Basin-Wide Plan for Joint Integrated Water Resources Management of Overappropriated Portions of the Platte River Basin, Nebraska

I. PURPOSE AND SCOPE OF THIS BASIN-WIDE PLAN

The purpose of this Basin-Wide Plan (Plan) is to meet the requirements of Neb. Rev. Stat. § 46-715(4)(a) for those portions of the Platte River Basin upstream of the Kearney Canal Diversion designated as overappropriated by the Nebraska Department of Natural Resources (DNR) on September 15, 2004. This area is defined in the DNR's Order, which also defines the area in which ground water is hydrologically connected to the overappropriated surface water basin (see map 1). The overappropriated basin and the hydrologically connected area will hereinafter be referred to as the "overappropriated basin."

This Plan applies to the designated overappropriated basin within the following natural resources districts (NRDs): the North Platte NRD, the South Platte NRD, the Twin Platte NRD, the Central Platte NRD, and the Tri-Basin NRD. These NRDs shall be collectively referred to below as the "Platte River Basin NRDs." This Plan was adopted after consultation and collaboration with stakeholders, as required by Neb. Rev. Stat. § 46-715, and after the DNR and the individual Platte River Basin NRDs held the following joint hearings:

- North Platte NRD, June 17, 2009, at the North Platte NRD office,
- South Platte NRD, June 16, 2009, at Western Nebraska Community College,
- Twin Platte NRD, July 2, 2009, at the Holiday Inn Express in North Platte,
- Central Platte NRD, July 7, 2009, at the Holiday Inn Express in Lexington and July 8, 2009, at the Central Platte NRD office, and
- Tri-Basin NRD, June 18, 2009, at the Board Room of Central Nebraska Public Power and Irrigation District.

This Plan will be adopted, implemented, and revised as necessary by the Platte River Basin NRDs and the DNR through the authorities granted by Nebraska Revised Statutes.

II. GOALS AND OBJECTIVES OF THE PLAN

A. Goals

1. Incrementally achieve and sustain a fully appropriated condition.
2. Prevent reductions in the flow of a river or stream that would cause noncompliance with an interstate compact or decree or other formal state contract or agreement.
3. Keep the Plan current.
4. Work cooperatively to identify and investigate disputes between ground water users and surface water appropriators and, if determined appropriate, implement management solutions to address such issues.

B. First Increment Objectives

The first increment of the Plan will not last more than 10 years. The Plan will take effect 30 days after it is adopted by DNR and all five Platte Basin NRD boards of directors.

Goal 1 Objectives:

1. Offset impacts of streamflow depletions to (A) surface water appropriations and (B) water wells constructed in aquifers dependent upon recharge from streamflow to the extent those depletions are due to water use initiated after July 1, 1997.
2. Actively pursue funding for offsets and develop and maintain data and analytical tools, such as the Cooperative Hydrology Study (COHYST) and other programs and projects needed to implement this Plan.
3. Continue to develop the methodology to calculate the difference between the current and fully appropriated levels of development in each NRD.
4. Conduct a technical analysis as described in Neb. Rev. Stat. § 46-715(4)(d)(iii) for this Plan and the individual Platte River Basin NRDs' integrated management plans (IMPs) after they have been in effect for at least five years, to determine whether the controls adopted in the respective plans or other management actions taken by the NRD are sufficient to offset depletions due to post- July 1, 1997, water uses and whether the provisions of this Plan and the IMPs are adequate to sustain progress toward a fully appropriated level of water use.
5. Use available funds to offset depletions due to water uses initiated prior to July 1, 1997, that are identified as part of the overall difference between current and fully appropriated levels of development.
6. Adopt and implement IMPs in each Platte River Basin NRD

Goal 2 Objectives:

1. Prevent streamflow depletions that would cause noncompliance by Nebraska with the Nebraska New Depletions Plan (NDP) included within the Platte River Recovery Implementation Program (Program), for as long as the Program exists.

Goal 3 Objectives:

1. Meet at least annually to review progress toward achieving the goals and objectives of this Plan and those portions of individual NRD IMPs that implement this Plan.
2. Gather and evaluate data and information to measure the effectiveness of controls, incentives and/or other programs in the individual NRD IMPs used to implement this Plan.

Goal 4 Objectives:

1. Identify disputes between ground water users and surface water appropriators.
2. Investigate and address issues between ground water users and surface water appropriators, based on investigation results.

C. Subsequent Increment(s) Objectives

1. Offset any remaining depletions due to water uses initiated prior to July 1, 1997, that are identified as part of the overall difference between current and fully appropriated levels of development incrementally, as described in Neb. Rev. Stat.§ 46-715 (d).
2. Review and revise the Plan as necessary so that its provisions will allow achievement of the existing as well as any newly identified goals and objectives for subsequent Plan increments.
3. Review available data and complete analyses of the actions taken in the individual IMPs to offset depletions to estimate progress toward meeting the goals and objectives of this Plan and whether the actions taken will be sufficient to enable continued progress toward achieving the goals and objectives for subsequent increments of this Plan.

III. COMPONENTS OF THE PLAN

Goal 1, Objective 1: Offset impacts of streamflow depletions to (A) surface water appropriations and (B) water wells constructed in aquifers dependent upon recharge from streamflow, to the extent those depletions are due to water use initiated after July 1, 1997. (hereinafter referred to as "streamflow depletions" or "depletions").

Measures that can potentially be used to overcome the adverse effects of increases in consumptive use on streamflows include both those that reduce intentional consumptive use and those that enhance existing water supplies in other ways, or that increase the ability to use existing supplies more effectively.

A. Offset depletions to streamflows for new or expanded uses initiated after July 1, 1997, in the overappropriated basin.
   1. Identify depletions and accretions due to any of the following:
      a. changes in irrigated acres;
      b. changes in municipal and domestic uses of water;
      c. changes in livestock use of water;
      d. changes in industrial uses of water;
      e. changes in proportion of water provided by surface water and groundwater sources on commingled irrigated land; and/or
      f. any other relevant changes in water use that affect streamflows.
   2. Develop methodologies and gather and evaluate data that could be used to estimate depletions and accretions to streamflow.
   3. Identify projects that may be used to enhance water supply. These projects shall be pursued on a basin-wide level, when such projects will help achieve sustainable levels of supply and use and address water shortages in one NRD that affect more than one NRD.

4. Reduce consumptive water use through retirement of irrigated lands, water use allocation, and/or other management options.
5. Establish uniform methods for calculating depletions and offsets and for conducting water banking of both ground water and surface water, using tools developed as part of COHYST and other methods.
6. Establish uniform methods for identifying and regulating water use on acres irrigated with both surface water and ground water.
7. Ensure that offsets of depletions occur at the equivalent time, amount, and location of the depletion.

B. Initial identification of depletions
   1. The COHYST model was used to estimate part of the depletions to streamflow due to development after July 1, 1997, and before December 31, 2005, in the overappropriated basin.
      a. The increase in ground water irrigated acres within the hydrologically connected area of the overappropriated basin, along with the stream depletions (table 1) associated with those increases, are identified by and reported for each individual NRD in five-year-average increments through the year 2048 in the COHYST Report[1].
      b. Multiple COHYST reports have identified various limitations to the model. As these limitations are addressed by COHYST, or by other technical efforts pursued by DNR and the NRDs, any associated changes have the potential to alter the resulting depletion values. DNR and the Platte River Basin NRDs will determine how the depletion estimates from the COHYST model, as well as any other methodologies, need to be revised when additional data or model improvements become available.
      c. Table 1 shows the 2043-2048 average annual streamflow depletion due to new ground water irrigated acres from July 1, 1997, to December 31, 2005, as determined by the June 10, 2008, COHYST analysis for the entire area of each NRD as well as only the overappropriated area within each NRD. DNR and the Platte River Basin NRDs will determine whether the depletion estimates in table 1 should be revised as additional information is collected, as refinements are made to consumptive use estimates, as revisions are made in the COHYST models, or as deemed appropriate by the NRDs and DNR.
         i. For the purposes of the Basin-Wide Plan, depletions to streamflows estimated by the COHYST model will need to be adjusted to reflect the requirement to offset only those amounts needed to prevent depletions to (A) surface water appropriations and (B) water wells constructed in aquifers dependent upon recharge from streamflow. This analysis will take into account the methodologies used to develop the COHYST depletion values.

[1] Luckey, Richard R. 2008. *Estimated Stream Baseflow Depletion by Natural Resources District in the Nebraska Platte Basin due to Gained and Lost Groundwater Irrigated Land after July 1, 1997.* Aurora, CO: High Plains Hydrology, LLC. Prepared for Cooperative Hydrology Study. 47 p.

2. Estimates of other new uses have been calculated by the DNR and the Platte River Basin NRDs
   a. Changes in population will be used as an indicator of the change in the consumptive use of water for municipalities and domestic users in rural areas. Tables 2a through 2d show the change in population in each Platte River Basin NRD between 1997 and 2005.
   b. Changes in the number of livestock as reported by the Nebraska Agricultural Statistics Service or the Agricultural Census will be used as an indicator of the change in the consumptive use of water due to livestock. Tables 3a and 3 b show the changes in the number of cattle in each Platte River Basin NRD between 1997 and 2005.
   c. Changes in the industrial use of water will be estimated based upon registered well data and a survey of industrial uses in the Platte Basin. Table 4, which has not been developed at this time, will show the changes in industrial water use in each Platte River Basin NRD between 1997 and 2005.

3. Other data and methods may be used to determine consumptive use and depletions as long as DNR and the NRD(s) agree on the data or method used.

Table 1: 2043-2048 average annual streamflow depletion due to new ground water irrigated acres from July 1, 1997, to December 31, 2005, as determined by the June 10, 2008, COHYST analysis for the entire area of each NRD and the overappropriated area only within each NRD.

Natural Resources District	**Average Annual Depletions in the Years 2043-2048 (for the entire area of each individual NRD)**	**Average Annual Depletions in the Years 2043-2048 (for the OA portion within each NRD)**
North Platte NRD	8,000 acre-feet	7,900 acre-feet
South Platte NRD	700 acre-feet	200 acre-feet
Twin Platte NRD	7,700 acre-feet	6,700 acre-feet
Central Platte NRD	3,400 acre-feet	1,400 acre-feet
Tri-Basin NRD	5,000 acre-feet	2,200 acre-feet
Other NRDs	1,500 acre-feet	0 acre-feet

Table 2a: Change in human population over the entire NRD between 1997 and 2005.

NRD Name	**1997**	**2005**	**Change**
Central Platte	121,977	129,586	7,609
North Platte	45,088	44,928	-160
South Platte	15,597	15,779	182
Tri-Basin	18,934	18,243	-691
Twin Platte	40,351	41,835	1,484
Total	**241,947**	**250,371**	**8,424**

Table 2b: Change in total human population in the overappropriated area in each NRD.

Total OA Pop by NRD	**1997**	**2005**	**Change**
Central Platte	8,155	8,577	422
North Platte	37,680	37,600	-80
South Platte	10,762	10,806	44
Tri-Basin	2,918	2,838	-80
Twin Platte	36,627	37,796	1,169
Total	**96,142**	**97,617**	**1,475**

Table 2c: Change in city populations in the overappropriated area in each NRD.

OA_City Pop by NRD	**1997**	**2005**	**Change**
Central Platte	6,301	6,676	375
North Platte	29,445	29,333	-112
South Platte	10,064	10,095	31
Tri-Basin	1,626	1,618	-8
Twin Platte	31,712	32,395	683
Total	**79,148**	**80,117**	**969**

Table 2d: Change in rural human population in the overappropriated area in each NRD

OA_Rural Pop by NRD	**1997**	**2005**	**Change**
Central Platte	1,854	1,901	47
North Platte	8,235	8,267	32
South Platte	698	711	13
Tri-Basin	1,292	1,220	-72
Twin Platte	4,915	5,401	486
Total	**16,994**	**17,500**	**506**

Table 3a: Change in cattle population from 1997 to 2005 for entire area of the NRD.

NRDs	**1997**	**2005**	**Change**
Central Platte	552,560	486,580	-65,980
North Platte	425,280	408,210	-17,070
South Platte	100,980	83,160	-17,820
Tri-Basin	276,210	267,300	-8,910
Twin Platte	263,460	265,380	1,920
Other	938,970	857,880	-81,090
Total	**2,557,460**	**2,368,510**	**-188,950**

Table 3b: Change in cattle population from 1997 to 2005 for the overappropriated area of the NRD.

NRDs	1997	2005	Change
Central Platte	78,660	68,290	-10,370
North Platte	218,650	208,630	-10,020
South Platte	18,320	15,470	-2,850
Tri-Basin	62,220	61,960	-260
Twin Platte	135,550	134,570	-980
Total	**513,400**	**488,920**	**-24,480**

Table 4
At this time the DNR and the Platte Basin NRDs have not compiled data on the change in the consumptive use of water due to industrial activities in the Platte Basin. This data will be developed by DNR and the Platte Basin NRDs and brought to the first annual basin-wide meeting as a proposed amendment to the Basin-Wide Plan.

Goal 1, Objective 2: Actively pursue funding for offsets and develop and maintain data and analytical tools, such as COHYST and other programs and projects needed to implement this Plan.

A. Work together to maintain and improve COHYST.
B. Work to secure necessary funding for existing and proposed projects that will advance the goals of this Plan.

Goal 1, Objective 3: Continue to develop the methodology to calculate the difference between the current and fully appropriated levels of development in each NRD.

A. The determination of the overall difference between current and fully appropriated levels of development will:
    1. take into account cyclical supply, including drought;
    2. identify the portion of the overall difference that is due to conservation measures;
    3. identify the portion of the overall difference that is due to water use initiated prior to July 1, 1997; and
    4. identify the portion of the overall difference that is due to water use initiated or expanded on or after July 1, 1997.

B. As a preliminary step in developing the overall difference between fully and over appropriated conditions, the DNR, CNPPID, NPPD, and CPNRD performed a preliminary estimate of the changes in stream reach gains and surface water demands affected by such reach gain changes entitled "Preliminary Estimate of Historical Stream Flow Reductions in the Overappropriated Portion of the Platte River in

Nebraska." The DNR and the Platte Basin NRDs are not in agreement that the methodology used in that estimate is the most appropriate to determine the difference between fully and overappropriated, and accordingly, both the DNR and the Platte Basin NRDs will work to identify the overall difference between the current and fully appropriated levels of development. The estimate of the difference between fully and overappropriated, as identified in that preliminary estimate, also did not identify portions of the overall difference due to water use initiated prior to July 1, 1997, conservation measures and/or other possible causes including but not limited to drought, invasive vegetation, crop rotation, and canal operations, diversions and returns. These portions will be identified during the first increment. The preliminary estimate also did not contain specific requirements that an NRD would need to meet to achieve a fully appropriated condition, nor was it intended. The portion of the overall difference due to ground water use was not identified in this report. A peer review process of any analysis to determine the difference between the current and fully appropriated levels of development shall be required before final approval and adoption.

C. The COHYST model, and other models or tools, will be used to refine estimates of the overall difference between the current and fully appropriated levels of development. The estimates will be adjusted as additional information is collected, as refinements are made to consumptive use estimates, as revisions are made to the COHYST model, or as deemed appropriate by the NRDs and DNR.

D. A water budget/consumption approach may also be used to determine the overall difference as it can be a useful tool in that it allows for a comprehensive understanding of the water supplies and uses in the basin.

Goal 1, Objective 4: Conduct a technical analysis as described in Neb. Rev. Stat. § 46-715(4)(d)(iii) for this Plan and the individual Platte River Basin NRD IMPs after they have been in effect for at least five years, to determine whether the controls adopted in the respective plans or other management actions taken by the NRD are sufficient to offset depletions due to post- July 1, 1997, water uses and whether the provisions of this Plan and the IMPs are adequate to sustain progress toward a fully appropriated level of water use.

A. In the second and any subsequent increments of this Plan, the IMP for each NRD shall specify the extent to which any remaining overall difference between fully and overappropriated status results from consumptive uses within each individual NRD.
B. The IMP for each of the Platte River Basin NRDs that is adopted for any subsequent increment of the overappropriated basin planning process shall describe how progress toward the depletion reduction objective for that particular NRD is to be measured.

Goal 1, Objective 5: Use available funds to offset depletions due to water uses initiated prior to July 1, 1997, that are identified as part of the overall difference between current and fully appropriated levels of development.

A. Cooperate with the federal government to utilize programs such as CREP and EQIP that promote reductions in consumptive use.
B. Encourage Platte River Basin NRDs, agencies, and water users to participate in these programs.

Goal 1, Objective 6: Adopt and implement integrated management plans (IMPs) in each Platte River Basin NRD.

A. The IMP for each Platte River Basin NRD shall:
    1. Be consistent with this Basin-Wide Plan.
    2. Identify management options that will help to achieve the goals and objectives of this Plan.
        a. Management actions should take into account the cyclical nature of water supplies as well as the impact of conservation measures.
        b. Management options available to be used in the IMPs to address the objectives of the first increment are those found in Neb. Rev. Stat. §§ 46-716 and 46-739. Other options that are not regulatory include, but are not limited to, augmentation/retiming projects; alternative management of canals; new storage reservoirs and/or underground storage; water banking; incentive programs for retiring irrigated acres and/or purchasing surface water; alternative management of existing reservoirs and drought management plans.
        c. Riparian and riverine vegetation control may be considered as a management option when a change in consumptive use can be scientifically proven and there is a comprehensive accounting of all changes in such vegetation over the development period.
    3. Ensure that depletions caused by new or expanded uses within each Platte River Basin NRD are offset.
    4. Describe how progress toward the depletion reduction objective for that Platte River Basin NRD is to be measured. Possible tools to use for such measurements include, but are not limited to the following:
        a. tracking reductions in irrigated acres;
        b. monitoring reductions in consumptive water uses; and
        c. making new COHYST model runs.
    5. Include actions that will offset depletive impacts of post- July 1, 1997, water uses outside the overappropriated area, to the extent that those new uses deplete streamflows within the overappropriated area.
    6. Allow for the transfer of certified acres across NRD boundaries, while not increasing streamflow depletions to the Platte River.

B. If DNR and a Platte River Basin NRD determine that management actions taken have not provided the offsets required to meet the goals of the Basin-Wide Plan they will revise the individual district IMP.
    1. As prescribed by Neb. Rev. Stat. § 46-715(4)(d)(iv), a consultative and collaborative process shall, if necessary, identify goals and objectives for subsequent increments of the IMP.

Goal 2, Objective 1: Prevent streamflow depletions that would cause noncompliance by Nebraska with the NDP included within the Program, for as long as a Program exists.

A. Ensure that the ground water and surface water controls adopted in the individual district IMPs are sufficient to ensure that the state will remain in compliance with state and federal laws as well as decrees and other formal state agreements.
B. Collectively, as defined in the Nebraska NDP, offset the new depletions caused by new uses within the Platte River Basin NRDs.

Goal 3, Objective 1: Meet at least annually to review progress toward achieving the goals and objectives of the Basin-Wide Plan and those portions of individual NRD IMPs that implement this Plan.

A. The first annual meeting will be held within one year of when this Plan is adopted at a time and place designated by DNR and the Platte Basin NRDs. Thereafter, the annual meeting will be held in June or July of each year, unless agreed to otherwise.
B. Discussion shall include, but not be limited to the following:
    1. revisions to this Plan;
    2. revisions to the IMPs (the individual IMPs may be amended more frequently);
    3. new data and information, including items like consumptive use calculations for municipal, livestock and industrial uses;
    4. disputes related to implementation of IMPs; and/or
    5. any other topic on which the DNR and the Platte Basin NRDs have mutually agreed.
C. A proposed agenda will be made available to the public, along with any available supporting documents, at least two weeks prior to the annual meeting.
D. As a result of actions taken at the annual meeting, the Plan may be revised as necessary.
E. Stakeholder and/or public feedback concerning the Basin-Wide Plan or individual IMPs will be considered in the following process:
    1. Basin-Wide Plan
        a. Any ground water user, surface water appropriator, NRD, or DNR may, at least 30 days before the annual review meeting between the NRDs and DNR, send a written request to DNR or a Platte Basin NRD for revision to the Basin-Wide Plan.
            i. The affected Platte Basin NRD(s) and DNR will review the proposed issues prior to the annual meeting.

ii. Opportunity for input regarding the proposed issues will be provided to the party making the request during the annual meeting.

iii. At a minimum, written requestors will receive a written response, regardless of whether the NRDs and DNR agree to consider proposed Plan revisions.

b. If DNR and the Platte River Basin NRDs agree to consider potential revisions to the Basin-Wide Plan, then the public will be notified of the potential revisions to the Basin-Wide Plan, and input will be solicited.

i. An advisory or stakeholder group may be convened, if the affected NRD(s) and DNR determine that the proposed changes warrant the formation of such a group.

c. After receiving public comments, Basin-Wide Plan revisions will be considered for adoption.

d. If the NRD(s) and DNR agree on revisions to the Basin-Wide Plan after the annual meeting, then a hearing will be held to solicit formal comment. Following the public hearing, the proposed changes will be considered and may be adopted.

2. IMPs

a. If the overappropriated Basin-Wide Plan is revised, then revisions to the overappropriated basin portion of individual Platte Basin IMPs will be made as necessary, in accordance with Neb. Rev. Stat.§ 46-715(4).

b. If the Platte River Basin NRD(s) and DNR agree on revisions to an IMP after the annual meeting, then a hearing will be held to solicit formal comment. The IMPs for each of the five Platte Basin NRDs shall be provided to all other NRDs in the overappropriated basin for comment before revisions are approved.

c. DNR and any Platte Basin NRD may amend an IMP at more frequent intervals as more data and information become available, as provided in Neb. Rev. Stat. § 46-715(4)(d)(ii).

Goal 3, Objective 2: Gather and evaluate data and information to measure the effectiveness of controls, incentives and or other programs in the individual NRD IMPs used to implement this Plan.

A. Jointly conduct a study to identify the impact of soil and water conservation measures on streamflows. Specifically, assess the impact on streamflow depletions from conservation measures, as required by Neb. Rev. Stat. § 46-715(4)(c).
B. Review current methodologies, as well as proposed new methodologies, and evaluate data at the annual meeting discussed in goal 3, objective A.
C. Revise Plan, if such revisions will ensure that its goals and objectives will be achieved in the timeliest and most efficient and cost-effective manner possible.

Goal 4, Objective 1: Identify disputes between ground water users and surface water appropriators.

A. Surface water appropriators or ground water users may present data and other supporting information identifying the nature and scope of potential disputes at the annual meeting.
B. The Platte River Basin NRDs and DNR may present data and other supporting information identifying the nature and scope of potential disputes at the annual meeting.

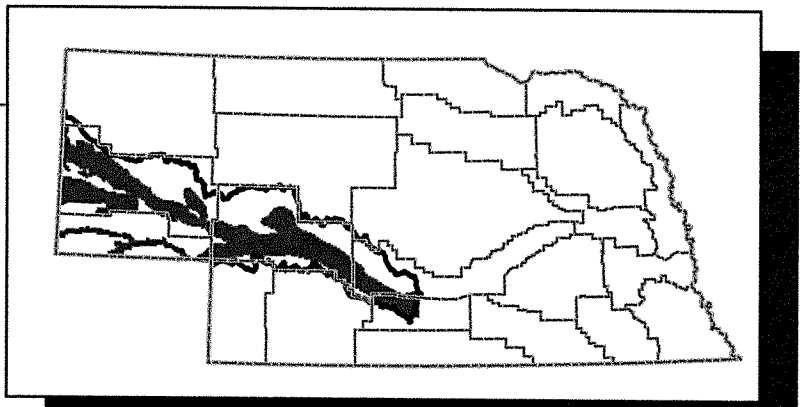
Goal 4, Objective 2: Investigate and address disputes between ground water users and surface water appropriators based on the investigation results.

A. The DNR and the Platte River Basin NRDs shall determine whether specific disputes identified via goal 4, objective 1, have a hydrologic impact.
B. The DNR and the Platte River Basin NRD(s) will investigate a given dispute in order to determine whether the issue should be addressed through modification of the Basin-Wide Plan or individual IMPs, or by other means.
C. If it is determined, as a result of the investigation, that the issue is not a basin-wide issue, the issue will be turned over to the appropriate affected NRD(s) and/or DNR.
D. The DNR and/or the affected Platte River Basin NRD(s), as determined in goal 4, objective 2, section B, working with the affected water user(s), shall develop management solutions, as appropriate, to address the issue(s).
E. The DNR and the affected Platte River Basin NRD(s) shall update the Basin-Wide Plan and/or individual IMP, as appropriate.

Map 1

Overappropriated Surface Water and the Geographic Area Determined to Have Surface Water Hydrologically Connected to Ground Water for the Purpose of Overappropriated Designation.

Planning Section



UPPER NIOBRARA WHITE

NORTH PLATTE

SOUTH PLATTE

TWIN PLATTE

LOWER LOUP

CENTRAL PLATTE

MIDDLE REPUBLICAN

UPPER REPUBLICAN

TRI-BASIN

Explanation

- Overappropriated Surface Water Area
- Hydrologically Connected Surface and Ground Water
- State Boundary
- NRDs

0 12.5 25 50 75 100 Miles

This map represents the areas described in the Order issued by the Department of Natural Resources on September 15, 2004 designating the surface water resources within the Platte River Basin above the Kearney Canal Diversion, the North Platte River Basin including Pumpkinseed Creek and the South Platte River Basin including Lodgepole Creek as overappropriated. Also represented is the geographic area within which it has been determined that surface water is hydrologically connected to ground water for the purpose of designating the surface water resources within this same area. Additional information regarding the designation can be found in the Order issued by the Department of Natural Resources on September 15, 2004.

Map Produced by Kevin J. Schwartman, March 3, 2009