

REVEGETATION IS IT IMPORTANT.....

- ✓ Because we don't like abandoned lands with blowing dust and weeds?
- ✓ Or, maybe we understand that lands can continue to be productive with the removal of irrigation?

Revegetation requirements of lands from which irrigation water is being removed is a relatively new decree requirement. At least in water time. A requirement which hasn't been uniformly applied.



Land Protection Measures

Project sponsored: Lower Arkansas Valley Water Conservancy District

With funding from: Colorado Water Conservation Board

Evaluation Directed by: Gerry Knapp, Valley Resource & Water Management

Richard Rhoades, Range and Reveg LLC

REVEGETATION...WHAT? WHY? HOW?

Since we all like to watch grass grow,
revegetation should be of interest to all!

- **What?** For our purposes today, we will focus on what to do with irrigated farm ground when the water is transferred from the land.
- **Why?** Erosion control, Noxious and nuisance weed management, Keep the land productive, wildlife habitat or livestock grazing.
- **How?** Let's deal with that later in the discussion.





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STUDY PARAMETERS

Phase one: Review reclamation requirements of various decrees and administrative authorizations

Phase two: Review the on-the-ground status of dried-up lands.

Phase Three: Interviewed stakeholders, participants, and local elected officials.

Phase Four: Evaluated the effectiveness of the decree requirements to fulfill intended results.

RECOMMENDATIONS

- Compiled suggested changes or additions to the language of decrees for future consideration.
- Compiled a “Revegetation Program Development & Implementation Manual”



PHASE ONE: REVIEW OF TRANSFER DECREES

- A wide variety of requirements ranging from none to very robust and well-defined requirements.
 - ▶ - Standards are not always present with a procedure to be followed attached.
 - ▶ - Evaluation methodology isn't always included with required standards.
- Historical Requirements
 - Reclamation requirements are relatively new in water transfer decrees:
 - CO Statute enacted in 1992.
 - *“Reasonable provisions designed to accomplish the revegetation and noxious weed management of lands from which irrigation water is removed”.*

FROM THIS...

*“... the transferring shareholder shall place into effect a **program whose goal will be the establishment of a ground cover** of a type which will not require irrigation after its establishment, in order to mitigate the blowing of sand or dust or the proliferation of noxious weeds. A shareholder who intends to transfer water to municipal or other non-irrigation use **shall not plow up irrigated land covered with a perennial such as alfalfa**. The goal shall not so much be the re-establishment of native species but rather of an economically viable dryland forage crop...”*
(October 21, 1985, Proxy Group Stipulation)

...TO THIS

- RFD Revegetation Standard
 - A Classification table rating fields from Class I through Class VII, start to finish.
 - Adopted in several decrees as the “standard”
 - RFD standard is more of a progression evaluation than an establishment evaluation
- ▶ Of note, all of the RFD lands have established revegetation completed. This was developed in the late 1980s or early 1990. Pretty much ahead of its time as the requirement didn't come along until 1992.


...TO THIS CONTINUED

- ▶ Associated Establishment completion requirement of any field occurs when:
- ▶ “perennial grass stands have a plant frequency of 15% or more with no deficient areas larger than one acre in size over 90% of the field.”
 - ▶ Evaluate basal cover using transects.
- ▶ How the “standard” is applied varies through several decrees.

PHASE TWO: EVALUATION TO REVEG REQUIREMENTS

- Observations:
 - Revegetation results vary widely.
 - Use of supplemental irrigation to establish revegetation was most successful.
 - Dryland revegetation has shown limited success in developing revegetation.
 - Weed control during revegetation is critical.
 - Grass species selection, in particular, non-native and not adapted species fail.
 - Dryland farming, where allowed, is generally not successful.



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- ▶ **Delineation of Responsibility for Revegetation**
 - ▶ **Weed Control Provisions: “Weeds Adequately Controlled” not defined.**
 - ▶ **Dryland Farming Responsibility.**
 - ▶ **Oversight and Accountability during Revegetation Development.**
 - ▶ **Post Establishment Management of Revegetation.**

WHAT TO DO WITH ISSUES IDENTIFIED OR OBSERVED

- Issues Identified break down into two general categories either technical, on-the-ground issues; or non-technical, those related to regulations and requirements.
- Technical issues: Development of a revegetation manual to address technical issues of concern.
 - ▶ The revegetation manual was developed based upon observations of the different revegetation activities during this study, evaluating what worked and what didn't on the dry-up lands.
- Non-technical issues: Describe issues and provide appropriate recommendations

**PHASE FOUR:
DISCUSSION OF ISSUES &
RECOMMENDATIONS FOR ALLEVIATING
ISSUES OF CONCERN**

Assignment of Responsibility for Revegetation

- ▶ Water Seller – Landowner assigned revegetation responsibility.
 - Landowner may not have technical and / or financial resources to revegetate successfully.
 - Revegetated land is worth less than the cost of revegetation.
- ▶ Water Purchaser – Transferring entity assigned revegetation responsibility.
 - Transferring entity generally has resources and incentives necessary to successfully complete revegetation responsibility

Recommendations

- ▶ Revegetation or Reclamation needs to be clearly defined within the decree. (vision of what the land should look like, standards and evaluation)
- ▶ Accountability must be clearly defined and appropriate.
- ▶ Having the responsibility assigned to the transferring entity is recommended.
- ▶ Use of water only for revegetation until successful establishment



- ▶ Definition of the Criteria for Revegetation Establishment

- ▶ Recommendations:

- Adopt a uniform definition of establishment that is clearly understood with the appropriate evaluation methodology included.

- Suggested criteria and methodology included in the report.

- ▶ Weed Control Provisions are not adequately defined.

- ▶ Noxious weed control is identified by statute; however, “nuisance weeds” are not.

- ▶ Weed control requirements must include both.

- ▶ Recommendations:

- Suggested weed control goals and definitions are included within the report.

➤ Oversight and Accountability During Revegetation Development.

- In many or most situations, revegetation has not occurred in a timely manner or has been purposely delayed
- In many cases, revegetation has not been established effectively.
- Successfully meeting the obligation must have incentives.

▶ Recommendations:

The use of the transferred water for new uses must be tied to the completion of the revegetation or reclamation obligation.

➤ Dryland Farming Responsibility

- Where dryland farming is allowed, the land is potentially vulnerable should the dryland farming fail or be discontinued.

▶ Recommendations:

Where dryland farming is allowed instead of revegetation, monitoring and review should occur along with having provisions in place to assure revegetation occurs should dryland farming cease.

- Post Establishment maintenance of responsibility
 - In many cases, the revegetation requirement is satisfied at establishment evaluation.
 - Revegetated lands are more fragile than native prairie.

- Recommendations:

A transfer decree should include a maintenance period.

Limitations on how revegetated lands are used following revegetation need to be included.



SUMMARY

- This study was not exhaustive of all transfer decrees and requirements, although we understand it to represent the range of current and previous requirements and standards.
- A more detailed list of the issues discussed in this overview is included within the report, along with recommendations that could be used to standardize requirements and standards within transfer decrees going forward.

**COMMENTS &
QUESTIONS?**





REVEGETATION

A brief overview of recommendations

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Special Considerations

- Location – the climate of the Lower Arkansas Valley (low precipitation-high evaporation)
- Water supply available for revegetation?
- Existing condition inventory – e.g. weed problems
- Post revegetation land use – may determine selection of grass species
- Soils and vegetative community potential
- Who is responsible for revegetation?
- Who pays for revegetation?

Weed Control-needed to reduce weed seed bank in the soil.

- Before grass seeding – establishing a cover crop by farming or herbicides or both
- During cover crop growth
- After grass seeding – as grass is getting established
- After grass is established – long term monitoring





Weed Control Defined – “weeds adequately controlled” is not enough

- Definition - Adequate Weed Control: *Weed infestations may be controlled using either mowing, herbicide application, biological control, or a combination. When weeds are mowed, they must leave a stubble of at least **six-inches** in height. The mowing operations must be conducted before the weeds develop **viable seeds** and before weed height produces **excessive litter**. The residue from mowing must be left on the soil to protect it from solar evaporation. **Low-growing** weeds shall require herbicide application(s) for adequate control. Herbicide applications will be conducted before the weeds develop viable seeds.*

Swath and bale is NOT weed control

- Weeds are allowed to grow to create more tons of dry matter to sell
- Weeds go to seed – add to weed seed bank
- Soil moisture is lost
- Weed seed is disbursed at site and transported to other sites
- Remaining stubble is too short to provide protection from erosion and solar radiation





Cover Crop

- Prior to planting, seedbed preparation controls weeds
- Catches snow
- Provides shade for new grass seedlings
- Reduces wind at soil surface
- Increases soil moisture retention
- Decreases evaporation
- Weed control in cover crop



Seed Selection

- Soil Information (Web Soil Survey)
- Ecological Site (lists species by soil)
- Nearby rangeland species
- Nearby successful seeding





Seed Selection

- NRCS Plant Materials Technical Note 59, revised is an excellent source of what to plant, when to plant, how much to plant.
- The Revegetation Manual is the “How to”





Seed Selection

- Use certified seed variety, if available
- Use named variety (cultivar) if certified is not available
- USDA Plants database will have description and recommended location to plant a seed variety



Grass Seeding

- Use a Grass Drill
 - Multiple seed boxes for different
 - Agitators
 - Disc openers
 - Depth bands – prevent planting seed too deep
 - Packer wheels





Supplemental Water

- Due to climatic limitations – limited rainfall
- NOT full irrigation
- Establish grass, then withdrawn
- May not be available in a timely manner but neither is rainfall
- Sprinkler has advantages over flood or furrow
- Sprinkler has better control of depth of irrigation

Monitoring

- Must be defined – who is accountable?
- Weeds are a continual issue
- Pests (prairie dogs)
- Grazing (overgrazing can destroy an expensive
on project)



Most Common Reasons for Failure

- Lack of Weed Control
- Lack of Weed Control
- Lack of Weed Control
- Poor species selection (not adapted to site)
- Planting too deep
- LACK OF EFFECTIVE SOIL MOISTURE MANAGEMENT



Dryland Farming limitations

- Average precipitation*

Pueblo – 12.57” ; La Junta – 11.48” ; Las Animas - 13.73” ; Lamar - 15.84”

- Due to temperature and wind – high evaporation
 - A variety of indices, equations and charts show dryland farming in the lower Arkansas Valley as marginal
 - Precipitation is sporadic and unreliable
 - Below average precipitation can occur several years in succession
- Effective precipitation – precipitation that is stored in the soil, is difficult to achieve

* Colorado Climate Center 1981-2010

A word about dryland farming

- Some decrees allow dryland farming in lieu of revegetation
- As noted previously, the lower Arkansas Valley has limited effective precipitation
- Weed control is vital to any limited farming success
- What happens to the land if dryland farming fails? Who is responsible for revegetation





THE GUY THAT DONT
SHUT THIS GATE
IS A
HORSE'S ASS
Shorty Haines

Arkansas Valley Range Project

Land Management Plan
2023

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Aurora System Area Map



AVRP Background

- 1989: City of Aurora purchased 58% of Rocky Ford Ditch shares from Resource Investment Group (RIG)
 - 4,100 acres real property owned by City of Aurora
 - Revegetation required by court decree began in 1990
 - Considered successfully revegetated in 2001
- 2004: Second purchase of Rocky Ford Ditch water shares (RFII) from ~2,800 acres
 - Most of land not owned by Aurora
 - Continued farming program on ~900 acres
 - Considered successfully revegetated in 2011
 - Management of land the responsibility of Aurora until retained jurisdiction expires



Mission Statement

“To sustainably manage lands that Aurora has decreed responsibility for which have been revegetated under the Rocky Ford Ditch while allowing for multiple uses now and in the future.”



Vision Statement

To effectively manage previously irrigated land that has been successfully revegetated in order to provide:

- Resource protection to prevent soil erosion;
- Prevention of noxious weed proliferation;
- Forage for livestock to remain productive agricultural land;
- Habitat for native wildlife populations;
- Opportunity for improved biodiversity; and
- Educational opportunities and partnerships for the local community that will enhance the understanding of the importance of proper management of these lands for future use.



Management of Property

- Understand ecology of revegetated rangeland when making decisions
- Grazing management to benefit forage, soil health, and wildlife habitat
- Management of issues and weather events that move land away from resource goals
- Community relationships and education
- Evaluation of potential projects



Integrated Management Tools

- Livestock grazing
- Weed control
 - grazing
 - herbicide application
 - mowing
- Wildlife habitat protection and control
- Drought and wildfire mitigation
- Community relations



Grazing Management of AVRP



- Developed
 - 88 pastures
 - 23 water centers
- Graze 200 cows/pair year round
- Short duration grazing during growing season to allow for plant recovery and encourage root growth
- Graze again in winter
- Early drought detection



Conclusion

- City of Aurora has a long-term investment in the Lower Arkansas Valley
- Revegetation of formerly irrigated cropland under the Rocky Ford Ditch was lengthy and significant resources were invested into its success
- Management is required to maintain healthy rangeland ecosystem
- Provide agricultural and educational benefits to the community to continue healthy lands into the future

