January 21, 2016

To: Fort Lyon Canal Company Board of Directors

From: Michelle A. Nelson, Senior Agronomist, AgriTech Consulting

RE: Arkansas River Farms Change of Water Rights Hearing Proposals

As per the request of the Fort Lyon Canal Company Board of Directors, AgriTech Consulting has reviewed the proposed measures relating to the required revegetation of the proposed dry-up acres by Arkansas River Farms (ARF). Comments in this review are primarily based upon the Memorandum provided by Duane D. Helton on January 16, 2016 to the Fort Lyon Board of Directors.

As per page 12 of the Memorandum, it states that the 41 farms associated with the LAWMA trade shares will either be dry-land farmed or revegetated. Within Attachment C that provides a draft revegetation agreement, there is no mention of dry-land farming definitions, requirements, or monitoring plans to ensure that dry-land farming is conducted “acceptably”. Determination of release from restrictions when sufficient cover or dry land farming practices are established would also need to be defined. The following definitions may be considered:

Dry-land farming is growing crops in a cyclic rotation, including a fallow period in every second or third year for dry-land farming. The best management practices include the following:

- The management of annual precipitation to produce marketable commodities or palatable forage for livestock and warrant a reasonable expectation of ongoing profits.
- Weed control methods on crop land may include conservation tillage, mowing or chemicals to manage harvested crop residue to reduce evapotranspiration of soil moisture and maintain ground cover to minimize soil erosion by wind or water.
Conservation tillage is achieved by the use of non-inversion tillage equipment such as chisels, field cultivators, sweeps, vertical tillage, no-till planters or strip till planters to minimize harvested crop residue losses and will maintain approximately 35% or more residue ground cover over 60% or more of the entire field.

- Release from restrictions to be considered after 3 successful years of crop production (to potentially include a fallow year in crop rotation) and adequate cover requirements being met, as per fall inspections.
- For grain crops such as winter wheat or milo, crop residue cover is at least 30%, determined by step-point method.
- For hay or forage crops, crop stubble measures at least 5 inches, with row spacing no more than 30 inches,
- Weeds are adequately controlled on the parcel

As per page 46 of the Memorandum, it states that all dirt ditches, culverts, and concrete control structures are to be removed as a hindrance to the revegetation process. At this time, based on the area-wide revegetation success rate (or lack thereof, due to drought conditions) in neighboring fields, AgriTech recommends that those ditches and structures remain in-tact and are maintained until such time that the parcels are successfully revegetated in the case that irrigation is required to establish the planted native grasses.

The proposed Revegetation Classifications appear to be appropriate, but rather than the “ring” method listed, the Point-Step Method is recommended and generally more widely used in the field for plant counts. In addition, AgriTech Consulting has had success with digital data collection in these instances. We are able to catalog sites on an ongoing basis and show accurate data with a year-to-year trend. Digital data collection is highly recommended, especially considering the number of sites to be tracked.

The Seed Recommendations listed on the final page of Attachment C have a few items to consider. First, it is important to recognize that these seeding rates do reflect the seeding rates NRCS has set forth for the MLRA’s (Major Land Resource Area) 67B South and 69 for seed that is drilled. If for some reason the seed were to be broadcast applied (which we do not recommend at this time), all the rates would need to be doubled. This blend may need to be adjusted based on seed availability and specific field attributes. The Colorado NRCS Tech Note 59 should be used for additional options for different seed blends tailored to specific fields. Modifications to the seed blend need to be approved by both ARF and Ft. Lyon Canal Company or appointed representative. Seed tags should be submitted to Ft. Lyon Canal Company or their appointed representative for each field in order to have data collection and monitoring efforts to be maximized.
Although Altai Wildrye may have many qualities that will benefit the revegetation effort, it is important to note that it is actually an introduced sod forming variety, not a native grass. See attached NRCS Plant Guide. Also, Alatai Wildrye is not recommended by NRCS as a suitable crop in the 67B South MLRA. Sand Lovegrass is also not recommended as suitable for either 67B South or 69, and requires between 16 to 35 inches of precipitation to be successful.

Sterile oats could also be a viable cover crop option, to be planted at a minimum of 35 pounds per acre. Stubble of any of the cover crops or grasses should not to be mowed or harvested to leave less than 5 inches or more of standing stubble. It is not recommended to spray herbicides on young native grass species as well. Mowing to minimize weed seed maturity and maximize grass seed production during appropriate time periods is recommended, and will need to be closely monitored by the ARF Farm Manager. Herbicide residuals may also play a key role in establishing grass populations, which may require various cover crops to mitigate their effects. Due to all these considerations, as well as individual field issues, a plan should be developed for each field and progress reports/inspections should be filed with each of them.
ALTAI WILDRYE
*Leymus angustus* (Trin.) Pilg.

Contributed by: USDA NRCS Idaho and North Dakota Plant Materials Program

Plant Symbol = LEAN3

Status
Consult the PLANTS Web site and your State Department of Natural Resources for this plant’s current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

Description
*General:* Grass Family (Poaceae). Altai wildrye is an introduced, drought resistant, perennial grass that can grow to approximately 40 inches tall. The coarse, wide, erect, basal leaves vary from light green to blue. The plant is generally a bunch type but has short rhizomes. The root system can penetrate 10-13 feet deep and can use soil moisture to that depth more efficiently than most other grasses.

Culms are solitary or tufted, 60-100 cm (24-40 in) tall, glabrous, or pubescent below nodes and the seedhead. Leaf sheath is grayish green, usually shorter than the internodes, smooth or slightly scabrous. The ligule is 0.5-1 mm (0.02-0.04 in) long, membranous with an obtuse apex. Leaf blade is glaucous, rolled, 15-25 cm (6-10 in) long and 0.5-0.7 cm (0.20-0.28 in) wide, stiff and mostly smooth on both sides. The spike is erect, 15-20 cm (6-10 in) long by 0.7-1 cm (0.28-0.39 in) diameter. There are 2-3 spikelets per node with 2 or 3 florets per spikelet. Glumes cover the base of the first lemma, 10-13 mm (0.39-0.51 in) long, linear-lanceolate and 1-veined. Lemma is lanceolate, with 5-7 faint veins. The first lemma is 10-14 mm (0.39-0.55 in) long including an awn. The palea is slightly shorter than the lemma and is ciliate along the keels (Flora of China). The seed is very large, three times the size of Russian wildrye (Kruger).

Distribution:
Altai wildrye is native to China, Kazakhstan, Kyrgyzstan, Mongolia, Russia, Turkmenistan, Uzbekistan, southwest Asia and Europe (Flora of China). For current distribution in North America, consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation
Altai wildrye is well adapted to loam to clay-loam soils receiving 14-18 inches or greater mean annual precipitation (or irrigated). It has comparable seedling emergence and tolerance to salinity as Russian wildrye (Kruger), (McElgunn and Lawrence, 1973) and can be utilized to reclaim saline sites.

Uses
*Grazing:* Altai wildrye is well suited for pasture forage production. It has a long period of growth that begins early in the spring and continues into late fall. The mostly basal leaves make the forage difficult to harvest as hay (Smoliak, et. al, 1990).

*Wildlife:* Altai wildrye provides good wildlife cover because of its tall stature and standing residue but is not readily used by foraging wildlife. It has limited value as a seed source for wildlife and birds or use by native pollinators (Sedivec, et. al, 2007).

Alternate Names

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Adaptation
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Establishment
Altai wildrye seedlings grow and establish slowly and as compared to many other grasses and are poor competitors with weeds. Good seedbed preparation is critical to stand establishment. It is important to have a clean, firm seedbed. Weeds should be destroyed by cultivation or with herbicides before seeding. After emergence, weed control will need to continue to ensure plant establishment. Once Altai wildrye is established, it is very competitive with most weeds (Smoliak, et. al, 1990).

Even though seed of Altai wildrye is large and can emerge better from deeper depths than many other grasses, shallow seeding is recommended because of its reduced competitive ability (Smoliak, et. al, 1990), (Kruger). Altai wildrye should be seeded with a drill at a depth of ¼-½ inch. There are approximately 68,000 seeds per pound (PLANTS Database). The recommended full seeding rate is 12 pounds Pure Live Seed (PLS) per acre (Ogle, et. al, 2010). If used as a component of a seeding mix, adjust to percent of mix desired. For critical area stabilization or broadcast planting, double the drill seeding rate to 24 pounds PLS per acre.

Management
New stands of Altai wildrye should not be grazed until they are well established and have started to produce seed heads. Eight inches of new growth should be attained in spring before grazing is allowed in established stands. Grazing cycles with 35 days or more rest are recommended. Six inches of stubble should remain at the end of the grazing season to maintain the long-term health of the stand (Ogle, et al., 2009).

Altai wildrye establishes slowly as compared to many other grasses and is a poor competitor with weeds. However, once established, it is a very competitive grass. Altai wildrye produces about 20 percent of its total growth by mid-May and 30 percent by early June and reaches peak forage production by late July. It provides good quality forage in spring and early summer based on its growth patterns. It also provides excellent quality forage in the fall and early winter (Sedivec, et al, 2007). In northern regions, it is commonly swathed into windrows and utilized for winter forage (Ogle, et al., 2010).

Pests and Potential Problems
Altai wildrye is susceptible to leaf spot diseases. Resistance to leaf spot has been a factor in the selection of released varieties (Sedivec, et al, 2007).

Environmental Concerns
Altai wildrye is a bunchgrass that develops short rhizomes. It generally does not move from its planting location except under ideal climatic and environmental conditions.

Seed Production
Plant Altai wildrye seed at 6-7 pounds PLS per acre in 30-36 inch rows to a seeding depth of ¼ to½ inch in a clean, firm seedbed. This seeding rate is equivalent to approximately 30 seeds per linear foot of row. Seeding in April and May is recommended to maximize stand establishment and seed yield (Kruger). To facilitate seed production and weed control, it is desirable to plant in spaced rows instead of a solid stand. Between-row cultivation is required to maximize seed yield, and to maintain rows and weed-free conditions.

Fertilizer is generally not recommended during establishment. If soil nitrogen and phosphorus are low, an application of 10-15 pounds per acre of nitrogen and 20-30 pounds per acre of phosphorus may be applied and incorporated into the soil prior to planting. Fertilize for full seed production following the establishment year in the early fall or if on sandy soils, use split applications in early fall and again in early spring.

Clipping or mowing annual weeds is an effective strategy for control during the establishment year. Weeds should be mowed as needed to prevent them from setting seed. Once Altai wildrye becomes established, there will be fewer weeds. Hand rouging and herbicides labeled for grass seed production will also be required. The most difficult weeds to control include quackgrass, cheatgrass (downy brome), green foxtail and Persian darnel. (Kruger).
Seed is usually harvested mid to late July. Swathing to allow the seed to complete maturity followed by combining is recommended. Direct combining is also an option but harvest timing and seed drying are critical elements that must be dealt with. Altai wildrye readily shatters when mature and seed must be dried to 10-12 percent moisture content before storage (Kruger). Seed yields range from 50 to 150 pounds per acre on dryland and 75 to 200 pounds per acre under irrigation. The removal of residue and stubble from seed production fields is critical to maintaining the seed productivity of a stand. Plots remaining unclipped in the fall show elevation of the growing points above the ground level predisposing primordial seed heads to winter injury (Kruger).

**Cultivars, Improved, and Selected Materials (and area of origin)**

‘Eejay’ was selected and released by Agriculture Canada (Swift Current, Saskatchewan) in 1989. It was selected for higher seed and forage yield compared to Prairieland and is also resistant to leaf spot diseases (Sedivec, et al. 2007).

‘Mustang’ was released in 2004 by the USDA-Agricultural Research Service, Forage and Range Laboratory in Logan, Utah. It is significantly taller than Prairieland, Pearl and Eejay. It has higher forage production than Prairieland or Pearl and superior seedling establishment compared to Prairieland and Pearl (Sedivec, et al. 2007).

‘Pearl’ was selected and released by Agriculture Canada (Swift Current, Saskatchewan) in 1989. It was selected for higher seed production than Prairieland. It has lower forage yield than Prairieland and is also resistant to leaf spot diseases (Sedivec, et al. 2007).

‘Prairieland’ was selected and released by Agriculture Canada (Swift Current, Saskatchewan) in 1976. It was selected for high seed yield, high forage yield and is resistant to leaf spot diseases (Sedivec, et al. 2007).

**References**


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Citation


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