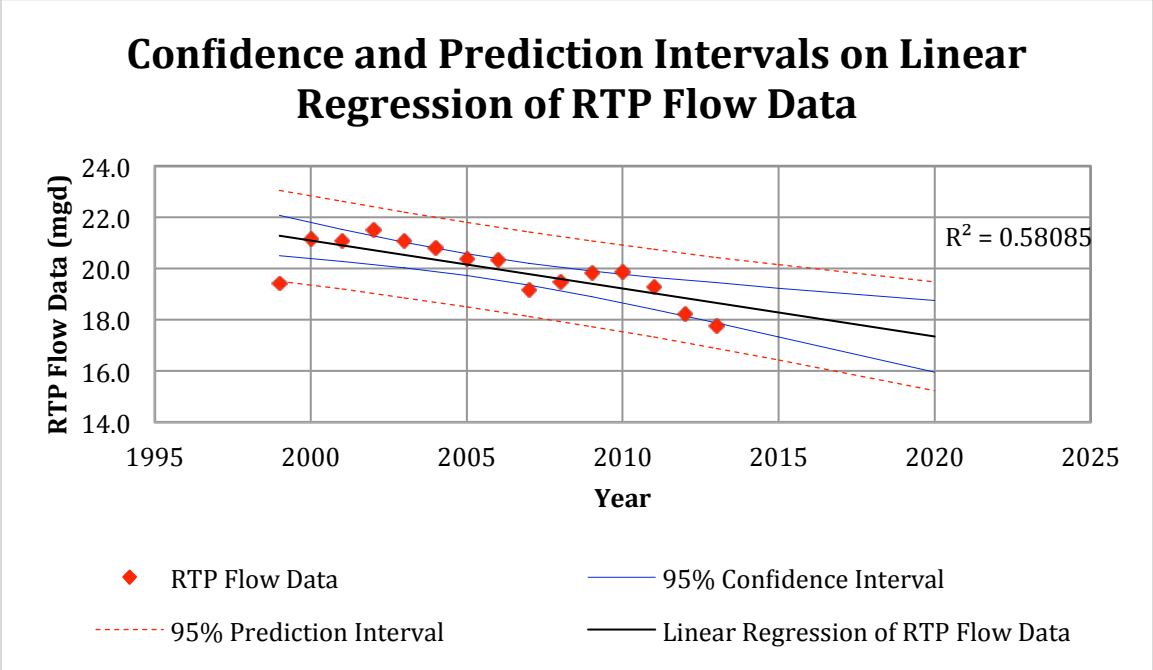


Figure 6: Confidence and Prediction Intervals on Linear Regression of RTP Flow Data

3.2 Analysis of Census Population Data

Census population data for the total RTP service area for years 2000 through 2012 are plotted in Figure 7. A 2.3% decrease in population from 254,882 to 249,014 is shown between 2001 and 2005. Population increased after 2005. The 2012 estimated MRWPCA service area population is 263,433.

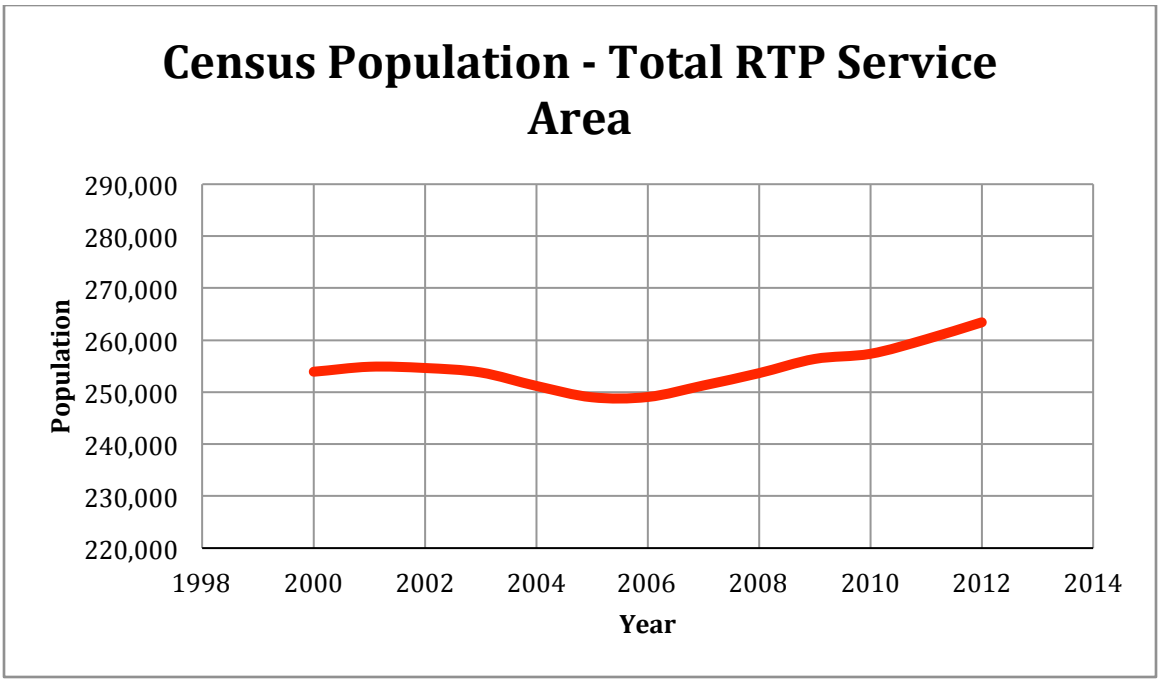


Figure 7: Census Population – Total RTP Service Area

3.2.1 Statistical Validation of Population Data

Linear and exponential regressions behave similarly given short time frames and steady growth, so for efficiency in analysis, only linear regressions were used to determine confidence intervals.

The decline in population seen between 2000 and 2005 poses a challenge for applying regression analysis to the data. Typical demographic models of population projections fit linear or exponential curves to historical population data[1]. When unusually large and long periods of population decline are used as inputs to the regression, the resulting trend line may not closely align with the most recent group of data points, and confidence and prediction intervals show a large degree of uncertainty. Such was the case of the regression analysis performed on population data from 2000-2012; the resulting regression line shows a poor fit, a larger degree of uncertainty and a much slower trend in growth than what is suggested by the six most recent years on the record. Using only data

[1] Alan Walter Steiss. Population Estimates and Projections. *Local Government Finance: Capital Facilities Planning and Debt Administration*. http://www-personal.umich.edu/~steiss/page55.html

O'Neill, Brian C. et al. A Guide to Global Population Projections. *Demographic Research,* Vol 4, Article 8, Pages 203-288, Published 13 June 2001 www. http://www.demographic-research.org/volumes/vol4/8/4-8.pdf

from 2006 to 2012 produces a trend line with a much better fit and a very small confidence interval.

Both of the above results are useful for making population projections. By their nature, population projections contain a high degree of uncertainty, and it is not appropriate to use confidence intervals to measure uncertainty in long-range projections. Typical demographic methods attempt to capture this uncertainty by producing "high" and "low" projections, that represent extreme scenarios, and an estimate of future value is expected to occur between these curves[2]. In this case, the slow growth trends produced by using the full range of data available from 2000 to 2012 will serve as the "low" projection for each community, and the faster growth trends produced using only the years 2006 through 2012 will serve to create the "high" projection.

Figures 8 and 9 present the statistical confidence intervals of the population trends.

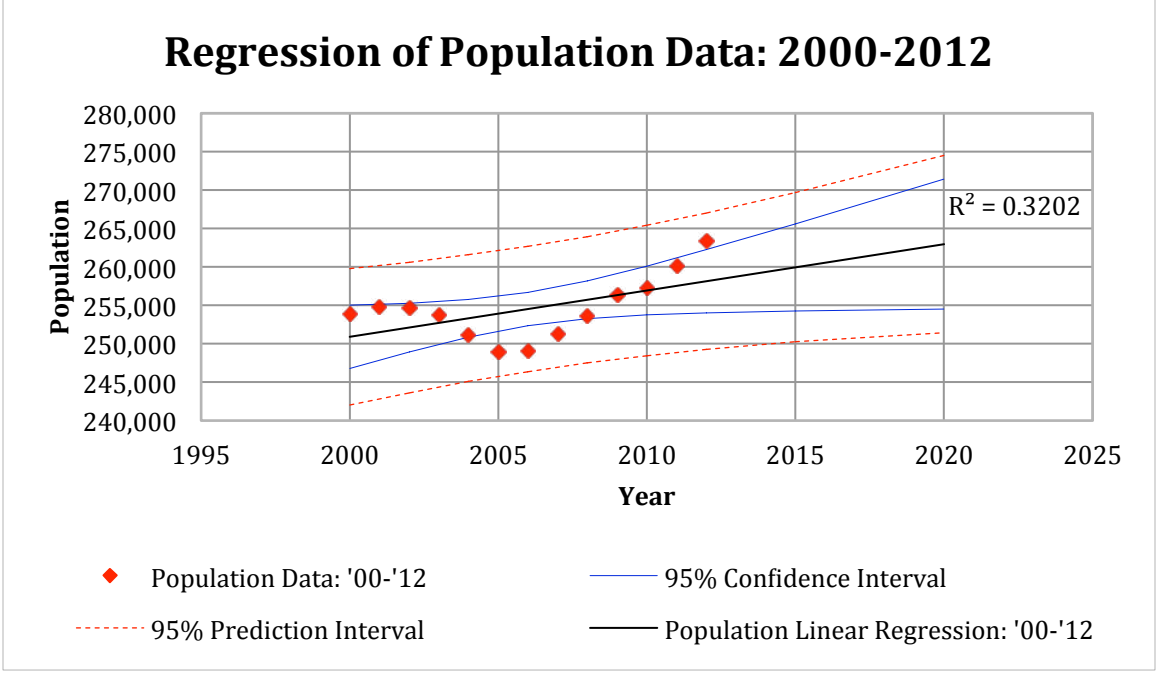


Figure 8: Confidence and Prediction Intervals on Linear Regression of Population Data: 2000-2012

[2] Alan Walter Steiss. Population Estimates and Projections. *Local Government Finance: Capital Facilities Planning and Debt Administration*. http://www-personal.umich.edu/~steiss/page55.html

O'Neill, Brian C. et al. A Guide to Global Population Projections. *Demographic Research,* Vol 4, Article 8, Pages 203-288, Published 13 June 2001 www. http://www.demographic-research.org/volumes/vol4/8/4-8.pdf

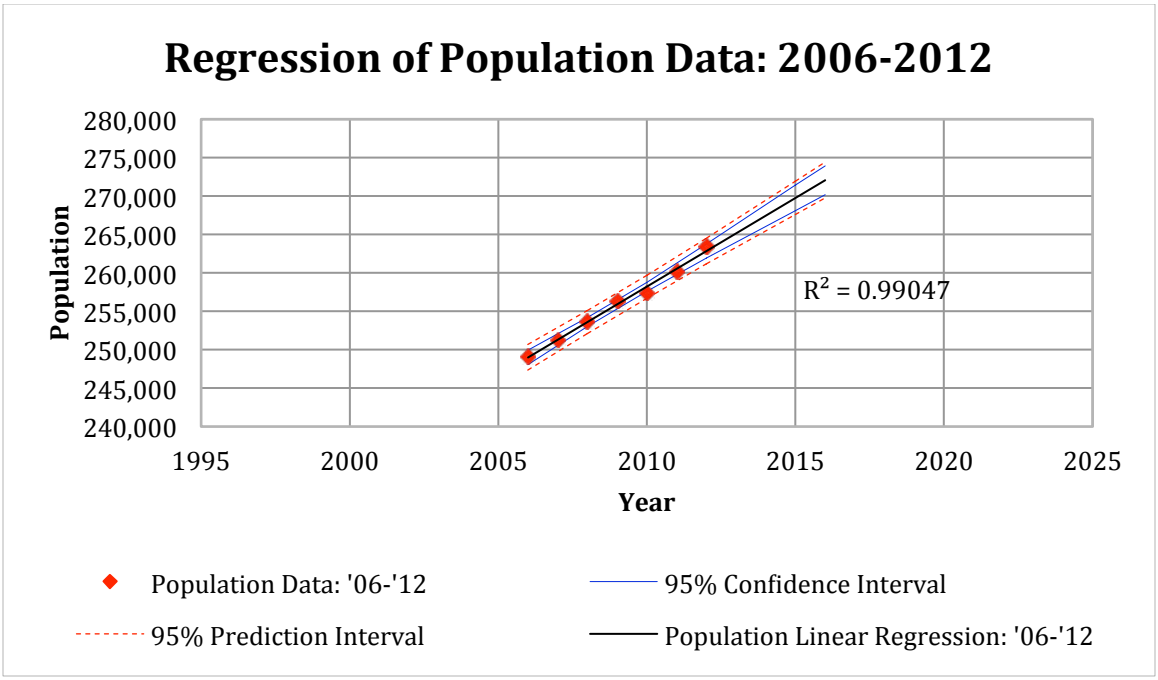


Figure 9: Confidence and Prediction Intervals on Linear Regression of Population Data: 2006-2012

3.3 Calculation of Historical GPCD

Average wastewater GPCD for the total RTP service area for years 2000 through 2012 were calculated using the historical wastewater flow and population data, as presented in Figure 10. Wastewater generation has trended downward from a 2002 maximum of 84.4 GPCD to a year 2012 minimum of 69.2 GPCD.

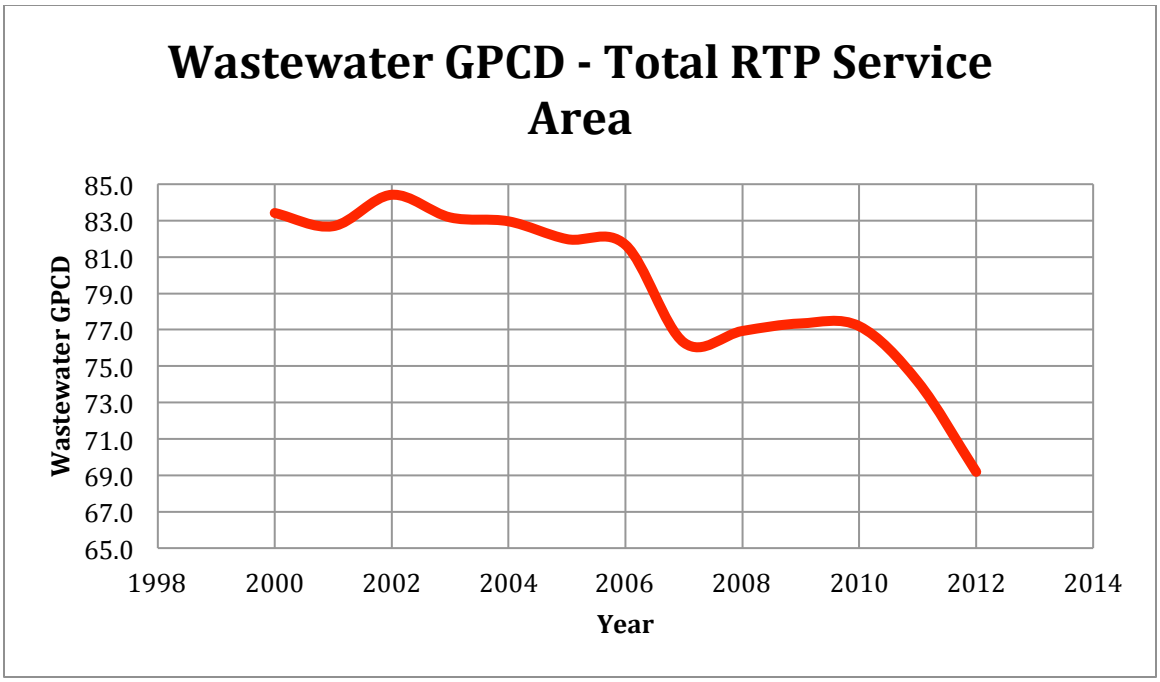


Figure 10: Wastewater GPCD – Total RTP Service Area

3.3.1 Statistical Validation of GPCD

Historical GPCD was calculated from population and flow data, so its variation, goodness of fit in a linear regression, and confidence interval are dependent upon these measured quantities. However, the regression analysis does show that GPCD is linearly correlated with time, useful as an input variable for RTP flow projections (Figure 11).

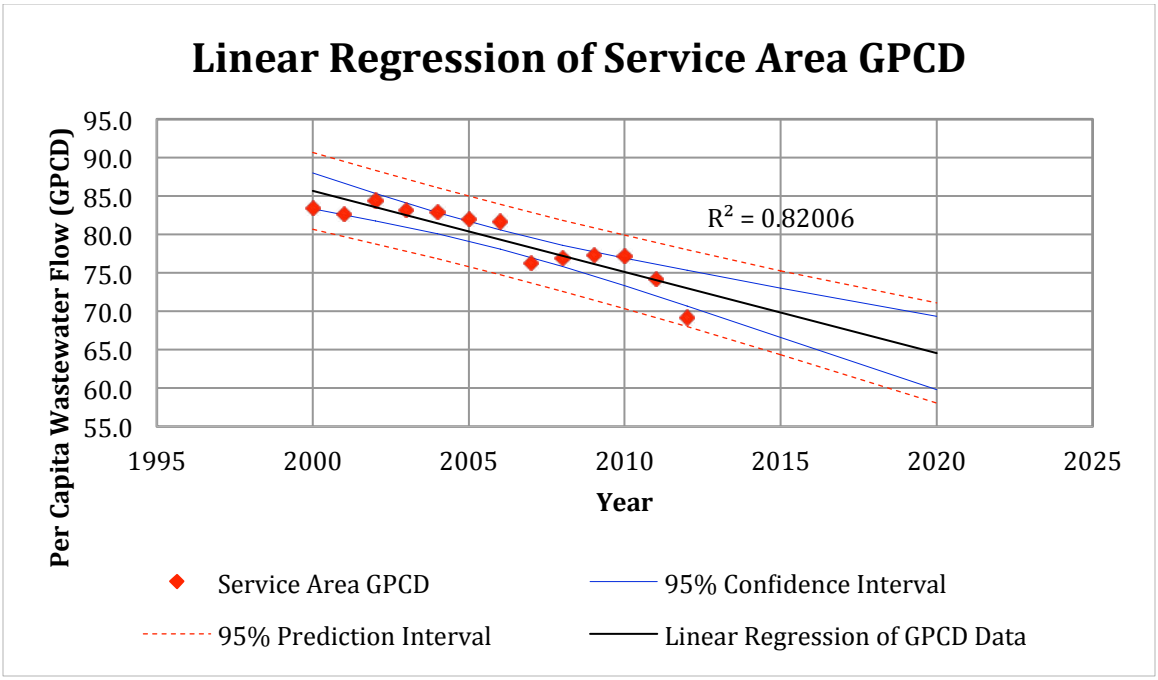


Figure 11: Confidence and Prediction Intervals on Linear Regression of Historical Service Area GPCD

3.4 RTP Wastewater Flow Projections

MRWPCA service area populations were projected to the year 2055 using the four trends described in Table 1. Linear trends were applied for their simplicity, and exponential trends were applied for their predictions of more rapid growth under ideal conditions. Using the full set of data from 2000 to 2012 provides the most data points for input, while using only 2006 to 2012 data helps attenuate the effects of population decreases between 2000 and 2005. Table 1 shows the percent increase in 2055 population compared to the most current estimates in 2012. Resulting population projections to the RTP are shown in Figure 12.

GPCD projections are made using a phased method. Starting from the present day, GPCD is projected using Trend 1, because regression analysis of historical GPCD showed that a linear trend is appropriate. GPCD cannot realistically fall below zero, so a minimum value is chosen. When the downward linear trend in GPCD meets the minimum value, it is assumed that all future values of GPCD remain constant at this minimum. A report by AWWARF sets an expected value of 69.0 GPCD. Because of strict conservation in the MRWPCA service area, this report chooses 59.0 GPCD as the minimum value.

Table 1: Description of Population Trend Analysis Methods Used to Produce Range of Wastewater Flow Projections

Legend Entry	Description	% Pop. Increase
Trend 1	A linear curve is fitted to data from year 2000 to 2012	8%
Trend 2	A linear curve is fitted to data from year 2006 to 2012	30%
Trend 3	An exponential curve is fitted to data from year 2000 to 2012	10%
Trend 4	An exponential curve is fitted to data from year 2006 to 2012	48%

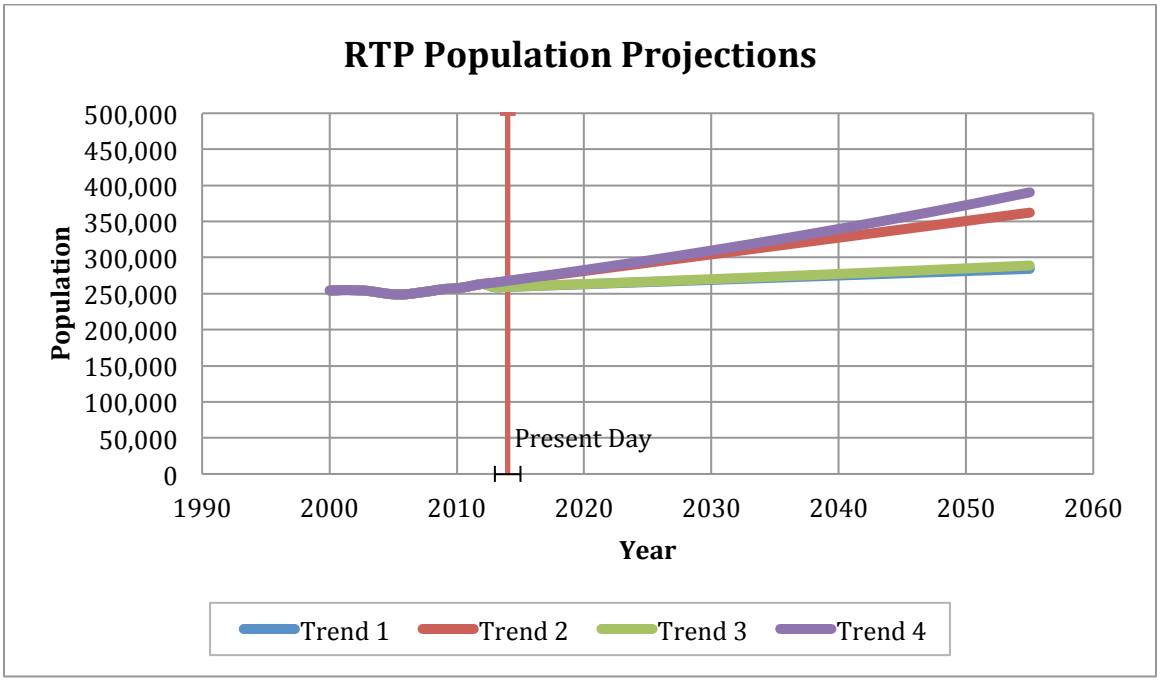


Figure 12: RTP Service Area Population Projections

Projections of per capita flow for the total service area is presented in Figure 13. A linear curve was applied to per capita flow data from year 2000 to 2012 and projected forward in time. GPCD values were constrained to the minimum value of 59.0 GPCD.

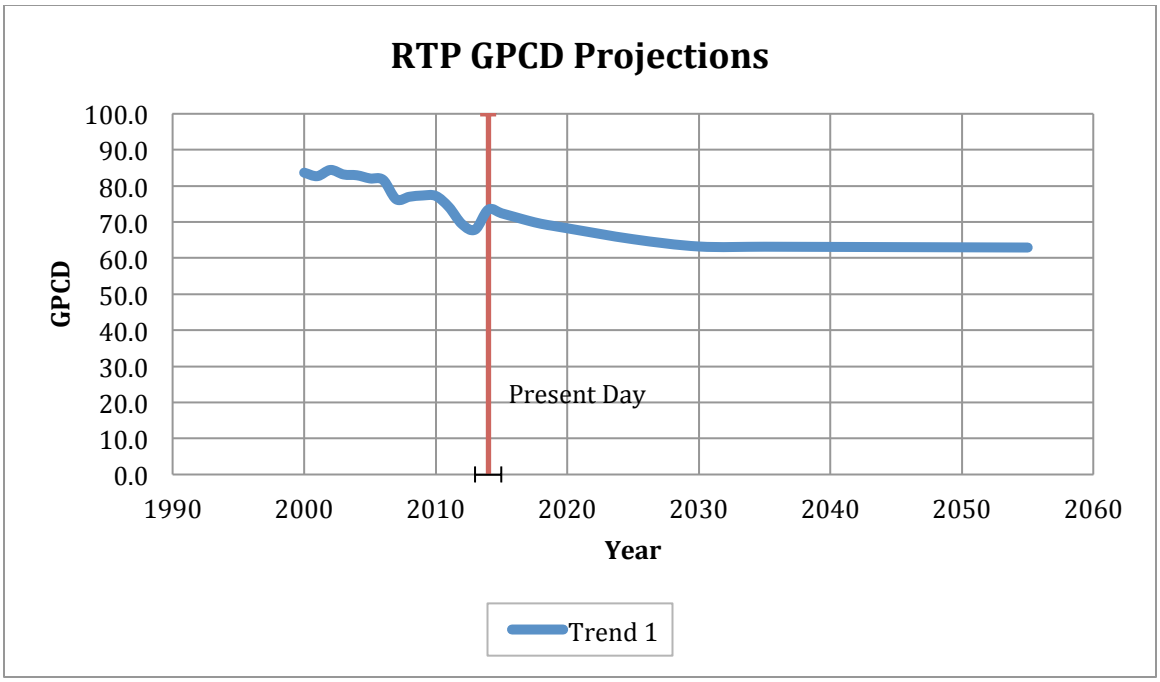


Figure 13: Average Service Area GPCD Projection

The set of population and GPCD projections was used to calculate four wastewater flow projections at the RTP, and the results are shown in Figure 14. Lines showing the RTP design capacity and an estimate of build-out wastewater flow (EMC Planning Group, 2013) are shown for reference. Flow to the RTP is projected to decrease until approximately the year 2030, as per capita wastewater flow decreases toward 59.0 GPCD. A resulting estimate of RTP flow for year 2030 is a range between 17.1 and 19.5 mgd. Once GPCD reaches its minimum value, the influence of projected population growth causes projected flow to increase.

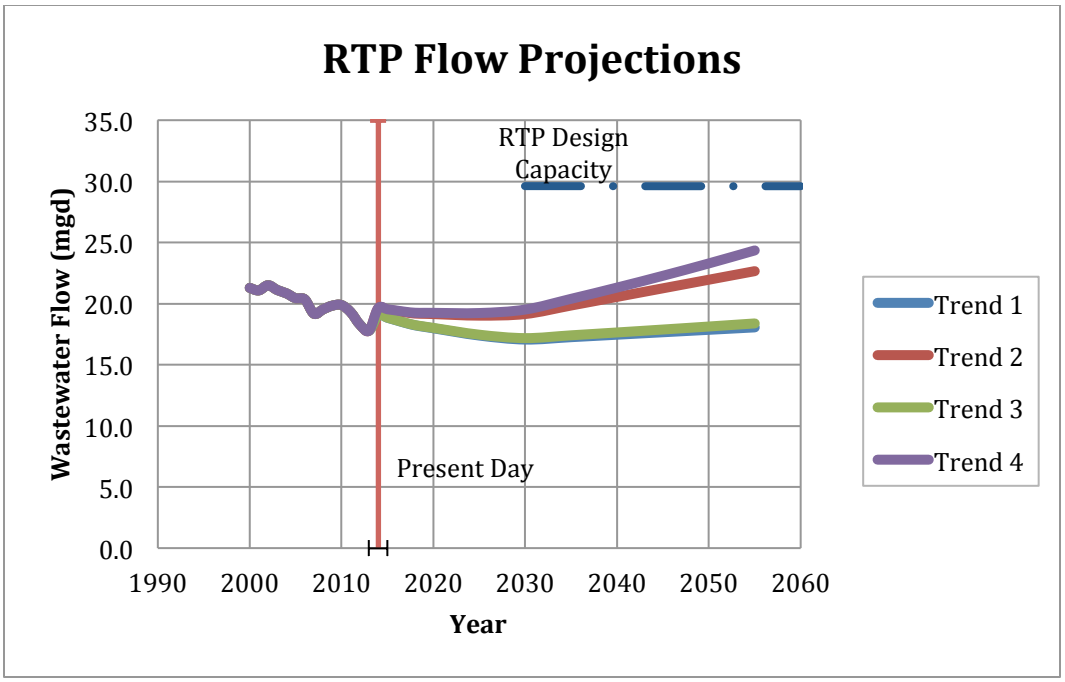


Figure 14: RTP Wastewater Flow Projections

Table 2 tabulates the "low" and "high" projections of wastewater flow in 2055 for each community and at the RTP. These represent extreme conditions, and it is expected that the true value will lie between these values.

Table 2: 2055 Projections of "Low" and "High" Flow Scenarios

Pump Station	Low Flow (mgd)	High Flow (mgd)
Pacific Grove	0.8	1.2
Monterey	1.4	2.3
Seaside	2.3	3.1
Ord*	0.9*	0.9*
Marina	1.1	1.6
Salinas	10.9	14.6
Moss Landing	0.00	0.04
Castroville	0.7	0.7
Total RTP	18.1	24.3

* Projected differences in flow at Ord from the 2013 baseline of 0.9 mgd are included in the flow projections of its surrounding communities, as discussed in the methodology section. The baseline 0.9 mgd is shown here to allow the summation of community flows to equal RTP flow.

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4 CONCLUSION

Wastewater flows to the RTP from the MRWPCA service area have been decreasing for the past several years. It is projected that flows will continue to decrease until approximately the year 2030, when per capita flows are projected to reach a minimum and flows at the RTP may range between 17.1 and 19.2 mgd. Based on the "high" and "low" projections of population growth and the establishment of a basement GPCD of 59.0, flows are projected to increase after 2030 and may range between 22.7 and 24.3 mgd by the year 2055, i.e. 77% to 82% of RTP design capacity. Other choices in projection methodology and assumptions may produce varying results.

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5 RECOMMENDATIONS

The following recommendations are made to improve the accuracy of the wastewater flow projections to the RTP and from each of the MRWPCA service area communities:

1. Update the wastewater flow projection model as new population and flow data becomes available.
2. Use a land use GIS to determine precisely differences in the sewersheds throughout the MRWPCA service area, and delineate the sewershed contributing wastewater flow to each pump station. Review and revise the sewersheds to resolve population data defined by the U.S. Census Bureau.
3. Conduct wastewater flow monitoring and acquire potable water consumption data at Seaside and Moss Landing to validate current wastewater flow data and correct historical flow data.
4. Conduct wastewater flow monitoring for non-residential land uses to verify large connections that may be affecting the wastewater GPCD values. This would include each of the military connections and the large commercial connections.
5. Incorporate the recommendations of a demographer that is familiar with the regional economic constraints and opportunities to validate service area population projections and methodologies.
6. Perform a study of the Fort Ord Pump Station, to determine the portions of Ord's surrounding communities that have sewers linked to the pump station. This will allow for the projection of population growth, GPCD decline, and wastewater flow in the Ord region, which currently goes unrecognized by the Census Bureau.

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6 REFERENCES

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EMC Planning Group. Mayer et al. *Member agencies projected needs inventory*. Monterey, CA, 2013.

Monterey Regional Water Pollution Control Agency (MRWPCA). *About facilities treatment*. Monterey, CA, 2013. <http://www.mrwpca.org/about_facilities_treatment.php> (Accessed April 11, 2014).

O'Neill, Brian C. et al. A Guide to Global Population Projections. *Demographic Research,* Vol 4, Article 8, Pages 203-288, Published 13 June 2001 www. http://www.demographic-research.org/volumes/vol4/8/4-8.pdf

APPENDIX A - WASTEWATER FLOW DATA

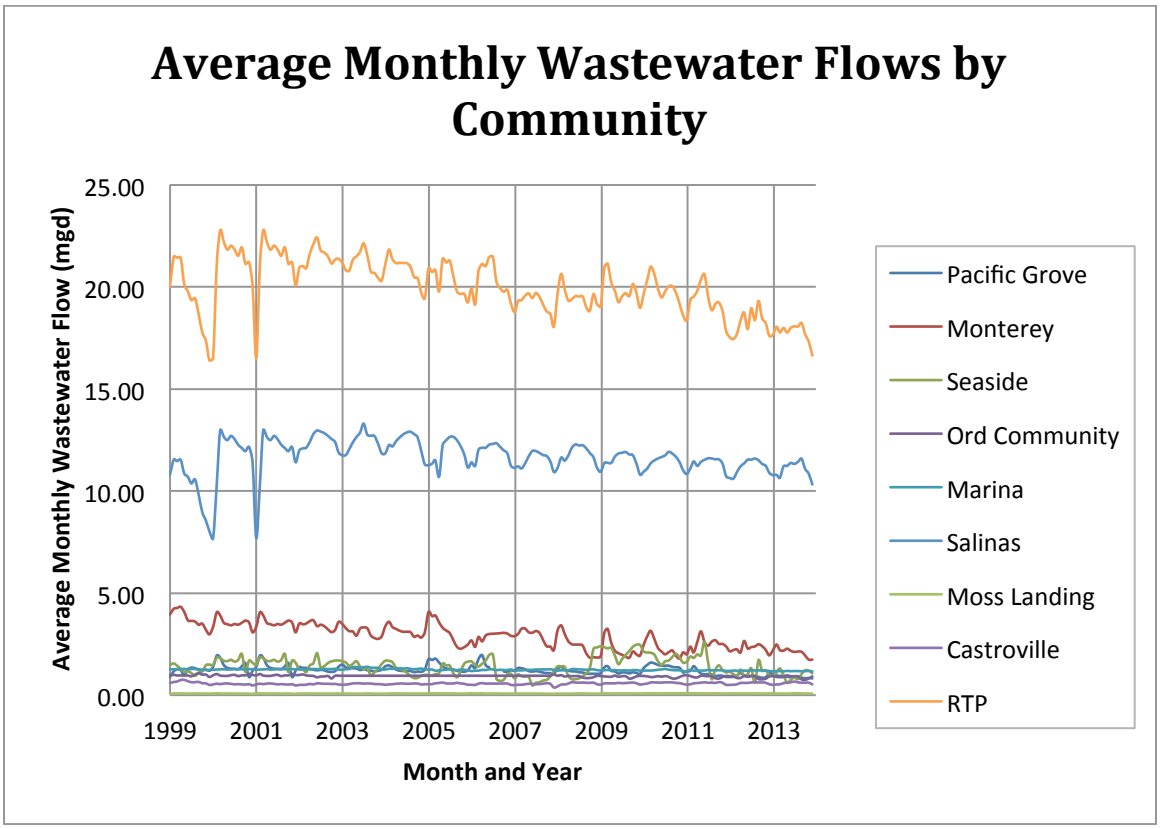


Figure 15: Average Monthly Wastewater Flows by Community

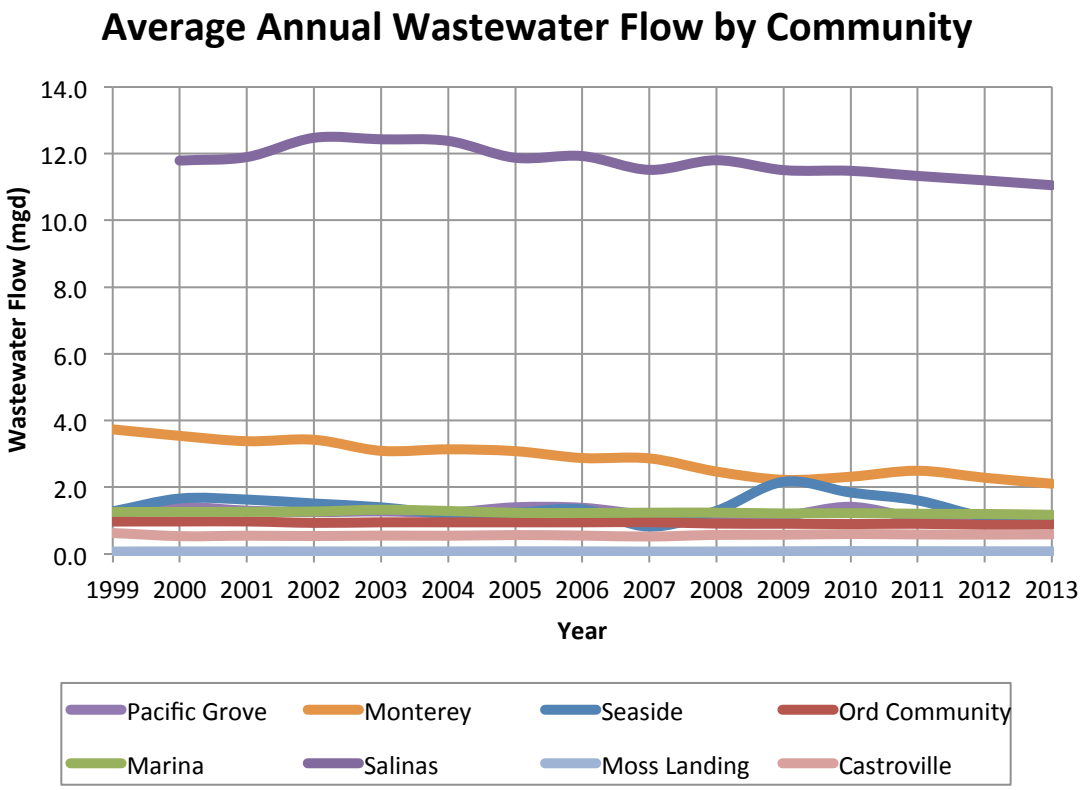


Figure 16: Average Annual Wastewater Flow by Community

APPENDIX B - POPULATION DATA

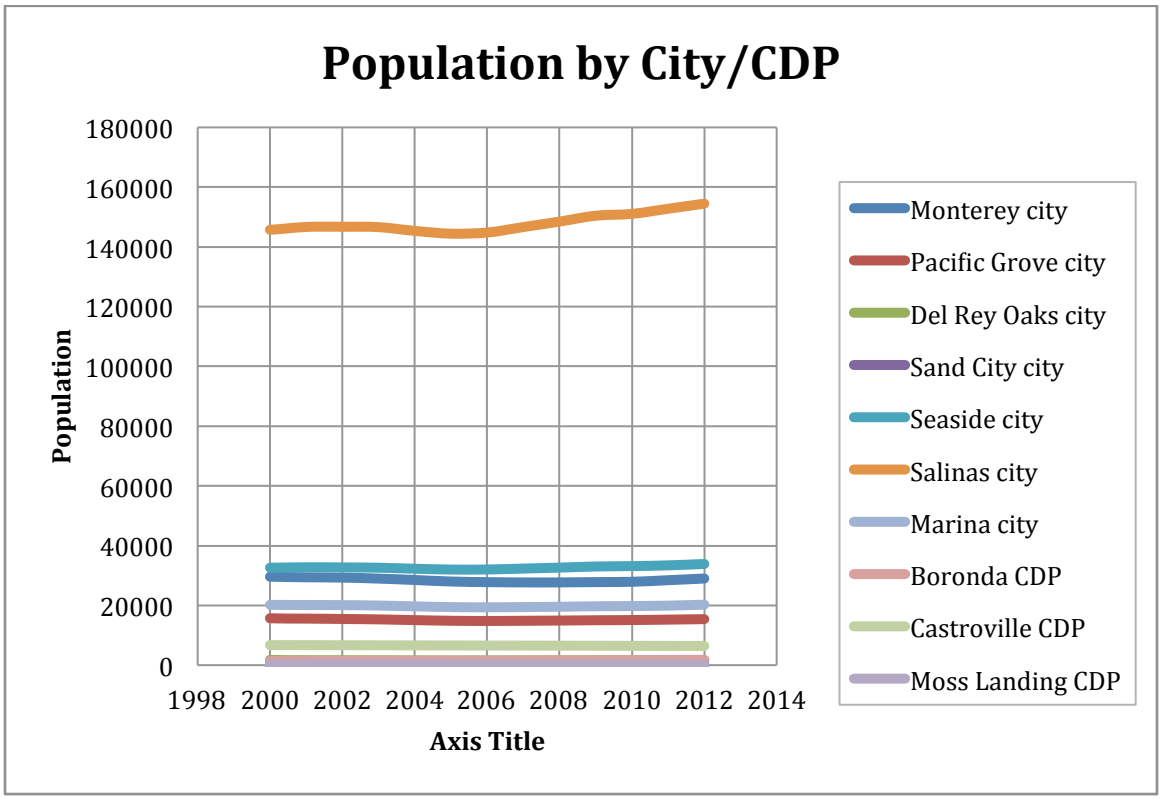


Figure 17: Census Population by City/CDP

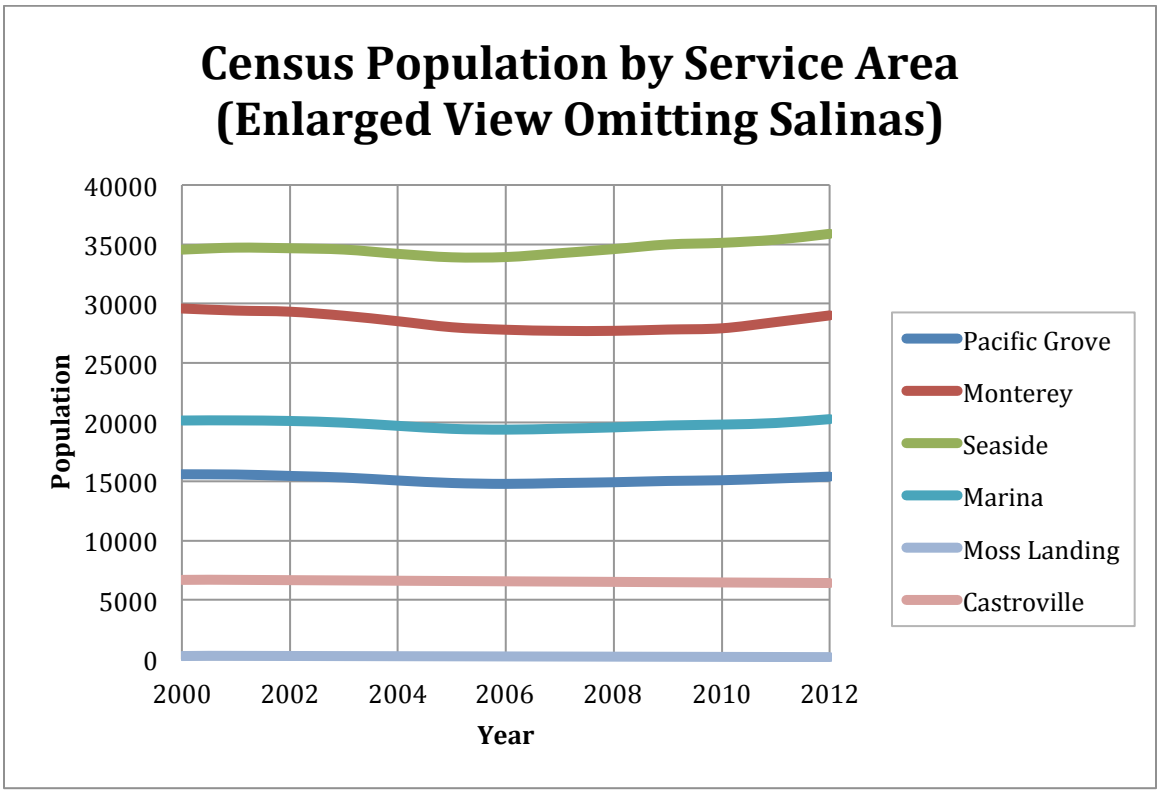


Figure 18: Census Population by Service Area (Zoomed)

APPENDIX C - WASTEWATER GPCD ESTIMATES

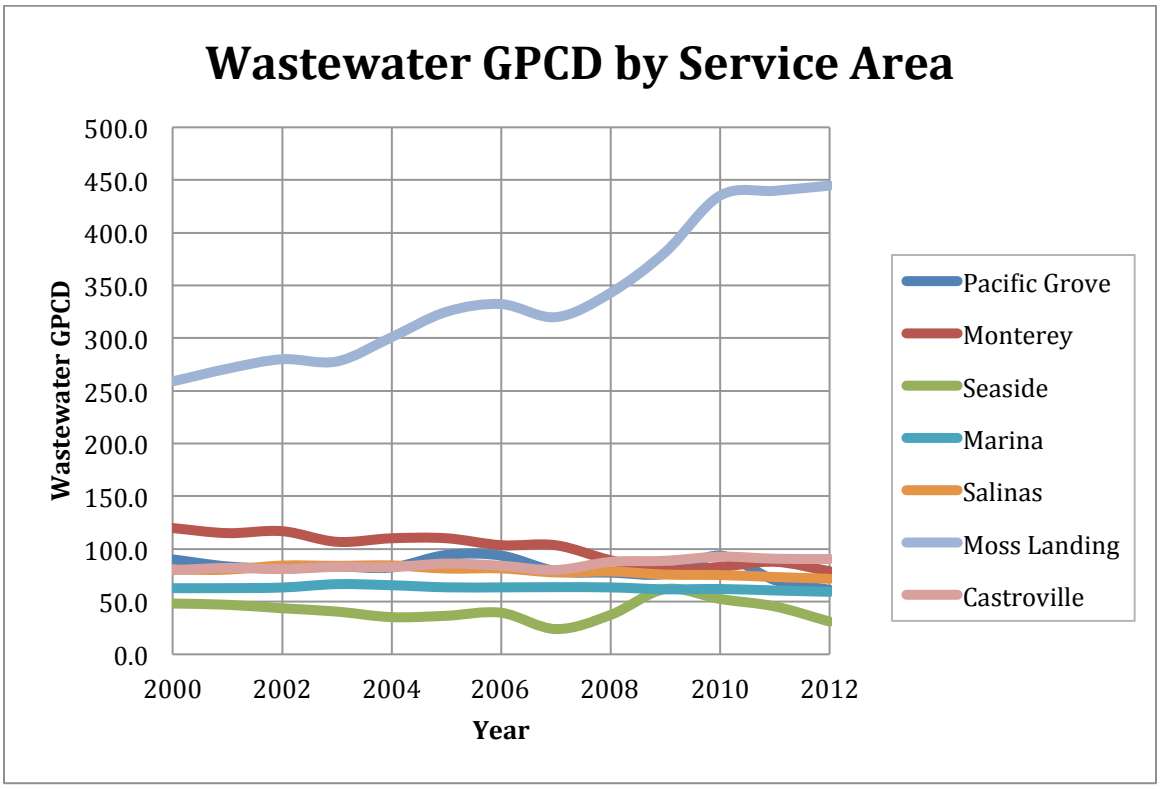
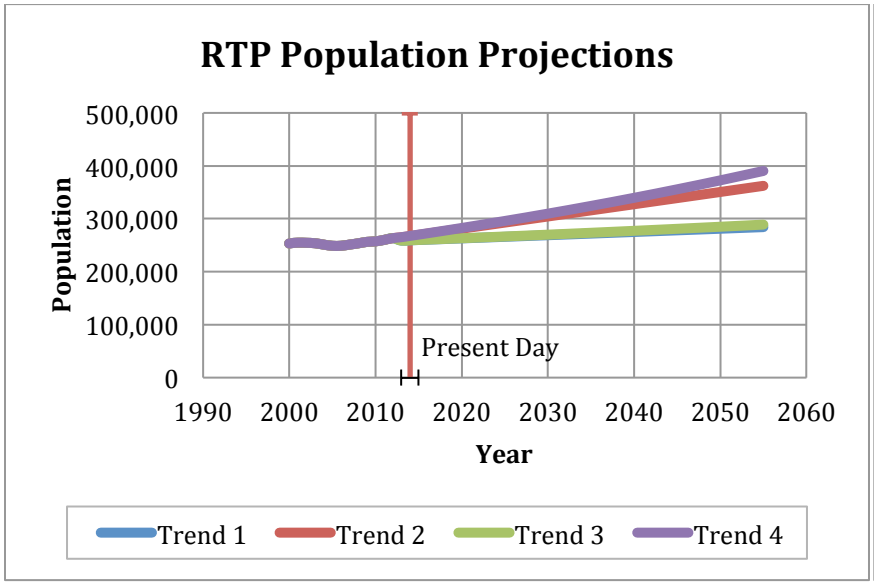
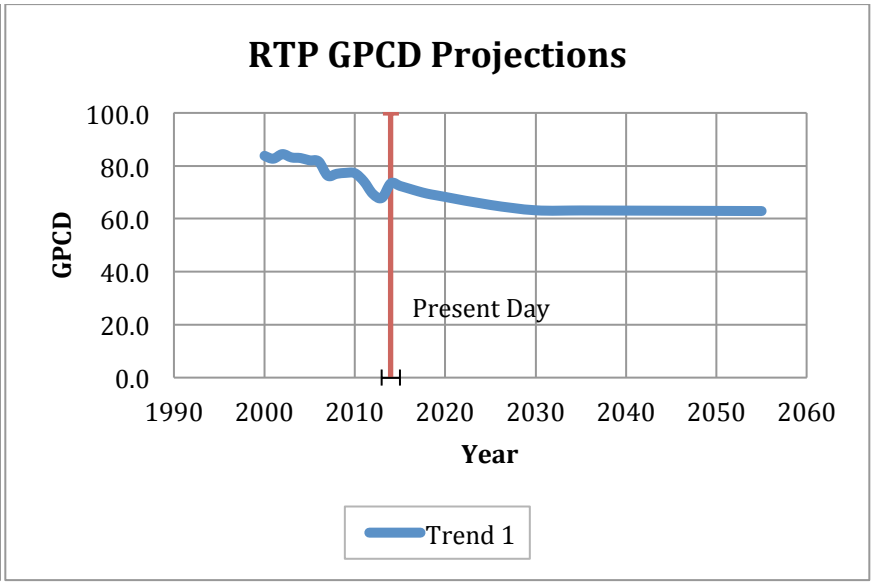


Figure 19: Wastewater GPCD by Service Area

APPENDIX D – RTP PROJECTIONS





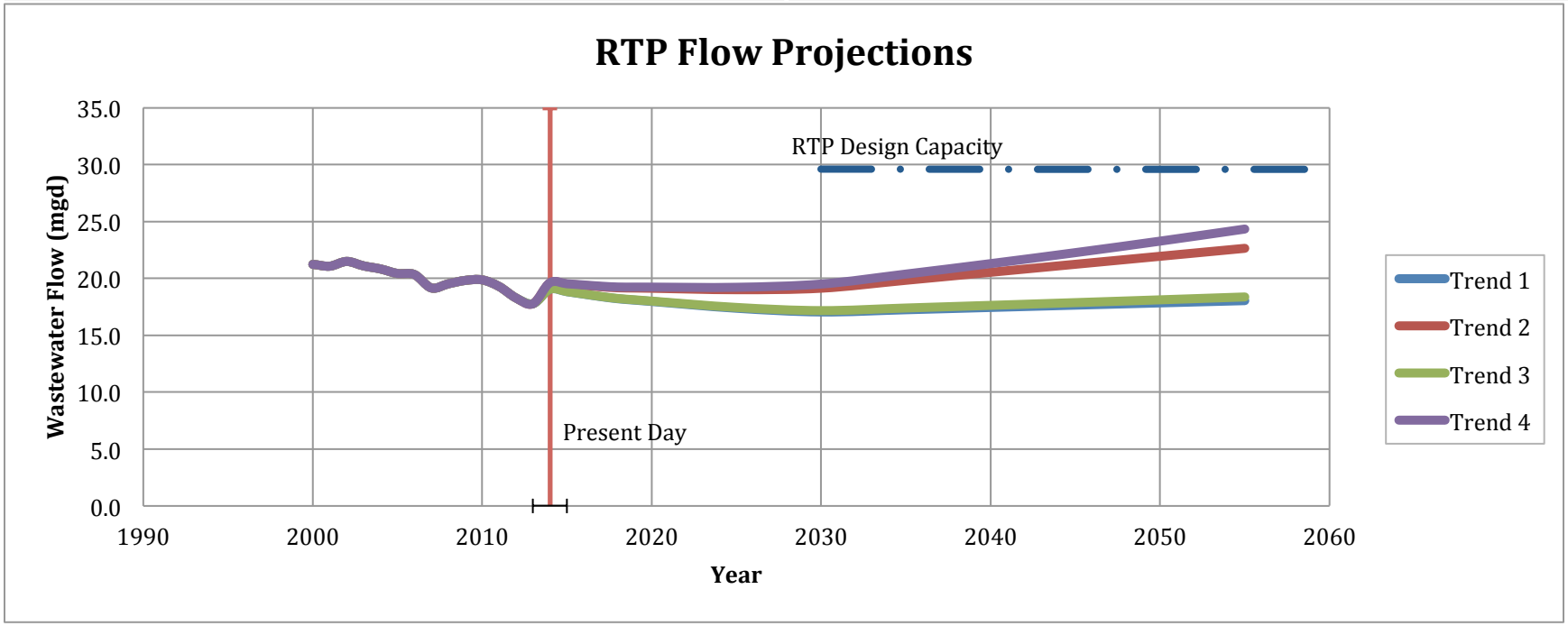


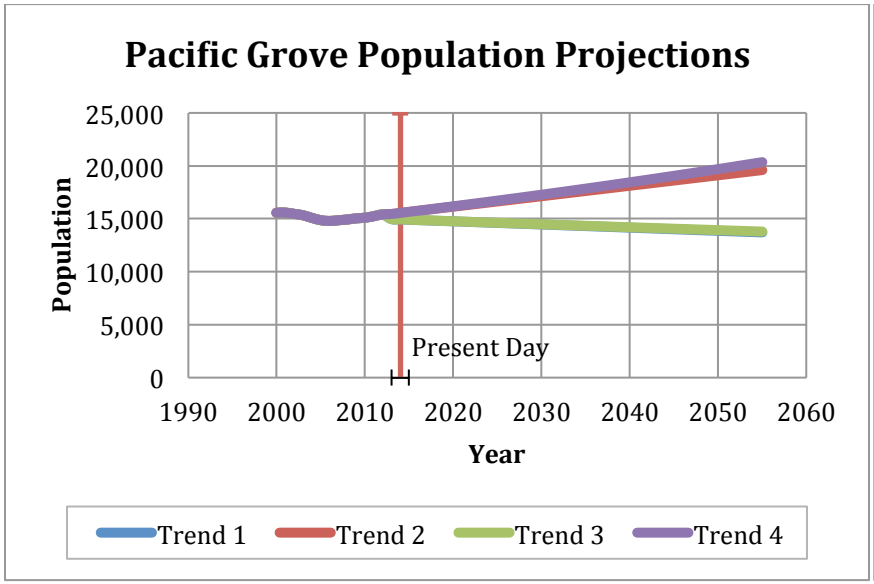
Figure 20: RTP Projections

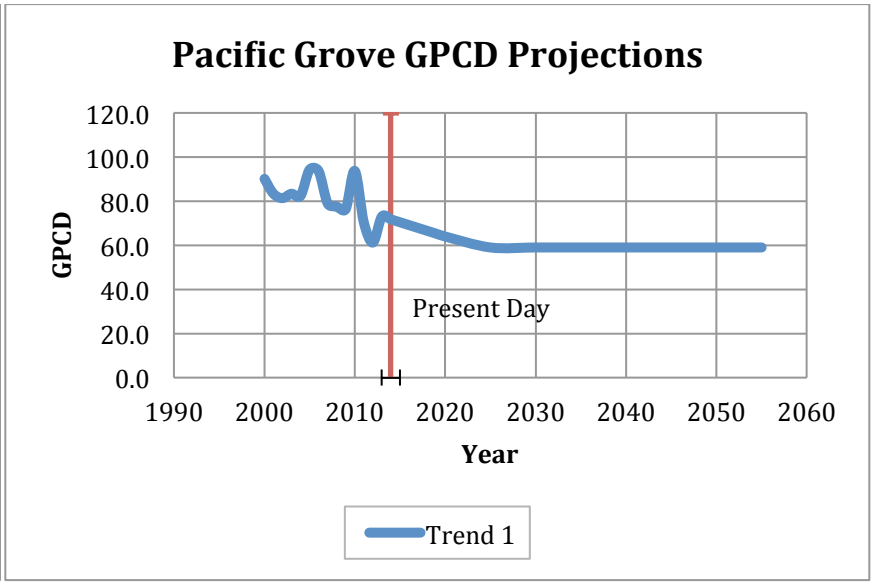
Table 3: RTP Model Results

Community	RTP Total
Min GPCD	59.0

	Year	Population				GPCD	Wastewater Flow			
		Trend 1	Trend 2	Trend 3	Trend 4	Trend 1	Trend 1	Trend 2	Trend 3	Trend 4
Historical	1999						19.4	19.4	19.4	19.4
	2000	253,870	253,870	253,870	253,870	83.8	21.3	21.3	21.3	21.3
	2001	254,882	254,882	254,882	254,882	82.7	21.1	21.1	21.1	21.1
	2002	254,644	254,644	254,644	254,644	84.4	21.5	21.5	21.5	21.5
	2003	253,791	253,791	253,791	253,791	83.2	21.1	21.1	21.1	21.1
	2004	251,200	251,200	251,200	251,200	83.0	20.8	20.8	20.8	20.8
	2005	249,014	249,014	249,014	249,014	82.1	20.4	20.4	20.4	20.4
	2006	249,066	249,066	249,066	249,066	81.7	20.3	20.3	20.3	20.3
	2007	251,280	251,280	251,280	251,280	76.3	19.2	19.2	19.2	19.2
	2008	253,653	253,653	253,653	253,653	77.0	19.5	19.5	19.5	19.5
	2009	256,383	256,383	256,383	256,383	77.3	19.8	19.8	19.8	19.8
	2010	257,375	257,375	257,375	257,375	77.2	19.9	19.9	19.9	19.9
	2011	260,164	260,164	260,164	260,164	74.2	19.3	19.3	19.3	19.3
	2012	263,433	263,433	263,433	263,433	69.4	18.3	18.3	18.3	18.3
Projections	2013	258,737	265,135	258,747	265,273	67.9	17.8	17.8	17.8	17.8
	2014	259,340	267,442	259,376	267,686	73.4	19.1	19.6	19.1	19.6
	2015	259,942	269,749	260,010	270,123	72.4	18.8	19.5	18.8	19.5
	2016	260,545	272,056	260,648	272,584	71.4	18.6	19.4	18.6	19.4
	2017	261,147	274,362	261,290	275,070	70.4	18.4	19.3	18.4	19.3
	2018	261,750	276,669	261,937	277,581	69.5	18.2	19.2	18.2	19.3
	2019	262,353	278,976	262,588	280,118	68.8	18.1	19.2	18.1	19.2
	2020	262,955	281,283	263,243	282,679	68.2	18.0	19.1	18.0	19.2
	2025	265,968	292,817	266,587	295,876	65.2	17.4	19.0	17.5	19.2
	2030	268,980	304,352	270,042	309,745	63.2	17.1	19.1	17.2	19.5
	2035	272,029	315,922	273,609	324,317	63.1	17.3	19.8	17.4	20.4
	2040	275,090	327,504	277,289	339,628	63.1	17.5	20.5	17.6	21.3
	2045	278,150	339,086	281,084	355,715	63.0	17.7	21.3	17.9	22.3
	2050	281,211	350,669	284,996	372,616	63.0	17.9	22.0	18.1	23.3
	2055	284,272	362,251	289,026	390,372	62.9	18.1	22.7	18.4	24.3

APPENDIX E – PACIFIC GROVE PROJECTIONS





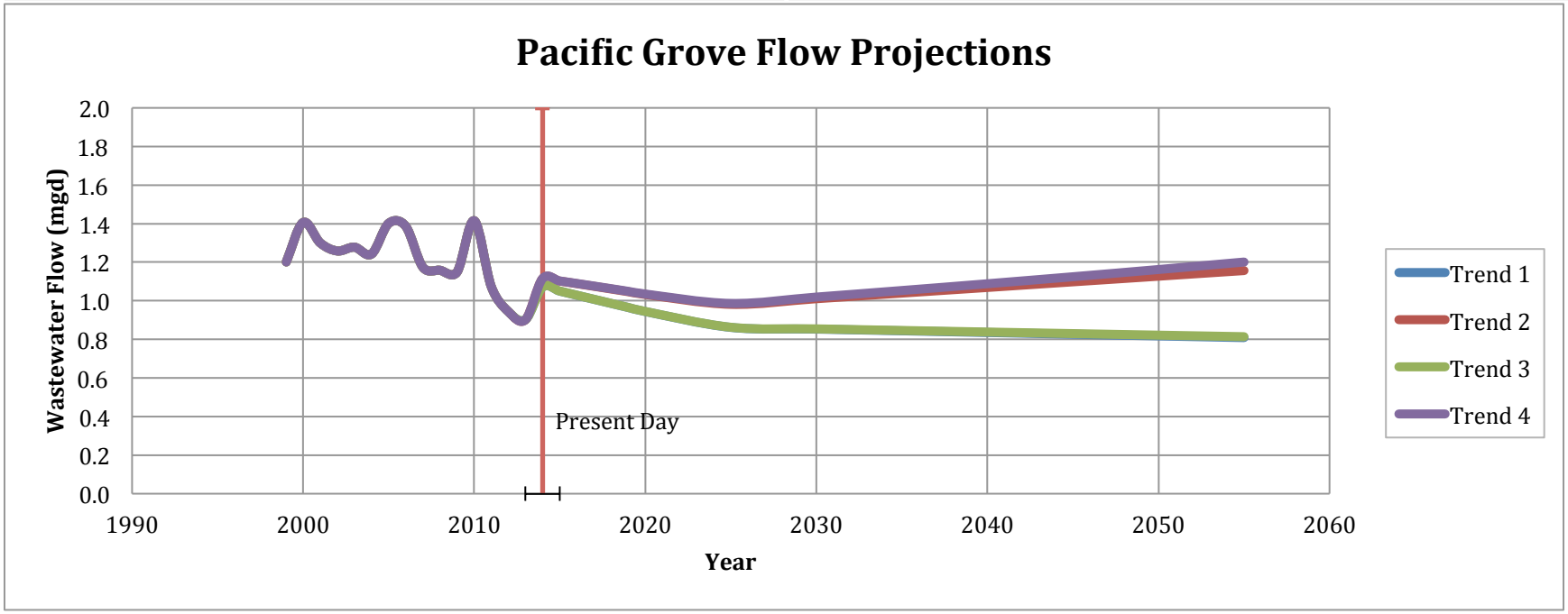


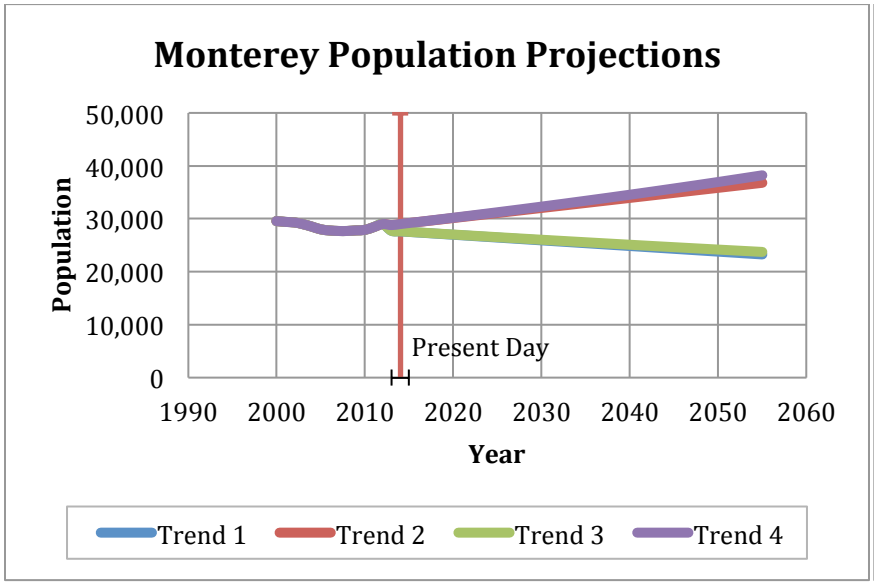
Figure 21: Pacific Grove Projections

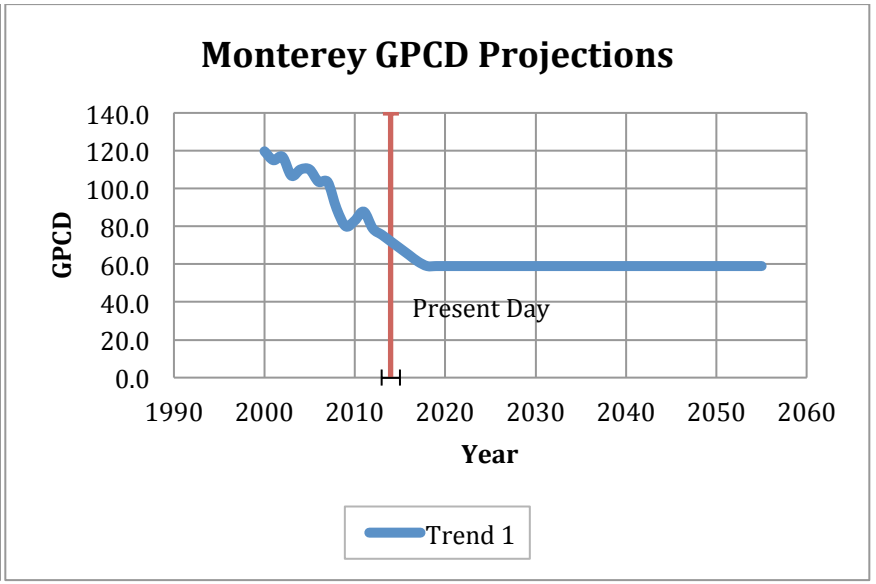
Table 4: Pacific Grove Model Results

Community	Pacific Grove
Min GPCD	59.0

		Population				GPCD	Wastewater Flow			
	Year	Trend 1	Trend 2	Trend 3	Trend 4	Trend 1	Trend 1	Trend 2	Trend 3	Trend 4
Historical	1999						1.2	1.2	1.2	1.2
	2000	15,595	15,595	15,595	15,595	90.2	1.4	1.4	1.4	1.4
	2001	15,584	15,584	15,584	15,584	83.4	1.3	1.3	1.3	1.3
	2002	15,464	15,464	15,464	15,464	81.4	1.3	1.3	1.3	1.3
	2003	15,330	15,330	15,330	15,330	83.3	1.3	1.3	1.3	1.3
	2004	15,080	15,080	15,080	15,080	82.4	1.2	1.2	1.2	1.2
	2005	14,869	14,869	14,869	14,869	94.3	1.4	1.4	1.4	1.4
	2006	14,795	14,795	14,795	14,795	93.7	1.4	1.4	1.4	1.4
	2007	14,864	14,864	14,864	14,864	79.0	1.2	1.2	1.2	1.2
	2008	14,933	14,933	14,933	14,933	77.6	1.2	1.2	1.2	1.2
	2009	15,041	15,041	15,041	15,041	76.4	1.1	1.1	1.1	1.1
	2010	15,101	15,101	15,101	15,101	93.7	1.4	1.4	1.4	1.4
	2011	15,246	15,246	15,246	15,246	70.4	1.1	1.1	1.1	1.1
	2012	15,407	15,407	15,407	15,407	61.2	0.9	0.9	0.9	0.9
Projections	2013	14,969	15,451	14,970	15,454	73.0	0.9	0.9	0.9	0.9
	2014	14,939	15,550	14,941	15,556	71.7	1.1	1.1	1.1	1.1
	2015	14,909	15,648	14,912	15,658	70.4	1.1	1.1	1.1	1.1
	2016	14,879	15,747	14,883	15,761	69.1	1.0	1.1	1.0	1.1
	2017	14,849	15,846	14,854	15,864	67.8	1.0	1.1	1.0	1.1
	2018	14,819	15,945	14,825	15,969	66.6	1.0	1.1	1.0	1.1
	2019	14,789	16,044	14,796	16,074	65.3	1.0	1.0	1.0	1.0
	2020	14,759	16,143	14,767	16,179	64.0	0.9	1.0	0.9	1.0
	2025	14,610	16,637	14,624	16,719	59.0	0.9	1.0	0.9	1.0
	2030	14,461	17,131	14,482	17,276	59.0	0.9	1.0	0.9	1.0
	2035	14,311	17,626	14,342	17,851	59.0	0.8	1.0	0.8	1.1
	2040	14,162	18,120	14,203	18,446	59.0	0.8	1.1	0.8	1.1
	2045	14,013	18,614	14,065	19,060	59.0	0.8	1.1	0.8	1.1
	2050	13,863	19,108	13,929	19,695	59.0	0.8	1.1	0.8	1.2
	2055	13,714	19,603	13,794	20,352	59.0	0.8	1.2	0.8	1.2

APPENDIX F – MONTEREY PROJECTIONS





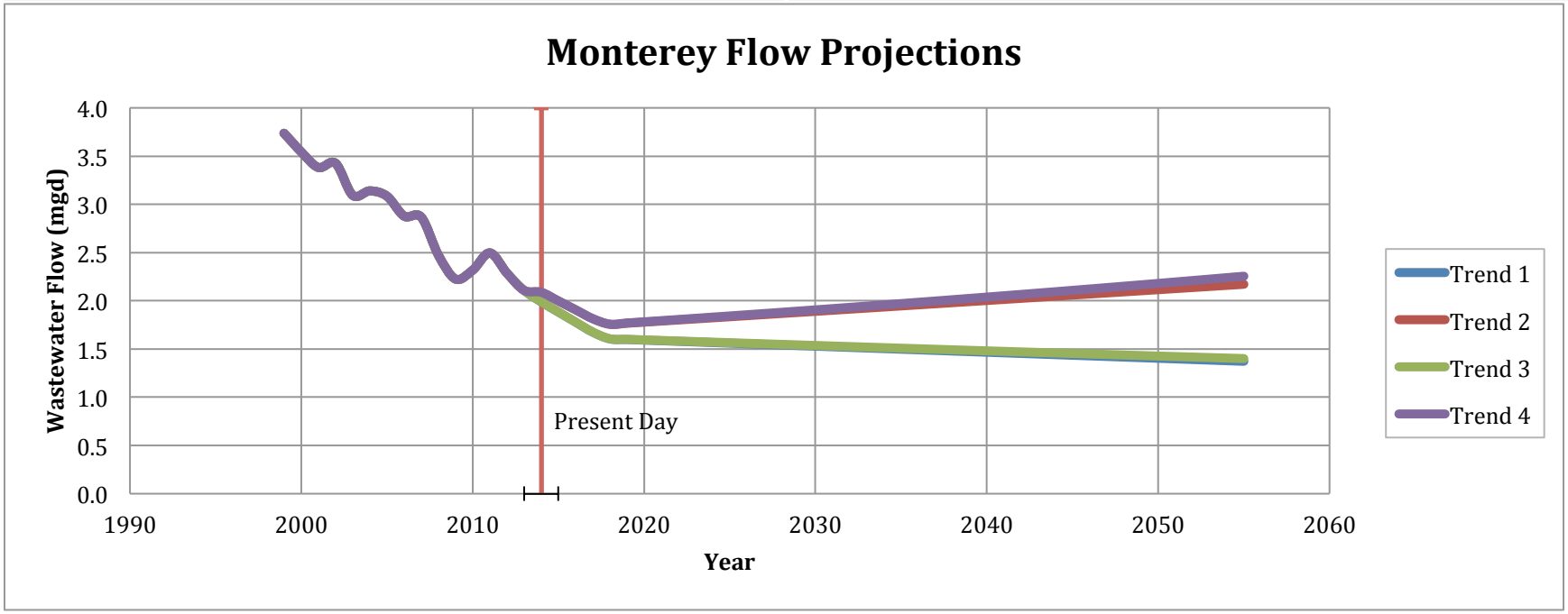


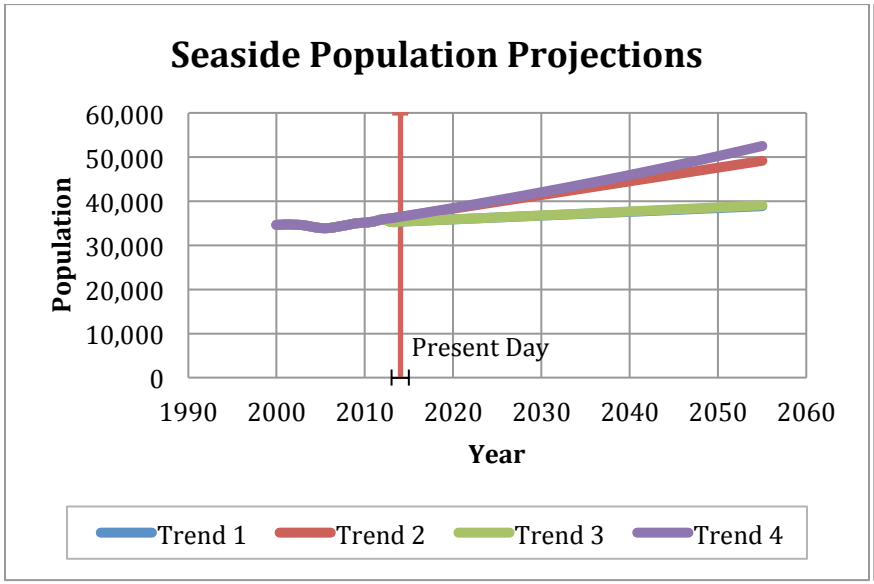
Figure 22: Monterey Projections

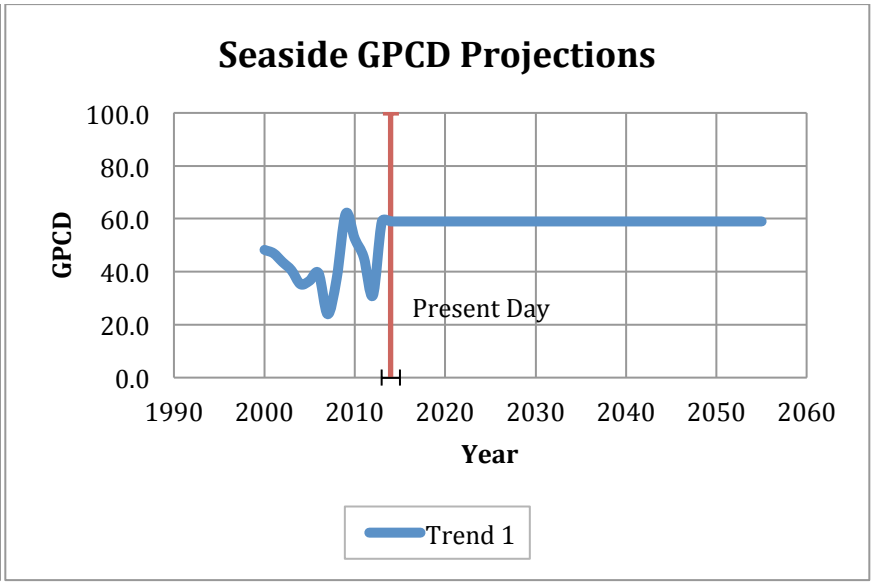
Table 5: Monterey Model Results

Community	Monterey
Min GPCD	59.0

		Population				GPCD	Wastewater Flow			
	Year	Trend 1	Trend 2	Trend 3	Trend 4	Trend 1	Trend 1	Trend 2	Trend 3	Trend 4
Historical	1999						3.7	3.7	3.7	3.7
	2000	29,582	29,582	29,582	29,582	119.7	3.5	3.5	3.5	3.5
	2001	29,410	29,410	29,410	29,410	115.0	3.4	3.4	3.4	3.4
	2002	29,315	29,315	29,315	29,315	116.8	3.4	3.4	3.4	3.4
	2003	28,975	28,975	28,975	28,975	106.8	3.1	3.1	3.1	3.1
	2004	28,512	28,512	28,512	28,512	110.1	3.1	3.1	3.1	3.1
	2005	28,005	28,005	28,005	28,005	110.1	3.1	3.1	3.1	3.1
	2006	27,794	27,794	27,794	27,794	103.5	2.9	2.9	2.9	2.9
	2007	27,698	27,698	27,698	27,698	103.5	2.9	2.9	2.9	2.9
	2008	27,701	27,701	27,701	27,701	89.3	2.5	2.5	2.5	2.5
	2009	27,810	27,810	27,810	27,810	80.0	2.2	2.2	2.2	2.2
	2010	27,914	27,914	27,914	27,914	83.0	2.3	2.3	2.3	2.3
	2011	28,440	28,440	28,440	28,440	87.8	2.5	2.5	2.5	2.5
	2012	29,003	29,003	29,003	29,003	78.8	2.3	2.3	2.3	2.3
Projections	2013	27,729	28,812	27,737	28,812	75.5	2.1	2.1	2.1	2.1
	2014	27,623	29,002	27,635	29,007	72.0	2.0	2.1	2.0	2.1
	2015	27,517	29,192	27,533	29,202	68.4	1.9	2.0	1.9	2.0
	2016	27,410	29,382	27,431	29,399	64.9	1.8	1.9	1.8	1.9
	2017	27,304	29,573	27,329	29,598	61.3	1.7	1.8	1.7	1.8
	2018	27,198	29,763	27,228	29,798	59.0	1.6	1.8	1.6	1.8
	2019	27,091	29,953	27,128	29,999	59.0	1.6	1.8	1.6	1.8
	2020	26,985	30,143	27,027	30,201	59.0	1.6	1.8	1.6	1.8
	2025	26,454	31,094	26,532	31,234	59.0	1.6	1.8	1.6	1.8
	2030	25,922	32,044	26,045	32,301	59.0	1.5	1.9	1.5	1.9
	2035	25,390	32,995	25,567	33,406	59.0	1.5	1.9	1.5	2.0
	2040	24,859	33,946	25,098	34,548	59.0	1.5	2.0	1.5	2.0
	2045	24,327	34,897	24,637	35,729	59.0	1.4	2.1	1.5	2.1
	2050	23,795	35,847	24,185	36,951	59.0	1.4	2.1	1.4	2.2
	2055	23,264	36,798	23,742	38,214	59.0	1.4	2.2	1.4	2.3

APPENDIX G – SEASIDE PROJECTIONS





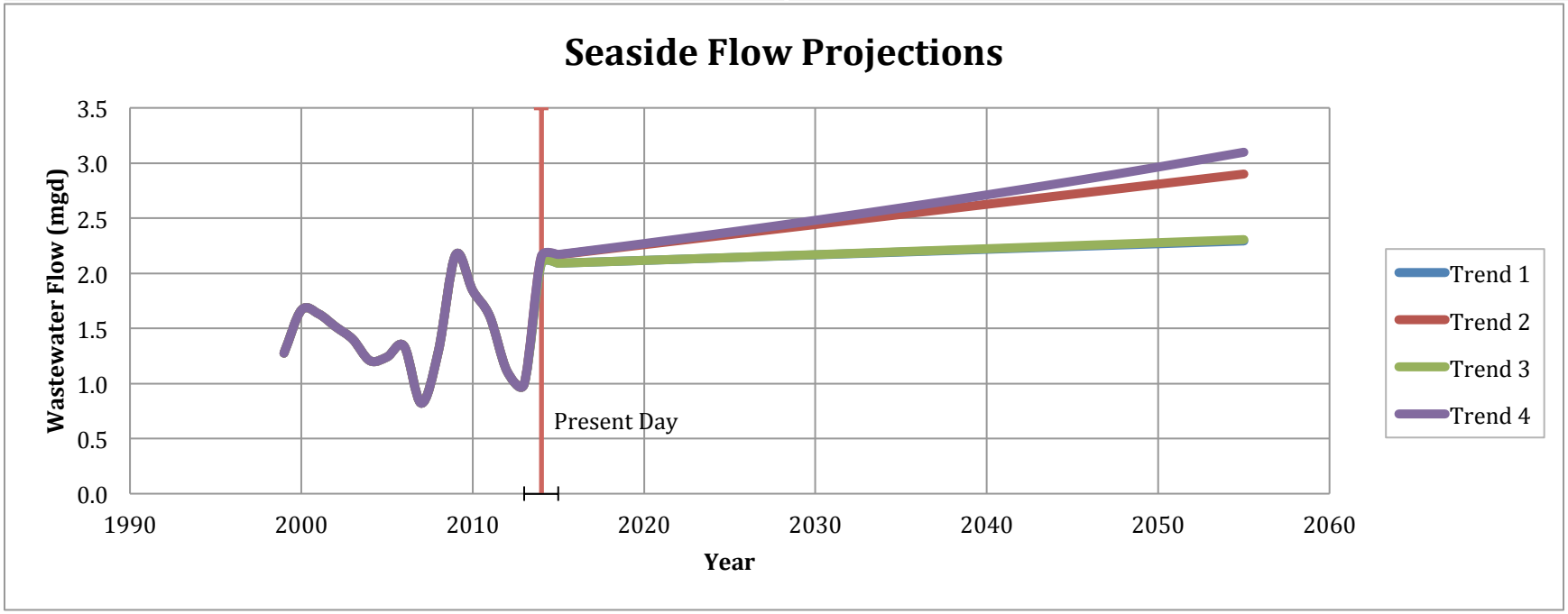


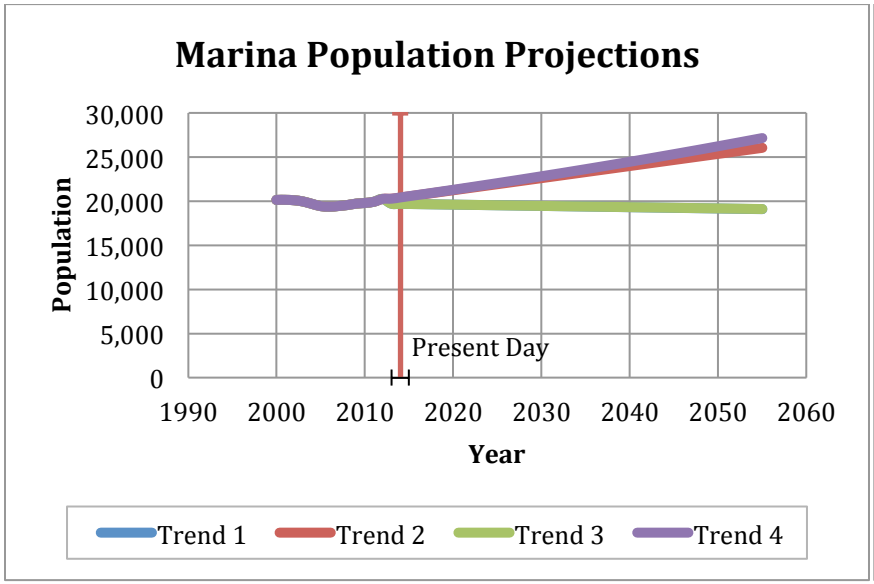
Figure 23: Seaside Projections

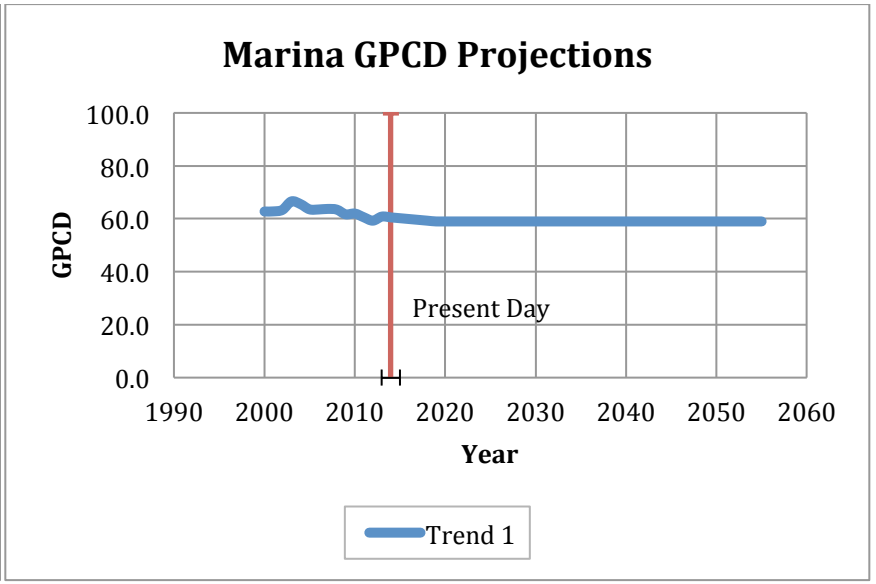
Table 6: Seaside Model Results

Community	Seaside, Sand City, and Del Rey Oaks
Min GPCD	59.0

		Population				GPCD	Wastewater Flow			
	Year	Trend 1	Trend 2	Trend 3	Trend 4	Trend 1	Trend 1	Trend 2	Trend 3	Trend 4
Historical	1999						1.3	1.3	1.3	1.3
	2000	34,558	34,558	34,558	34,558	48.2	1.7	1.7	1.7	1.7
	2001	34,716	34,716	34,716	34,716	47.0	1.6	1.6	1.6	1.6
	2002	34,665	34,665	34,665	34,665	43.7	1.5	1.5	1.5	1.5
	2003	34,555	34,555	34,555	34,555	40.5	1.4	1.4	1.4	1.4
	2004	34,196	34,196	34,196	34,196	35.3	1.2	1.2	1.2	1.2
	2005	33,903	33,903	33,903	33,903	36.6	1.2	1.2	1.2	1.2
	2006	33,923	33,923	33,923	33,923	39.4	1.3	1.3	1.3	1.3
	2007	34,247	34,247	34,247	34,247	24.0	0.8	0.8	0.8	0.8
	2008	34,593	34,593	34,593	34,593	37.4	1.3	1.3	1.3	1.3
	2009	34,983	34,983	34,983	34,983	61.9	2.2	2.2	2.2	2.2
	2010	35,122	35,122	35,122	35,122	52.5	1.8	1.8	1.8	1.8
	2011	35,387	35,387	35,387	35,387	45.4	1.6	1.6	1.6	1.6
	2012	35,882	35,882	35,882	35,882	31.0	1.1	1.1	1.1	1.1
Projections	2013	35,270	36,118	35,264	36,134	59.0	1.0	1.0	1.0	1.0
	2014	35,355	36,428	35,350	36,457	59.0	2.1	2.1	2.1	2.2
	2015	35,440	36,738	35,436	36,783	59.0	2.1	2.2	2.1	2.2
	2016	35,526	37,048	35,523	37,112	59.0	2.1	2.2	2.1	2.2
	2017	35,611	37,358	35,610	37,443	59.0	2.1	2.2	2.1	2.2
	2018	35,697	37,669	35,697	37,778	59.0	2.1	2.2	2.1	2.2
	2019	35,782	37,979	35,784	38,116	59.0	2.1	2.2	2.1	2.2
	2020	35,868	38,289	35,871	38,456	59.0	2.1	2.3	2.1	2.3
	2025	36,295	39,840	36,311	40,205	59.0	2.1	2.4	2.1	2.4
	2030	36,722	41,391	36,757	42,034	59.0	2.2	2.4	2.2	2.5
	2035	37,149	42,942	37,208	43,946	59.0	2.2	2.5	2.2	2.6
	2040	37,576	44,493	37,664	45,945	59.0	2.2	2.6	2.2	2.7
	2045	38,003	46,044	38,126	48,035	59.0	2.2	2.7	2.2	2.8
	2050	38,431	47,596	38,594	50,220	59.0	2.3	2.8	2.3	3.0
	2055	38,858	49,147	39,067	52,504	59.0	2.3	2.9	2.3	3.1

APPENDIX H – MARINA PROJECTIONS





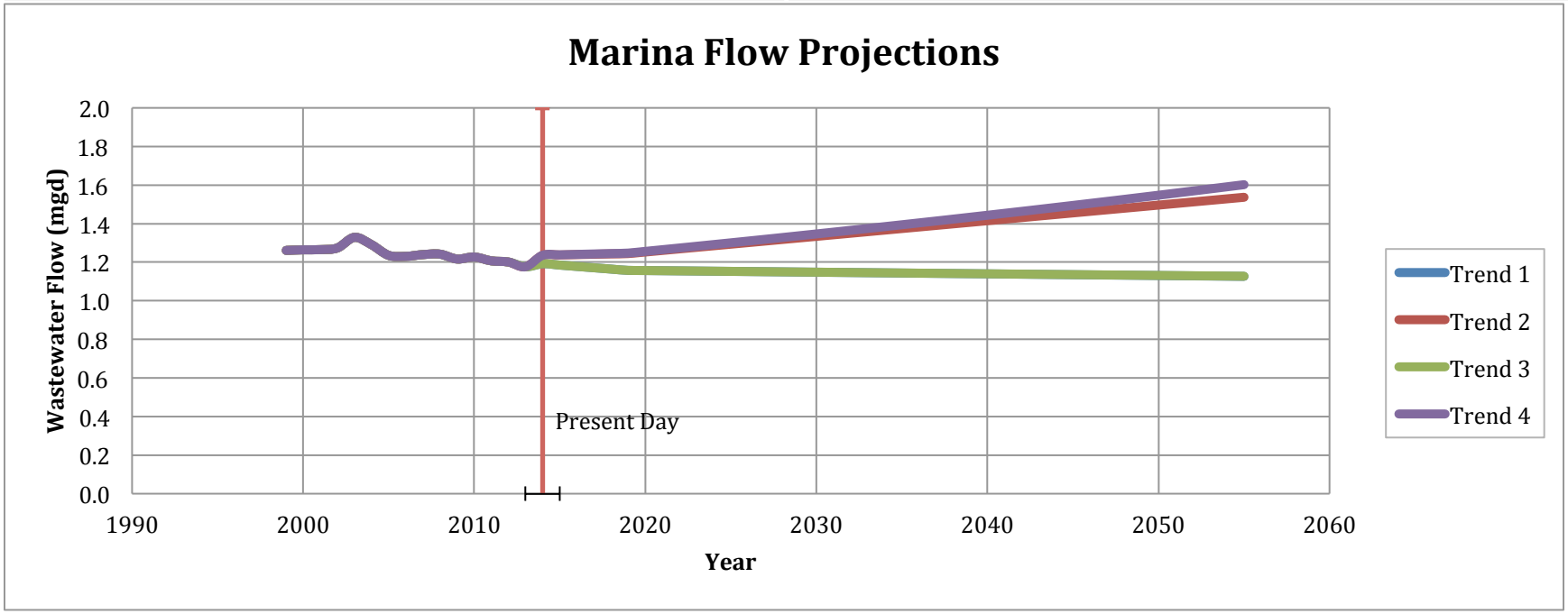


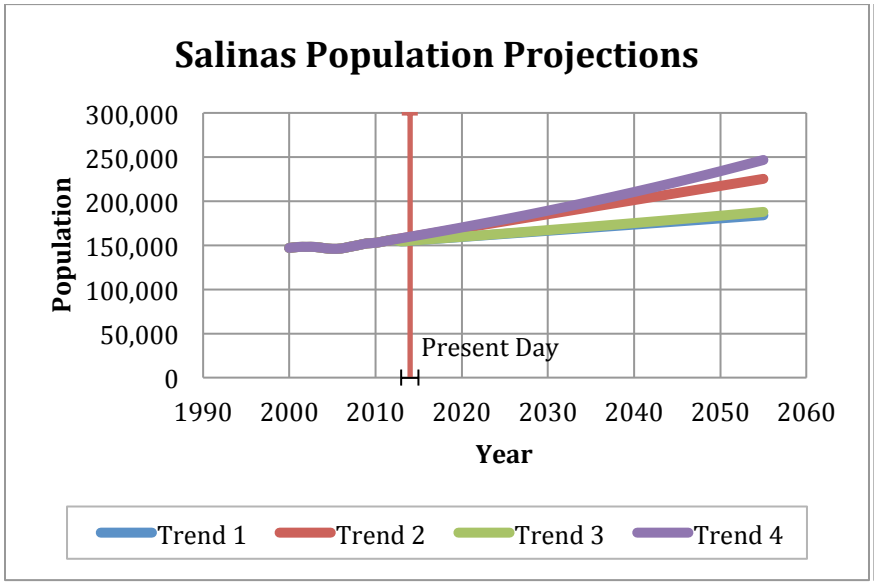
Figure 24: Marina Projections

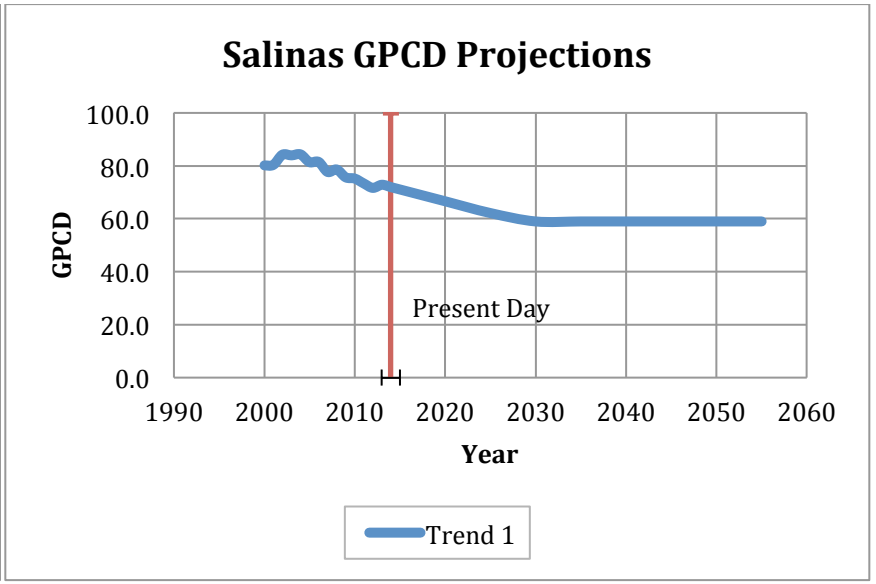
Table 7: Marina Model Results

Community	Marina
Min GPCD	59.0

		Population				GPCD	Wastewater Flow			
	Year	Trend 1	Trend 2	Trend 3	Trend 4	Trend 1	Trend 1	Trend 2	Trend 3	Trend 4
Historical	1999						1.3	1.3	1.3	1.3
	2000	20,151	20,151	20,151	20,151	62.7	1.3	1.3	1.3	1.3
	2001	20,147	20,147	20,147	20,147	62.8	1.3	1.3	1.3	1.3
	2002	20,100	20,100	20,100	20,100	63.4	1.3	1.3	1.3	1.3
	2003	19,956	19,956	19,956	19,956	66.6	1.3	1.3	1.3	1.3
	2004	19,690	19,690	19,690	19,690	65.5	1.3	1.3	1.3	1.3
	2005	19,435	19,435	19,435	19,435	63.6	1.2	1.2	1.2	1.2
	2006	19,369	19,369	19,369	19,369	63.5	1.2	1.2	1.2	1.2
	2007	19,449	19,449	19,449	19,449	63.7	1.2	1.2	1.2	1.2
	2008	19,559	19,559	19,559	19,559	63.5	1.2	1.2	1.2	1.2
	2009	19,718	19,718	19,718	19,718	61.7	1.2	1.2	1.2	1.2
	2010	19,795	19,795	19,795	19,795	62.0	1.2	1.2	1.2	1.2
	2011	19,928	19,928	19,928	19,928	60.6	1.2	1.2	1.2	1.2
	2012	20,253	20,253	20,253	20,253	59.3	1.2	1.2	1.2	1.2
Projections	2013	19,709	20,274	19,707	20,278	60.8	1.2	1.2	1.2	1.2
	2014	19,694	20,411	19,693	20,420	60.5	1.2	1.2	1.2	1.2
	2015	19,680	20,549	19,678	20,562	60.2	1.2	1.2	1.2	1.2
	2016	19,665	20,686	19,664	20,705	59.9	1.2	1.2	1.2	1.2
	2017	19,650	20,823	19,649	20,850	59.6	1.2	1.2	1.2	1.2
	2018	19,636	20,961	19,635	20,995	59.3	1.2	1.2	1.2	1.2
	2019	19,621	21,098	19,621	21,141	59.0	1.2	1.2	1.2	1.2
	2020	19,607	21,235	19,606	21,289	59.0	1.2	1.3	1.2	1.3
	2025	19,533	21,922	19,534	22,041	59.0	1.2	1.3	1.2	1.3
	2030	19,460	22,609	19,462	22,821	59.0	1.1	1.3	1.1	1.3
	2035	19,387	23,296	19,390	23,627	59.0	1.1	1.4	1.1	1.4
	2040	19,314	23,983	19,319	24,463	59.0	1.1	1.4	1.1	1.4
	2045	19,240	24,669	19,248	25,327	59.0	1.1	1.5	1.1	1.5
	2050	19,167	25,356	19,177	26,223	59.0	1.1	1.5	1.1	1.5
	2055	19,094	26,043	19,107	27,150	59.0	1.1	1.5	1.1	1.6

APPENDIX I – SALINAS PROJECTIONS





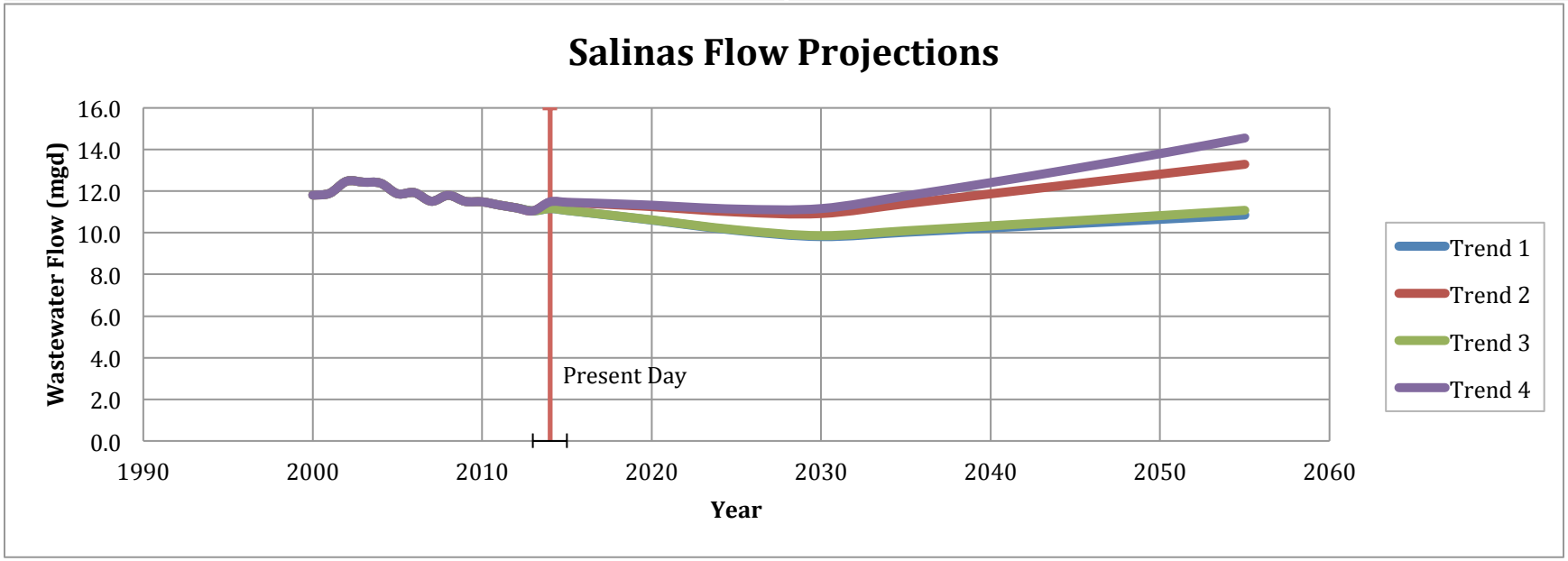


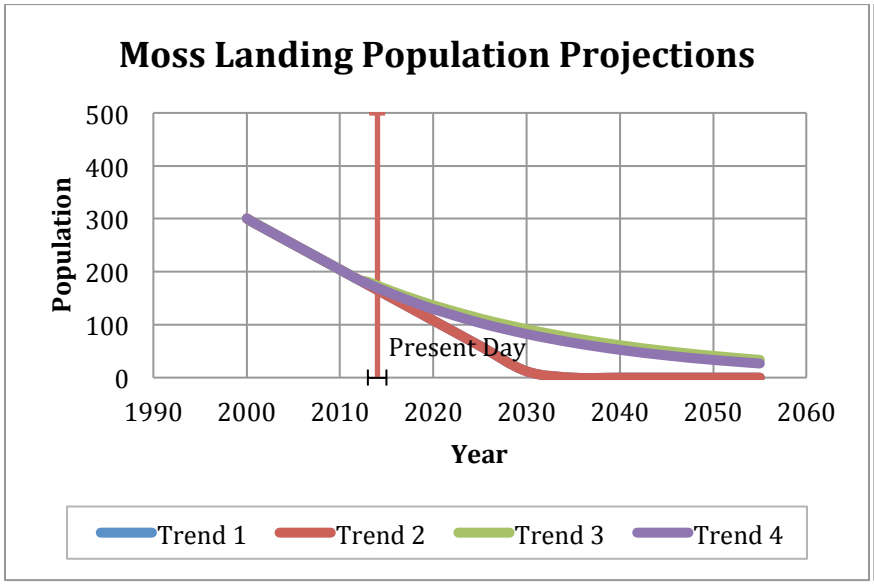
Figure 25: Salinas Projections

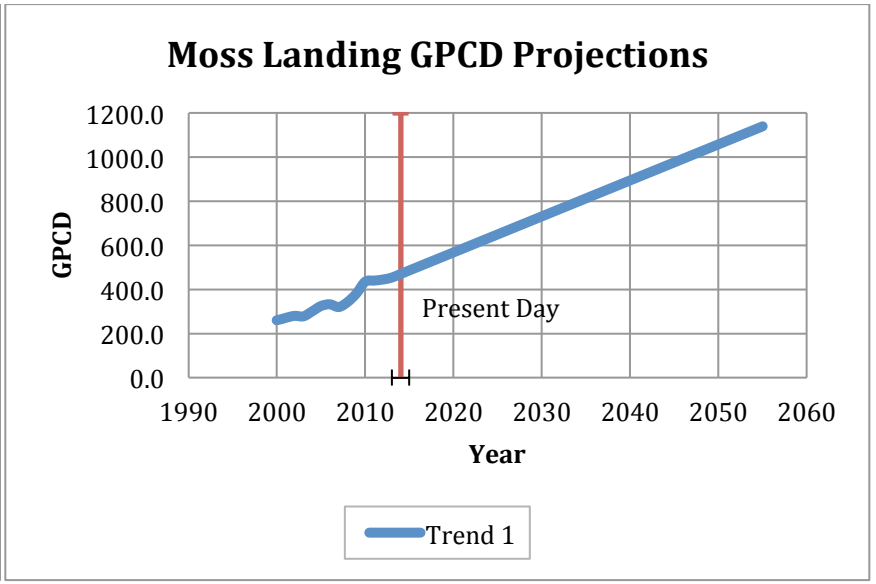
Table 8: Salinas Model Results

Community	Salinas and Boronda
Min GPCD	59.0

		Population				GPCD	Wastewater Flow			
	Year	Trend 1	Trend 2	Trend 3	Trend 4	Trend 1	Trend 1	Trend 2	Trend 3	Trend 4
Historical	1999						10.3	10.3	10.3	10.3
	2000	146,960	146,960	146,960	146,960	80.3	11.8	11.8	11.8	11.8
	2001	148,035	148,035	148,035	148,035	80.4	11.9	11.9	11.9	11.9
	2002	148,144	148,144	148,144	148,144	84.2	12.5	12.5	12.5	12.5
	2003	148,053	148,053	148,053	148,053	84.0	12.4	12.4	12.4	12.4
	2004	146,834	146,834	146,834	146,834	84.3	12.4	12.4	12.4	12.4
	2005	145,948	145,948	145,948	145,948	81.4	11.9	11.9	11.9	11.9
	2006	146,364	146,364	146,364	146,364	81.5	11.9	11.9	11.9	11.9
	2007	148,236	148,236	148,236	148,236	77.7	11.5	11.5	11.5	11.5
	2008	150,114	150,114	150,114	150,114	78.6	11.8	11.8	11.8	11.8
	2009	152,113	152,113	152,113	152,113	75.7	11.5	11.5	11.5	11.5
	2010	152,758	152,758	152,758	152,758	75.2	11.5	11.5	11.5	11.5
	2011	154,512	154,512	154,512	154,512	73.4	11.3	11.3	11.3	11.3
	2012	156,271	156,271	156,271	156,271	71.7	11.2	11.2	11.2	11.2
Projections	2013	154,477	157,898	154,478	158,008	72.8	11.1	11.1	11.1	11.1
	2014	155,179	159,502	155,198	159,692	71.9	11.2	11.5	11.2	11.5
	2015	155,881	161,106	155,921	161,394	71.0	11.1	11.4	11.1	11.5
	2016	156,583	162,710	156,648	163,114	70.1	11.0	11.4	11.0	11.4
	2017	157,285	164,314	157,378	164,853	69.2	10.9	11.4	10.9	11.4
	2018	157,987	165,919	158,112	166,610	68.4	10.8	11.3	10.8	11.4
	2019	158,688	167,523	158,849	168,386	67.5	10.7	11.3	10.7	11.4
	2020	159,390	169,127	159,589	170,181	66.6	10.6	11.3	10.6	11.3
	2025	162,900	177,148	163,343	179,447	62.1	10.1	11.0	10.1	11.1
	2030	166,409	185,169	167,185	189,216	59.0	9.8	10.9	9.9	11.2
	2035	169,918	193,190	171,117	199,518	59.0	10.0	11.4	10.1	11.8
	2040	173,427	201,210	175,142	210,381	59.0	10.2	11.9	10.3	12.4
	2045	176,936	209,231	179,262	221,835	59.0	10.4	12.3	10.6	13.1
	2050	180,446	217,252	183,479	233,912	59.0	10.6	12.8	10.8	13.8
	2055	183,955	225,273	187,795	246,648	59.0	10.9	13.3	11.1	14.6

APPENDIX J – MOSS LANDING PROJECTIONS





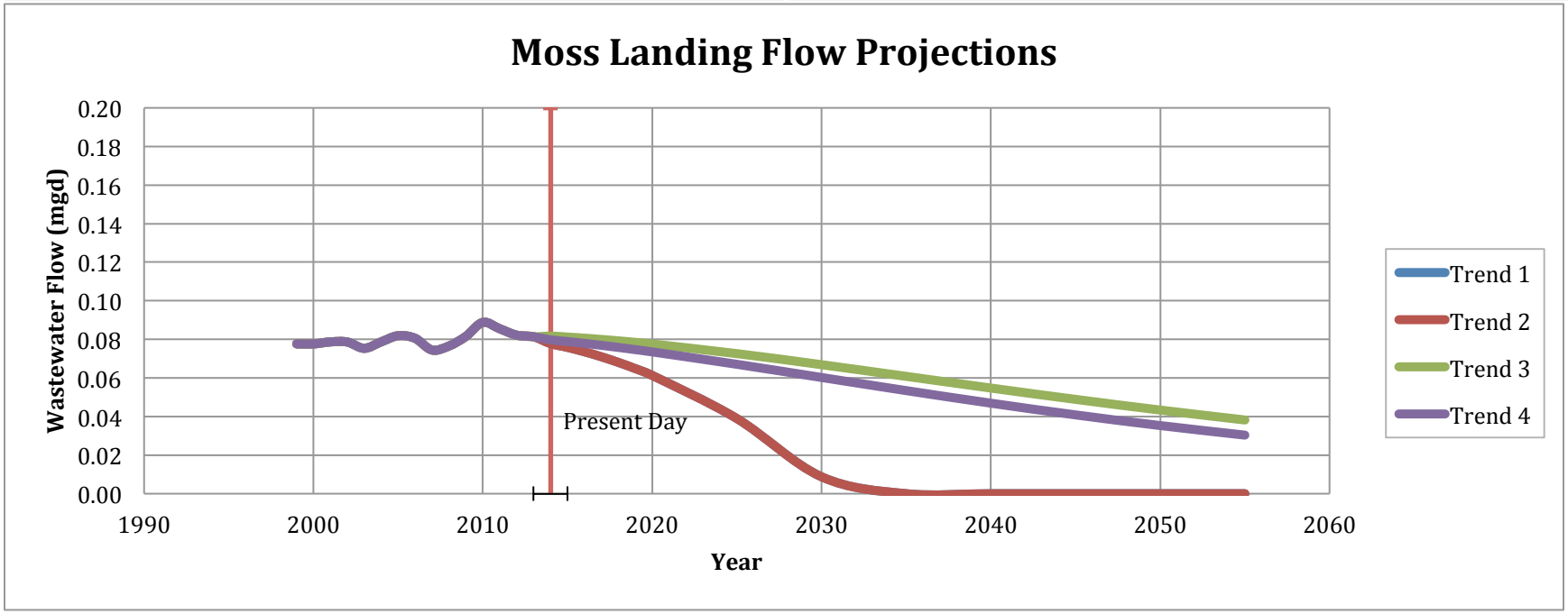


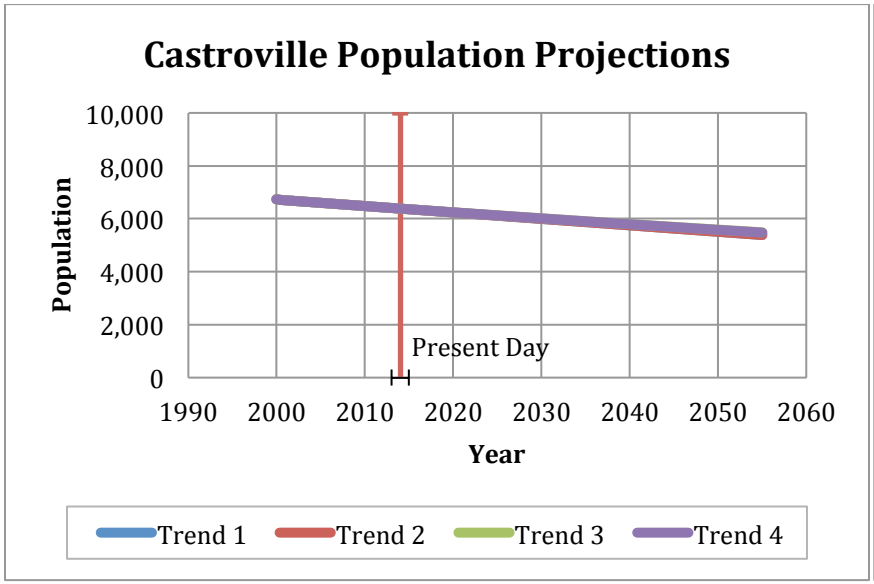
Figure 26: Moss Landing Projections

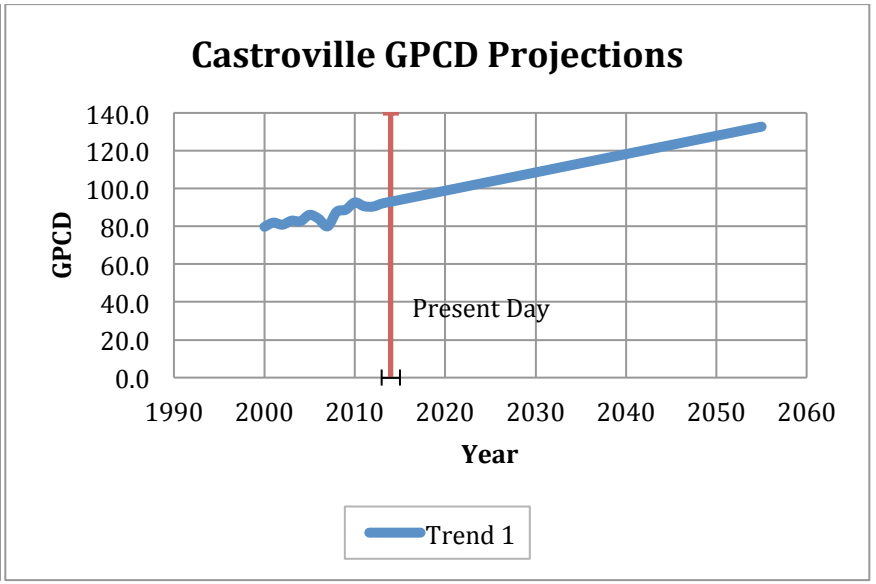
Table 9: Moss Landing Model Results

Community	Moss Landing
Min GPCD	59.0

		Population				GPCD	Wastewater Flow			
	Year	Trend 1	Trend 2	Trend 3	Trend 4	Trend 1	Trend 1	Trend 2	Trend 3	Trend 4
Historical	1999						0.08	0.08	0.08	0.08
	2000	300	300	300	300	258.8	0.08	0.08	0.08	0.08
	2001	290	290	290	290	271.0	0.08	0.08	0.08	0.08
	2002	281	281	281	281	280.0	0.08	0.08	0.08	0.08
	2003	271	271	271	271	277.9	0.08	0.08	0.08	0.08
	2004	262	262	262	262	300.9	0.08	0.08	0.08	0.08
	2005	252	252	252	252	325.0	0.08	0.08	0.08	0.08
	2006	242	242	242	242	332.3	0.08	0.08	0.08	0.08
	2007	233	233	233	233	319.9	0.07	0.07	0.07	0.07
	2008	223	223	223	223	343.0	0.08	0.08	0.08	0.08
	2009	214	214	214	214	381.7	0.08	0.08	0.08	0.08
	2010	204	204	204	204	435.3	0.09	0.09	0.09	0.09
	2011	194	194	194	194	439.8	0.09	0.09	0.09	0.09
	2012	185	185	185	185	444.7	0.08	0.08	0.08	0.08
Projections	2013	175	175	181	178	453.5	0.08	0.08	0.08	0.08
	2014	166	166	174	170	469.8	0.08	0.08	0.08	0.08
	2015	156	156	167	162	486.2	0.08	0.08	0.08	0.08
	2016	146	146	160	155	502.5	0.07	0.07	0.08	0.08
	2017	137	137	154	148	518.8	0.07	0.07	0.08	0.08
	2018	127	127	148	142	535.1	0.07	0.07	0.08	0.08
	2019	118	118	142	135	551.5	0.06	0.06	0.08	0.07
	2020	108	108	137	129	567.8	0.06	0.06	0.08	0.07
	2025	60	60	112	103	649.4	0.04	0.04	0.07	0.07
	2030	12	12	91	82	731.1	0.01	0.01	0.07	0.06
	2035	0	0	75	66	812.7	0.00	0.00	0.06	0.05
	2040	0	0	61	52	894.3	0.00	0.00	0.05	0.05
	2045	0	0	50	42	975.9	0.00	0.00	0.05	0.04
	2050	0	0	41	33	1057.6	0.00	0.00	0.04	0.04
	2055	0	0	34	27	1139.2	0.00	0.00	0.04	0.03

APPENDIX K – CASTROVILLE PROJECTIONS





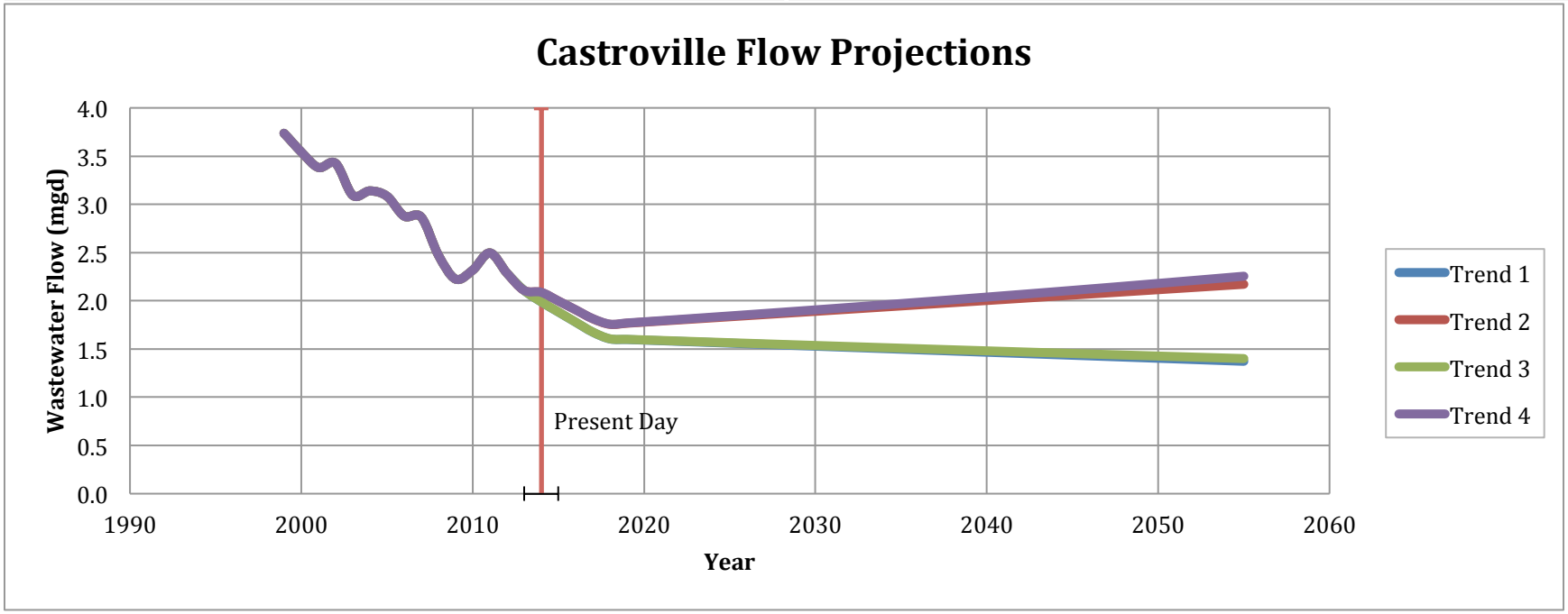


Figure 27: Castroville Projections

Table 10: Castroville Model Results

Community	Castroville
Min GPCD	59.0

		Population				GPCD	Wastewater Flow			
	Year	Trend 1	Trend 2	Trend 3	Trend 4	Trend 1	Trend 1	Trend 2	Trend 3	Trend 4
Historical	1999						0.6	0.6	0.6	0.6
	2000	6,724	6,724	6,724	6,724	79.8	0.5	0.5	0.5	0.5
	2001	6,700	6,700	6,700	6,700	82.0	0.5	0.5	0.5	0.5
	2002	6,675	6,675	6,675	6,675	80.9	0.5	0.5	0.5	0.5
	2003	6,651	6,651	6,651	6,651	83.0	0.6	0.6	0.6	0.6
	2004	6,627	6,627	6,627	6,627	82.7	0.5	0.5	0.5	0.5
	2005	6,603	6,603	6,603	6,603	86.1	0.6	0.6	0.6	0.6
	2006	6,578	6,578	6,578	6,578	84.0	0.6	0.6	0.6	0.6
	2007	6,554	6,554	6,554	6,554	80.0	0.5	0.5	0.5	0.5
	2008	6,530	6,530	6,530	6,530	87.7	0.6	0.6	0.6	0.6
	2009	6,505	6,505	6,505	6,505	88.8	0.6	0.6	0.6	0.6
	2010	6,481	6,481	6,481	6,481	92.7	0.6	0.6	0.6	0.6
	2011	6,457	6,457	6,457	6,457	90.7	0.6	0.6	0.6	0.6
	2012	6,432	6,432	6,432	6,432	90.4	0.6	0.6	0.6	0.6
Projections	2013	6,408	6,408	6,410	6,409	92.1	0.6	0.6	0.6	0.6
	2014	6,384	6,384	6,386	6,385	93.0	0.6	0.6	0.6	0.6
	2015	6,360	6,360	6,362	6,361	94.0	0.6	0.6	0.6	0.6
	2016	6,335	6,335	6,339	6,337	95.0	0.6	0.6	0.6	0.6
	2017	6,311	6,311	6,316	6,314	95.9	0.6	0.6	0.6	0.6
	2018	6,287	6,287	6,292	6,290	96.9	0.6	0.6	0.6	0.6
	2019	6,262	6,262	6,269	6,267	97.9	0.6	0.6	0.6	0.6
	2020	6,238	6,238	6,246	6,243	98.8	0.6	0.6	0.6	0.6
	2025	6,117	6,117	6,132	6,128	103.7	0.6	0.6	0.6	0.6
	2030	5,995	5,995	6,019	6,014	108.5	0.7	0.7	0.7	0.7
	2035	5,874	5,874	5,909	5,903	113.4	0.7	0.7	0.7	0.7
	2040	5,752	5,752	5,801	5,794	118.2	0.7	0.7	0.7	0.7
	2045	5,631	5,631	5,695	5,687	123.1	0.7	0.7	0.7	0.7
	2050	5,509	5,509	5,591	5,581	127.9	0.7	0.7	0.7	0.7
	2055	5,388	5,388	5,488	5,478	132.7	0.7	0.7	0.7	0.7

APPENDIX L – INSTRUCTIONS FOR ADJUSTING THE MODEL

Adjusting the Projections Model

The MRWPCA wastewater flow projections spreadsheet model is contained within one Excel 2011 spreadsheet file. The file is separated into multiple worksheets that are viewed by clicking on the named tabs located at the bottom of the open file's window. The model was developed so that new population and flow data may be added and minimum GPCD constraints changed. Changes to the model can be made within the 9 community model worksheets. The community model worksheets are:

- Pacific Grove Model
- Monterey Model
- Seaside Model (includes Del Rey Oaks and Sand City)
- Marina Model
- Salinas Model (includes Boronda)
- Moss Landing Model
- Castroville Model
- RTP Model
- RTP Independent Model

The other worksheets are for reference and calculation purposes only and should not be modified.

The following sections describe the adjustable model features.

Change Minimum Assumed GPCD

The model accounts for assumptions that per capita wastewater flow is always greater than or equal to a selected baseline value. The baseline value is adjustable by the user. The current model uses 59.0 GPCD as the default assumed minimum baseline value. To test a different minimum assumed GPCD for any community, type the desired number into the box labeled "Min GPCD" at the top of a community model tab. Projected GPCD values will only decrease to values greater than or equal to this minimum value.

Community	Pacific Grove
Min GPCD	59.0

Input Value

	Year	Population				GPCD	Wastewater Flow			
			2	Trend 3	Trend 4	Trend 1	Trend 1	Trend 2	Trend 3	Trend 4
Historical	1999						1.2	1.2	1.2	1.2
	2000	15,595	15,595	15,595	15,595	90.2	1.4	1.4	1.4	1.4
	2001	15,584	15,584	15,584	15,584	83.4	1.3	1.3	1.3	1.3
	2002	15,464	15,464	15,464	15,464	81.4	1.3	1.3	1.3	1.3
	2003	15,330	15,330	15,330	15,330	83.3	1.3	1.3	1.3	1.3
	2004	15,080	15,080	15,080	15,080	82.4	1.2	1.2	1.2	1.2
	2005	14,869	14,869	14,869	14,869	94.3	1.4	1.4	1.4	1.4
	2006	14,795	14,795	14,795	14,795	93.7	1.4	1.4	1.4	1.4
	2007	14,864	14,864	14,864	14,864	79.0	1.2	1.2	1.2	1.2
	2008	14,933	14,933	14,933	14,933	77.6	1.2	1.2	1.2	1.2
	2009	15,041	15,041	15,041	15,041	76.4	1.1	1.1	1.1	1.1
	2010	15,101	15,101	15,101	15,101	93.7	1.4	1.4	1.4	1.4
	2011	15,246	15,246	15,246	15,246	70.4	1.1	1.1	1.1	1.1
	2012	15,407	15,407	15,407	15,407	61.2	0.9	0.9	0.9	0.9
Projections	2013	14,969	15,451	14,970	15,454	73.0	0.9	0.9	0.9	0.9
	2014	14,939	15,550	14,941	15,556	71.7	1.1	1.1	1.1	1.1
	2015	14,909	15,648	14,912	15,658	70.4	1.1	1.1	1.1	1.1
	2016	14,879	15,747	14,883	15,761	69.1	1.0	1.1	1.0	1.1
	2017	14,849	15,846	14,854	15,864	67.8	1.0	1.1	1.0	1.1
	2018	14,819	15,945	14,825	15,969	66.6	1.0	1.1	1.0	1.1
	2019	14,789	16,044	14,796	16,074	65.3	1.0	1.0	1.0	1.0
	2020	14,759	16,143	14,767	16,179	64.0	1.0	1.0	0.9	1.0
	2025	14,610	16,637	14,624	16,719	59.0	0.9	1.0	0.9	1.0
	2030	14,461	17,131	14,482	17,276	59.0	0.9	1.0	0.9	1.0
	2035	14,311	17,626	14,342	17,851	59.0	0.8	1.0	0.8	1.1
	2040	14,162	18,120	14,203	18,446	59.0	0.8	1.1	0.8	1.1
	2045	14,013	18,614	14,065	19,060	59.0	0.8	1.1	0.8	1.1
	2050	13,863	19,108	13,929	19,695	59.0	0.8	1.1	0.8	1.2
	2055	13,714	19,603	13,794	20,352	59.0	0.8	1.2	0.8	1.2

Min GPCD Achieved

Figure 28: Change Minimum Assumed GPCD

Input New Population and Flow Data

Green shaded cells in the community model tabs contain historical data, while unshaded cells contain projected values. To update the community models with the latest actual population data, type the new data into the first year of unshaded projections. Because four different population projections are made to account for a range of possible scenarios, there are four columns of population data that need to be updated. For example, if the U.S. Census publishes a 2013 population estimate of 15,600 for the city of Pacific Grove, type 15,600 into each of the four population columns corresponding to the year 2013.

Use the same method to input the latest actual wastewater flow data.

After a row is updated with actual data for both population and wastewater flow, update the GPCD cell in the same row by copying the green shaded GPCD cell from the row above, right clicking the unshaded cell to be updated, select Paste Special, then choose Formulas from the pop-up menu.

As a visual aid, shade the new cells containing actual data green: select the cells, right click, and choose Format Cells from the pop-up menu. From the window that appears, select the fill tab, and choose light green to shade the cells to signify that they contain data and not projections.

Update population projections by double clicking the population projection cell under the row that was just updated. The data used as inputs to this cell should appear as colored rectangles on the spreadsheet. Click and drag the bottom corners of the rectangles covering the input population data and input years so that the rectangle enlarges to also cover the new population data value entered and its corresponding year. Press Enter. Right click the cell, select copy, then highlight all rows of unshaded projections within that column, taking care not to highlight any rows of actual data. Right click, select Paste Special, then choose Formulas from the pop-up menu. The formulas used to calculate population projections should update. Repeat the steps from this paragraph for the remaining columns of population projections.

Once the population projections are updated by following these steps, the wastewater flow projections automatically update.

Community	Pacific Grove
Min GPCD	59.0

		Population				GPCD	Wastewater Flow			
	Year	Trend 1	Trend 2	Trend 3	Trend 4	Trend 1	Trend 1	Trend 2	Trend 3	Trend 4
Historical	1999						1.2	1.2	1.2	1.2
	2000	15,595	15,595	15,595	15,595	90.2	1.4	1.4	1.4	1.4
	2001	15,584	15,584	15,584	15,584	83.4	1.3	1.3	1.3	1.3
	2002	15,464	15,464	15,464	15,464	81.4	1.3	1.3	1.3	1.3
	2003	15,330	15,330	15,330	15,330	83.3	1.3	1.3	1.3	1.3
	2004	15,080	15,080	15,080	15,080	82.4	1.2	1.2	1.2	1.2
	2005	14,869	14,869	14,869	14,869	94.3	1.4	1.4	1.4	1.4
	2006	14,795	14,795	14,795	14,795	93.7	1.4	1.4	1.4	1.4
	2007	14,864	14,864	14,864	14,864	79.0	1.2	1.2	1.2	1.2
	2008	14,933	14,933	14,933	14,933	77.6	1.2	1.2	1.2	1.2
	2009	15,041	15,041	15,041	15,041	76.4	1.1	1.1	1.1	1.1
	2010	15,101	15,101	15,101	15,101	93.7	1.4	1.4	1.4	1.4
	2011	15,246	15,246	15,246	15,246	70.4	1.1	1.1	1.1	1.1
	2012	15,407	15,407	15,407	15,407	61.2	0.9	0.9	0.9	0.9
Projections	2013	14,969	15,451	14,970	15,454	73.0	0.9	0.9	0.9	0.9
	2014	=TREND($D$7:$D$19,$B$7:$B$19,B21)				71.7	1.1	1.1	1.1	1.1
	2015	TREND(known_y's, [known_x's], [new_x's], [const])				70.4	1.1	1.1	1.1	1.1
	2016	14,879	15,747	14,883	15,761	69.1	1.0	1.1	1.0	1.1
	2017	14,849	15,846	14,854	15,864	67.8	1.0	1.1	1.0	1.1
	2018	14,819	15,945	14,825	15,969	66.6	1.0	1.1	1.0	1.1
	2019	14,789	16,044	14,796	16,074	65.3	1.0	1.0	1.0	1.0
	2020	14,759	16,143	14,767	16,179	64.0	0.9	1.0	0.9	1.0
	2025	14,610	16,637	14,624	16,719	59.0	0.9	1.0	0.9	1.0
	2030	14,461	17,131	14,482	17,276	59.0	0.9	1.0	0.9	1.0
	2035	14,311	17,626	14,342	17,851	59.0	0.8	1.0	0.8	1.1
	2040	14,162	18,120	14,203	18,446	59.0	0.8	1.1	0.8	1.1
	2045	14,013	18,614	14,065	19,060	59.0	0.8	1.1	0.8	1.1
	2050	13,863	19,108	13,929	19,695	59.0	0.8	1.1	0.8	1.2
	2055	13,714	19,603	13,794	20,352	59.0	0.8	1.2	0.8	1.2

Figure 29: Input New Population and Flow Data

Adjust "Present Day" on Graphs

The red vertical bars in the projection graphs are visual aids that can be individually adjusted to match the current year. To do this, right click anywhere on the graph and choose "Select Data." A pop-up menu will open. From the list of data series on the left, scroll down and click "Present Day." Change the "X–value" on the right by typing in an equal sign, a curly brace, the current year, and a closing curly brace.

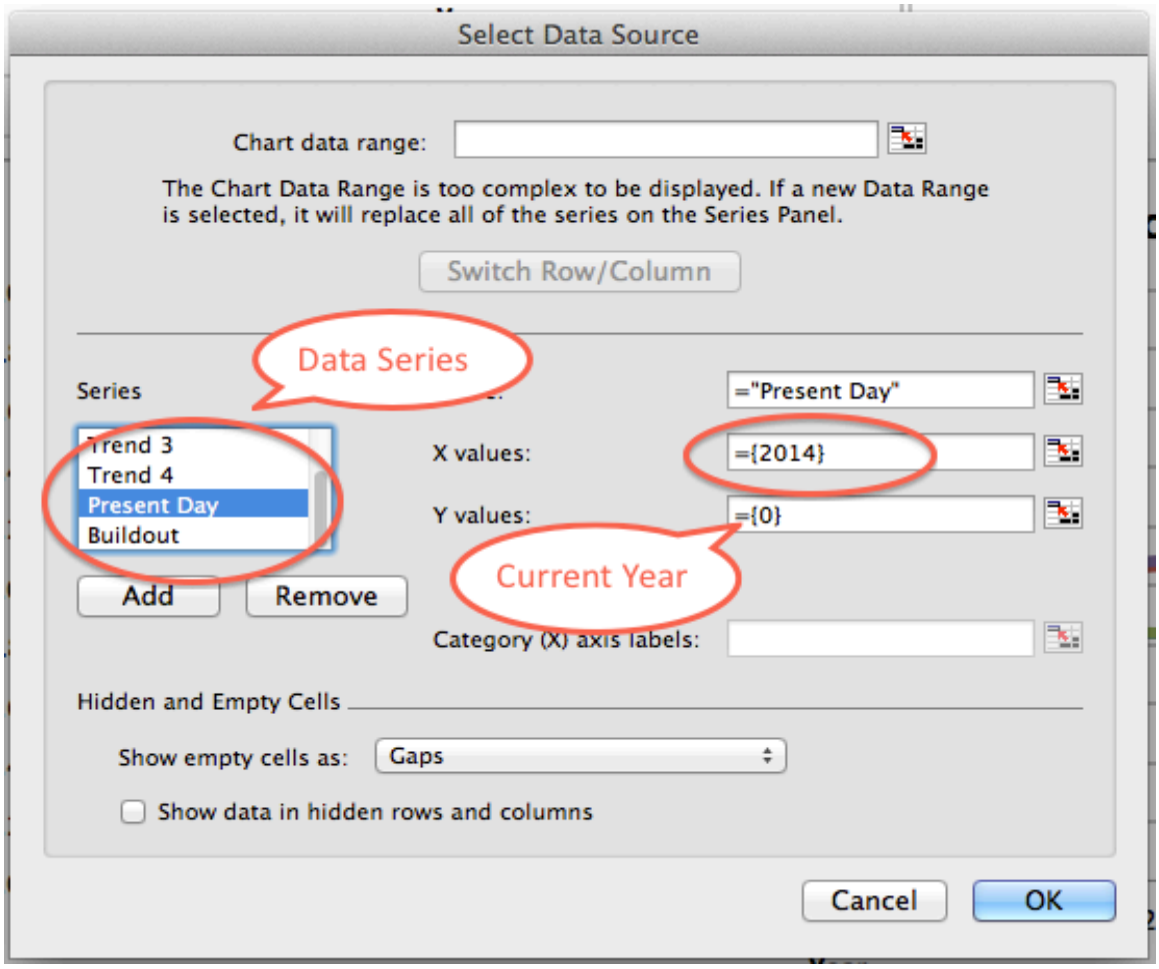


Figure 30: Input "Present Day" on Graphs

Independent RTP Projections

Changes made to population and wastewater flow projections in individual community spreadsheets are calculated to accumulate in the RTP projection results, presented in the worksheet "RTP Model". That is, RTP wastewater flow projections are made from cumulative results at the community level.

To test changes in population and wastewater flow projections or GPCD constraints at the RTP independently from the behavior of its communities, use the "RTP Independent Model" spreadsheet tab in the same manner as other community tabs. This worksheet relies on flow data directly from the RTP and is not data calculated from the regional pump stations.

Community		RTP Independent								
Min GPCD		59.0								
		Population					Wastewater Flow			
	Year	Trend 1	Trend 2	Trend 3	Trend		end 1	Trend 2	Trend 3	Trend 4
Historical	1999						19.4	19.4	19.4	19.4
	2000	253,870	253,870	253,870	253,870	83.7	21.2	21.2	21.2	21.2
	2001	254,882	254,882	254,882	254,882	82.7	21.1	21.1	21.1	21.1
	2002	254,644	254,644	254,644	254,644	84.4	21.5	21.5	21.5	21.5
	2003	253,791	253,791	253,791	253,791	83.2	21.1	21.1	21.1	21.1
	2004	251,200	251,200	251,200	251,200	83.0	20.8	20.8	20.8	20.8
	2005	249,014	249,014	249,014	249,014	82.1	20.4	20.4	20.4	20.4
	2006	249,066	249,066	249,066	249,066	81.7	20.3	20.3	20.3	20.3
	2007	251,280	251,280	251,280	251,280	76.3	19.2	19.2	19.2	19.2
	2008	253,653	253,653	253,653	253,653	77.0	19.5	19.5	19.5	19.5
	2009	256,383	256,383	256,383	256,383	77.3	19.8	19.8	19.8	19.8
	2010	257,375	257,375	257,375	257,375	77.2	19.9	19.9	19.9	19.9
	2011	260,164	260,164	260,164	260,164	74.2	19.3	19.3	19.3	19.3
	2012	263,433	263,433	263,433	263,433	69.4	18.3	18.3	18.3	18.3
Projections	2013	258,737	265,135	258,693	265,256	72.0	17.8	17.8	17.8	17.8
	2014	259,340	267,442	259,300	267,657	70.9	18.4	19.0	18.4	19.0
	2015	259,942	269,749	259,907	270,080	69.9	18.2	18.9	18.2	18.9
	2016	260,545	272,056	260,517	272,524	68.8	17.9	18.7	17.9	18.8
	2017	261,147	274,362	261,127	274,991	67.8	17.7	18.6	17.7	18.6
	2018	261,750	276,669	261,739	277,480	66.7	17.5	18.5	17.5	18.5
	2019	262,353	278,976	262,353	279,992	65.7	17.2	18.3	17.2	18.4
	2020	262,955	281,283	262,968	282,526	64.6	17.0	18.2	17.0	18.3
	2025	265,968	292,817	266,064	295,546	59.3	15.8	17.4	15.8	17.5
	2030	268,980	304,352	269,196	309,166	59.0	15.9	18.0	15.9	18.2
	2035	271,993	315,886	272,366	323,414	59.0	16.0	18.6	16.1	19.1
	2040	275,006	327,420	275,573	338,318	59.0	16.2	19.3	16.3	20.0
	2045	278,018	338,954	278,817	353,910	59.0	16.4	20.0	16.5	20.9
	2050	281,031	350,489	282,100	370,219	59.0	16.6	20.7	16.6	21.8
	2055	284,044	362,023	285,422	387,281	59.0	16.8	21.4	16.8	22.8

Independent Model

Figure 31: Independent RTP Projections

APPENDIX M – WASTEWATER FORECASTING MODEL