

Discussed internally, not distributed

# Republican River Planning Group Meeting

June 22, 2007

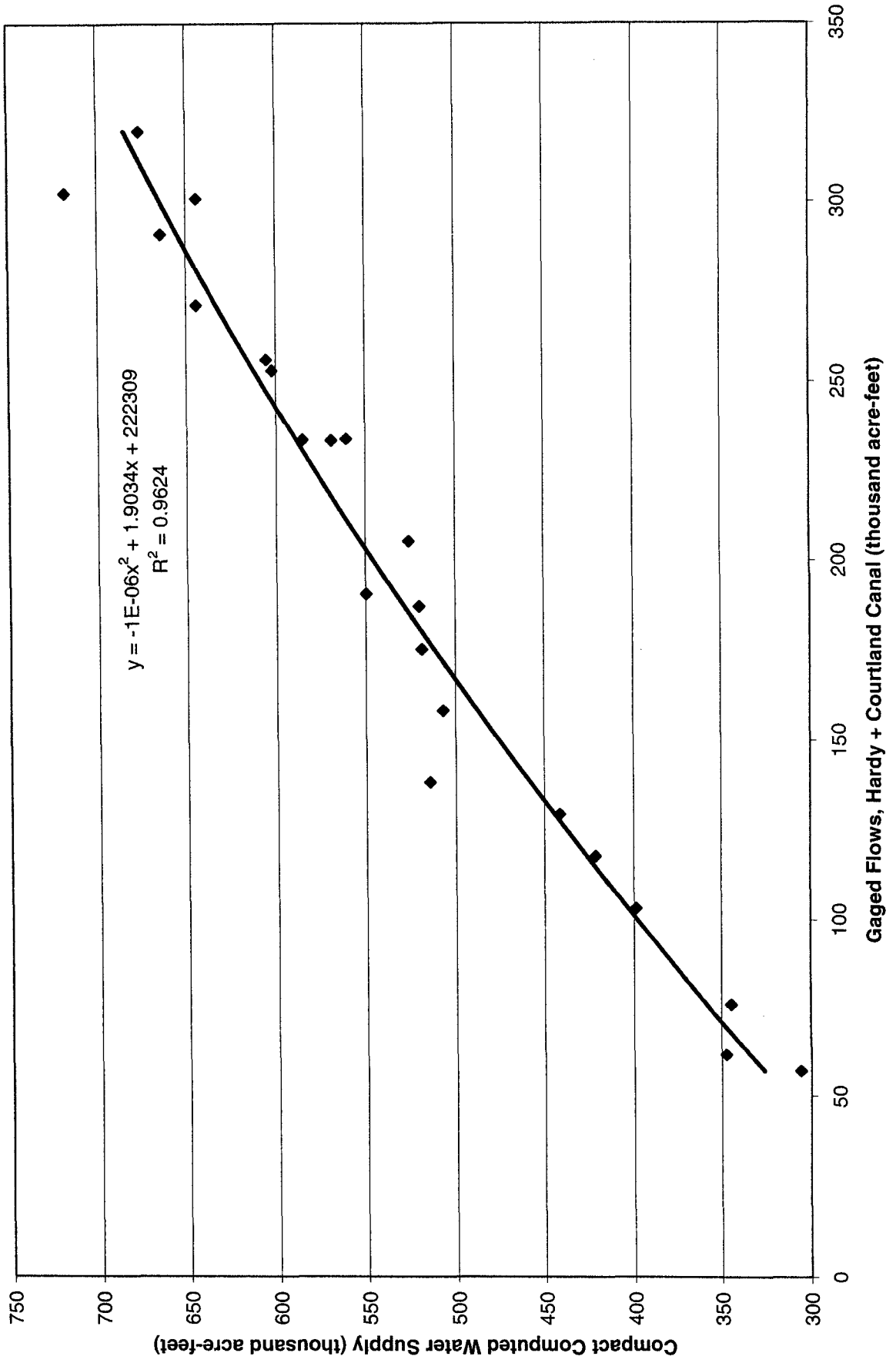
# Agenda

- **New Model Runs**
  - Average Conditions
  - Dry Conditions
  - Projecting the NE Compact Allocation
  - Determining the reductions needed to stay within that Allocation
- **Review Basinwide Planning Document**

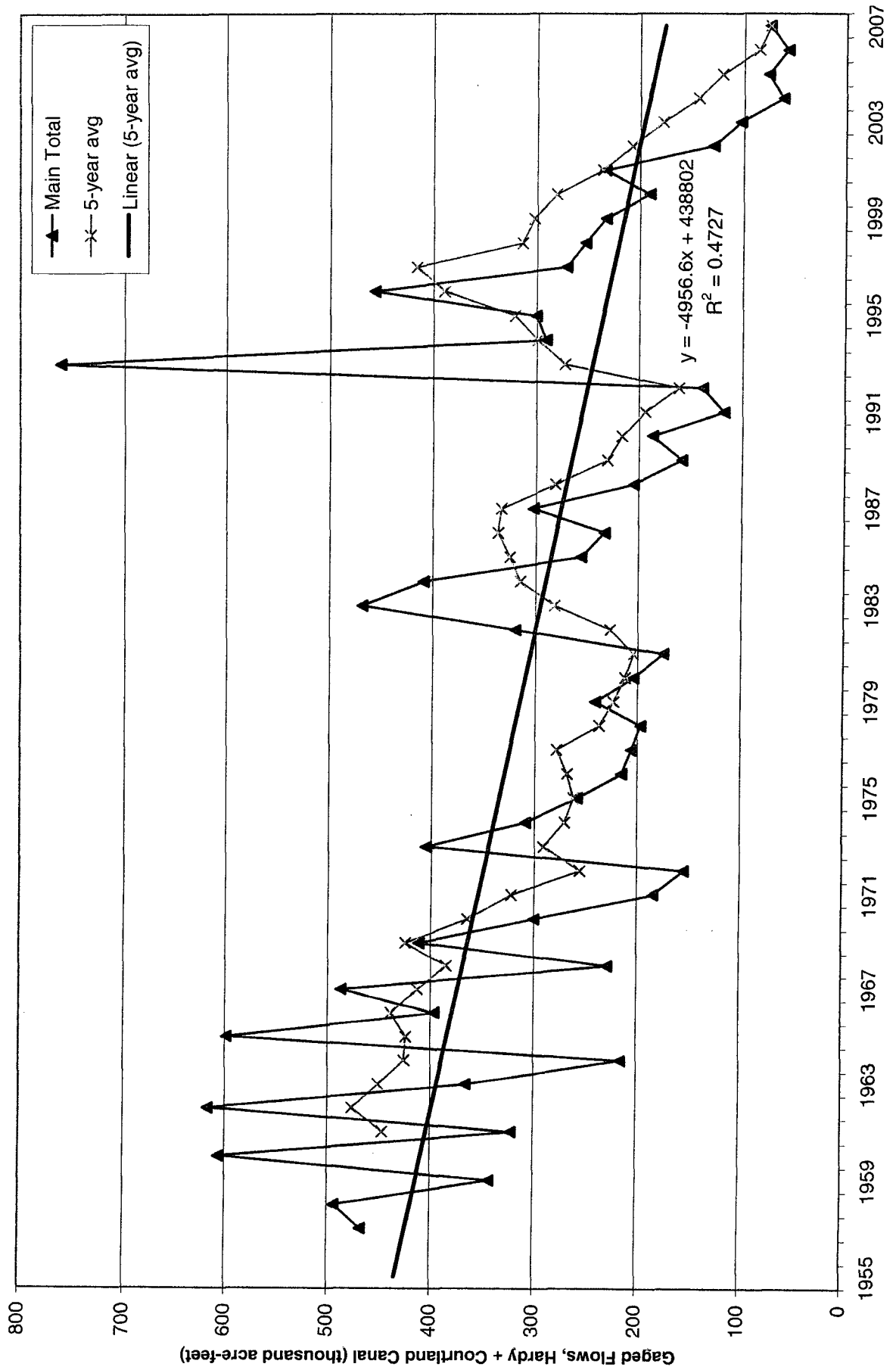
# New Model Runs

- Two new sets of modeling scenarios have been completed
- The precipitation record was analyzed and the following statistics computed for each gauge:
  - 50<sup>th</sup> Percentile (similar to average) – Average Scenario
  - 35<sup>th</sup> Percentile – Dry Scenario
- Model was run repeating these rainfall values for 40 years with the NRDs pumping their full allocation

# Projecting the NE Allocation



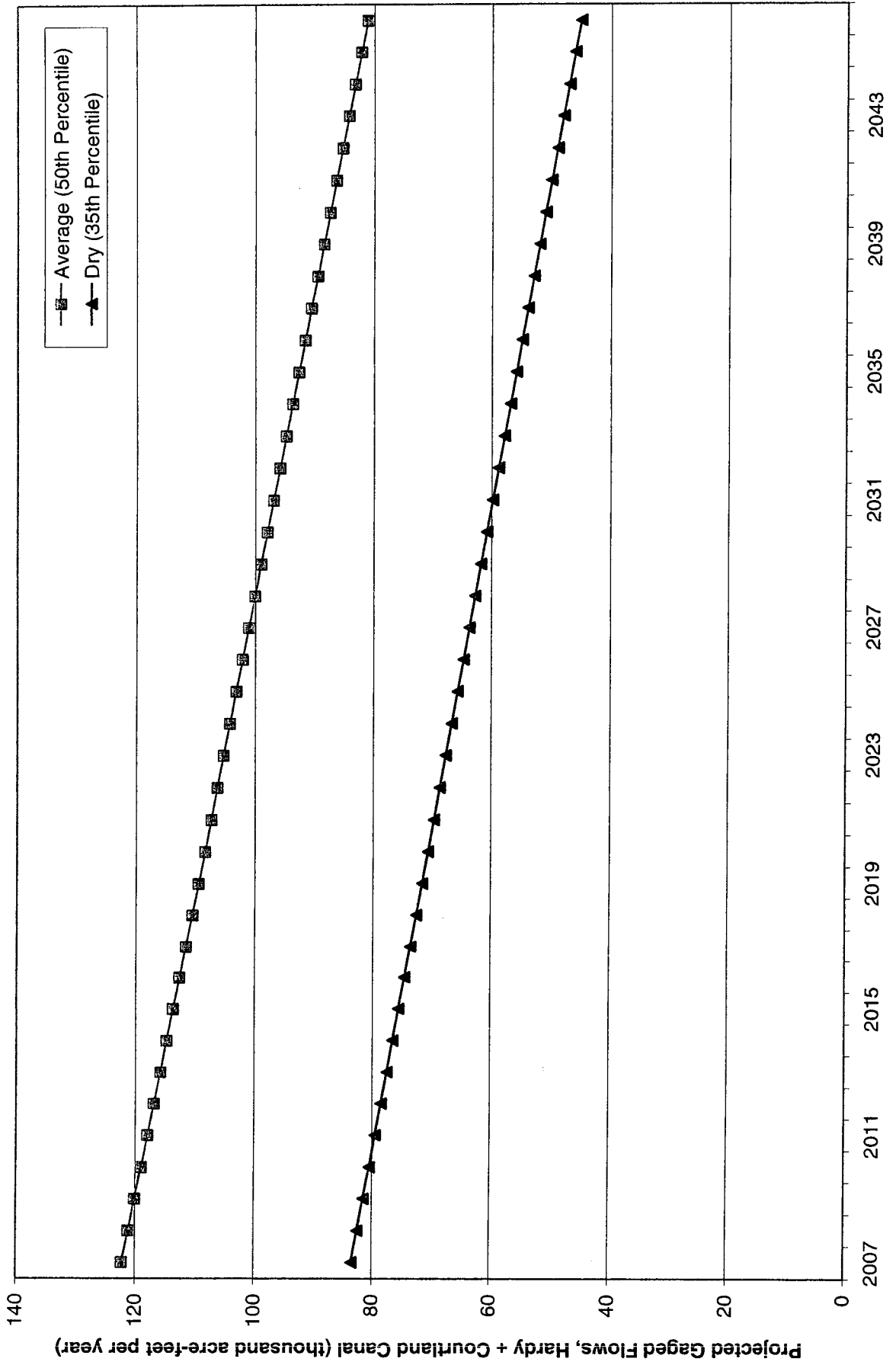
# Projecting Future Streamflows



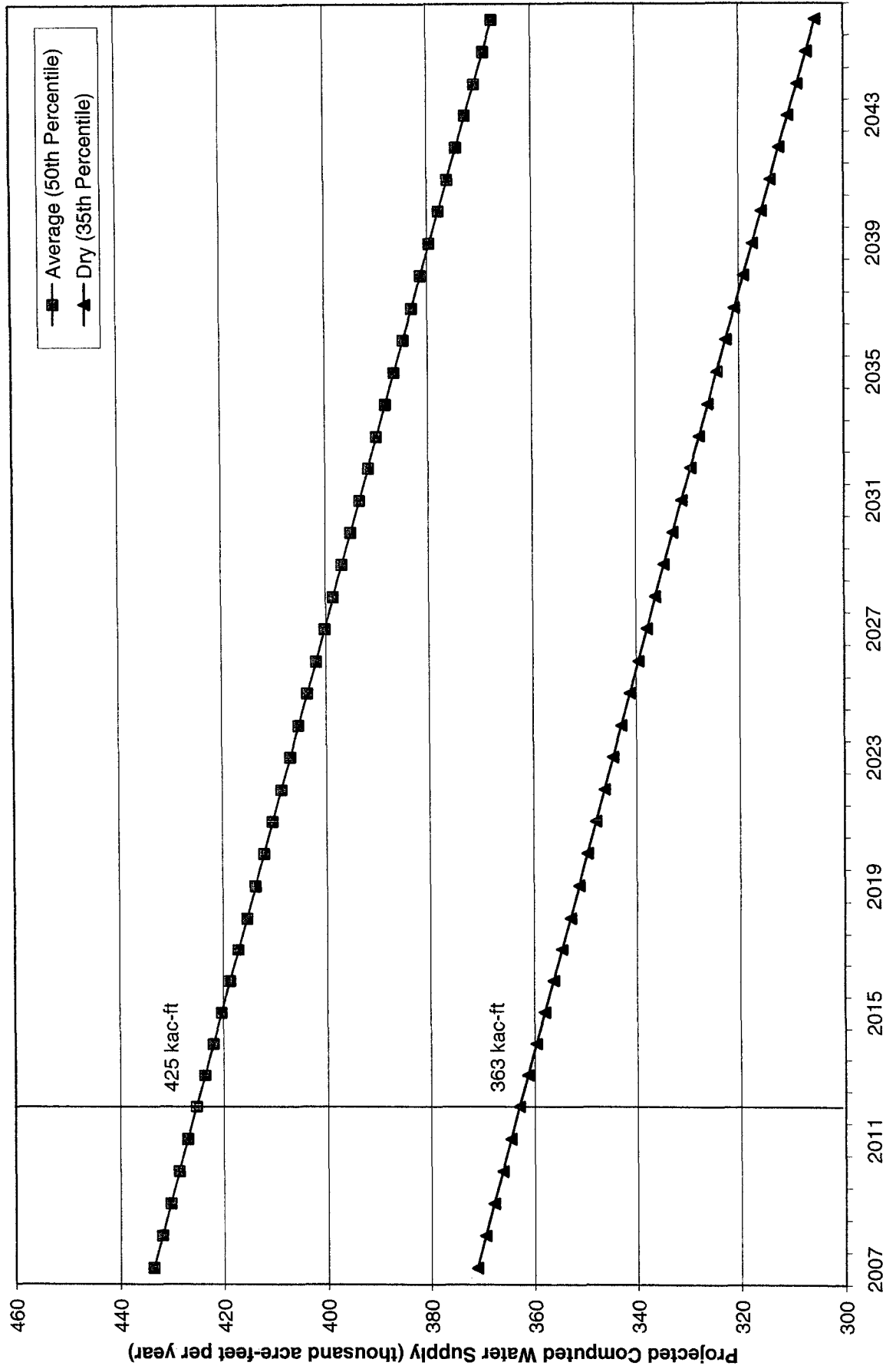
# Projecting Future Streamflows

- Use 50<sup>th</sup> (average) and 35<sup>th</sup> percentile flow from last 50 years
- Adjust for the trend in streamflow
  - $(\text{Period of record}/2) * \text{slope} = (53/2) * 4956$
- For future years, subtract the modeled annual reduction in baseflow
  - 1054 acre-feet per year (average)
  - 983 acre-feet per year (dry)

# Projected Streamflow

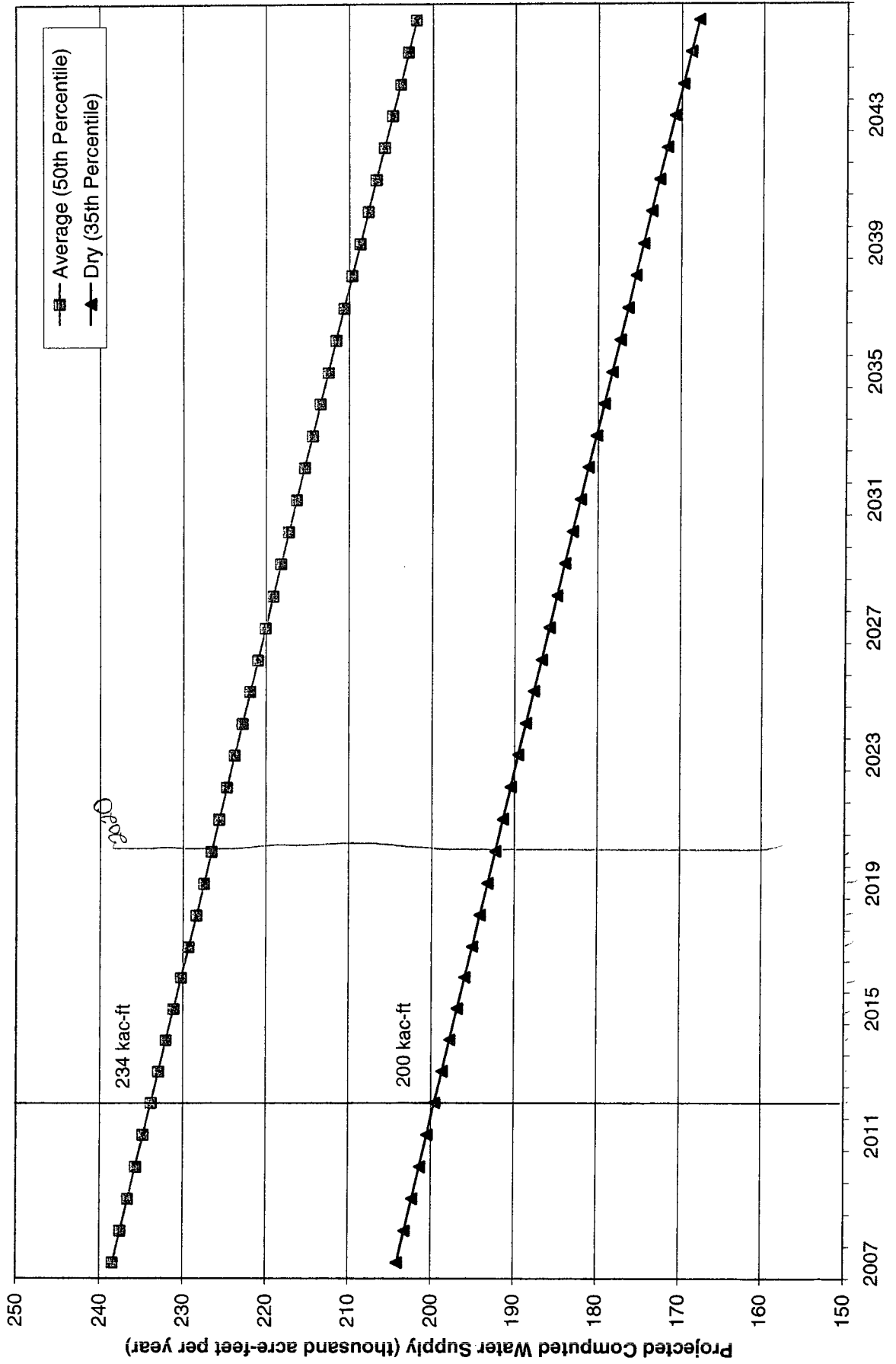


# Projected Compact CWS





# Projected NE Allocation

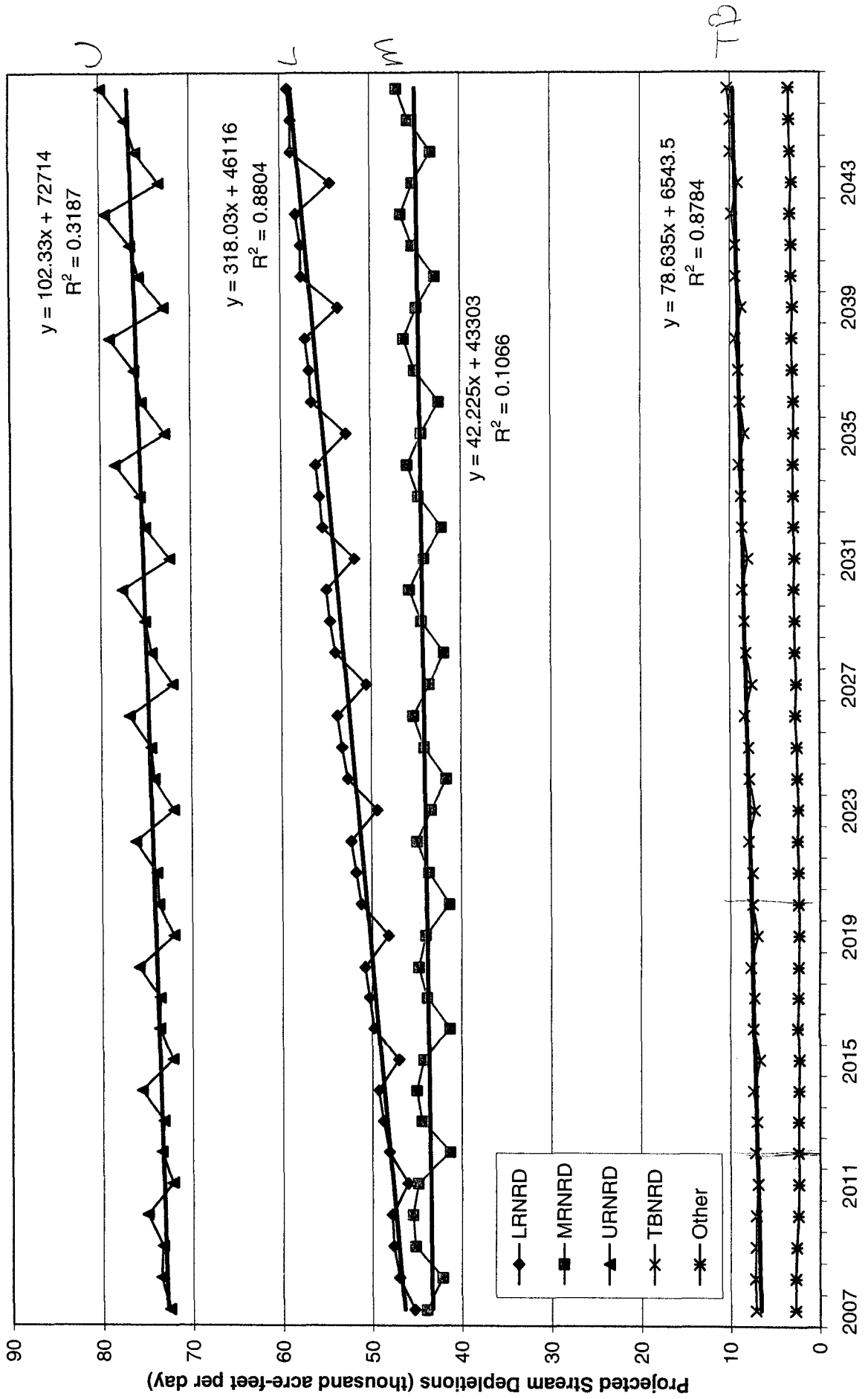


# Determining NRD portions of GW allotment

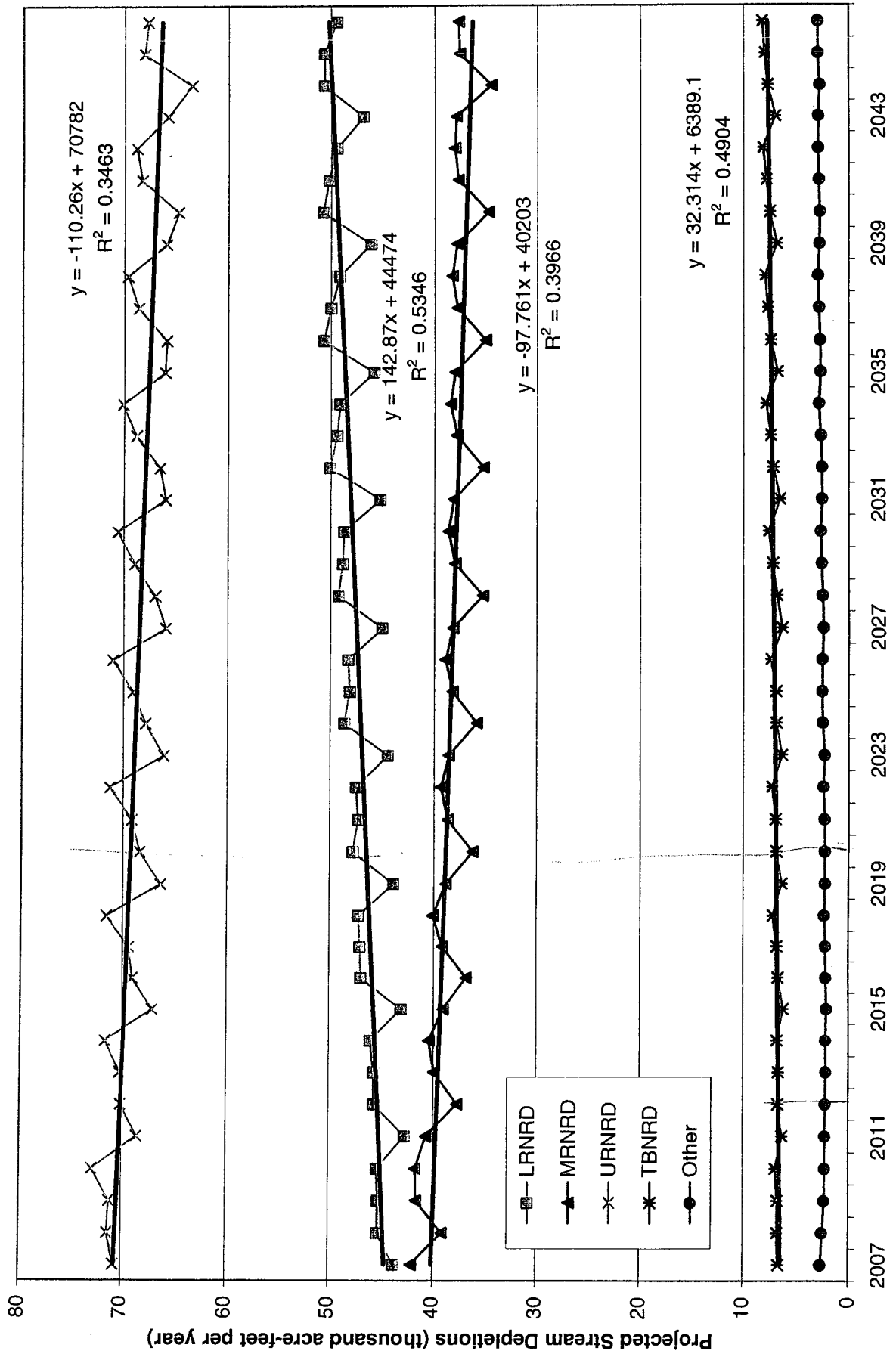
- GW allotment is 159 kac-ft under average conditions and 134 kac-ft under dry conditions in 2012
- Splitting this up using 26% to LR, 30% to MR and 44% to UR, for 2012

	LRNRD	MRNRD	URNRD
Average	41,300	47,600	69,900
Dry	34,800	40,200	58,900

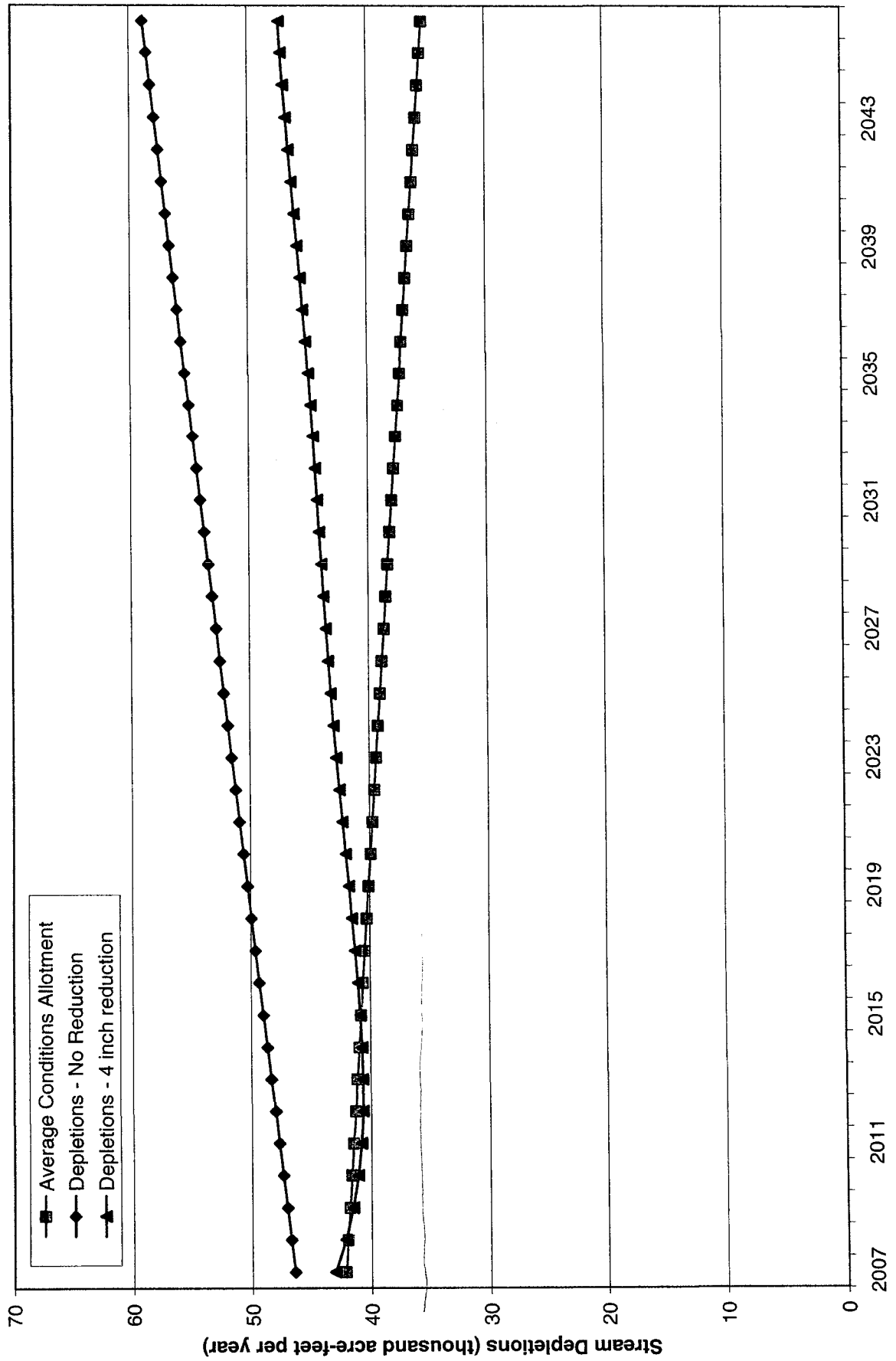
# Projected Depletions - Average



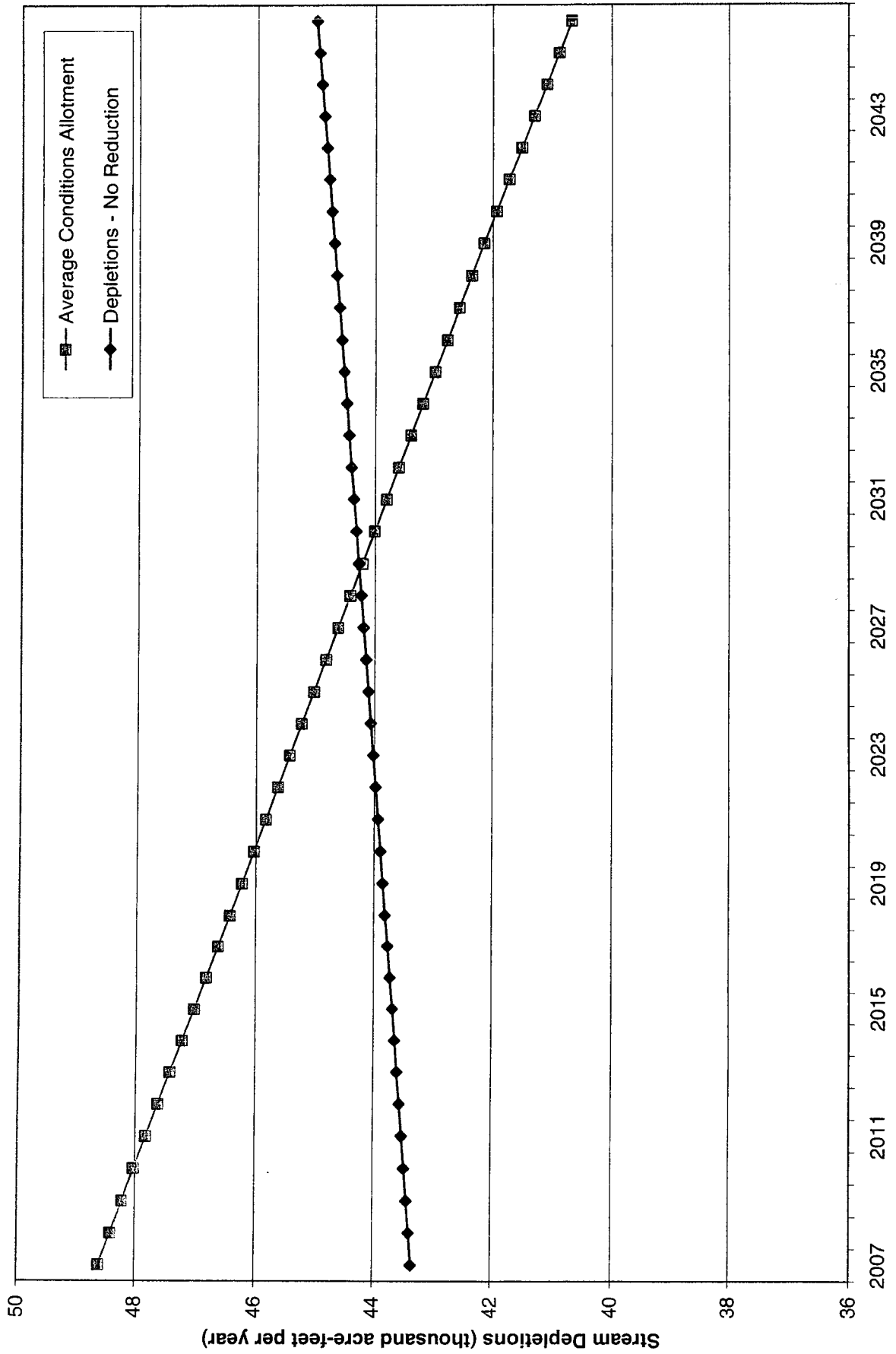
# Projected Depletions - Dry



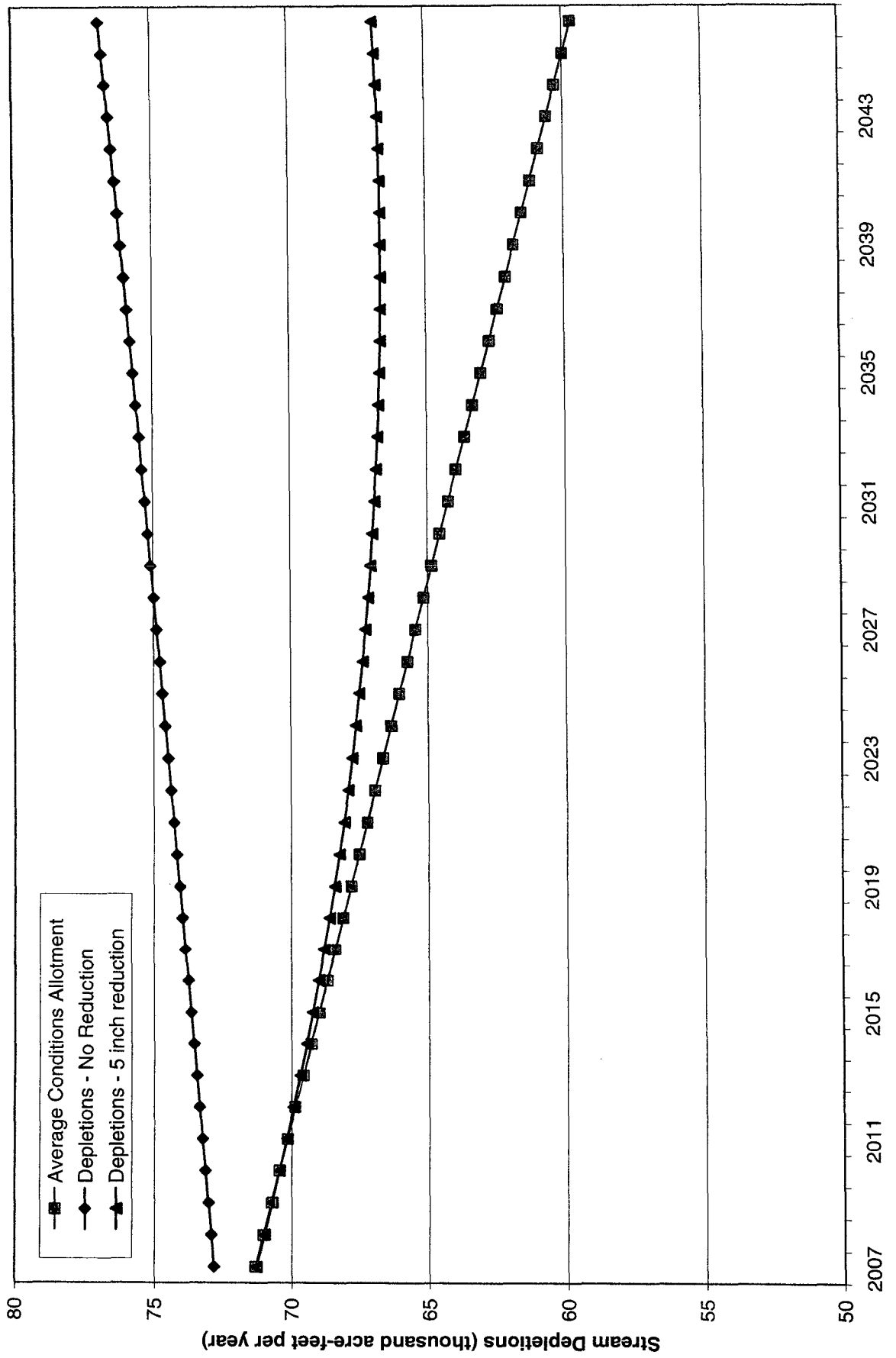
# LRNRD -- Average Conditions



# MRNRD -- Average Conditions



# URNRD – Average Conditions



SIGN-IN SHEET

June 15, 2007

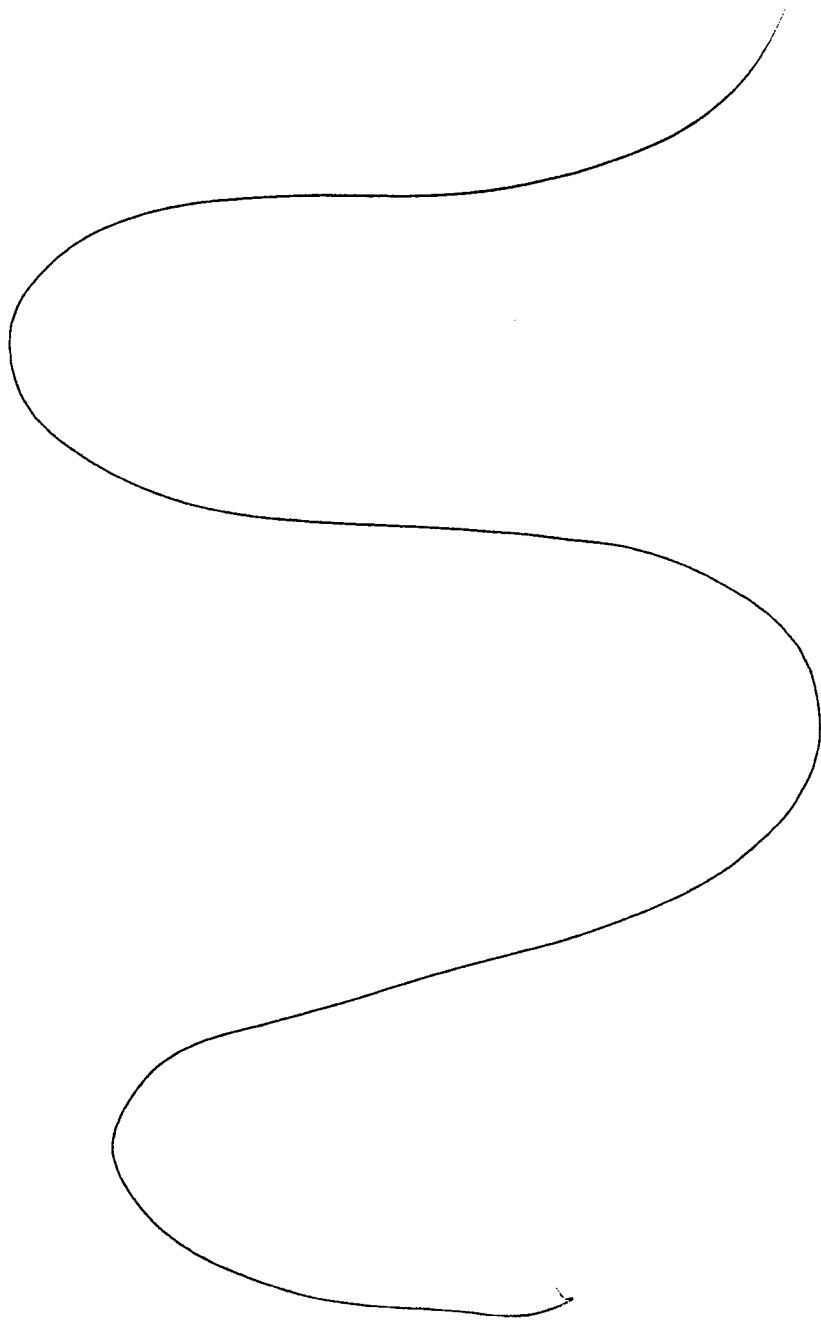
Jim Dietz  
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# Memo

**To:** Sen. Leroy Loudon, Sen. Carol Hudkins, Sen. Tom Carlson, Sen. Annette Dubas, Sen. Deb Fischer, Sen. Gail Kopplin, Sen. Norm Wallman, Jody Gittins,  
**From:** Sen. Mark Christensen  
**CC:** Gov. Dave Heineman, Dir. Ann Bleed; Speaker Mike Flood, Dave Cookson; John Erickson, Jasper Fanning, Dan Smith, Mike Clements, John Thorburn, Dean Edson  
**Date:** 6/22/2007  
**Re:** LB 701 Oversight

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## **Information Request from NRDs for LB 701 Oversight**

Previously, as the session was winding down, I spoke with Chairman Loudon about getting the requests for information required in LB 701 sent out to the NRDs, and about scheduling an oversight meeting to review their related reports. Unfortunately, we were unable to get this accomplished before we adjourned for the year.

I know the implementation of LB 701 is important to all of us on the Natural Resources Committee, as it is especially so for the constituents in Sen. Carlson's and my districts. I have heard from many of my constituents from McCook and other areas who want to know where we are at with the implementation of the law. It has been several months since the passage of this bill, and I do not want to lose the momentum and spirit of cooperation achieved during this last session. Because of this, I am requesting from Chairman Loudon and the rest of you on the Natural Resources Committee that we request the information from the NRDs required in LB 701 Section 6(2), and schedule an oversight meeting. The NRDs are to receive 45 days to respond in a written report to our committee's request for information on their plans for compliance. In my opinion, I think the request from the Natural Resources Committee should happen as soon as possible, but no later than the end of July at our committee's first meeting during the interim. I think it would be preferable for us, as well as our constituents, to be able to review these reports by our August 21 meeting in Chadron to see what the NRDs are planning for short and long-term compact compliance.

The oversight of LB 701 is a great responsibility. We need to ensure that the agreements that were made by all parties involved during the forging of this essential water law are adhered to over the next several months and years. The livelihood of many people in the basin and people in nearby areas demands that we stay on top of the implementation of LB 701 to ensure that the Legislative intent is honored and reasonable plans for programs and funding are being sought that are best for the basin and the State as a whole.

Please contact me if you have any feedback. Thanks for your time.

### New Average and Drought Scenario Model Runs

Two new modeling scenarios have been developed in response to comments from the NRD's. The first is an average conditions scenario, which uses the long term average precipitation for each of the compact rainfall gages, and repeats this average value every year for forty years. The second is a dry-year scenario, which uses the 35<sup>th</sup> percentile precipitation (or the precipitation that is 15 percentage points below the average) from each of the compact gages, and repeats this value every year for forty years. The pumping values used in these scenarios are the current NRD allocations, and the acres used are the current NRD certified acres. This results in an average pumping of ~12.5 inches per irrigated acre. Additional model runs were completed for each scenario with even inch reductions in pumping from the allocation amounts.

In order to have a benchmark for comparison, estimates of the NE Compact allocation in the future was made for the average and dry-year conditions. This was accomplished through a regression equation which relates gaged flow (Hardy + Cortland Canal annual flows) in the basin to the Compact Computed Water Supply (CWS). The median and 35<sup>th</sup> percentile flow for the period of record were adjusted downward to account for the observed trend in the data and future reductions in baseflow due to the lag effect, and these values were used to calculate a projected CWS. These values for the year 2012 are ~425 thousand acre-feet (kAF) for the average condition and ~363 kAF for the drought condition. Assuming the Nebraska Compact allocation would equal 55% of these totals (which equals the average portion NE has received in the recent past), the 2012 projected NE Compact allocations are ~234 kAF under average conditions and ~200 kAF under drought conditions.

The future imported water supply was assumed to be equal to 10 kAF, and the future reservoir evaporation charged to NE was assumed to be 25 kAF per year. The values were added to and subtracted from the above allocation numbers, respectively, to come up with values for total allowable use by NE. These values were then allotted to surface water and groundwater users based on the average split of consumptive use during 1998-2002. The result was an allotted depletion for surface water users in 2012 of ~60 kAF during average conditions and ~51 kAF during drought conditions. Note that these values do not include the reservoir evaporation that was already taken out, this is strictly the actual consumptive use of water in the canals and on the fields. The remainder, ~159 kAF during average conditions or ~134 kAF during drought conditions, is the projected allotment of depletions for groundwater users in 2012.

These values can then be compared to the modeled depletions for these two scenarios. Under average conditions, with users pumping their full, current allocation, groundwater depletions in the basin will be ~174 kAF, or ~15 kAF more than the projected groundwater allotment. Under dry-year conditions, with users pumping their full, current allocation, groundwater depletions in the basin will be around 162 kAF, or 32 kAF more than the projected groundwater allotment. Reduced pumping runs indicated that pumping would need to be restricted to a level ~5 inches below the current allocations in order to achieve a balance under average conditions. Furthermore, groundwater pumping would

need to be restricted to a level ~9 inches below the current allocations in order to achieve a balance under dry-year conditions. These reductions translate to basin wide average allocations of ~3-4 inches under dry-year conditions, or ~7-8 inches under average conditions.

Surface water leasing or other augmentation plans may be implemented to increase the groundwater allotment, thus allowing for an increase in these recommended allocations. However, in order to offset the lag effect, total allocations should not exceed a level 1 to 2 inches below the current allocations. In other words, even though the allocations may be higher than those indicated above if the NRDs offset depletions in other ways, they should not be allowed to increase to the current levels.

DRAFT for Discussion Purposes Only

This DRAFT has not been approved by any irrigation district or natural resources district.

**A Proposed Plan to Keep Nebraska in Compliance with The Republican River Compact**

Jointly Developed by Republican River Natural Resources Districts and The Nebraska Department of Natural Resources  
5/22/07

**Introduction:** Nebraska has been challenged to stay in compliance with the terms of the Republican River Compact and the *Kansas v Nebraska* lawsuit settlement because of the severe drought that has plagued southwest Nebraska since 2000. The state and basin Natural Resources Districts (NRDs) have completed all the tasks called for in the lawsuit settlement, including establishing a moratorium on development of new wells, limiting and certifying all irrigated cropland and regulating diversions of surface water below Harlan County Dam to protect streamflows for Kansas Bostwick Irrigation District.

In spite of these regulatory actions and the voluntary efforts of basin residents to conserve irrigation water and enroll over 50,000 irrigated acres in conservation programs like CREP and EQIP, Nebraska is still in danger of being unable to maintain compliance with its legal obligations to the State of Kansas. Drought has diminished streamflows, drastically reducing Nebraska's allocation of Republican River water. Nebraska's allocation of Republican River water supplies set consecutive record lows in 2004 and 2005. Preliminary data indicate that the allocations are likely to remain at record low levels in 2006.

The Nebraska Department of Natural Resources (DNR) and Republican Basin NRDs are committed to work together to insure that Nebraska remains in compliance with the compact. The NRDs recognize that they have roles to play in both implementation and financing compact compliance programs. The NRDs and DNR also recognize that additional regulation of water users will be necessary to achieve the goal of maintaining compact compliance.

Maintaining compact compliance will be costly. Republican Basin NRDs are near or at their levy limits, so they are unable to raise additional funds unless they are given additional taxing authority. Governor Heineman has proposed creation of a Water Resources Cash Fund to provide state money to assist local government with water resources management. Increases in both state and local funding will be critical to insure Nebraska's continued compliance with the interstate compact. Following are lists of regulatory and voluntary actions that can be taken over the next six years to maintain compact compliance.

**Plan Goal:** *The State of Nebraska and Republican Basin Natural Resources Districts will work together to reach a sustainable balance between water use in Nebraska's portion of the Republican River Basin and the amount of water allocated to Nebraska by the Republican River Compact by the year 2012.*

**2007 Plan objectives**

## DRAFT for Discussion Purposes Only

This DRAFT has not been approved by any irrigation district or natural resources district.

### Legislative Actions

- With the passage of LB 701 the NRDs and the DNR were given additional authorities. The legislation pertinent to the Republican River planning and management can be found in Appendix A.

### Regulatory Actions

- Republican Basin NRDs and DNR will continue to enforce existing moratoriums on new water uses and limits on groundwater pumping.

### Voluntary Actions

- The DNR will purchase 12,500 acre-feet of storage water and the natural flow available to the Nebraska Bostwick Irrigation District below Harlan County Lake from the Nebraska Bostwick Irrigation District for delivery to the Kansas Bostwick Irrigation District.
- The NRDs will purchase the natural flow available to the Frenchman Valley Irrigation District and the Riverside Irrigation District and the natural flow above and the storage water available from Harry Strunk Lake from the Frenchman Cambridge Irrigation District for delivery to the Kansas Irrigation District. The DNR will work with the Bureau of Reclamation to track and protect the consumptive use portion of this water to and through the Harlan County Lake for Kansas Bostwick Irrigation District.
- The NRDs and the DNR will continue and expand projects to control vegetation in the Republican River and tributary stream channels. (The approximate cost is believed to be \$750,000 in the initial year.)
- The NRD and DNR will continue and expand programs to inform and educate landowners about irrigation best management practices and encourage additional water conservation. (Approximately \$50,000)
- The DNR will continue to work with pivot manufacturers and the University of Nebraska to develop new methods to make better use of whatever water is available to the basin and to develop programs to educate landowners about the availability of these practices.

## **2008-2012 Plan objectives**

### Legislative Actions

### Guidelines for Planning Actions

Every five years, starting in 2007 the DNR, in consultation with the NRDs shall forecast the maximum amount of water that may be depleted from streamflow for beneficial consumptive use and still achieve and maintain an annual balance between Nebraska's Allocation and Computed beneficial Consumptive Use (CBCU) so that the State can be in compliance with the Republican River Compact. In 2007 this forecast will be for period from January 1, 2008 to December 31 2012.

To make this forecast the Department will examine the supply expected to be available under an average and a below average annual precipitation scenario.

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For future planning purposes, the DNR will also make forecasts of the amount of water that will be available over the next 20 years.

The forecasted streamflow depletions available for use by Nebraska under the Republican River Compact shall be allotted on a five-year basis starting in 2008 to surface water users and ground water users in each NRD in accordance with the following guidelines:

- The estimated depletion due to reservoir evaporation from both Bureau of Reclamation Reservoirs and other reservoirs in the Basin will be subtracted from the forecasted streamflow depletions. The remaining available depletions to streamflow will be allotted to surface water and ground water irrigated acres based on the amount of depletions used by each during the years 1998-2002 as calculated by the RRCA accounting program.
- The depletions from ground water uses shall be distributed to the Upper Republican NRD, Middle Republican NRD and Lower Republican NRD based on each NRD's percentage of the total depletions to stream flow that occurred for the 1998-2002. Currently these percentages are set as:
  - LRNRD = 26%
  - MRNRD = 30%
  - URNRD = 44%.

However, these percentages will be reviewed to insure fairness of the distribution among the NRDs using several different modeling scenarios and the metered pumping data. These estimates may be adjusted by mutual agreement if the review determines an adjustment needs to be made to insure fairness among the NRDs.

- The Tri-Basin NRD will not be allotted a depletion and will have no requirement to live within an allotted depletion as long as the Imported Water Supply as computed by the Republican River Compact Administration Model is greater than or equal to zero. To achieve this objective the Tri-Basin NRD shall maintain water levels in its portion of the ground water mound as delineated in the Republican River Settlement at or above the average water levels for the years 1981 through 1985. If however, the Imported Water Supply from Tri-Basin (Not Imported Water Supply Credit) not consumed by Tri-Basin becomes less than the amount needed to offset any Computed Beneficial Consumptive Uses of Virgin Water Supply by wells within the Tri-Basin NRD as computed by the Republican River Compact Administration, the Tri-Basin NRD will be given a share of the allotted percentage allocations and the Tri-Basin NRD will be treated the same as the other three NRDs.

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- Accretions to the stream may be used to offset depletions to the stream
  - Any accretions to the stream developed as a result of programs funded by the State, such as State-funded CREP and EQIP programs or other surface water or ground water use buyout programs or augmentation projects will be used to offset any overuse by the State. When Nebraska's CBCU does not exceed the CAS and the State is in Compliance with the Republican River Compact, accretions to the stream resulting from State funded programs will be used to offset depletions by surface water users if streamflow is too low to allow surface water users to use their full allowable depletion. Otherwise, accretions from State-funded programs will be used to offset depletions for surface water users and ground water users in each NRD according to the percentages established to distribute the allowable depletions.
  - Any streamflow accretions developed through programs funded by an NRD, may be used to offset depletions by the NRD funding the program.
  - Any streamflow accretions developed through programs funded by a surface water user may be used to offset the depletions caused by that surface water user.
- By January 1 of 2008 and each year thereafter the DNR in consultation with the NRDs shall forecast the maximum amount of water that may be available from streamflow for beneficial consumptive use for the next year in order to comply with the Republican River Compact.
- Compliance with the Integrated Management Plan will be based on a five year running average as in the Republican River Compact and, in water-short-years, a two or three year running average, depending of which is controlling for Compact compliance.

At the end of each year the DNR will estimate the previous years Allocation and CBCU for surface water users and each NRD and determine whether the surface water users or an NRD exceeded its allotted supply or was under its Allotted supply. Any unused allotted water may be carried over for use in the subsequent years. Any over use of water must be offset in subsequent years so that the five year running average CBCU is less than the allotted supply for the five years or if it is a water short year, the two or three year CBCU is less than the two or three year allotted supply.

### Regulatory Actions

#### Administration of Ground Water



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- The regulations used to administer ground water use will be determined by the local Natural Resources Districts and the DNR in accordance with Neb. Rev. Stat. § 46-715. In accordance with Neb. Rev. Stat. § 46-739, the plan shall include regulations that together with other augmentation or voluntary reduction incentive programs, will assure that depletions to the stream from ground water pumping does not exceed the depletions allotted to the NRD so that each NRD is assuming their share of the responsibility to keep Nebraska in compliance with the Republican River Compact. Neither the individual NRD or the DNR will require the integrated management plan to be amended solely for the purpose of changing the responsibility of water users within the NRD based on the failure of another basin NRD to implement or enforce an integrated management plan to meet their share of the responsibility to keep Nebraska in compliance with the Republican River Compact.

After taking into account any augmentation plans or reductions in beneficial consumptive use achieved through basinwide incentive programs, make such additional reductions in ground water use in water short years as are necessary to achieve a reduction in beneficial consumptive use in the NRD in an amount proportionate to the total reduction in consumptive use that is needed in Nebraska above Guide Rock in such years.

### Administration of Surface Water

- The State will administer surface water diversions first in time first in right, but will not allow the total depletions to stream flow from surface water use to exceed the stream flow depletions allotted to surface water use for each five-year period to stay within Compact compliance.

**Bleed, Ann**


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**From:** Schneider, Jim [jschneider@dnr.ne.gov]  
**Sent:** Thursday, June 21, 2007 12:28 PM  
**To:** Edgerton, Brad; Williams, Jim  
**Cc:** ableed@dnr.state.ne.us; Koester, Paul  
**Subject:** \*\*\*OLD ADDRESS\*\*\* RE: Proposed Allocation Presentation for June 22, 2007

Brad,

Good Point.

I just summed up all of the water that has passed the Hardy and Courtland Canal gages for the last 365 days. So the assumption is that the rest of this year will have flows similar to the same time last year, which should be very conservative. The total flow is just over 100 kac-feet (about 65k ac-ft this year). Using the regression I developed, that would translate to a Compact CWS of ~400 kac-ft. Assuming NE gets 55% of this, our allocation this year might be around 220 kac-ft.

I know Ann asked you about the delay in the releases from Harry Strunk last night but I forgot to ask her what you said about it. Anyway, since the outflows from Harry Strunk dropped below 325 cfs, I took the daily outflows and calculated the difference between 325 and the outflow. Through today, I calculate around 1800 ac-ft more might have been released if they had stopped arguing and just gotten on with it. I know that all of that may not have made it to Harlan, but considering how close we may come to 119, that may be significant. What do you think?

Jim

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**From:** Edgerton, Brad  
**Sent:** Thursday, June 21, 2007 8:03 AM  
**To:** Williams, Jim  
**Cc:** Jim Schneider  
**Subject:** RE: Proposed Allocation Presentation for June 22, 2007

Jim  
The first questions they will ask is "How much water has passed Hardy to date"?

Brad

=====

Brad Edgerton  
Nebraska Dept. of Natural Resources  
Field Office Supervisor  
Republican River Basin

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6/22/2007

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=====  
**From:** Williams, Jim  
**Sent:** Wednesday, June 20, 2007 3:17 PM  
**To:** MikeClements; Jasper Fanning; Dan Smith; John Thorburn; David Cookson; Justin Lavene; Mike Delka (bostwick@gpcom.net); Stan Goodwin (goodlaw@mccooknet.net); Marvin Swanda; Steve Ronshaugen (SRONSHAUGEN@gp.usbr.gov); Bill Peck (wpeck@gp.usbr.gov); Dale Cramer (dcramer@atcjet.net); Steve Henry (steve.henry@plantpioneer.com); Lee Orton (lee@h2oboy.net); Dianna Clegg (cleggfarm@bwtfi.com); Roy Patterson (fcid@swnebr.net)  
**Cc:** Andersen, Pamela; Ann Bleed; Dunnigan, Brian; Edgerton, Brad; Paul Koester; Kurtz, Tina; Schneider, Jim; Thompson, Mike; Williams, Jim  
**Subject:** Proposed Allocation Presentation for June 22, 2007

For Your Information:

The attached information will be discussed at the Republican River Basin NRD Managers meeting in Holdrege on June 22, 2007. Please call me at (402) 471 – 1026 if you have any questions.



--Jim

---

James R. Williams, P.E., CFM  
Republican River Coordinator  
Nebraska Department of Natural Resources

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**Bleed, Ann**

**From:** jschneider@dnr.ne.gov  
**Sent:** Thursday, May 31, 2007 10:45 AM  
**To:** ableed@dnr.state.ne.us; Williams, Jim; ndwrcamb@swnebr.net  
**Cc:** Koester, Paul; Thompson, Mike  
**Subject:** New Average and Drought Scenario Model Runs.doc

Here's a writup of the

**New Average and Drought Scenario Model Runs**

Two new modeling scenarios have been developed in response to comments from the NRD's. The first is an average conditions scenario, which uses the long term average precipitation for each of the compact rainfall gages, and repeats this average value every year for forty years. The second is a drought scenario, which uses the 35<sup>th</sup> percentile precipitation (or the precipitation that is 15 percentage points below the average) from each of the compact gages, and repeats this value every year for forty years. The pumping values used in these scenarios are the current NRD allocations, and the acres used are the current NRD certified acres. This results in an average pumping of ~12.5 inches per irrigated acre. Additional model runs were completed for each scenario with even inch reductions in pumping from the allocation amounts.

In order to have a benchmark for comparison, estimates of the NE Compact allocation in the future was made for the average and drought conditions. This was accomplished through a regression equation which relates gaged flow (Hardy + Cortland Canal annual flows) in the basin to the Compact Computed Water Supply (CWS). The median 135<sup>th</sup> percentile flow for the period of record were adjusted downward to account for the observed trend in the data and future reductions in baseflow due to the lag effect, and these values were used to calculate a projected CWS. These values for the year 2012 are ~425 thousand acre-feet (kAF) for the average condition and ~363 kAF for the drought condition. Assuming the Nebraska Compact allocation would equal 55% of these totals (which equals the average portion NE has received in the recent past), the 2012 projected NE Compact allocations are ~234 kAF under average conditions and ~200 kAF under drought conditions.

The future imported water supply was assumed to be equal to 10 kAF, and the future reservoir evaporation charged to NE was assumed to be 25 kAF per year. The values were added to and subtracted from the above allocation numbers, respectively, to come up with values for total allowable use by NE. These values were then allotted to surface water and groundwater users based on the average split of consumptive use during 1998-2002. The result was an allotted depletion for surface water users in 2012 of ~60 kAF during average conditions and ~51 kAF during drought conditions. Note that these values do not include the reservoir evaporation that was already taken out, this is strictly the actual consumptive use of water in the canals and on the fields. The remainder, ~159 kAF during average conditions or ~134 kAF during drought conditions, is the projected allotment of depletions for groundwater users in 2012.

$$\Delta \text{flow} = 25 \text{ kAF}$$

These values can then be compared to the modeled depletions for these two scenarios. Under average conditions, with users pumping their full, current allocation, groundwater depletions in the basin will be ~174 kAF, or ~15 kAF more than the projected groundwater allotment. Under drought conditions, with users pumping their full, current allocation, groundwater depletions in the basin will be ~162 kAF, or ~32 kAF more than the projected groundwater allotment. Reduced pumping runs indicated that pumping would need to be restricted to a level ~5 inches below the current allocations in order to achieve a balance under average conditions. Furthermore, groundwater pumping would need to be restricted to a level ~9 inches below the current allocations in order to achieve a balance under drought conditions. These reductions translate to basin wide average allocations of ~3-4 inches under drought conditions, or ~7-8 inches under average conditions.

Surface water leasing or other augmentation plans may be implemented to increase the groundwater allotment, thus

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allowing for an increase in these recommended allocations. However, in order to offset the lag effect, total allocations should not exceed a level 1 to 2 inches below the current allocations. In other words, even though the allocations may be higher than those indicated above if the NRDs offset depletions in other ways, they should not be allowed to increase to the current levels.