

# Central Platte Natural Resources District 2015 Annual Report of Water Use Activities in the Central Platte NRD

For the 2016 Platte Basin Meeting



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Draft 2016

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**2015 ANNUAL REPORT OF WATER USE ACTIVITIES IN THE CENTRAL PLATTE NRD  
TO MEET THE REQUIREMENTS OF THE INTEGRATED MANAGEMENT PLAN  
FOR 2016 PLATTE BASIN MEETING**

**I. SUMMARY OF WATER USE**

The following is a compilation of records, statistics and historic conditions of water use which have been tracked by the Central Platte Natural Resources District (CPNRD) for calendar year 2015. All information supplied for this summary is organized within a GIS database complete with the locations, attributes and metadata necessary to recreate this report in tabular form. This report has been compiled for the 2016 Platte Basin meeting.

**II. CERTIFIED IRRIGATED ACRES**

In 2006, the district began certifying historic ground water and surface water irrigated acres. In order to be certified as irrigated, the land must have been irrigated at least 2 out of the 10 years for the period of 1995 – July 26, 2004. Land within the District but outside the original State stay on newly irrigated acres (January 6, 2006) was allowed to be developed (newly irrigated) in 2005 and was certified later on in 2008-2009. The initial certification process ended on March 31, 2008; however, land is constantly coming into compliance using FSA compliant photos depicting certified irrigated boundaries and associated 578 forms of certified irrigated crops with farm and tract numbers. Since that time, additions and de-certifications to the certified irrigated acres database have occurred through December 31, 2015, with a net result of 1,028,044 certified acres.

Detailed data regarding amount and water source of certified irrigated acres *can be found in TABLE 1. Certified Acres below*. The difference in total certified acres (2010-2015) reflects newly irrigated acres as well as newly certified and re-certified acres where new evidence of irrigated crop history has been established according to our Rules and Regulations.

**Table 1. Certified Acres**

<b>Year</b>	<b>Acres Certified</b>	<b>Acres of Ground Water</b>	<b>Acres of Surface Water</b>	<b>Acres of Co-Mingled</b>
2010	1,016,589	923,520	14,968	78,101
2011	1,016,668	923,904	14,658	78,106
2012	1,021,017	928,318	14,612	78,087
2013	1,025,466	932,826	14,590	78,050
2014	1,027,288	933,633	14,536	77,686

Year	Acres Certified	Acres of Ground Water	Acres of Surface Water	Acres of Co-Mingled
2015	1,028,044	936,554	14,315	77,175
Difference 10-15	11,455	13,034	-653	-926

### III. VARIANCES

#### A. Definitions

1. **Offsets-** A reduction of irrigated acres at one or more locations that serves to counter-balance or compensate for a transfer of water to another location.
2. **Transfers-** To allow for, with a CPNRD approved Variance, the consumptive use of water to be changed, (either in location or purpose) without causing an increase in depletions to the river or an impact to existing surface water or ground water users. CPNRD utilizes methodology for calculating depletions and accretions consistent with the other Platte Basin NRDs when evaluating proposed transfers to ensure that the criteria for compliance with Platte River Recovery Implementation Program (PRRIP), which includes the timing, location and amount of the depletion and corresponding offsets, are met.
3. **Variance-** To allow an exception to the stay on new irrigated acres and new consumptive uses while providing for adequate offsets or transfers to assure that there is no net increase in depletions to the river or impacts to existing surface water or ground water users.

#### B. Tracking

Variations were tracked using simple GIS polygons and attributes until 2007. By that date, it was realized that variations were beginning to occur over and over again on the same parcels of land. It was crucial to establish a transfer history on the original, historic certified acre boundary for each field where a variance occurred consecutively and changed the shape of the boundary numerous times. This was remedied by a Variance Geodatabase, which was able to track the transfers to and transfers from by date and Variance Code IDs. Therefore, it is very important, when using any future modeling techniques, to pay close attention to the yearly shape of an individual certified boundary which was affected by the variations. For example, a certified boundary in 2006 may have changed half of the acres to dry land and transferred those acres to another parcel for the year. In 2007, the same landowner may have chosen to transfer those acres back to the original certified boundary and repeat the process again in 2008. In any case, the transfers were only allowed to occur with a variance agreement, which stipulated that the net depletion to the river must remain zero.

Prior to the establishment of a water bank, all variations were transfers of water rights between landowners and no dollar amounts were exchanged. Water was

not available for purchase. Transfers were termed Variances through 2008, until the CPNRD acquired water and began selling from the fully appropriated water bank accounts to individuals. Presently all Variances are given a Waterbank transaction number.

#### IV. APPROVED TRANSFERS

Between January 1 and December 31, 2015, the CPNRD approved 160 transactions of water use transfers. Each transaction may have consisted of one or more parcels of land from different sections. For the years 2006-2008 all transactions were considered variances to the CPNRD's rules and regulations. Variances (transfers of irrigated acres) were only allowed if it was determined that there were no new depletions to the Platte River and that any offsets were located "upstream" or not more than one mile West of a line North and South of the new use of water.

The certified acre total for 2015 involved in these transfers to new irrigated lands was 1,955 acres. The total number of certified acres used to offset the new uses was 1,094. For further analysis and statistics, *see TABLE 2. Transfers below*. Each transfer resulted in no net increase in stream depletions when computed using the CIR offset calculator developed from the Cooperative Hydrology Study (COHYST) databases and models.

Detailed GIS data that displays the necessary information regarding the location, timing, amount and conditions associated with each transfer is shown in the appendix.

*See Appendix ATTACHMENT 4. New Use of Groundwater 2015, and ATTACHMENT 5. 2015 Mitigations.* Maps of transfers, retirements, and purchases are included in this report.

For locations, *see map in Appendix ATTACHMENT 1. Locations of Acres Transferred 2015 and the map in Appendix ATTACHMENT 2. Locations of Retirements 2015.*

**Table 2. Transfers**

Year	Cumulative Total of Acres Certified	# of Transfers (Transactions)	Acres Transferred to New Irrigation	Transferred Offset From Certified Acres	Retired Surface Acres	Retired Ground Acres	Total Affected Acres
2006	398,000	76	768.5	777.6	0	0	1,546.1
2007	952,784.6	122	887.9	1,000.7	0	342.2	2,230.8
2008	1,013,332	97	1,004	1,032.9	689.4	351.1	3,077.4
2009	1,014,530	136	2,226	519	440.7	667.3	3,853.0
2010	1,016,589	108	659.8	494.8	899	314.1	2,367.7
2011	1,016,668	136	1,222.4	851.1	332.8	395.1	2,801.4
2012	1,021,017	184	2,106.3	1,183.9	21.8	146.8	3,458.8

Year	Cumulative Total of Acres Certified	# of Transfers (Transactions)	Acres Transferred to New Irrigation	Transferred Offset From Certified Acres	Retired Surface Acres	Retired Ground Acres	Total Affected Acres
2013	1,025,466	339	2020.1	1461.4	0	0	3,481.5
2014	1,027,288	226	2,762	1,827	64	24.9	4,677.9
2015	1,028,044	160	1,955	1,094	0	160	3209
<b>Total</b>	<b>1,028,044</b>	<b>1,584</b>	<b>15,612</b>	<b>10,242.4</b>	<b>2,447.7</b>	<b>2,401.5</b>	<b>30,703.6</b>

## V. WELL CONSTRUCTION PERMITS

### A. Wells

132 well permits were issued for 2015.

### B. Well Permit Types

Well permits by type are shown in **Table 3. Well Permits Issued by Type** below and the following is a description of the well types.

#### a. Supplemental Ground Water Wells

CPNRD issued supplemental ground water well permits (coded SG) for the district where ground water wells are constructed to supplement existing ground water wells. There were no increased irrigated acres associated with these wells unless an approved variance was granted with offset acres, although the primary use of the well was to irrigate previously certified land.

#### b. Supplemental Surface to Ground Water Well

CPNRD issued supplemental surface to ground water well permits (coded SS) for the district where ground water wells were drilled to augment surface water irrigation when surface water was not available. There was no increase in certified irrigated acres unless an approved variance was granted with offsets. Those permits were granted with the stipulation that the ground water well could not be used unless surface water was no longer available.

#### c. Replacement Wells

CPNRD issued replacement well permits (coded RP) where an existing ground water well had become unusable and needed to be replaced (decommissioned). There was no increase in certified irrigated acres associated with these well permits unless an approved variance was granted with offset acres, and the primary use of the well was to irrigate certified land that had been irrigated previously.

d. Transfer Wells

CPNRD issued conditional use well permits (coded TF) for the district where ground water wells were drilled and water was bought or transferred to that location and no increase in consumptive use occurred. This land was then considered certified irrigated and the location where it was transferred from with a variance/waterbank transaction was considered non-irrigated and certified as such.

e. New Wells

CPNRD issued new well permits (coded NP) for the district where ground water wells were drilled and water was bought or transferred to that location and no increase in consumptive use occurred. This land was then considered certified irrigated and the location where it was transferred from with a variance/waterbank transaction was considered non-irrigated and certified as such.

f. Dewatering Wells

CPNRD issued dewatering well permits (coded DW) for the district where ground water wells were drilled to help lower the water table around residents with ground water in basements; these were considered permanent wells (over 90 days).

g. Municipal/Industrial

CPNRD issued municipal (coded MU) and industrial/commercial (coded IN) well permits for the district where municipalities/industries may have needed wells for water quantity or quality issues. Also, industrial/ commercial may be issued for commercial feedlots or such things as gravel mining operations.

h. Domestic Wells Over 50 Gallons Per Minute

There were zero domestic well permits (coded DO) issued with a pump capacity greater than 50 gallons per minute.

i. Other Permits

j. Conversion to groundwater

CPNRD issued conversion to groundwater (coded CG) for the district where a conversion of surface water to ground water occurred.

CPNRD issued zero remediation well permits.

**Table 3. Well Permits Issued By Type**

<b>2015 Well Permit Types and Corresponding Transfers</b>		
<b>Well Permit Type</b>	<b>2015</b>	<b>Associated Transfer</b>
CPSG	14	0
CPSS	0	0
CPRP	107	0
CPCG	0	0
CPNP	5	0
CPDW	1	0
CPMU	0	0
CPIN	3	0
CPDO	1	0
<b>TOTAL</b>	<b>131</b>	<b>0</b>

## VI. MUNICIPAL AND INDUSTRIAL ACCOUNTING

### A. *Calculating a Baseline of Municipal Consumptive Use*

CPNRD calculates baseline consumptive use for each municipality in the district based on historic consumptive use data. Consumptive use is determined from ground water pumping volumes, wastewater discharge volumes (when available), and/or computer modeling, and converted to a per capita volume. The baseline per capita volume, plus the annual population growth estimated by the Nebraska Department of Economic Development and/or U.S. Census Bureau will be used to determine annual changes in consumptive uses. Changes in consumptive use are tracked annually for each municipality through a reporting and database system administered by the CPNRD. There are 30 towns and cities within the CPNRD and the net population increase during 2010 was 1,638. 17 towns had decreases in population resulting in 194 acre-feet less usage. 10 towns had increases in population resulting in 323 acre-feet addition usage. The estimated 2010 net increase in water consumption was 129 acre-feet. The population for CPNRD in 2010 was 112,054. Population estimates for 2015, when available, will be used to calculate depletion offsets needed for municipal growth.

### B. *Historic Water Use Survey*

The initial Historic Water Use Survey for municipalities was mailed on April 7, 2010, to municipalities throughout the CPNRD. Of the 30 municipalities in the district, 27 have public water supply wells. Those 27 municipalities have returned the initial survey to date.

### C. *Certified Irrigated Cropland to Urban Development*

To account for municipal offset, CPNRD has evaluated the quantity of certified irrigated cropland that has been converted to urban development. Seven cities were examined throughout the district to determine this change as per the 2004 CPNRD certification process.

2005 urban development baseline was first established for the following seven cities: Silver Creek, Central City, Grand Island, Kearney, Lexington, Cozad, and Gothenburg. New urban development was identified for 2006, 2007, 2008, and 2009 within 3 miles of city limits with future plans to incorporate the entire district into this evaluation. The 2015 updates of this data have not been completed at this time.

## VII. FLOW METER DATA

The NRD does not require or collect pumping data for the Integrated Management Plan (IMP).

## VIII. WATER BANKING ACTIVITIES

### A. *Geo-Spatial Waterbanking Software*

Planning began for the waterbanking software in 2006. A GIS company, Applied Data Consultants, was chosen to customize ArcGIS software to allow for efficiently computing the net impact to the river based on transfers of irrigation. The software directly utilized the latest COHYST crop irrigation requirement (CIR) coefficients, modeled stream depletion percentages and recharge calculations to display, track and catalog the net depletion effects to the Platte River for every polygon within a transaction. The long-term goal of the project is to ensure and provide evidence that as a result of each transfer of water rights, the net depletion to the river is zero. Below is a list of the transfer types which are tracked in our database.

The waterbank transactions are separated into five transfer type procedures:

- 1. Modifications:** Geographic modifications to existing certified acres. (changes in the shape of the polygons)
- 2. Purchases:** Procedure where a landowner or entity purchases water rights from the waterbank to transfer to newly irrigated acres or other uses. (calculated in acre-feet of impact to the river and measured in acres)
- 3. Retirements:** Transactions in which the CPNRD purchases and holds a conservation easement to the water right (ground water/surface water or co-mingled.) The water right is permanently retired.

**4. Transfer To:** Any procedure where a water right is moved to allow new irrigation. The instance of a “Transfer To” will occur with a purchase where a landowner purchases water from an NRD account and then transfers the water right to his/her land. A transfer to will always accompany a “Purchase” or “Transfer From.”

**5. Transfer From:** Procedure that designates acres or acre-feet of water rights that are to remain dry land and will offset a new use. It differs from “Purchase” in that no money is exchanged from the CPNRD Water Bank.

### ***B. Over-Appropriated Area***

Water right purchases within the over-appropriated area, or whose consumptive use changes impact the over-appropriated area, are held by permanent conservation easements for the purpose of fulfilling the obligations through State Statute. These water rights are not available for sale.

In 2015, the CPNRD acquired perpetual conservation easements on water rights in Dawson County, and the estimated accretion to the Platte River from ground water retirements using the latest COHYST offset calculator is 61.46 acre feet (ac-ft).

Over-Appropriated Zone Purchases are shown in **Table 4. Over-Appropriated Zone Retirements 2015**, along with the 2015 gains to the river.

See map in the Appendix **Attachment 2. Locations of Retirements 2015**.

**Table 4. Over-Appropriated Zone Retirements 2015**

Township	Range	Section	County	Acres	Surface/Ground	TransactionID	2015 ac-ft Gain to River
9	21	33	Dawson	149.5	Ground	1402	61.46
						<b>TOTAL</b>	<b>61.46</b>

### ***C. Formulas Used for Calculating Net Depletion***

CPNRD established a water bank for the purpose of encouraging and facilitating the transfer of water between users. The NRD has and will continue to purchase or account for transfers of water use using a water budget approach that nets no change in stream flows for a given time and location. CPNRD holds the transferred water uses in its water bank for the purposes of:

(1) off-setting new or expanded water uses;

- (2) saving water to meet statutory requirements or interstate agreement obligations;
- (3) saving water to meet future incremental targets toward achieving a fully appropriated condition; or
- (4) future water sales to individuals as offsets for development of new consumptive uses of ground water within the district.

In determining the amount of accretions to the stream that will be placed into the water bank, due to the transfer of ground water or surface water uses, CPNRD and the Department will agree on the best available tools to utilize for calculating stream flow accretions (i.e. the “bankable” volumes of water). The calculations used at this time to determine the accretions to be put into the water bank are based on long-term average water budgets. The relationship of ground water pumping, and ground water recharge on stream flow accretions or depletions were established using the COHYST EMU MODFLOW ground water model. The ground water model was run for a fifty (50) year period and the percentage value for year 50 was used to determine the stream flow accretion or depletion for the water budget analysis.

The water budget analysis is an accounting process that considers the change from present water use to future water use, on a given tract of land. Present water use is computed as the net ground water withdrawal for an irrigated corn crop (Crop Irrigation Requirement (CIR) minus the precipitation recharge for irrigated corn). The future water use considers the effect on water use of the new land use, which is typically dry land corn or grassland with no irrigation net ground water withdrawal. This is negative and is equal to the ground water recharge for the dry land corn or pasture. The accretion to the Platte River is then computed as the change in net ground water withdrawal multiplied by the stream depletion percentage to obtain a number for the volume of water being supplied to the river.

The water banking analysis of water supply is consistent with the methods used to evaluate transfers as described in subsection II.C.4.d (2) of Chapter 5 of CPNRD’s IMP). Additionally, these calculations determine the timing and location of stream flow changes due to the transfer to the water bank and any impacts to existing ground water or surface water users. The following formulas are utilized to ensure the correct timing, location and quantity of the offsets:

**Table 5. Net Depletions**

<p><b><u>Groundwater Transfers/Retirements</u></b></p> <p>·<u>Present Usage assumes Irrigated Corn</u>  <math display="block">Net\ Depletion = \% \ Depletion \times [(CIR - Recharge) \div 12] \times Acres</math></p> <p>·<u>Future Usage assumes Dryland Corn</u>  <math display="block">Net\ Depletion = \% \ Depletion \times [(Recharge) \div 12] \times Acres</math></p> <p>·Net Ground water usage = Irrigated corn depletion + dryland corn depletion</p> <p>·Positive Net Groundwater Usage means increased GW Withdrawal and increased Platte River Depletion</p>
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·Negative Net Groundwater Usage means increased GW recharge and increased Platte River Stream flow

**Surface Water Transfers /Retirements assuming no future ground water use.**

·Current Condition Usage assumes Irrigated Corn and Current Condition Recharge:

$$SW \text{ Depletion} = [(CIR) \div 12] \times \text{Acres} + [\% \text{ depletion} \times (\text{recharge} / 12)] \times \text{Acres}$$

·Future Condition assumes Dryland Corn

$$Net \text{ Depletion} = \% \text{ Depletion} \times [(recharge) \div 12] \times \text{Acres}$$

·Net Depletion of Surface Water use = *SW Depletion – Dry land Condition net depletion*

**Surface Water Retirements with future ground water use.**

·Current Condition Usage assumes SW Irrigated Corn and Current Condition Recharge

$$SW \text{ Depletion} = [(CIR) \div 12] \times \text{Acres} - [\% \text{ depletion} \times (\text{on-farm loss}/12)] \times \text{Acres}$$

·Future Condition assumes GW irrigated Corn

$$Net \text{ Depletion} = \% \text{ Depletion} \times [(CIR + \text{onfarm loss}) \div 12] \times \text{Acres}$$

·Net Depletion of Surface Water use = *SW irrigation Depletion – GW irrigation net depletion*

**Feedlot Conversions (Feedlot to Irrigated Corn)**

·Consumptive use of cattle/day = 7 gal/day

·Total head of cattle x 365 days

$$\frac{365 \text{ (day)} \times 7 \text{ gal/day/head}}{325,851 \text{ gal / ACFT.}} \times \% \text{ depletion} - \text{Future use (CIR)} = \text{Future Net Depletion}$$

#### **D. Fully Appropriated Area**

CPNRD has implemented certain rules within the fully appropriated area to achieve and/or maintain a balance between water uses and water supplies so that the economic viability, social and environmental health, safety, and welfare can be achieved and maintained for both near-term and long-term, considering the effects on existing surface water appropriators and ground water users.

Any person who desires to transfer the location of use of ground water from wells located within the district may do so only after applying for and obtaining approval from the CPNRD on forms provided by CPNRD. The transfer of location of use and the withdrawal of use at the new location shall be consistent with all applicable state statutes, ground water management plans and goals, and rules and regulations of the CPNRD. In addition, such transfers shall be conditioned upon and limited to transfers in which the land, where the right is transferred from, remains in dry land agricultural use. Once granted, such permits will remain in force for the period of time covered by the transfer or until the owners of the wells that are the subject of such transfer notify the CPNRD in writing that the permit should be cancelled, or until the CPNRD Board of Directors determine that such transfers are no longer in the best interest of the public.

#### **E. Area with Impacts to the Platte River below Chapman**

CPNRD adopted a new rule to their Rules and Regulations for Groundwater Use in Fully and Over Appropriated Areas on April 26<sup>th</sup>, 2012 in conjunction with their IMP and the Department. This new rule allows the CPNRD Board of

Directors to grant variances to the CPNRD Rules and Regulations for Groundwater Use in Fully and Over Appropriated Areas for an area that impacts the Platte River below Chapman, Nebraska. These impacts will not have to be offset as long as the CPNRD or the Department determine that any of these new uses are not causing an adverse effect to the Platte River below Chapman.

The CPNRD Board established an application period of February 28<sup>th</sup> through April 15<sup>th</sup> for the year 2012, with applicants being notified of the status of their application by April 30<sup>th</sup>. For the crop year 2015 and thereafter, applications will be taken from October 1<sup>st</sup> through November 30<sup>th</sup> with applicants being notified of the status of their application by February 1<sup>st</sup>.

The CPNRD Board of Directors can approve the new use of 2,500 acres or 250 acre feet (500 acre feet according to the Integrated Management Plan)\* (*source cited below*) depletion to the Platte River. To be eligible, the applicant must be in compliance with all District regulations and programs and certify that they are in compliance with all Federal and State programs.

*\*2012 CPNRD/NDNR Integrated Management Plan. Chpt. 5, Section III, (c) Variances. Pg.18*

The Board of Directors established a ranking system for determining which applications would be approved, with: (1) fewer acres have a higher ranking, (2) the least depletion on the Platte River having a higher ranking, and (3) other items the CPNRD Board may determine. A non-refundable application fee of \$100 on all applications up to 10 acres and \$150 for all applications over 10 acres are and will be applied. The applications are only good for the current application period and cannot be carried over to the next year.

All existing Rules and Regulations dealing with variances and transfers apply in the area with impacts to the Platte River below Chapman except those dealing with the time that offsets are required. If the CPNRD and/or the Department determine the new uses are causing an adverse impact to existing surface water appropriators and/or groundwater users, sufficient numbers of the new uses will be required to provide offsets to the Platte River to mitigate the impacts to the long term beneficial uses.

The Board of Directors will determine a method of selecting those required to make offsets. The plan for development must be implemented during the calendar year which it was approved except for the 2012 calendar year which had to be implemented by the 2013 growing season. Any application granted is tied to the tract of land for which it was applied and is non-transferable.

#### ***F. Summary of all Waterbanking Activities***

1. By the close of 2015, the CPNRD Water Bank had a balance of 2,566 acre feet of water rights available for offset in the over-appropriated area.

2. The distribution of all waterbanking activities as they correspond to the PBHEP Priority Zone Curves are shown in the *Appendix ATTACHMENT 6. Percentage Summary of Acres by Priority*.
3. CPNRD policy is to allow the purchase of water rights from the fully-appropriated water bank accounts, as long as the land that the water rights are transferred to are downstream (East) or within one mile of a North/South line of the parcel to be offset. There were zero transactions involving water bank purchases in 2015.
4. Approved transfers made in 2015 resulted in a depletion to the Platte River over the next 50 years. *See Appendix Attachment 7. 2015 CPNRD Certified Irrigated Acreage Transfers Estimated Effect on the Platte River*. The accretions shown in the attachment were estimated using the 1999, Hunt methodology\* (*source cited below*) for the PBHEP Zones established along the Platte River. Locations of the acres transferred are shown on map *see the Appendix Attachment 1. Locations of Acres Transferred 2015*.

\*Hunt, B., 1999. *Unsteady stream depletion from ground water pumping*. *Ground Water*, 37(1), 98-102.

## IX. OTHER STREAM FLOW ACCRETION ACTIVITIES

CPNRD has a variety of proposed projects which may positively affect Platte River Stream flows. The following is a list of projects being studied:

1. Elm Creek Reservoir- has multiple uses including flood control, storage and release of Platte River flows for (PRRIP) purposes and recreation.
2. Rehabilitation of Surface Water Canals- Cozad, Thirty Mile, and Southside (Orchard Alfalfa). The canals will be used for their original purpose, surface water irrigation delivery; as well as for retiming Platte River flows to enhance target flows for endangered species. The retiming of Platte River flows will be accomplished by diverting flows excess to target flows to recharge the ground water system or by transferring surface water irrigation rights to instream flows, which will be diverted from the canal back to the river.
3. Conjunctive Water Management Studies- currently being conducted with other partners: DNR, Twin Platte NRD, and Nebraska Public Power District (NPPD) to look at surface water and ground water management options with the goal of ensuring that the supplies of surface and ground

water in the Platte basin are optimized and managed efficiently with maximum benefits and minimum waste and in a manner consistent with State and local policies. The studies and analysis for these projects are not yet completed.

## **X. GROUND WATER LEVELS**

The tracking and reporting of ground water levels are not required in the IMP.

## **XI. APPENDIX**

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