11 Anti-Degradation Analysis

11.1 REGULATORY BACKGROUND

The Recycled Water Policy requires recycled water projects included within SNMPs to satisfy the requirements of State Water Board Resolution No. 68-16, the State antidegradation policy adopted in 1968 to protect and maintain existing water quality in California. Resolution No. 68-16 is interpreted to incorporate the federal antidegradation policy and satisfies the federal regulation requiring states to adopt their own antidegradation policies. Resolution No. 68-16 states in part:

1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial uses of such water and will not result in water quality less than that prescribed in the policies.
2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality water will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

Entities that carry out actions that involve the disposal of wastes that could impact high quality waters are subject to the State's antidegradation policy and required to implement best practicable treatment or control (BPTC) of the discharge to avoid producing a pollution or nuisance and maintain the highest water quality consistent with maximum benefit to the people of the State. The Recycled Water Policy finds that use of recycled water in accordance with the Policy is presumed to have a beneficial impact. The Policy requires that SNMPs be tailored to address the discharge of salts, nutrients, and other constituents that could impact water quality in a groundwater basin/sub-basin. SNMPs are required to address and implement provisions, as appropriate, to control sources of salts and/or nutrients to groundwater basins, including those associated with recycled water irrigation projects and groundwater recharge reuse projects.

With regard to Resolution No. 68-16 and the potential degradation of groundwater quality with the implementation of a recycled water project that results in groundwater recharge and/or landscape irrigation, the Recycled Water Policy finds the following:

- Groundwater recharge with recycled water for later extraction and use in accordance with this Policy and state and federal water quality law is to the benefit of the people of the state of California. Nonetheless, the State Water Board finds that groundwater recharge projects using recycled water have the potential to lower water quality in a basin. The proponent of a groundwater recharge project must demonstrate compliance with Resolution No. 68-16. Until such time as a salt/nutrient management plan is in effect, such compliance may be demonstrated as follows:
    1. A project that utilizes less than 10% of the available assimilative capacity in a basin/sub-basin (or multiple projects utilizing less than 20% of the available

assimilative capacity in a basin/sub-basin) need only conduct an antidegradation analysis verifying the use of the assimilative capacity. For those basins/sub-basins where the RWQCBs have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the RWQCB, until such time as the salt/nutrient plan is approved by the RWQCB as is in effect. For compliance with this sub-paragraph, the available assimilative capacity shall be calculated by comparing the mineral water quality objective with the average concentration of the basin/sub-basin, either over the most recent five years of data available or using a data set approved by the RWQCB Executive Officer. In determining whether the available assimilative capacity will be exceeded by the project or projects, the RWQCB shall calculate the impacts of the project or projects over at least a ten year time frame.

2. In the event a project or multiple projects utilize more than the fraction of the assimilative capacity designated in subparagraph (1) [above], then a RWQCB-deemed acceptable antidegradation analysis shall be performed to comply with Resolution No. 68-16. The project proponent shall provide sufficient information for the RWQCB to make this determination. An example of an approved method is the method used by the State Water Board in connection with Resolution No. 2004-0060 and the RWQCB in connection with Resolution No. R8-2004-00041. An integrated approach (using surface water, groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of Resolution No. 68-16 is encouraged.

- Landscape irrigation with recycled water in accordance with this Policy is to the benefit of the people of the State of California. Nonetheless, the State Water Board finds that the use of water for irrigation may, regardless of its source, collectively affect groundwater quality over time. The State Water Board intends to address these impacts in part through the development of salt/nutrient management plans described in paragraph 6 of the Recycled Water Policy (see Appendix 1 of the Recycled Water Policy).

  1. A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) [of the Recycled Water Policy; see Appendix 1] is in place may be approved without further antidegradation analysis, provided that the project is consistent with the plan.

  2. A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is being prepared may be approved by the RWQCB by demonstrating through a salt/nutrient mass balance or similar analysis that the project uses less than 10% of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin (or multiple projects using less than 20% of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin).

In the issuing of WDRs and National Pollutant Discharge Elimination System (NPDES) permits, RWQCBs are required under the Clean Water Act section 301(b)(1)(C) and its implementing regulations (40 CFR 122.4(a); 40 CFR 122.4(d); 40 CFR 122.44(d)) to establish conditions in WDRs and NPDES permits that ensure compliance with state water quality standards, including antidegradation requirements.

The federal antidegradation policy (40 CFR 131.12(a)(1)) requires that:

> "*existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected."* As defined in 40 CFR 131.3(e), *"[e]xisting uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards."*

The conditions established in WDRs and NPDES permits that ensure compliance with antidegradation requirements are effluent limitations, discharge specifications, and individual tasks (e.g., special studies) for assuring BPTC of the discharge and the highest water quality consistent with the maximum benefit to the people of the State will be achieved. The adoption of WDRs and NPDES permits by a RWQCB signifies that the discharge permitted by a given Order (a) will not produce degradation that results in water quality less than that prescribed in a Basin Plan, and (b) is consistent with the antidegradation provisions of 40 CFR part 131.12 and Resolution 68-16 *up to the permitted discharge capacity specified in the Order with compliance with effluent limitations* (emphasis added). RWQCBs also maintain the authority to reopen a given Order to reconsider effluent limitations, discharge specifications, and other requirements as means to ensure compliance with Resolution No. 68-16.

11.2 APPROACH

Existing groundwater quality and available assimilative capacity for TDS, chloride, and nitrate-N for the basins/subareas of the LSCR were estimated (see **Sections 4** and **5**), along with a characterization of planned recycled water projects (see **Section 9**), to determine how such future projects will potentially impact groundwater quality in the areas in which recycled water is intended to be applied. The current analysis evaluated if future estimated degradation to groundwater quality, vis-à-vis the use of available assimilative capacity in a basin/sub-basin, with implementation of a planned recycled water project is consistent with provisions of the Recycled Water Policy and state and federal antidegradation policies. Consistent with these policies, the use of assimilative capacity was utilized to determine compliance with the antidegradation policy by evaluating if projects are:

> (1) subject only to verification of its use of available assimilative capacity as it individually, or in combination with other projects in the same basin/subarea, is estimated to use less than 10% (single project) or less than 20% (multiple projects) of available assimilative capacity; or

(2) subject to a 'complete'[1] antidegradation analysis due to its estimated use of available assimilative capacity in excess of either the 10% (single project) or 20% (multiple projects) thresholds specified in the Recycled Water Policy.

Additionally, the planned recycled water projects were evaluated to assess if the loading would be considered a "new load" to the subarea. Several of the wastewater treatment plants currently discharge to groundwater through percolation ponds. Discharges to the percolation ponds that are in compliance with the prescribed effluent limitations are considered to be in compliance with the antidegradation policy up to the design flow of the treatment plant (as outlined in the findings for the waste discharge requirements). As a result, any recycled water projects that occur in the same subarea as the current effluent discharges are not considered a new load to the subarea and are consistent with the antidegradation policy if they are below the allowable load.

As discussed in **Section 9**, while the volume of some recycled water projects have been planned, the exact locations and specifications for the projects are still in development. As a result, the procedures provided in **Section 9** have been developed to ensure degradation of the groundwater basins does not occur at levels above those allowed under the Recycled Water Policy. The procedures require that any projects with loadings of salts and nutrients above the assimilative capacity thresholds implement management measures to offset the loading above the threshold. The thresholds were set consistent with the antidegradation policy to meet condition 1 above. Therefore, projects implemented in accordance with the procedures outlined in **Section 9** are deemed to be in compliance with the antidegradation policy.

If no assimilative capacity is available or a project exceeds the assimilative capacity thresholds and management measures are not proposed, the project would be subject to a 'complete' antidegradation analysis prior to implementation. No projects in the SNMP planning area have been developed in sufficient detail to allow a complete antidegradation analysis to be completed.

Based on the analysis in **Section 9**, compliance with the antidegradation policy for planned recycled water projects defined in **Section 8** are provided below by basin/subarea.

11.3 ASSESSMENT OF POTENTIAL WATER QUALITY IMPACTS

11.3.1 Piru Basin

11.3.1.1 Piru Basin – Upper Area below Lake Piru

No recycled water projects are currently planned that will apply recycled water to this subarea of the Piru basin.

11.3.1.2 Piru Basin – Lower Area East of Piru Creek

No recycled water projects are currently planned that will apply recycled water to this subarea of the Piru basin.

[1] A complete antidegradation analysis must include a socioeconomic analysis to establish the balance between the proposed action and the public interest.

11.3.1.3 Piru Basin – Lower Area West of Piru Creek

Recycled water produced at the Piru WWTP is intended to be used for irrigation of farm land located to the north, east, and south of the treatment plant beginning in 2016. Initial recycled water use is estimated to be 0.2 mgd (current treatment plant flow rate) and is anticipated to increase up to 0.5 mgd over time. The Piru WWTP currently discharges its effluent to percolation ponds in the subarea and is permitted to discharge up to 0.5 mgd in this manner. Although the Piru WWTP discharge currently exceeds the chloride limit of the Waste Discharge Permit, the District is participating in the development of this SNMP and the implementation of the Watershed-wide Monitoring Program. The analysis provided in **Section 9** indicates that there is sufficient assimilative capacity in the Lower Area West of Piru Creek sub-basin for the current chloride loading discharged from the Piru WWTP and the full range of planned recycled water projects. Furthermore, the chloride concentrations in the groundwater wells downstream of the plant discharge percolation pond are less than the water quality objective of 100 mg/L of chloride.

The use of recycled water produced by the WWTP for irrigation on land nearby the facility will not result in a net increase in pollutant loading to the groundwater in the subarea above the assimilative capacity thresholds. These planned recycled water projects are therefore consistent with the Recycled Water Policy and state and federal antidegradation policies.

11.3.2 Fillmore Basin

11.3.2.1 Fillmore Basin – Pole Creek Fan Area

There are four recycled water projects currently planned for implementation in the Pole Creek Fan Area of the Fillmore basin. Recycled water in this subarea will be produced by the City of Fillmore's Wastewater Reclamation Plant (FWRP). Two of these projects are planned to deliver recycled water for landscape irrigation and two are planned for agricultural irrigation in the subarea. Recycled water delivery volumes have been determined for three of the projects, totaling 0.19 mgd. The agricultural irrigation project scheduled to deliver recycled water to an area located east of the City limits currently has no defined acreage. First delivery dates for recycled water have not been established for any of these projects. The FWRP currently produces an average of 0.93 mgd of treated effluent that is discharged to percolation ponds and delivered as recycled water to local parks and schools in the subarea. The FWRP has a permitted discharge capacity of 2.4 mgd.

Based on the analysis in **Section 9**, the use of recycled water produced by the FWRP for landscape and agricultural irrigation on nearby land will not result in a net increase in pollutant loading to the groundwater above the assimilative capacity thresholds for the planned projects. Therefore, the planned recycled water projects for the FWRP are consistent with the Recycled Water Policy and state and federal antidegradation policies.

11.3.2.2 Fillmore Basin – South Side of Santa Clara River

No recycled water projects are currently planned that will apply recycled water to this subarea of the Fillmore basin.

11.3.2.3 Fillmore Basin – Remaining Fillmore

No recycled water projects are currently planned that will apply recycled water to this subarea of the Fillmore basin.

11.3.3 Santa Paula Basin

11.3.3.1 Santa Paula Basin – West of Peck Road

The City of Santa Paula intends to deliver recycled water for landscape irrigation purposes from its Santa Paula Water Recycling Facility (SPWRF), located in the West of Peck Road subarea, to a recycled water project area that may be located in the East of Peck Road subarea. The SPWRF currently produces an average of 1.88 mgd of treated effluent that is discharged to percolation ponds. The facility has an annual average flow limitation of 2.6 mgd, as evaluated monthly, that applies to all discharges to percolation ponds. The City intends to begin applying 0.4 mgd of recycled water for landscape irrigation beginning in 2015, with projections of applying up to 1.45 mgd for landscape irrigation by 2035. Because potential impacts to groundwater quality due to the application of recycled water produced by the SPWRF may occur in the East of Peck Road subarea, those impacts are discussed in the subsection below.

Based on the analysis in **Section 9**, the planned use of recycled water produced by the SPWRF for landscape irrigation will not result in a net increase in pollutant loading above the assimilative capacity thresholds for the planned projects. Therefore, the planned recycled water projects for the SPWRF are consistent with the Recycled Water Policy and state and federal antidegradation policies.

Three other agencies (Saticoy WWTP, Limoneira and Olivelands Sewer Farms, and Todd Road Jail WWTP) anticipate the production of recycled water at some point in the future. However, current recycled water demand in their service areas is not sufficient to begin developing specific water reuse projects. When such future recycled water projects are planned, they will need to undergo an evaluation to confirm that they are consistent with the Recycled Water Policy, the LSCR SNMP, and state and federal antidegradation policies in accordance with the procedures outlined in **Section 9**.

11.3.3.2 Santa Paula Basin – East of Peck Road

Should the Santa Paula's recycled water be applied in the East of Peck Road subarea, it represents a change in the location of salt and nutrient loading to the Santa Paula basin as a whole from the current discharge of treated effluent to percolation ponds in the West of Peck Road subarea to a future application of recycled water to the East of Peck Road subarea. Based on the average annual concentration of salts and nitrate-N currently discharged to percolation ponds in the West of Peck Road subarea, groundwater loading of these parameters to the East of Peck Road subarea with implementation of the planned recycled water project was estimated in **Section 9**. Under an initial scenario where 0.4 mgd of recycled water is applied in the subarea, the loadings will not exceed the assimilative capacity thresholds and the project is consistent with the Recycled Water Policy and state and federal antidegradation policies. However for the maximum planned recycled water use, the estimated nitrate loading exceeds the assimilative capacity thresholds. As a result, prior to implementation of the full project volume, a full antidegradation analysis for the City of Santa Paula planned recycled water project will be required unless salinity and nutrient management strategies can be employed to reduce the assimilative capacity increment used by nitrate to below the thresholds as outlined in **Section 9**.

It should be noted that the redistribution of salt and nutrient loading to the East of Peck Road subarea will produce a reduction of pollutant loading to the West of Peck Road subarea, as compared to existing conditions, which should improve groundwater quality for the parameters under consideration in that sub-basin.

11.3.4 Oxnard Forebay Basin

UWCD may purchase recycled water from the City of Oxnard's AWPF for groundwater recharge of the Oxnard Forebay basin and/or agricultural irrigation purposes. Because the AWPF is located in the Oxnard Plain, outside of the LSCR SNMP project area, the delivery of recycled water into the Oxnard Forebay constitutes a new groundwater loading to this subarea. The AWPF features advanced wastewater treatment technologies that include microfiltration, reverse osmosis, and UV disinfection. The AWPF produces treated effluent that meets Title 22 requirements for recycled water. The quality of the water produced by the AWPF is significantly better than the existing groundwater quality in the Oxnard Forebay. UWCD has not yet determined the amount of water it plans to deliver to the Oxnard Forebay or the estimated quality of the water, but it has identified a recycled water project area.

The planned recycled water project area may overlay a region where exceedances of the TDS water quality objective have been observed. However, on a subarea-wide basis, available assimilative capacity exists for TDS, as well as chloride and nitrate-N. The Oxnard Forebay shows a decreasing concentration trend for chloride and nitrate-N across all monitoring wells analyzed, and a decreasing concentration trend for TDS in three of the four wells evaluated. The intent of the Recycled Water Policy is to allow variability in salt and nutrient concentrations within a defined groundwater basin or sub-basin, to the extent that groundwater quality in certain areas can exceed water quality objectives, with the overriding requirement that groundwater quality averaged across the defined area remains below relevant water quality objectives and can be used for the beneficial uses for which it has been identified. The recycled water project area also extends to a small area within the Mound basin.

With respect to the Oxnard Forebay, the recycled water produced by the AWPF and intended for application in the basin is anticipated to improve overall groundwater quality by having a diluting effect on existing groundwater concentrations. The additional mass of water added to the basin likely would more than offset the mass of salt added by this project; however, the analysis could not be conducted at this point because estimates of the volume and water quality of the potential projects have not been determined. The evaluation of impacts will follow the procedures outlined in **Section 9**. If the analysis demonstrates that the projects will not use more than 10 % of the assimilative capacity or have a diluting effect on the sub-basin, the project will meet the requirements of the antidegradation policy and this plan and can proceed. If the proposed loading will use more than 10% of the available assimilative capacity, the project proponent would need to conduct a full antidegradation analysis or follow the procedures outlined in **Section 9** to do further evaluation or implement management measures to meet the requirements of the SNMP.

11.3.5 Mound Basin

In preparing this SNMP it was determined that the Mound basin on average exceeds its water quality objective for TDS of 1,200 mg/L by 30 mg/L. In contrast, it was determined that the basin has assimilative capacity for chloride and nitrate-N. Because no assimilative capacity exists for TDS, planned recycled water projects cannot demonstrate compliance with the antidegradation policy through verification that assimilative capacity use is below the thresholds.

The City of Ventura is evaluating a number of potential plans to deliver recycled water from its Ventura WRF to the Mound basin. The City has identified a planned recycled water project area where up to 0.05 mgd of recycled water for landscape irrigation will be supplied as the area is developed. This planned project has been permitted and the infrastructure for delivering the recycled water is being developed. However, development must occur for the project to be implemented. Because this project has already been permitted, it is considered an existing project even though the water is not yet being delivered. Although assimilative capacity for TDS is not available, as long as the recycled water application meets permit requirements, implementation of this project is allowed. The use of recycled water consistent with the permit requirements in this area will be consistent with the antidegradation policy as the use of the water will not result in degradation beyond that which is already permitted. As a result, this recycled water project is considered to be consistent with the Recycled Water Policy and state and federal antidegradation policies.

Other recycled water projects that could be implemented in the Mound basin could be subject to either implementation of management measures or a complete antidegradation analysis pending the results of further investigations. Because the effluent is not currently discharged to the groundwater basin, the planned recycled water projects would be considered new loads to the basin. As described in **Section 9**, additional recycled water projects that would occur at existing discharge concentrations would meet the thresholds for use of assimilative capacity for chloride and nitrate-N. However, no assimilative capacity is available for TDS. If management measures are implemented in accordance with **Section 9**, the projects would be consistent with the Recycled Water Policy and state and federal antidegradation policies. Alternatively, further evaluation could be conducted.

As discussed in the SNMP, questions about the applicability of the water quality objectives for the Mound basin exist. Naturally occurring salts in the Mound basin result from its location near the coast, resulting in poor groundwater quality, particularly in the shallow aquifer system. In the existing water reclamation requirements for the City of Ventura, the permit acknowledges that the *"groundwaters of the shallow semiperched zone are of very poor quality and are not beneficially used in any significant amounts."* As a result, effluent limitations included in the permit for recycled water are 3,000 mg/L of TDS, which is equal to the objective for the unconfined and perched aquifers in the Oxnard Plain. Implementation of additional recycled water projects would meet the effluent limitations in the existing recycled water permit for the City of Ventura. Documentation that the recycled water projects are occurring in areas where the shallow semiperched zone exists and will not impact other portions of the Mound basin could potentially be used to demonstrate that assimilative capacity exists in the recycled water project area to demonstrate consistency with the antidegradation policy.

Additionally, implementation of additional recycled water projects from the City of Ventura may provide benefits for the Santa Clara River Estuary by removing some effluent discharges from the estuary. A 2012 settlement agreement between the City of Ventura, Heal the Bay, and Wishtoyo Foundation's Ventura Coastkeeper Program regarding the potential impacts of the discharge in the Estuary includes a provision to create opportunities to use between 50-100 % of the effluent for landscaping, agricultural, or other reclamation uses to stretch water supplies and reduce or eliminate the amount of effluent released into the Estuary. Ongoing studies being conducted by the City of Ventura in response to the settlement agreement and other permit requirements are designed to evaluate whether removal of effluent from the Santa Clara River

Estuary will be beneficial. The results of these studies may be used to support the development of additional recycled water projects by demonstrating that the additional degradation resulting from the projects is in the maximum benefit of the people of the state.

In addition to potential recycled water projects at current discharge concentrations, other projects under consideration include delivering 2-7 mgd for either indirect potable reuse or direct potable reuse within the Mound basin. Both indirect and direct potable reuse would almost certainly require treatment that would significantly reduce the concentrations of salts and nutrients in the recycled water. Treatment of the water is considered to be a management measure under the SNMP. The future application of Ventura WRF recycled water after treatment in the Mound basin would likely act to lower existing groundwater concentrations in the basin, and while not analyzed, the additional mass of water added to the basin likely would more than offset the mass of salt added, thus increasing the assimilative capacity for TDS in the basin. Consistent with the procedures outline in **Section 9**, if the proposed project creates assimilative capacity through dilution, no additional management measures would be needed and the project would be consistent with the Recycled Water Policy and state and federal antidegradation policies.

11.4 EVALUATION OF CONSISTENCY WITH ANTIDEGRADATION POLICY

The approach used in this antidegradation analysis for proposed recycled water use in the groundwater basins/sub-basins of the LSCR is to evaluate the planned recycled water projects and determine if they are:

> (1) subject only to verification of its use of available assimilative capacity as it individually, or in combination with other projects in the same basin/subarea, is estimated to use less than 10 % (single project) or less than 20 % (multiple projects) of available assimilative capacity; or
>
> (2) subject to a 'complete'[2] antidegradation analysis due to its estimated use of available assimilative capacity in excess of either the 10% (single project) or 20% (multiple projects) thresholds specified in the Recycled Water Policy.

Based on the analysis above, the planned recycled water projects for the Piru WWTP, FWRP, and SPWRF if the projects occur in the West of Peck Road subarea are subject only to verification of the use of available assimilative capacity and are compliant with state and federal antidegradation policies. As such and in accordance with the procedures outlined in **Section 9**, these projects may proceed without further analysis or management measures.

Based on the analysis above, the planned recycled water projects for the SPWRF if applied in the subarea East of Peck Road and Ventura WRF require further analysis. In accordance with the procedures in **Section 9**, project proponents have the option to evaluate and modify their projects to reduce the use of assimilative capacity or implement management measures to offset the loading above the thresholds for use of assimilative capacity. If either of these steps is taken, the proposed projects would be in compliance with the antidegradation policies. Alternatively, the project proponents could elect to conduct further study and/or conduct a complete

[2] A complete antidegradation analysis must include a socioeconomic analysis to establish the balance between the proposed action and the public interest.

antidegradation analysis. Should a complete antidegradation analysis be conducted, the analysis will adhere to the tenets of Resolution No. 68-16 and demonstrate that the projects will result in:

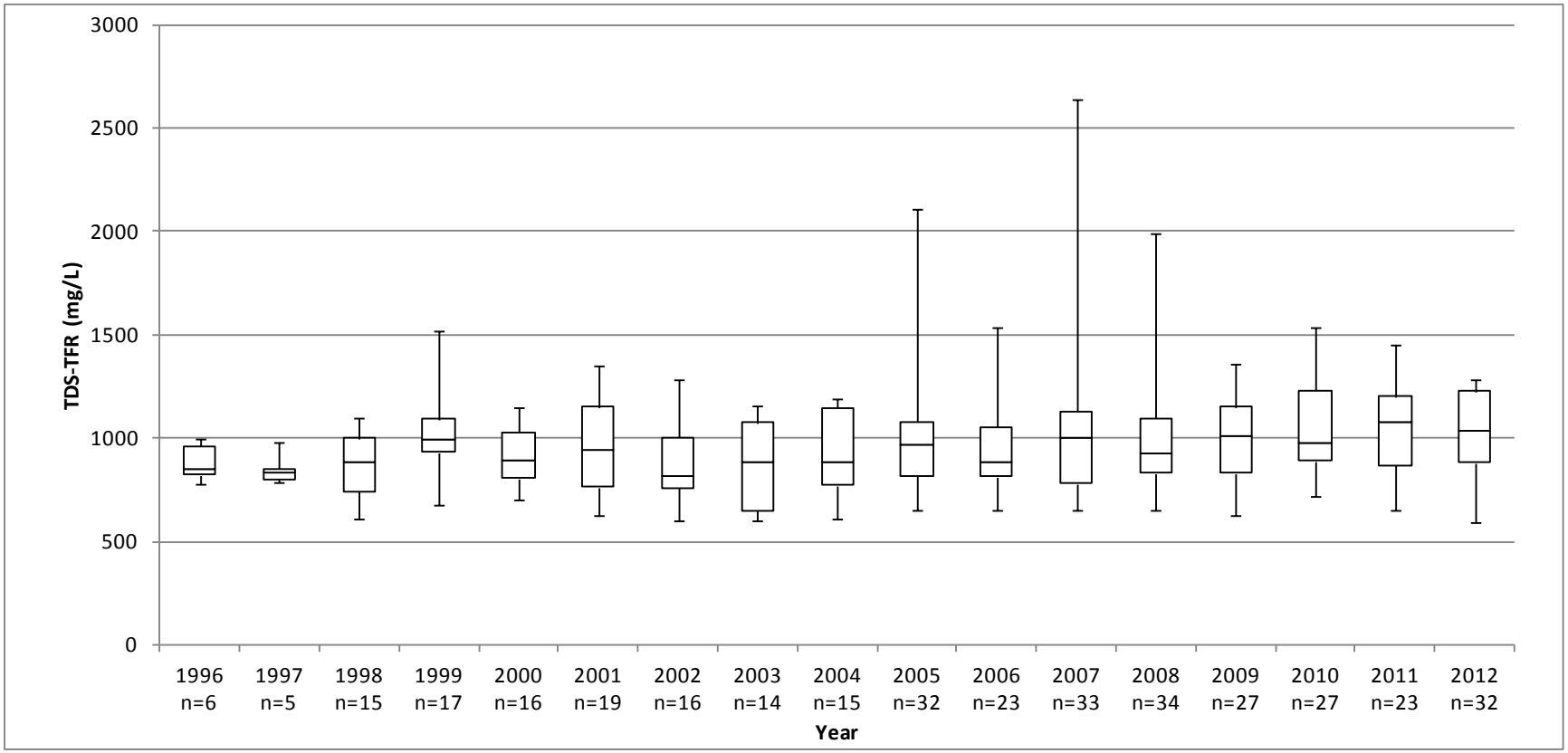
- Water quality consistent with the water quality prescribed in the Basin Plan
- Water quality changes that will not unreasonably affect present and anticipated beneficial uses
- Water quality changes that are consistent with the maximum benefit to the people of the State
- Projects that are consistent with the use of best practicable treatment or control to avoid pollution or nuisance and maintain the highest water quality consistent with maximum benefit to the people of the State
- Projects that are necessary to accommodate important economic or social development

If the complete antidegradation analysis, does not demonstrate these factors, the project will need to be modified or implementation measures will be need to be implemented to reduce the loading of salts and nutrients to the sub-basin.

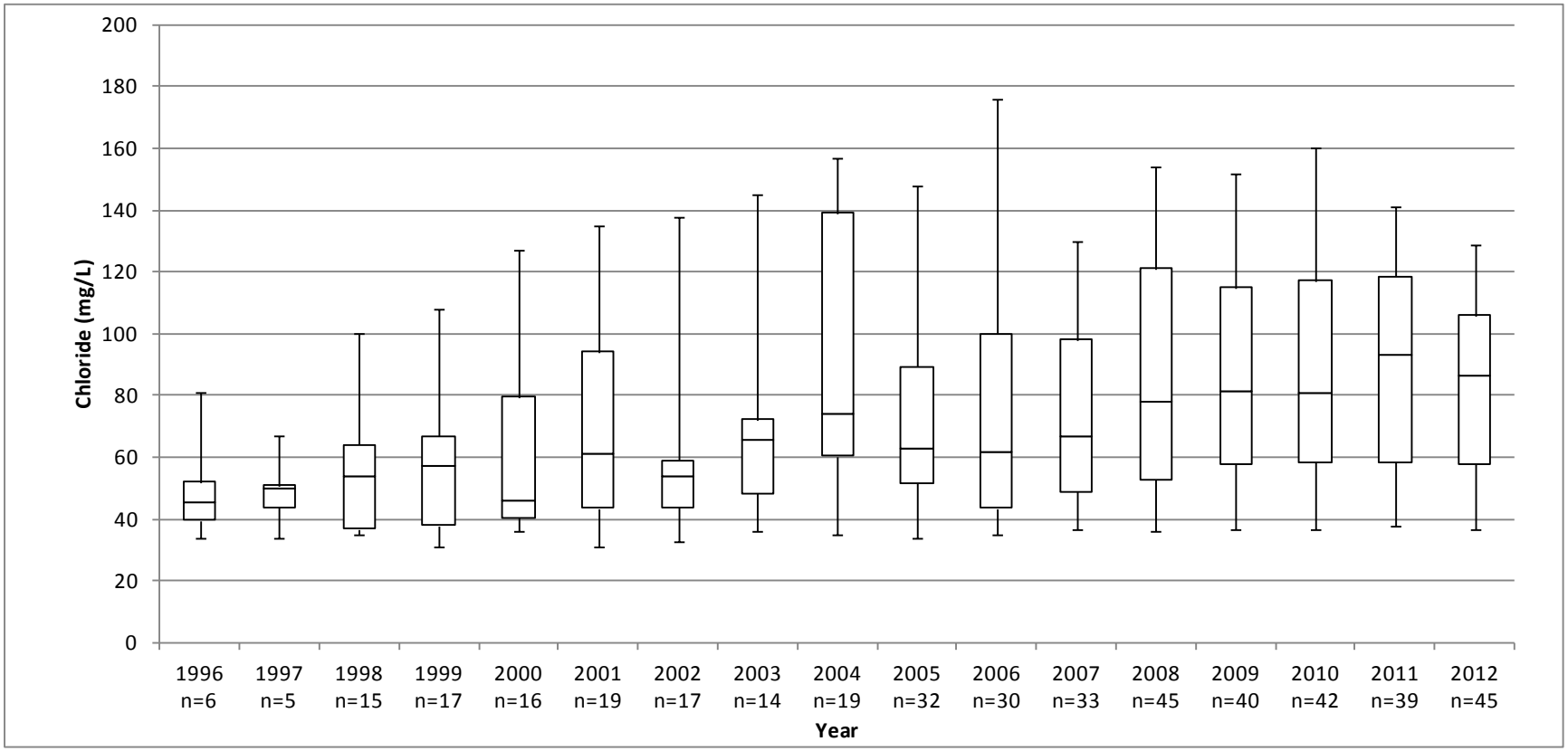
Based on the above, recycled water projects implemented in accordance with the procedures outlined in **Section 9** are consistent with state and federal antidegradation policies.

Appendix A. Box and Whisker Plots

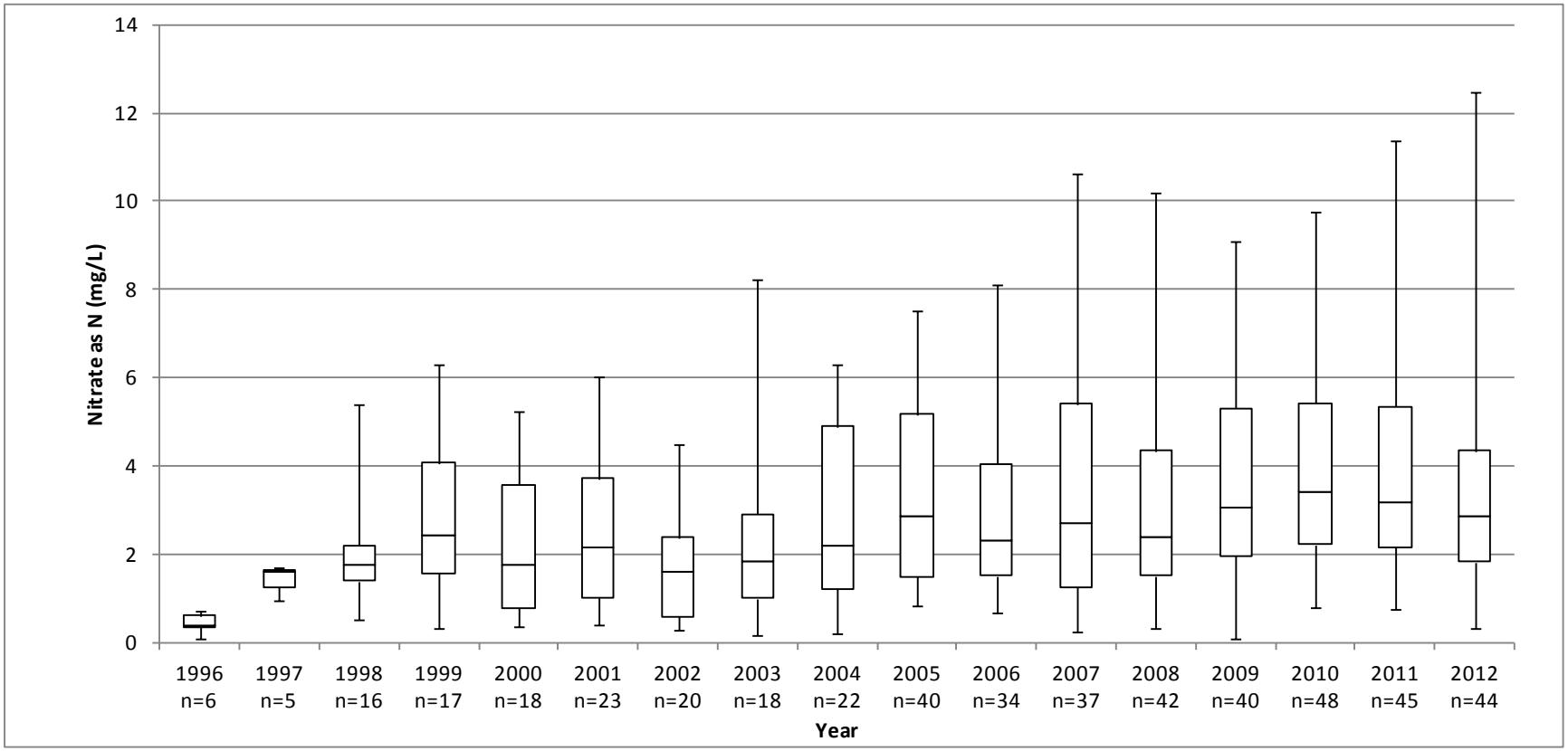
Box and Whisker Plots are provided for data available from most groundwater wells in the LSCR planning area, including data not used in the analyses presented in the SNMP, including data for wells with limited data sets and data points determined to be outliers. Data from groundwater wells associated with WWTP percolation ponds is not included in the plots. See **Section 4** for a discussion of the data used for the analyses.



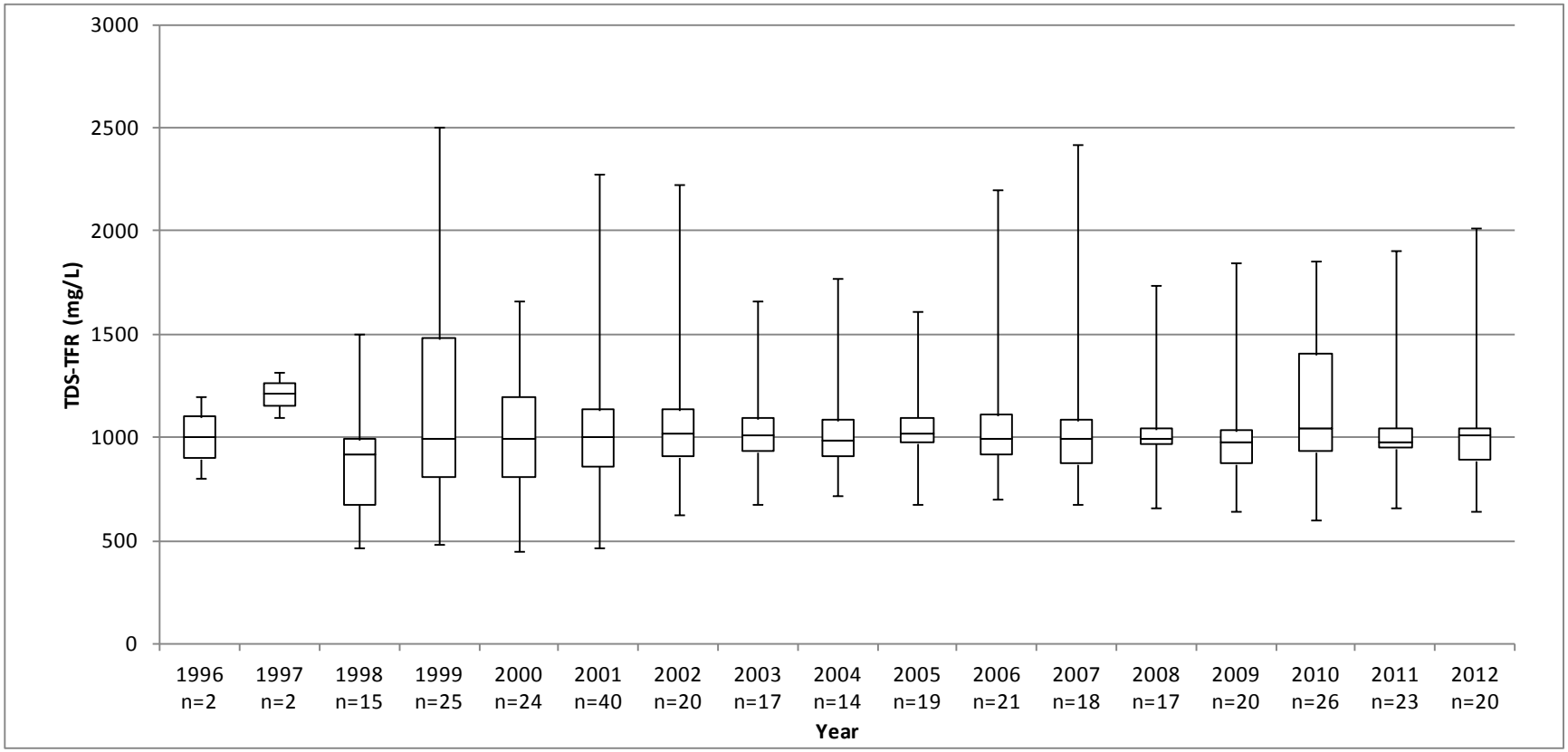
Appendix A Figure 1 TDS Box and Whisker Plot for the Piru Basin



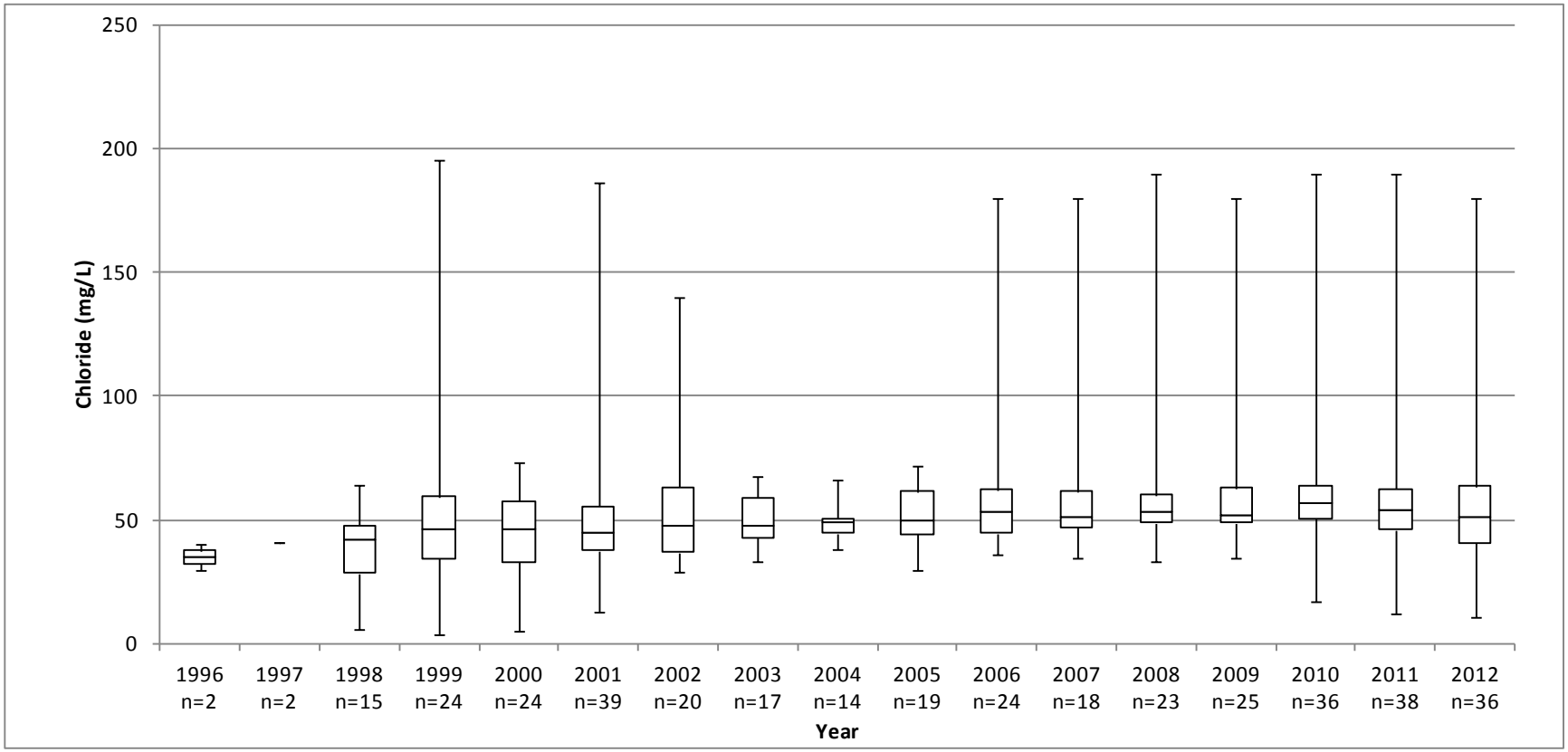
Appendix A Figure 2 Chloride Box and Whisker Plot for the Piru Basin



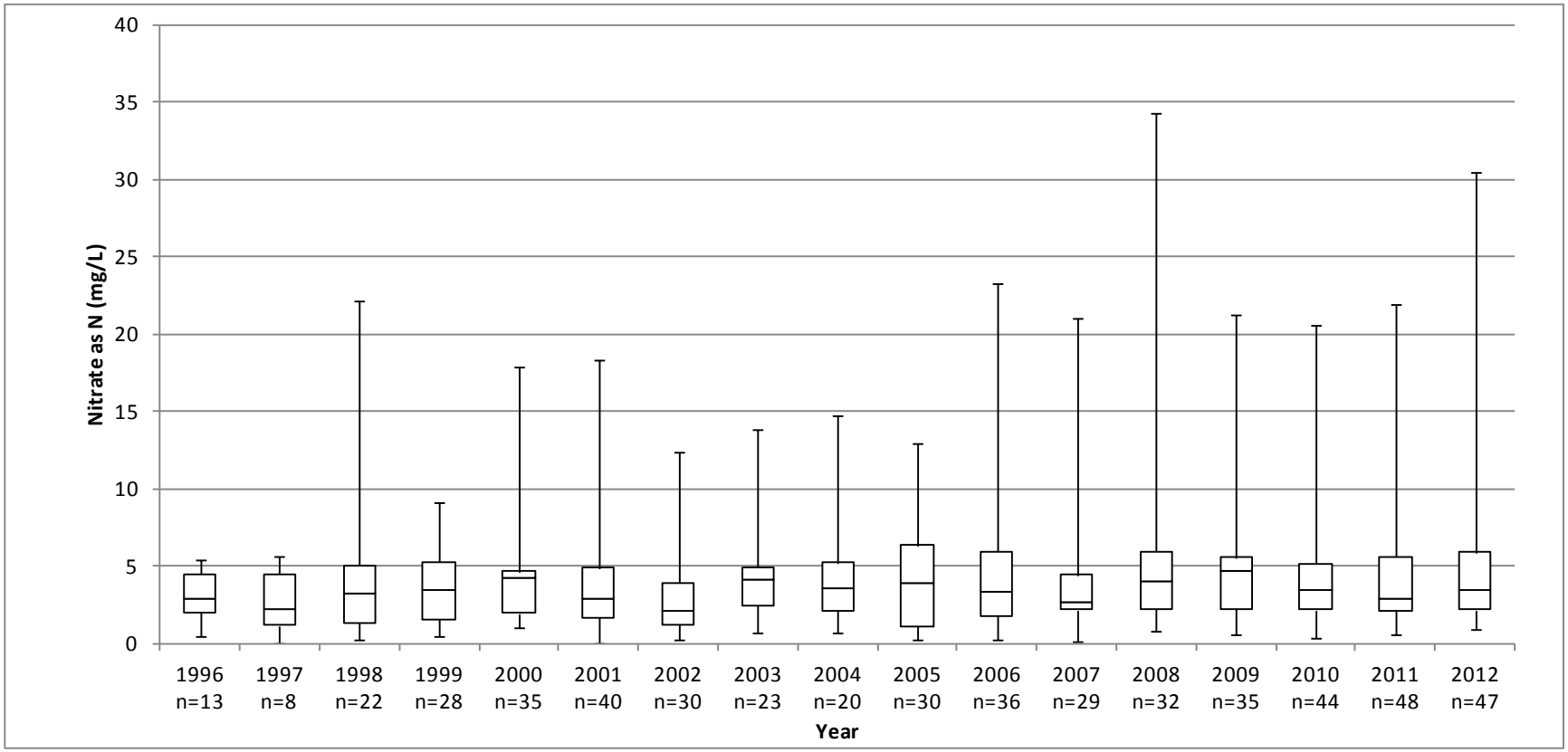
Appendix A Figure 3 Nitrate as N Box and Whisker Plot for the Piru Basin



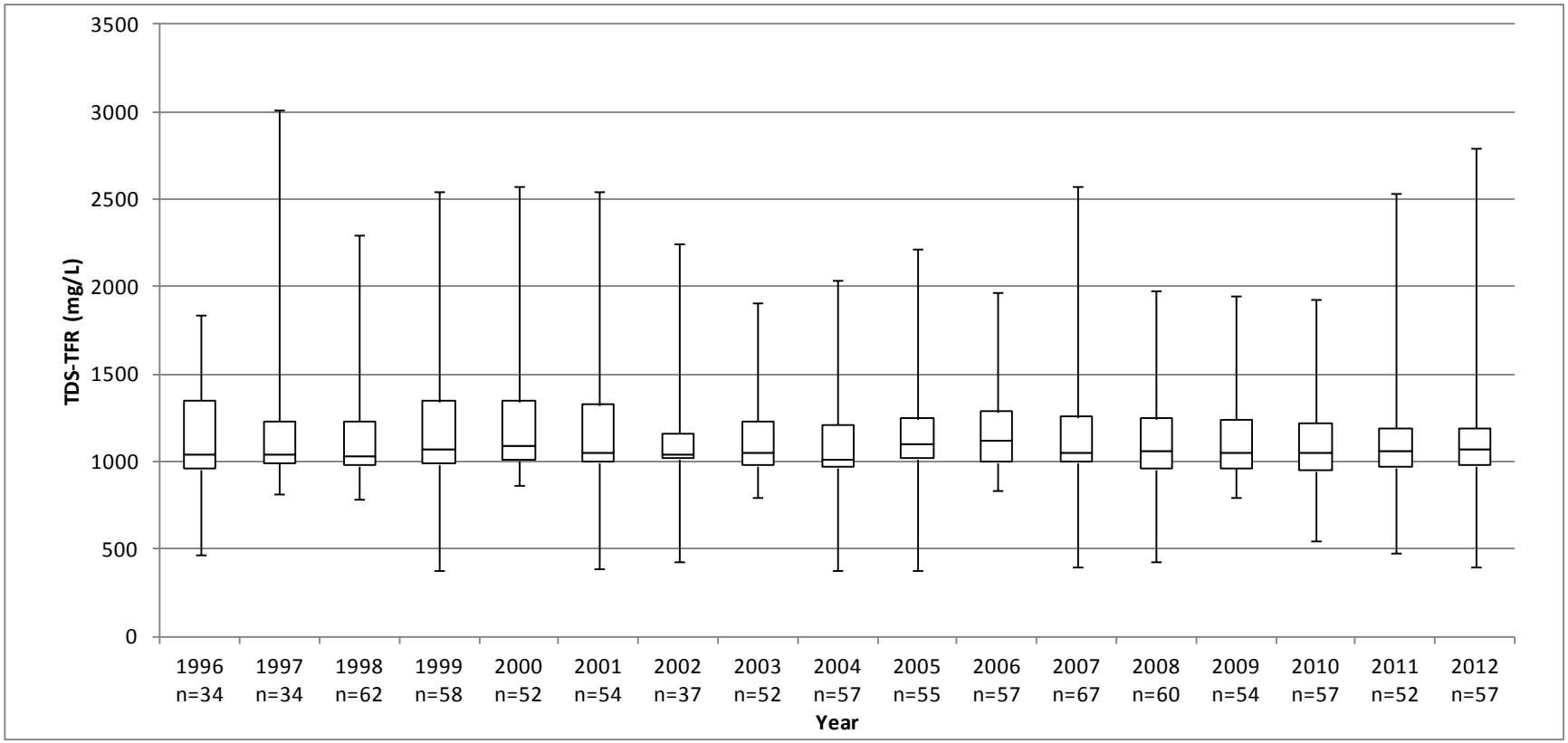
Appendix A Figure 4 TDS Box and Whisker Plot for the Fillmore Basin



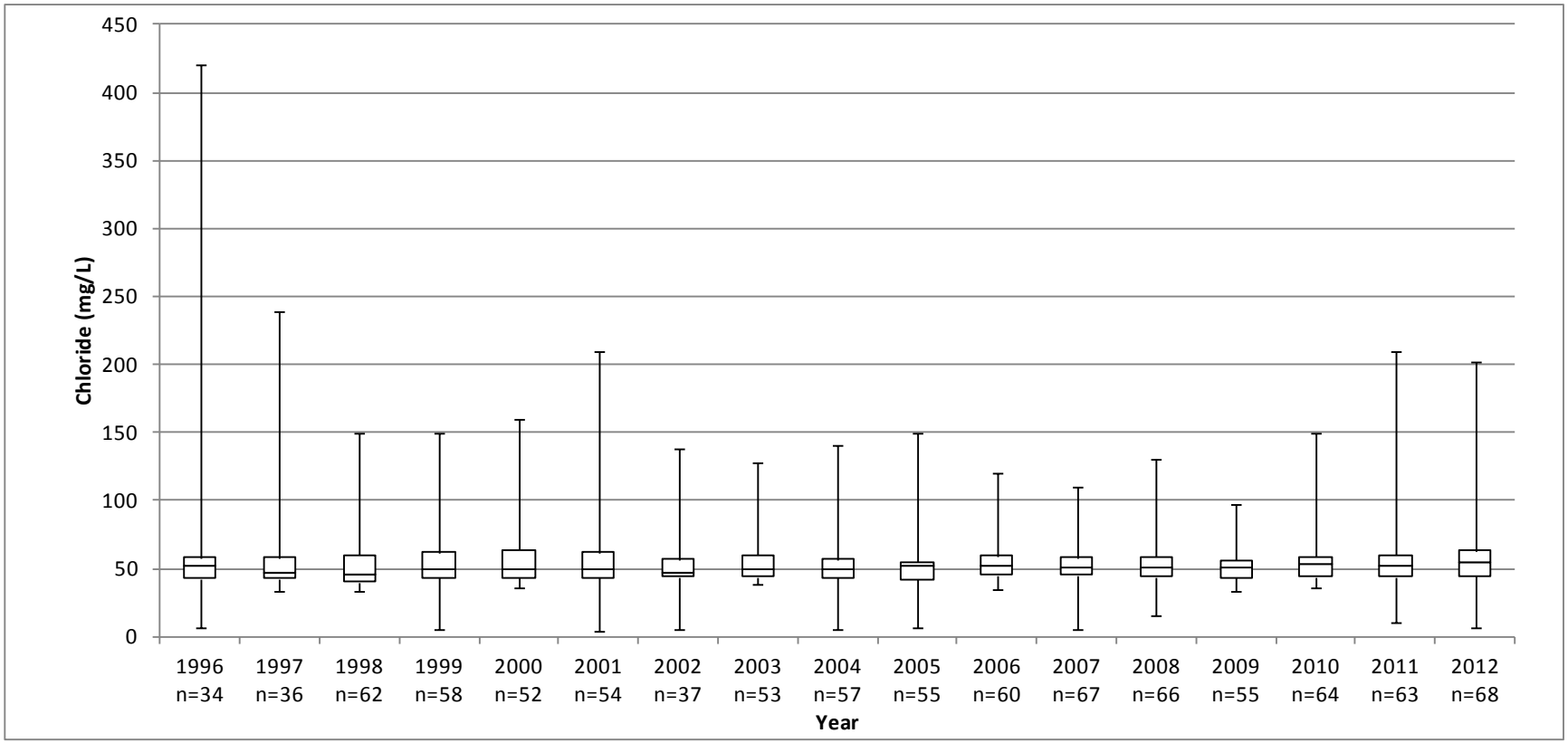
Appendix A Figure 5 Chloride Box and Whisker Plot for the Fillmore Basin



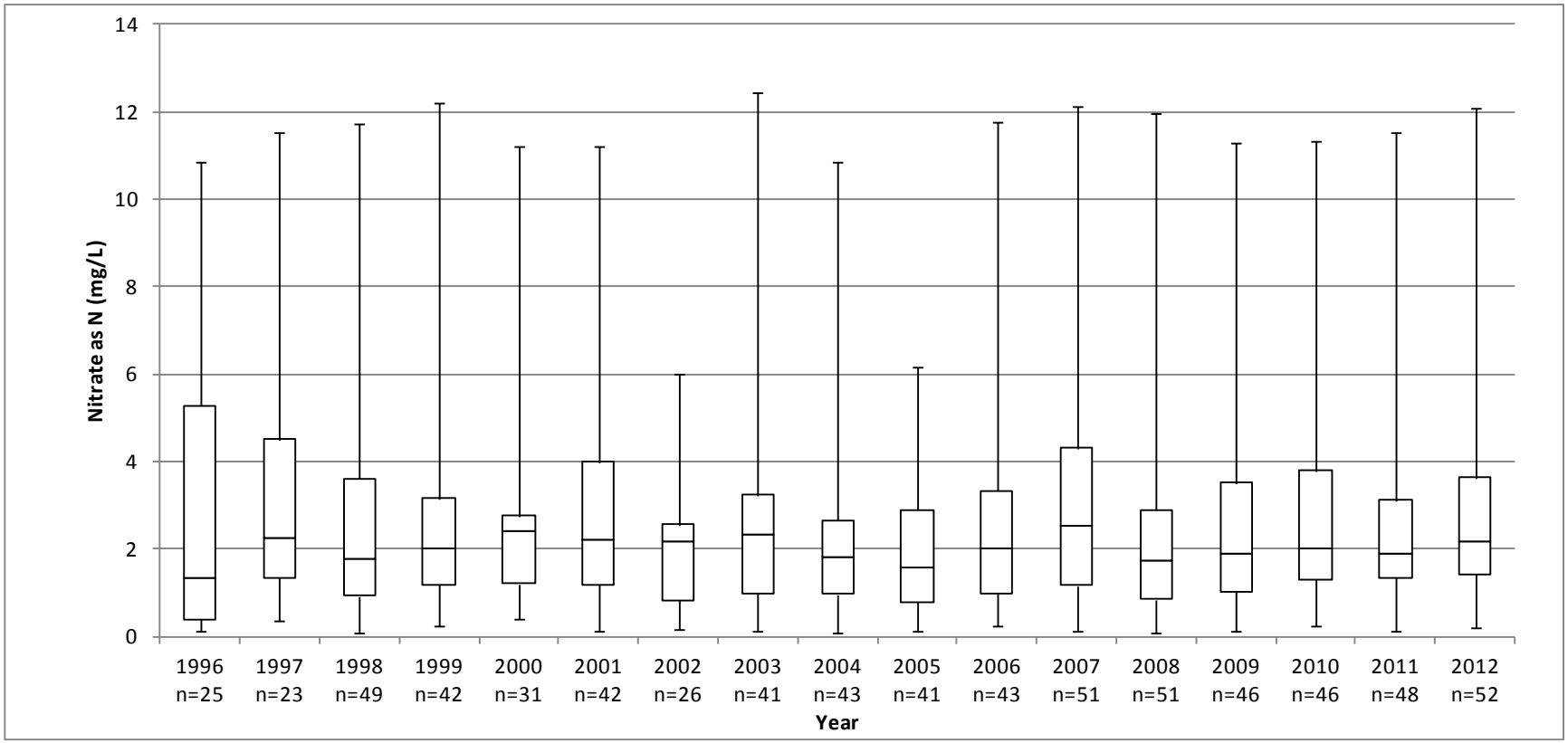
Appendix A Figure 6 Nitrate as N Box and Whisker Plot for the Fillmore Basin



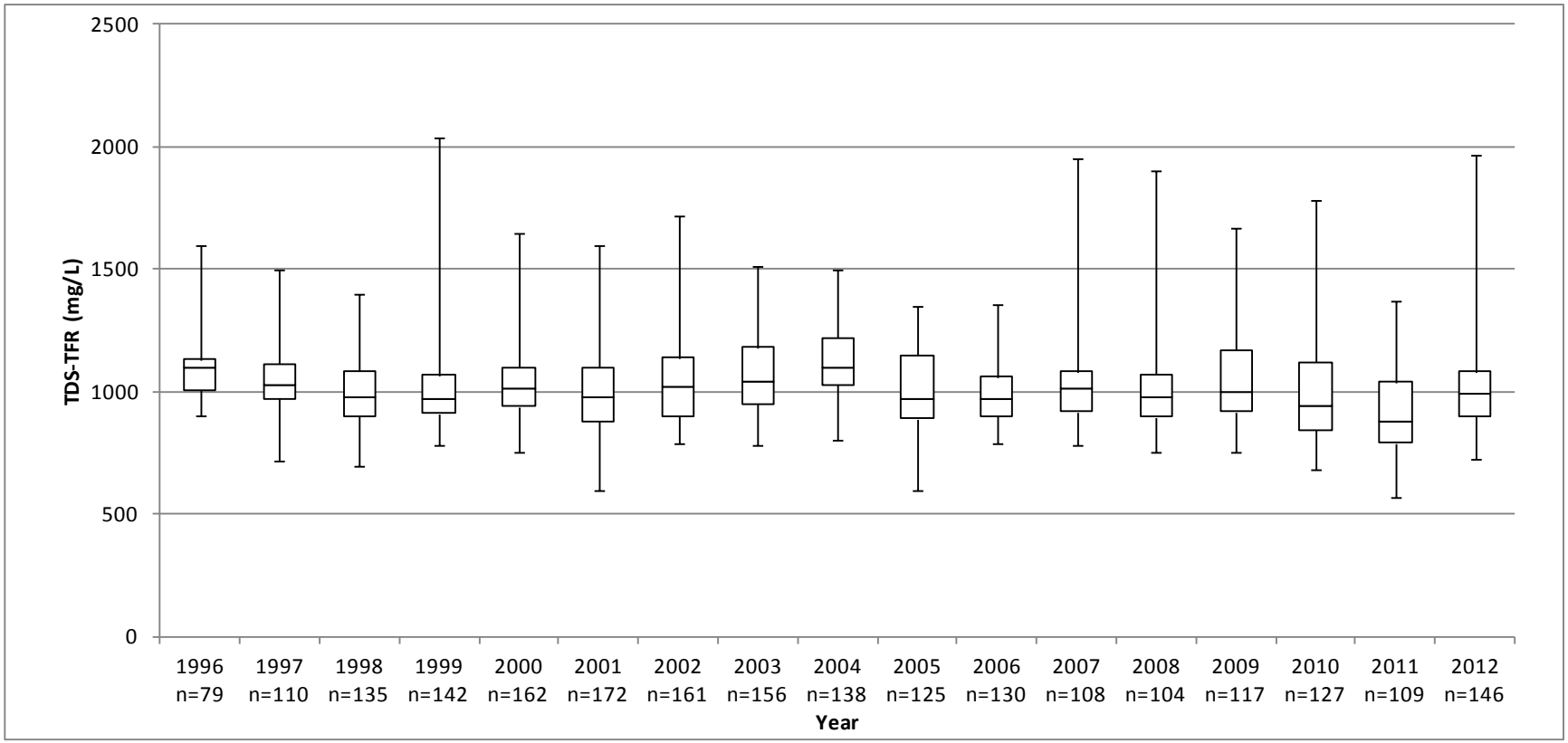
Appendix A Figure 7 TDS Box and Whisker Plot for the Santa Paula Basin



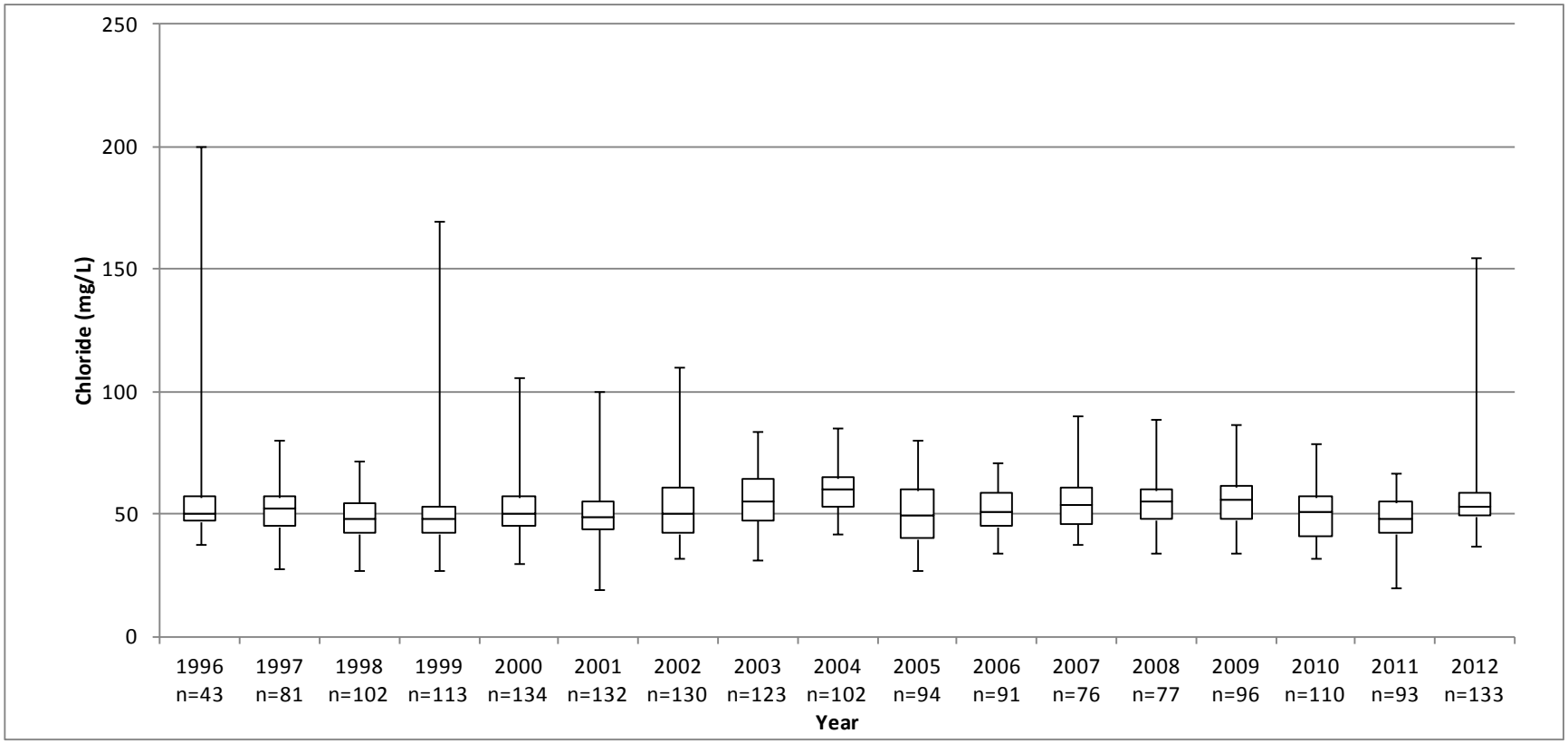
Appendix A Figure 8 Chloride Box and Whisker Plot for the Santa Paula Basin



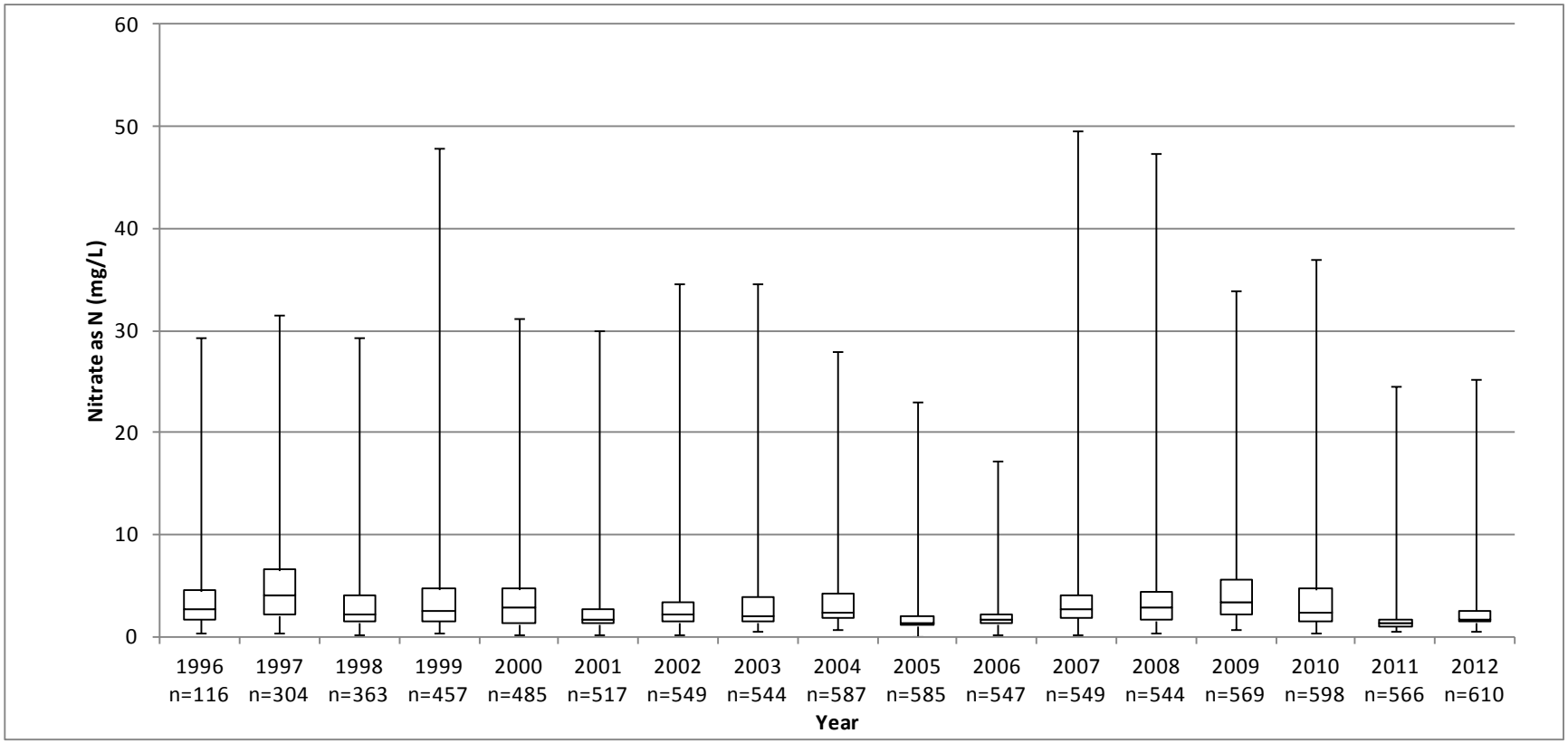
Appendix A Figure 9 Nitrate as N Box and Whisker Plot for the Santa Paula Basin



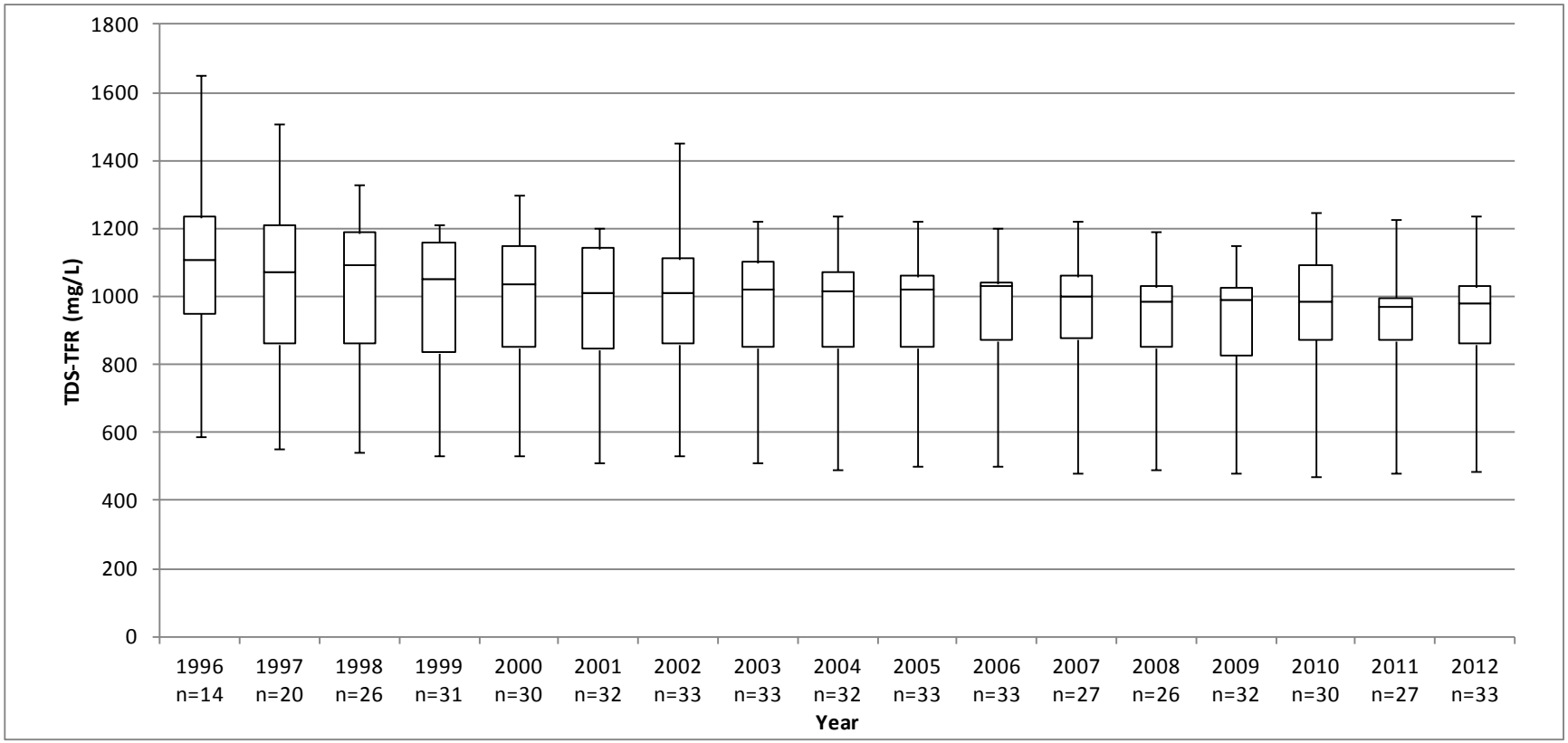
Appendix A Figure 10 TDS Box and Whisker Plot for the Upper Forebay Basin



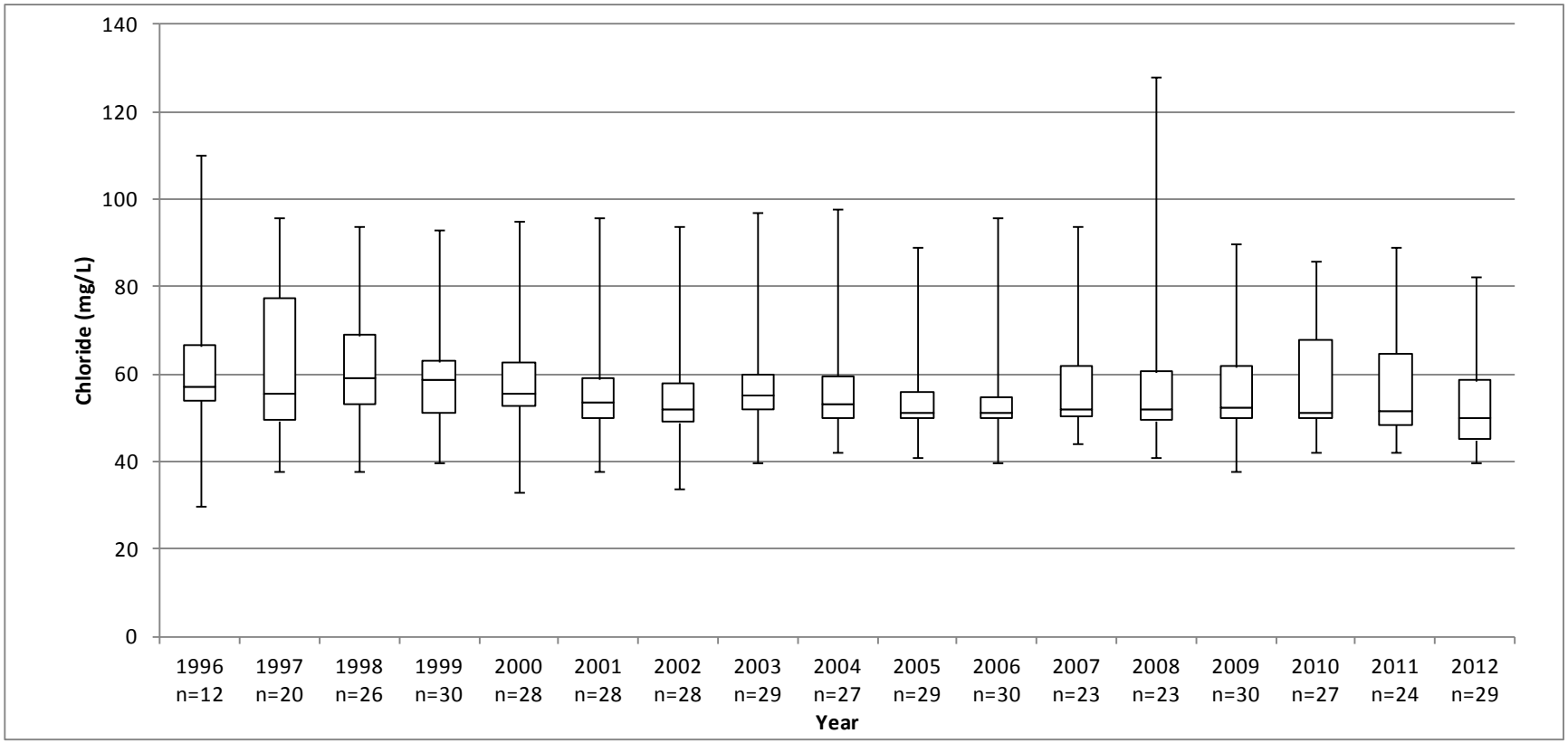
Appendix A Figure 11 Chloride Box and Whisker Plot for the Upper Forebay Basin



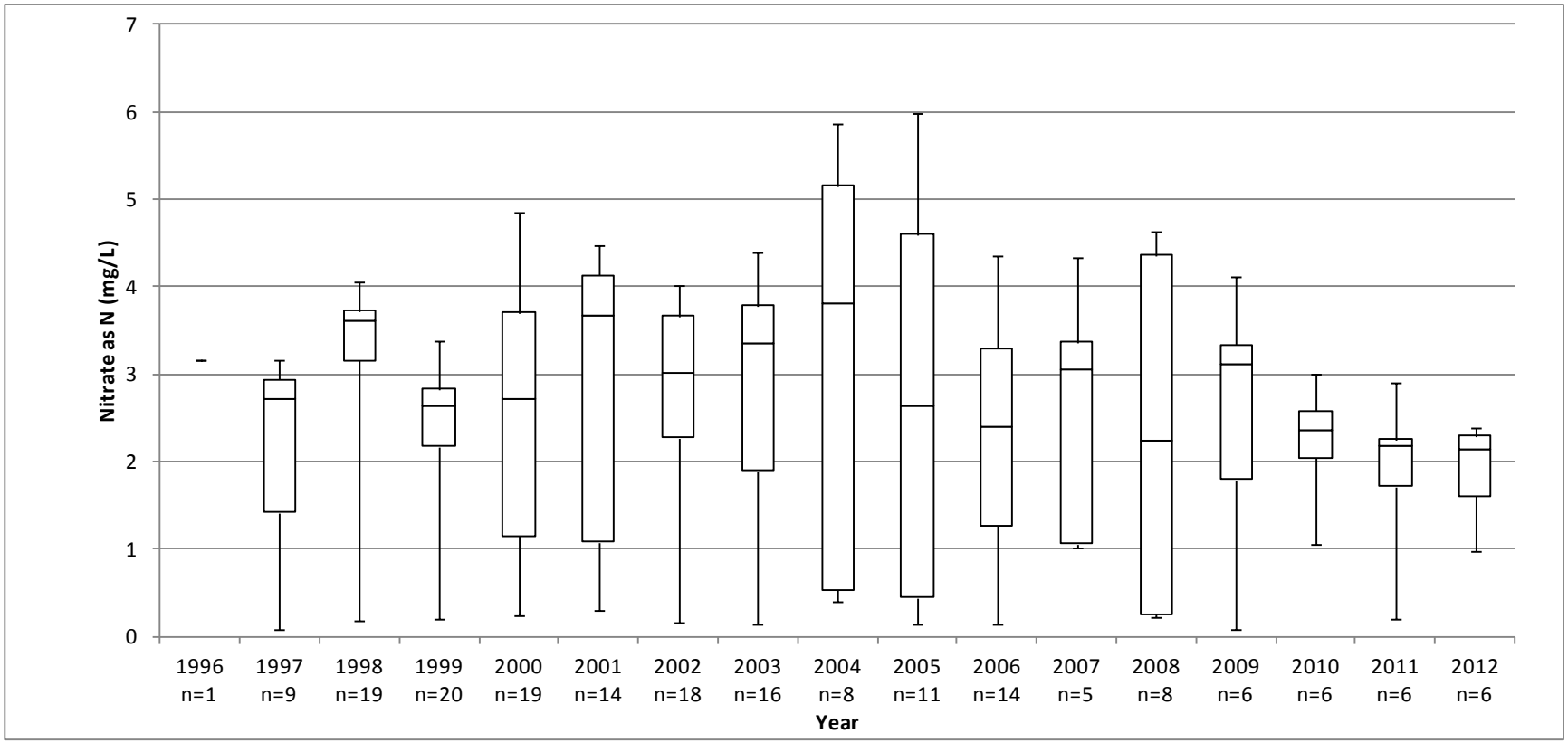
Appendix A Figure 12 Nitrate as N Box and Whisker Plot for the Upper Forebay Basin



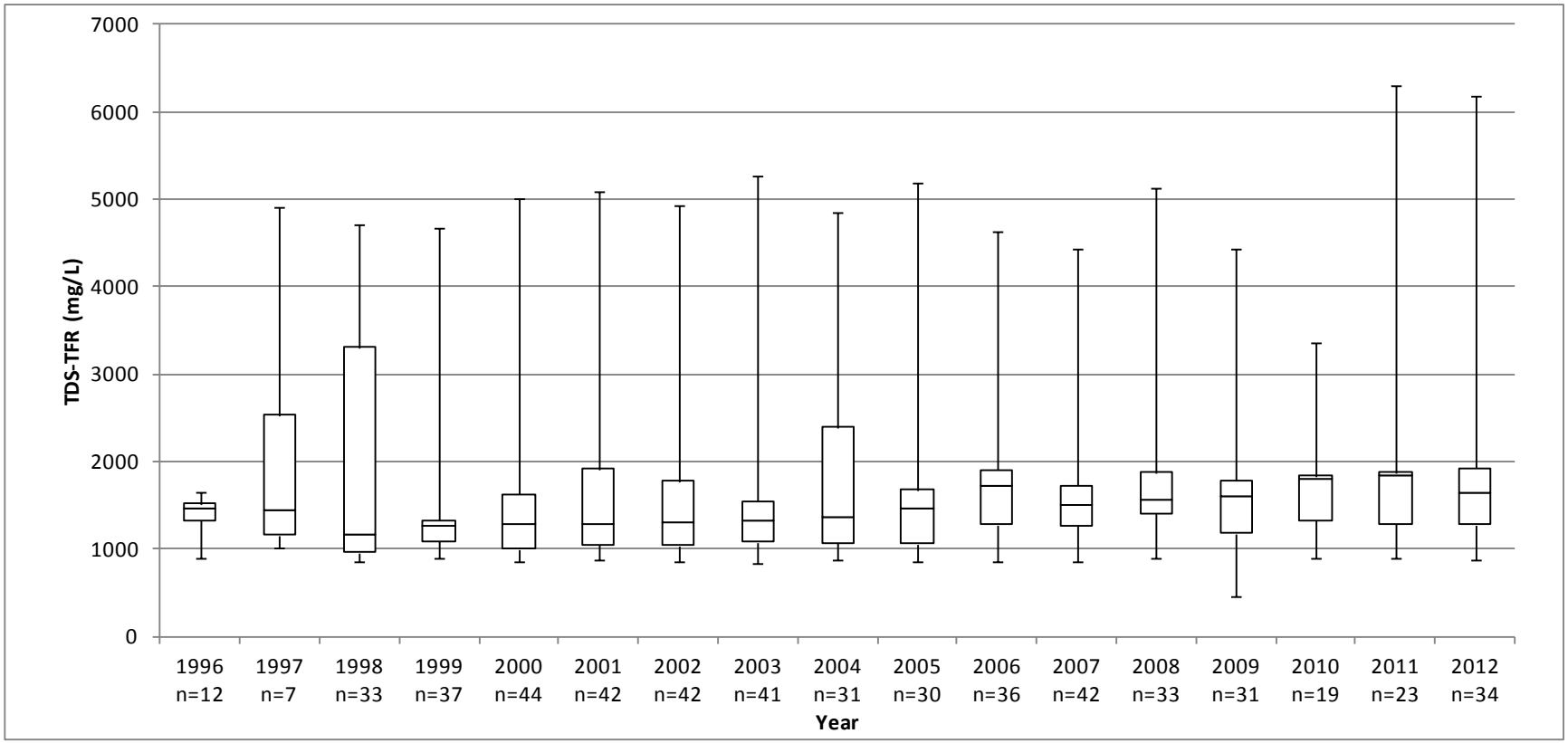
Appendix A Figure 13 TDS Box and Whisker Plot for the Lower Forebay Basin



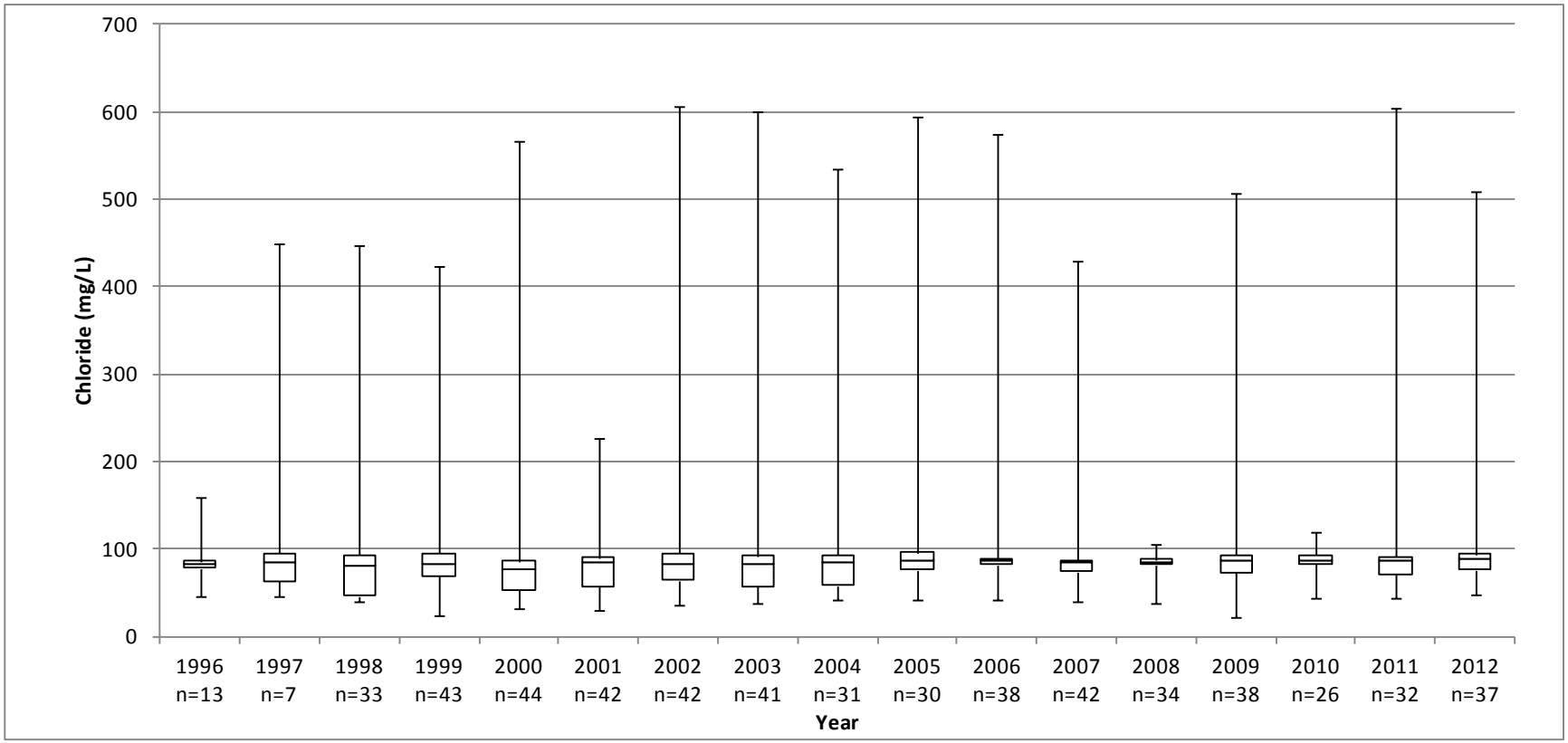
Appendix A Figure 14 Chloride Box and Whisker Plot for the Lower Forebay Basin



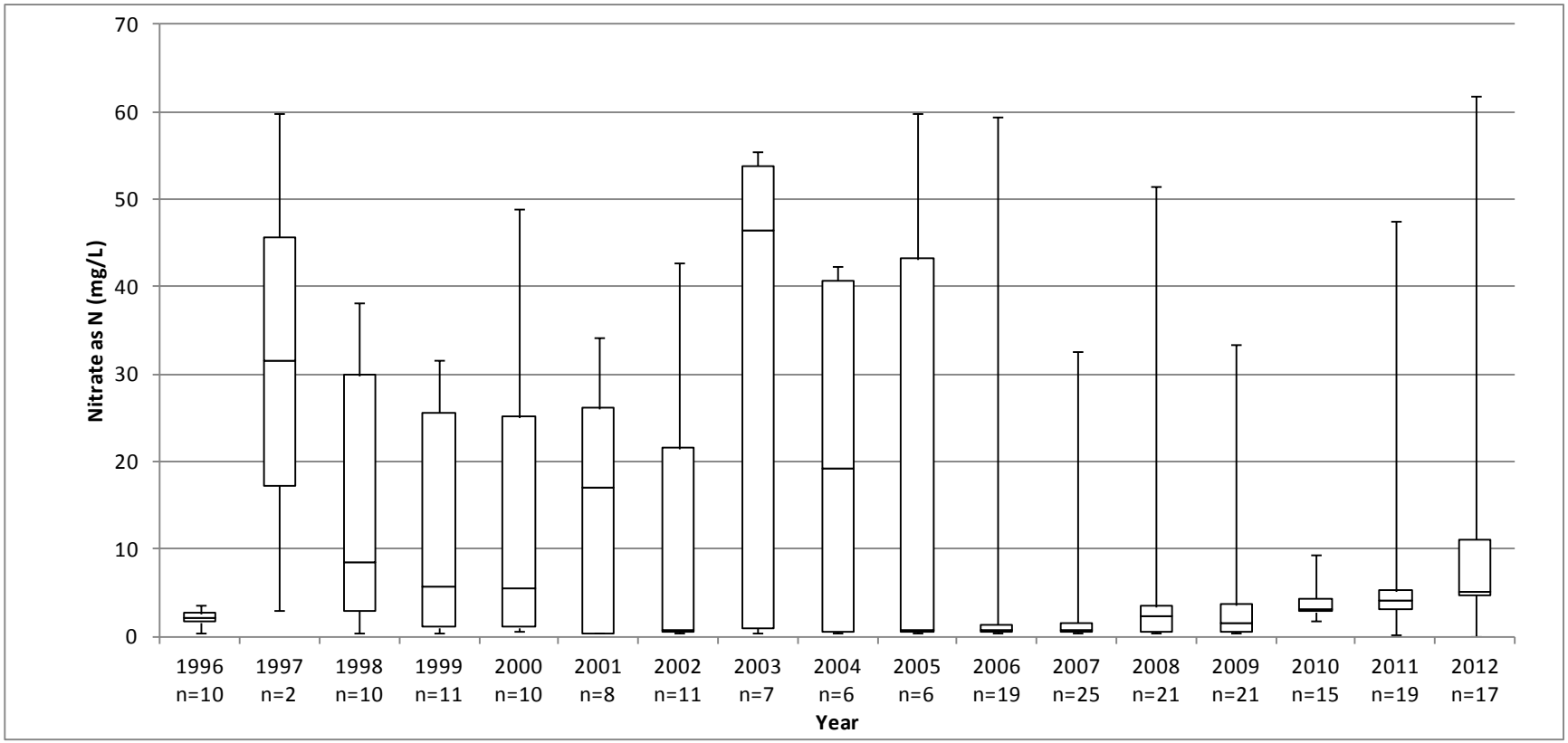
Appendix A Figure 15 Nitrate as N Box and Whisker Plot for the Lower Forebay Basin



Appendix A Figure 16 TDS Box and Whisker Plot for the Mound Basin



Appendix A Figure 17 Chloride Box and Whisker Plot for the Mound Basin



Appendix A Figure 18 Nitrate as N Box and Whisker Plot for the Mound Basin

Appendix B. Summary of Existing Monitoring Programs

Appendix B Table 1 Summary of Monitoring Programs in the Lower Santa Clara River SNMP Study Area

Data Type	Agency	Frequency	Parameter														No. of Locations	Program
			EC	TDS	Salinity	Cl^-	SO_4	B	Total N	Organic N	TKN	NH_3	NO_3	NO_2	NO_3 + NO_2	CECs		
Ground-water	Ventura County	Annually	■	■	■	■	■						■				Varies by year	Ventura County Groundwater Monitoring Program
Description: This program includes annual monitoring of groundwater wells for the purposes of groundwater resource assessment and management. The number of wells varies annually. For example in 2011 and 2012 there were 199 and 168 wells sampled throughout the County, respectively.																		
Ground-water	UWCD	Quarterly	■	■		■	■	■*					■				61	UWCD Water Quality Monitoring Program
		Semi-Annually	■	■		■	■	■*					■				33	
Description: UWCD conducts water quality monitoring of production wells and dedicated monitoring wells. In addition, UWCD uses groundwater monitoring data collected by Ventura County and water purveyors (data submitted to CPDH) to characterize groundwater quality within the District. In the Piru and Fillmore Basins the monitoring and production wells are sampled quarterly and semi-annually, respectively. In the Santa Paula Basin both the monitoring and production wells are sampled semi-annually. In the Mound Basin, the monitoring wells are sampled semi-annually, and no production wells are sampled. In the Forebay both the monitoring and production wells are generally sampled quarterly. The 11 new monitoring wells in the Forebay are sampled annually. *For the quarterly sampling events, an abbreviated suite of general minerals are analyzed twice per year. For the semi-annual sampling events, an abbreviated suite of general minerals are analyzed once per year. The abbreviated suite of general minerals does not include boron.																	
Ground-water	City of Santa Paula	Quarterly		■		■	■	■				■	■	■			3	WWTP WDR Monitoring requirements
Description: The City samples upgradient and downgradient of percolation ponds.																		
Ground-water	City of Santa Paula	Annually											■				5	CDPH Monitoring Requirements
		Other - Every 3 Years	■	■		■	■							■				
Description: The City conducts water quality monitoring of raw groundwater from their potable water supply wells.																		
Ground-water	City of Fillmore	Semi-Annually		■		■	■	■				■	■	■			3	WWTP WDR Monitoring requirements
Description: The City samples upgradient and downgradient of percolation ponds																		

Appendix B Table 1 Summary of Monitoring Programs in the Lower Santa Clara River SNMP Study Area

Data Type	Agency	Frequency	Parameter													No. of Locations	Program
			EC	TDS	Salinity	Cl^-	SO_4	B	Total N	Organic N	TKN	NH_3	NO_3	NO_2	$NO_3 + NO_2$	CECs	
Ground-water	City of Fillmore	Annually											■				3 CDPH Monitoring Requirements
		Other - Every 3 Years	■	■		■	■							■			
Description: The City conducts water quality monitoring of raw groundwater from their potable water supply wells																	
Ground-water	Ventura County Water Works	Quarterly		■		■	■	■		■		■	■	■			4 WWTP WDR Monitoring requirements
Description: The County conducts sampling from wells upgradient and downgradient of percolation ponds.																	
Ground-water	City of Ventura	Annually											■				6 CDPH Monitoring Requirements
		Other - Every 3 Years	■	■		■	■							■			
Description: The City conducts water quality monitoring of raw groundwater from their potable water supply wells.																	
Surface Water	UWCD	Quarterly	■	■		■	■	■*					■				5 UWCD Water Quality Monitoring Program
		Quarterly	■	■		■	■	■					■				7
		Other	■	■		■	■	■**					■				2
Description: UWCD conducts water quality monitoring of the Santa Clara River and tributaries. *For the quarterly sampling events, an abbreviated suite of general minerals are analyzed twice per year. The abbreviated suite of general minerals does not include boron. ** At two locations monitoring is conducted more frequently than quarterly. At Newhall Crossing, the general minerals suite (includes boron) is measured quarterly, and an abbreviated suite of minerals is measured on a monthly basis. At Freeman diversion, the general minerals suite (includes boron) is measured quarterly, and an abbreviated suite of minerals does not include boron) is measured twice per month.																
Surface Water	City of Ventura	Weekly			■												5 WWTP NPDES Permit Monitoring Requirements
		Monthly								■	■	■	■	■			5
Description: Upstream and downstream of WWTP discharge																	

Appendix B Table 1 Summary of Monitoring Programs in the Lower Santa Clara River SNMP Study Area

Data Type	Agency	Frequency	Parameter														No. of Locations	Program
			EC	TDS	Salinity	Cl^-	SO_4	B	Total N	Organic N	TKN	NH_3	NO_3	NO_2	$NO_3 + NO_2$	CECs		
Surface Water	VCAILG	Other - 1 to 2 dry events, and 1-2 wet events per year	■	■		■	■					■	■				7-8	Conditional Waiver of Waste Discharge Requirements for discharges from Irrigated Lands within the Los Angeles Region
Description: The VCAILG conducts monitoring per the requirements of the conditional waiver. Monitoring locations include several tributaries to the Santa Clara River, on agricultural drainage ditch and one background site.																		
Surface Water/ Storm-water	Ventura County	Annually	■		■	■		■			■	■			■		4	SCCWRP Bioassessment Study
Description: This 5-year bioassessment study is complete. The monitoring program for this study included water quality analyses at the monitoring locations. The 4 monitoring locations varied over the 5 year monitoring program. It is unknown if additional monitoring will be conducted in the future .																		
Surface Water/ Storm-water	Ventura County	Other	■	■	■			■			■	■			■		5	Ventura County Stormwater Quality Management Program
Description: This program includes monitoring of mass emissions stations and major outfalls. Within the project study area there is one mass emission station, Santa Clara River, and 4 major outfall stations. The mass emission and major outfall stations are monitored 4 times per year, 3 wet events and 1 dry event.																		