



## **CALIFORNIA UPLAND GAME PROGRAM GRANT AGREEMENT NUMBER: P1680048 – FINAL REPORT**

### **INTRODUCTION AND BACKGROUND**

(a) Knoxville Wildlife Area (KWA) is a very popular wildlife area for hunters targeting upland game birds, black-tailed deer, wild pig, and even offers limited waterfowl hunting opportunity. However, as with many of California's rural lands, large expanses of KWA are infested with invasive exotic plant species. The two main culprits being yellow star-thistle (*Centaurea solstitialis*) and medusa head (*Taeniatherum caput-medusae*). Yellow star-thistle (YST) is a very aggressive invasive that contains a large taproot extending 2-3 feet below the soil surface. This allows YST to out-compete native annual species and dominate entire sections of the landscape. The recent drought has amplified YST's stronghold in many areas. Medusa head (MH) is also a strong aggressor that out-competes native annuals. Once established, MH can create densities of 1,000-2,000 plants per square meter, not only eliminating native grasses and forbs but also creating high fire danger. YST and MH serve very little wildlife value due to their homogenous thick cover and un-palatable plant bodies. The National Wild Turkey Federation, in partnership with CDFW and the California Deer Association, helped to restore a 60 acre section of vital upland game bird habitat back to native annual grasses and forbs on Knoxville Wildlife Area.

(b) After recently experiencing the most impactful drought on record in the state of California, the effects of climate change are becoming increasingly known. With rising global temperatures and severe unpredictable weather patterns, effects on wildlife habitat and suitability are constantly in question. KWA contains large tracts of high quality upland game bird habitat that supports several species, mainly California quail, wild turkey, and mourning dove, and is very popular among upland game bird hunters. However, due to KWA's location in the upper reaches of a watershed and its rugged mountainous terrain, high quality habitat becomes fragmented due to the scarcity of water for approximately 3 months of the year (September – November) during years of average precipitation. Average daily temperatures during this period at KWA typically range between a high of 90-100 degrees Fahrenheit. The recent drought has only made things more difficult for wildlife on the area. This severe reduction in a limiting resource handicaps upland game bird populations, and highly limits their range expansion into otherwise very suitable habitat. The National Wild Turkey Federation, in partnership with CDFW, purchased and installed two 1,000 gallon water guzzlers in water-limited areas on KWA that help to benefit upland game birds, black-tailed deer, and many other diverse species of wildlife throughout the year.



## ACTIVITIES

(a) In the summer of 2016, CDFW staff coordinated with CAL FIRE to implement a prescribed fire over the project site, which removed the standing thatch and exposed the bare soil. CDFW then treated the site with herbicide in the fall of 2016 and the spring of 2017 to rid the site of any growing invasives. The herbicide treatment was funded through funds from California Deer Association. CDFW then mowed the site in the fall of 2017 in preparation for seed drilling. The entire project area was seed drilled in November and December of 2017. CDFW first drilled in cereal crops of triticale surrounding the project site as a buffer between invasive plant species and the restoration. They then planted the native seed mix purchased with the funds from California Deer Association as well as the seed purchased through this grant. All native seed was purchased from Hedgerow Farms in Winters, CA and the seed was harvested locally to the project site in both Napa and Yolo counties.

(b) Originally, NWTF and CDFW staff planned to install the guzzlers in the spring of 2017. However, the record rainfall that was experienced in the 2016-2017 water year greatly impacted Knoxville Wildlife Area's road system, delaying access into the guzzler sites. The guzzlers were then ordered in winter of 2017 and arrived to Knoxville Wildlife Area headquarters in the spring of 2018. A subcontractor was hired, and both guzzler sites were constructed and installed in May 2018. Each guzzler was inspected and approved by CDFW staff prior to the subcontractor moving equipment off the wildlife area.



## COSTS LIST FOR GRANT

|                                                                                                                                      |                                                   |                  |                  |                           |           |
|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------------------|------------------|---------------------------|-----------|
| <b>California Upland Game Program</b><br><b>Knoxville WLA Project</b><br><b>Agreement # P1680048</b><br>Project Manager: Kevin Vella |                                                   |                  |                  |                           |           |
|                                                                                                                                      | Start Date                                        | 5/19/2017        |                  |                           |           |
|                                                                                                                                      | End Date                                          | 6/30/2018        |                  |                           |           |
|                                                                                                                                      |                                                   |                  | <b>Date</b>      | <b>6/14/2018</b>          |           |
| 43500-1-07-27-0002                                                                                                                   |                                                   |                  |                  |                           |           |
|                                                                                                                                      |                                                   |                  | FY 18            | FY 19                     | Remaining |
| Account Number                                                                                                                       | Budget Item                                       | Budget           | Expenses         | Expenses                  | Budget    |
| 79501-1-07-27-0002                                                                                                                   | NWTF District Biologist (40 hours @ Actual Rate)  | 1,648.40         | 1,978.56         |                           | (330.16)  |
| 79502-1-07-27-0002                                                                                                                   | Travel (800 miles @ \$0.535/mile)                 | 428.00           | 541.94           |                           | (113.94)  |
| 79503-1-07-27-0002                                                                                                                   | <b>Supplies, Equip, Misc, etc</b>                 |                  |                  |                           |           |
|                                                                                                                                      | A Guzzler (2 @ \$2,806.75 each)                   | 5,613.50         | 5,750.00         |                           | (136.50)  |
|                                                                                                                                      | B Ground shipping cost (2 guzzlers @ \$150 each)  | 300.00           | 472.00           |                           | (172.00)  |
|                                                                                                                                      | C Roofing (16 @ \$15/each)                        | 240.00           | 250.00           |                           | (10.00)   |
|                                                                                                                                      | D Collection Frame (2 @ \$300/each)               | 600.00           | 600.00           |                           | -         |
|                                                                                                                                      | E Native Grass Seed (47.5 acres @ \$630/acre)     | 29,925.00        | 29,924.39        |                           | 0.61      |
| 79506-1-07-27-0002                                                                                                                   | <b>Subcontractor</b>                              |                  |                  |                           | -         |
|                                                                                                                                      | A Backhoe (16 hours @ \$110/hour)                 | 1,760.00         | 1,760.00         |                           | -         |
|                                                                                                                                      | B Subcontractor Supervisor (20 hours @ \$50/hour) | 1,000.00         | 1,000.00         |                           | -         |
|                                                                                                                                      | C Subcontractor Laborer (20 hours @ \$20/hour)    | 400.00           | 400.00           |                           | -         |
|                                                                                                                                      | D Equipment Mobilization (2 hours @ \$1000/hour)  | 2,000.00         | 2,000.00         |                           | -         |
| 79510-1-07-27-0002                                                                                                                   | Indirect 20.18%                                   | 7,820.74         |                  |                           | 7,820.74  |
| <b>41636-1-04-24-0002</b>                                                                                                            |                                                   | 51,735.64        | 44,676.89        | -                         | 7,058.75  |
|                                                                                                                                      |                                                   |                  |                  |                           |           |
|                                                                                                                                      |                                                   |                  |                  |                           |           |
|                                                                                                                                      |                                                   | Grant AR         | 44,676.89        |                           |           |
|                                                                                                                                      |                                                   | Less Payments    | 0.00             |                           |           |
|                                                                                                                                      |                                                   |                  |                  |                           |           |
| <b>1,978.56</b>                                                                                                                      | <b>Salary Clearing</b>                            | <b>Grants AR</b> | <b>44,676.89</b> |                           |           |
| <b>541.94</b>                                                                                                                        | <b>Travel Clearing</b>                            |                  | 4,790.00         | Due from CA State Chapter |           |
| <b>-</b>                                                                                                                             | <b>Indirect Clearing</b>                          |                  | (4,790.00)       | Rec'd ck 5/29/18          |           |
|                                                                                                                                      |                                                   |                  | 44,676.89        |                           |           |





Project site just after drilling in the native seed December 2017.



Native grasses and cereal grain crop in the foreground May 2018.





A flock of wild turkeys utilizing the project area March 2018.



Subcontractor installing one of the guzzlers May 2018.





Guzzler site #1 complete May 2018.



Guzzler site #2 complete May 2018.



## DISCUSSION

(a) The grassland restoration portion of this project is complete. The native grass plantings were moderately successful due to environmental conditions that the NWTF and CDFW have no control over (i.e. the lack of precipitation immediately following seed drilling). Due to the described conditions, many annual forbs were able to out-compete portions of the project area. The species that had the most success was purple needlegrass (*stipa pulchra*), while the rest of the grass species were not as successful. However, due to the aforementioned environmental conditions, a diverse mosaic of native annual grasses and forbs was created (with little to no yellow starthistle) throughout the entire project area. A HUGE success considering that yellow starthistle dominated the landscape prior to beginning operations. For the next several years maintenance will be crucial, and CDFW plans to spot-treat any undesired plant species within the project boundary through the use of herbicide. This type of intensive management will give the native grasses and forbs the best chance of long-term establishment, as well as the greatest overall benefit to upland game bird species. CDFW Environmental Scientist, Stacy Martinelli, stated that this spring she visually recorded the greatest use of the project site by wild turkeys and mourning doves than in any years prior. Hopefully this is a trend that will continue!

(b) The guzzler portion of this grant is complete. CDFW staff plans to manually fill both guzzlers for the dry months in 2018, however, the rainwater catchment systems will be utilized in filling the guzzlers throughout the foreseeable future. Both sites will now provide year-round water sources that will benefit upland game birds as well as all species of wildlife on Knoxville. CDFW also plans to install motion-sensing cameras at each site to index the amount of use by wildlife. The NWTF is very pleased with the outcome of this project and its benefit to upland game birds on Knoxville Wildlife Area.





**Hedgerow Farms, Inc.**  
21905 County Road 88  
Winters, CA 95694  
Ph: (530) 862-8847  
Fx: (530) 862-2753

**Date:** 11/9/2017  
**Customer:** CA Fish and Wildlife  
**Contact:** Stacy Martinelli  
**Tel:** (707) 676-2868  
**Cell:**  
**Email:** stacy.martinelli@wildlife.ca.gov  
**From:** eallen@hedgerowfarms.com  
**Email:** Emily Allen

**Project:** Knoxville Wildlife Area Seeding  
**Notes:** Drill seeding using McLaughlin Drill  
Funding from National Turkey Federation  
harsh soils  
not ideal weed control but some has been done  
would like flowers

**Estimated Project Date:** fall 2017

|                                   |                    |
|-----------------------------------|--------------------|
| Seed mix subtotal:                | \$27,541.53        |
| Subtotal for Asclepias eriocarpa: | \$360.00           |
| Seed Subtotal:                    | \$27,901.53        |
| Tax (7.25%):                      | \$2,022.86         |
| <b>Estimated Total:</b>           | <b>\$29,924.39</b> |

#### SEED QUOTATION

Acres for Mix: 36.1651

| SEED QUOTATION                                         |                           |                                       | Acres for mix: 36.1651          |                                        |              |                  |                     |            |
|--------------------------------------------------------|---------------------------|---------------------------------------|---------------------------------|----------------------------------------|--------------|------------------|---------------------|------------|
| Botanical Name                                         | Common Name               | Ecotype/Origin                        | Approximate Live Seeds/ PLS Lb. | Approximate Live Seeds/ Square foot    | PLS lbs/acre | PLS lbs for area | Cost/ PLS lb        | Cost/ Acre |
| <i>Stipa pulchra</i>                                   | purple needlegrass        | Fiske Creek, Yolo Co.                 | 70,000                          | 10                                     | 6.00         | 216.99           | \$43.00             | \$258.00   |
| <i>Poa secunda</i> ssp. <i>secunda</i>                 | one sided bluegrass       | Upper Fiske Creek, Yolo Co.           | 800,000                         | 28                                     | 1.50         | 54.25            | \$36.00             | \$54.00    |
| <i>Elymus glaucus</i>                                  | blue wildrye              | Anderson, Yolo Co.                    | 122,000                         | 11                                     | 4.00         | 144.66           | \$20.00             | \$80.00    |
| <i>Bromus carinatus</i>                                | California brome          | Arastradero Preserve, Santa Clara Co. | 70,000                          | 2                                      | 1.50         | 54.25            | \$18.00             | \$27.00    |
| <i>Festuca microstachys</i>                            | three weeks fescue        | Fiske Creek, Yolo Co.                 | 430,000                         | 15                                     | 1.50         | 54.25            | \$22.00             | \$33.00    |
| <i>Elymus multisetus</i>                               | big squimetail            | Tehama Co.                            | 95,000                          | 2                                      | 0.75         | 27.12            | \$105.00            | \$78.75    |
| <i>Hordeum brachyantherum</i> ssp. <i>californicum</i> | California barley         | Bear Valley Serpentine, Colusa Co.    | 220,000                         | 10                                     | 2.00         | 72.33            | \$45.00             | \$90.00    |
| <i>Melica californica</i>                              | California oniongrass     | Fiske Creek, Yolo Co.                 | 260,000                         | 4                                      | 0.75         | 27.12            | \$50.00             | \$37.50    |
| <i>Amsinckia menziesii</i>                             | small flowered fiddleneck | Esparto, Yolo Co.                     | 125,000                         | 1                                      | 0.25         | 9.04             | \$32.00             | \$8.00     |
| <i>Phacelia imbricata</i>                              | imbricate phacelia        | Colusa and Yolo Cos.                  | 275,000                         | 1                                      | 0.10         | 3.62             | \$75.00             | \$7.50     |
| <i>Clarkia unguiculata</i>                             | elegant clarkia           | Rumsey Canyon, Yolo Co.               | 1,400,000                       | 8                                      | 0.25         | 9.04             | \$48.00             | \$12.00    |
| <i>Eschscholzia californica</i>                        | California poppy          | Lodoga Hills, Colusa Co.              | 350,000                         | 4                                      | 0.50         | 18.08            | \$40.00             | \$20.00    |
| <i>Achillea millefolium</i>                            | yarrow                    | Cache Creek Watershed, Lake Co.       | 3,000,000                       | 10                                     | 0.15         | 5.42             | \$64.00             | \$9.60     |
| <i>Eriophyllum lanatum</i>                             | wooly sunflower           | Rumsey Canyon, Colusa Co.             | 1,150,000                       | 3                                      | 0.10         | 3.62             | \$120.00            | \$12.00    |
| <i>Calandrinia menziesii</i>                           | red maldis                | North of Winters, Yolo Co.            | 850,000                         | 4                                      | 0.20         | 7.23             | \$94.00             | \$18.80    |
| <i>Plantago erecta</i>                                 | dotseed plantain          | North of Winters, Yolo Co.            | 250,030                         | 3                                      | 0.55         | 19.89            | \$28.00             | \$15.40    |
| subtotals:                                             |                           |                                       |                                 | 116                                    | 20.10        | 726.91           | cost/acre: \$761.55 |            |
|                                                        |                           |                                       |                                 | subtotal for 36.1651 acre: \$27,541.53 |              |                  |                     |            |





Rainmaker Products, LLC  
PO Box 31697  
Bellingham WA 98228  
360-739-6361

tim@rainmakerwildlife.com  
www.RainmakerWildlife.com

NWTF Ship To:  
9848 Berryessa Knoxville Rd  
Napa, CA 94558

Account Number 2543  
Quote Number 25432155  
Issue Date 11/16/2017  
Due Date 12/1/2017

| Date           | Project/Item                         | Order | QTY | Price    | Taxes | Total             |
|----------------|--------------------------------------|-------|-----|----------|-------|-------------------|
| 11/16/2017     | DT-1000 Dome-Top 1000 Gallon Guzzler |       | 2   | 2,875.00 |       | 5,750.00          |
| 11/16/2017     | Freight                              |       | 1   | 472.00   |       | 472.00            |
| Sub-Total:     |                                      |       |     |          |       | \$6,222.00        |
| Total:         |                                      |       |     |          |       | <b>\$6,222.00</b> |
| Balance Owing: |                                      |       |     |          |       | \$6,222.00        |

#### QUOTE ONLY

You also have the option to pick up at the Sacramento Freight Terminal.  
Cost \$426.



Todd Pfyf Excavation

PO Box 172  
Artois, CA 95913

## Invoice

| Date      | Invoice # |
|-----------|-----------|
| 5/13/2018 | 267       |

|                                                              |
|--------------------------------------------------------------|
| Bill To                                                      |
| Kevin Vella<br>5341 Spreading Oak Ln<br>El Dorado, CA. 95623 |

| P.O. No.      | Terms | Project |
|---------------|-------|---------|
| Knoxville WA. |       |         |

| Quantity | Description                                    | Rate     | Amount   |
|----------|------------------------------------------------|----------|----------|
|          | mobilization                                   | 1,900.00 | 1,900.00 |
|          | Roofing tin                                    | 250.00   | 250.00   |
|          | Metal frame                                    | 600.00   | 600.00   |
|          | Steel posts                                    | 150.00   | 150.00   |
|          | Hardware                                       | 50.00    | 50.00    |
| 50       | Excavation, 50 HRS @ 140.00, Installation time | 140.00   | 7,000.00 |
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