Malheur River Wildlife Mitigation Project

(BPA Project #200002700)

2008 Annual Report

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INTRODUCTION

In 1998, the Burns Paiute Tribe (BPT) submitted a proposal to Bonneville Power Administration (BPA) for the acquisition of the Malheur River Wildlife Mitigation Project (Project). The proposed mitigation site was for the Denny Jones Ranch and included Bureau of Land Management (BLM) and Oregon Division of State Lands (DSL) leases and grazing allotments. The Project approval process and acquisition negotiations continued for several years until the BPT and BPA entered into a Memorandum of Agreement, which allowed for purchase of the Project in November 2000.

The 31,781 acre Project is located seven miles east of Juntura, Oregon and is adjacent to the Malheur River (Figure 1). Six thousand three hundred eighty-five acres are deeded to BPT, 4,154 acres are leased from DSL, and 21,242 acres are leased from BLM (Figure 2). In total 11 grazing allotments are leased between the two agencies. Deeded land stretches for seven miles along the Malheur River. It is the largest private landholding on the river between Riverside and Harper, Oregon. Approximately 938 acres of senior water rights are included with the Ranch.

The Project is comprised of meadow, wetland, riparian and shrub-steppe habitats. The BLM grazing allotment, located south of the ranch, is largely shrub-steppe habitat punctuated by springs and seeps. Hunter Creek, a perennial stream, flows through both private and BLM lands. Similarly, the DSL grazing allotment, which lies north of the Ranch, is predominantly shrub/juniper steppe habitat with springs and seeps dispersed throughout the upper end of draws (Figure 2).

Figure 2: Project and surrounding area land ownership.

Wildlife Value

The *Malheur Wild and Scenic River Management Plan* (U.S. Forest Service 1993) and the *North Fork Malheur Scenic River Management Plan* (U.S. Forest Service 1993) identified the Project area as a key component in the restoration of aquatic and terrestrial habitat within the Malheur River basin. Although the landscape may seem somewhat barren to the casual observer, a closer look reveals a clandestine diversity of wildlife. Much of the habitat in the Malheur River basin

has been marginalized by decades of intense grazing and agricultural practices, making the Project of paramount importance to special status wildlife species present in the ecoregion. Table 1 outlines species in the ecoregion designated as sensitive, threatened, endangered, or of special concern by state and federal listings. A number of the species listed are known to occur on Project lands.

Table 1: Special Status Wildlife Species of the Northern Basin and Range Ecoregion

Scientific Name	Common Name	Federal Status	State Status
Amphibians and Reptiles			
<i>Bufo boreas</i>	Western Toad		sensitive
<i>Rana luteiventris</i>	Columbia Spotted Frog	candidate for listing	sensitive
<i>Rana pipiens</i>	Northern Leopard Frog		critically sensitive
Birds			
<i>Baeolophus ridgwayi</i>	Juniper Titmouse		not yet ranked
<i>Buteo regalis</i>	Ferruginous Hawk	species of concern	critically sensitive
<i>Buteo swainsoni</i>	Swainson's Hawk		sensitive
<i>Centrocercus urophasianus</i>	Greater Sage-grouse	species of concern	sensitive
<i>Charadrius alexandrinus</i>	Western Snowy Plover	threatened	threatened
<i>Dolichonyx oryzivorus</i>	Bobolink		sensitive
<i>Egretta thula</i>	Snowy Egret		sensitive
<i>Empidonax traillii adsastus</i>	Willow Flycatcher		sensitive
<i>Falco peregrinus anatum</i>	Peregrine Falcon		endangered
<i>Grus canadensis tabida</i>	Greater Sandhill Crane		sensitive
<i>Himantopus mexicanus</i>	Black-necked Stilt		not yet ranked
<i>Larus pipixcan</i>	Franklin's Gull		sensitive
<i>Numerius americanus</i>	Long-billed Curlew		sensitive
<i>Oreortyx pictus</i>	Mountain Quail	species of concern	sensitive
<i>Pelecanus erythrorhynchos</i>	American White Pelican		sensitive
Fish			
<i>Cottus bendirei</i>	Malheur mottled Sculpin	species of concern	sensitive
<i>Oncorhynchus kisutch</i>	Coho Salmon	species of concern	ecoregion extirpation
<i>Oncorhynchus mykiss</i>	Redband Trout	species of concern	sensitive
<i>Onocorhynchus mykiss</i>	Steelhead	threatened	ecoregion extirpation
<i>Oncorhynchus tshawytscha</i>	Chinook Salmon	threatened	ecoregion extirpation
<i>Salvelinus confluentus</i>	Bull Trout	threatened	sensitive
Mammals			
<i>Antrozous pallidus</i>	Pallid Bat	species of concern	sensitive
<i>Brachylagus idahoensis</i>	Pygmy Rabbit	species of concern	sensitive
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	species of concern	critically sensitive
<i>Euderma maculatum</i>	Spotted Bat	species of concern	
<i>Lasiurus cinereus</i>	Hoary Bat		not yet ranked
<i>Lepus townsendii</i>	White-tailed Jackrabbit		sensitive
<i>Myotis californicus</i>	California Myotis		sensitive
<i>Myotis volans</i>	Long-legged Myotis	species of concern	sensitive
<i>Vulpes macrotis</i>	Kit Fox		threatened

Adapted from The Oregon Conservation Strategy (ODFW 2006).

Bird surveys conducted by BPT biologists have detected three state listed avian species since surveys began in 2006; greater sandhill crane (*Grus canadensis tabida*) in 2006-2008, black-necked stilt (*Himantopus mexicanus*) in 2007, and long-billed curlew (*Numenius americanus*) in 2007-2008 (Appendix D, pg. 2-5). Lek count data (Appendix C) demonstrates the importance of the Property as breeding, nesting and brood rearing habitat for the state and federally designated greater sage-grouse (*Centrocercus urophasianus*). Tribal biologists have also observed the American white pelican (*Pelecanus erythrorhynchos*) on the Property, a species designated as sensitive in the ecoregion.

Bat surveys conducted on the Property in 2008 (see Bat Surveys, p.18-19) potentially identified the calls of four bat species with populations in decline across their range. Two of the bat species detected, pallid bat (*Antrozous pallidus*) and Long-legged bat (*Myotis volans*), have attained both state and federal designations as special status species. The hoary bat (*Lasiurus cinereus*) and California myotis (*Myotis californicus*) were species with state designations detected during the survey.

Widespread water impoundments and agricultural diversions have led to the extirpation of three federally threatened anadromous fish in the Malheur River basin. Those are the Coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*Oncorhynchus mykiss*). However the state and federally listed redband trout (*Oncorhynchus mykiss*) does exist on the Property (Schwabe et al. 2008). The federally threatened bull trout (*Salvelinus confluentus*) and state and federally listed Malheur mottled sculpin (*Cottus bendirei*) now only exist at higher elevations in the subbasin (Schwabe et al. 2008).

The Project is known winter range for pronghorn (*Antilocapra americana*), Rocky Mountain elk (*Cervus elaphus*) and mule deer (*Odocoileus hemionus*).

Cultural Relationship

The Project is culturally significant to the BPT because it lies within their aboriginal territory. Historically, BPT members gathered roots, hunted, and fished along the Malheur River corridor.

Both the BPT and the public have a shared interest in the Project's permanent protection. Habitat protection and enhancement measures to the resident plant community will benefit diverse fish and wildlife assemblages. General management goals include improving water quality; enhancing upland, floodplain meadow and riparian habitats; controlling weeds; protecting springs and seeps; managing BLM grazing allotments to meet wildlife objectives; preserving cultural resources; and providing public hunting and recreation opportunities.

ACTIVITIES

During 2008, many activities occurred on the Project to improve and/or maintain the vegetation communities for the benefit of wildlife populations. Haying, wetland creation, irrigation, fencing, grazing, noxious weed control, planting projects, research and monitoring, and administrative duties all contributed to the success of the Project.

Haying

Haying practices have been utilized as a management tool since the Tribe acquired the Project. Haying is used to control weeds, remove decadent material, and improve bird and wild ungulate feeding opportunities.

Haying of the irrigated meadows and alfalfa field once again occurred in 2008 (Figure 3). One cutting of meadow grass produced 134.8 tons of hay and three cuttings of alfalfa produced 66.2 tons of hay.

Haying of the irrigated meadows was conducted by a local landowner, Joe Buermann. The hay was sold at a price of \$50/ton as a standing crop. He cut, bailed, stacked, and transported all of meadow hay with his own machinery and labor inputs.

Haying of the alfalfa field was conducted by Project staff. The alfalfa was sold at a price of \$20 and \$60 per ton and offered first to Tribal members. The remainder was retained for feeding horses used at the project site. All funds acquired were used to pay property taxes and DSL grazing fees.

Wetland Creation

Approximately 1 acre seasonal wetland was created directly southeast of field 6 (Figure 4). This 1 acre wetland will be used, depending on irrigation water availability, for seasonal wetland dependent wildlife. Installation took place in October, involving digging and placing a 4 inch PVC pipe with a cap on the irrigation ditch side. Water levels will be monitored on a weekly basis to ensure proper water depths are maintained.

Figure 3: Haying of grass (red) and alfalfa (green)

Figure 4: Wetland Creation

Irrigation

Irrigation is a daily activity utilized to provide quality forage for big game species. Irrigation also benefits migrating waterfowl and neo-tropical bird species, and keeps ponds full to the benefit of aquatic organisms.

Approximately 260 acres of the Project utilized flood irrigation. There were 86 acres in fields 5, 13 and 205 that used an irrigation pump to get water into a ditch, while the remaining acres used the irrigation diversion ditch for water. The direction and use of irrigation water was changed on a daily basis. In addition, daily maintenance includes removal of sedimentation, repair of breaches, cleaning of debris, trap dams, canal lining, and maintaining pump and dam structures.

Fencing

Fencing was removed that was used to delineate pastures when the property was originally managed as a ranch. Fencing is no longer needed so removal was undertaken to prevent animal injuries while navigating fence lines. Two fence miles adjacent to fields 7, 8, 9, 11, and 12 were removed (Figure 5). Fencing materials will be used for other property projects or will be recycled.

One and quarter mile of fence was added to the south side of field 3 and 4 to protect riparian in the CREP (Conservation Reserve Enhancement Program) buffer during cattle grazing (Figure 6). The entire fence in the CREP buffer on the south side of the Malheur River was removed by Natural Reclamation Service (NRS) and recycled in Ontario, Oregon.

Figure 5: Fence Removal (green CREP, red BPA).

Figure 6: Replacement Fence (red old, green new).

Grazing

Grazing reduced decadent material within the hay meadows (fields 3 and 4) following haying operations. The grazing opportunity was advertised in the local newspaper and bids were accepted. Joe Buermann of Silver Sage Ranch was successful in bidding for the pasture at a cost of \$18.00/Animal Unit Month (AUM). The fields were grazed starting in July 20, 2008, continuing through September 30, 2008. A total of 193.17 AUM were utilized.

Grazing began on DSL and BLM lands within the Road Gulch and Black Canyon allotments on November 20th, 2007. These allotments were last grazed during the winter of 2004 – 2005. Cattle remained in those allotments until March 31, 2008. Again, the grazing opportunity was advertised in the local newspaper and bids were accepted. Joe Cronin was successful in bidding for this pasture at a cost of \$21.01/AUM. Use during the grazing period tallied 434 AUM.

The region suffered a severe drought in 2007, leading to multiple wildfires and reduced forage availability. Consequently, many ranchers were looking for livestock pasture, driving up AUM prices. Historically, DSL has charged the Tribe \$5.20/AUM on the Road Gulch and Black Canyon pastures. As previously stated, we were charging \$21.01/AUM in 2008. The difference between what DSL charges and what the Tribe receives will be split 50% to DSL and 50% to the Tribe; the Tribes portion will be returned to the Project's budget.

Four allotments on BLM and Project lands last grazed in the summer of 2004 reentered the grazing rotation in 2008. Cattle were turned out on the Trail Creek pasture on April 1st but were removed by April 20th so a grass assessment on the deeded land portion of the Trail Creek Pasture could be performed. Grazing on Saddlehorse pasture thus began on April 20th and continued to May 31st. Cattle were rotated to Tim's Peak and Horse Camp pasture for the majority of the summer (May 31st to August 1st). Dinner Creek pasture was the last to be grazed, from August 1st to November 3rd. Antelope Swale was not grazed as planned due to cattle trespassing on the allotment. A total of 672 AUM were utilized between all the above allotments at \$22/AUM. All grazing income from 2008 was used to pay for property taxes and DSL grazing fees.

Noxious Weed Control

Under prior ownership, the Project's ability to provide high quality wildlife habitat was compromised because of high cattle stocking rates, lack of an ecologically sound grazing plan and a proliferation of introduced vegetation (Ashley 2005). Noxious weed control has been important to reestablish native vegetation and increase habitat value to wildlife.

Nearly 500 acres were treated by Project staff. Control was emphasized on grass pastures, fence lines, water canals, driveways, and the railroad right-of-way. Many weed species are treated but emphasis was placed on Scotch thistle (*Onopordum acanthium*), perennial pepperweed (*Lepidium latifolium*), clasping pepperweed (*Lepidium perfoliatum*), hoary cress (*Cardaria draba*), blue mustard (*Chorispora tenella*), flaxweed (*Descuraninia sophia*) bur buttercup (*Ranunculus testiculatus*) puncturevine (*Tribulus terrestris*), poison hemlock (*Conium maculatum*), and medusahead rye (*Taeniatherum caput-medusae*).

Both mechanical and chemical methods were used in 2008. Mechanical methods include mowing, weed-eating and hand pulling. Chemicals were distributed with a tractor boom, ATV boom, ATV spot sprayer, and backpack sprayer. Multiple chemicals were used dependent upon the weed species and location, including: Round-up, Banvel 2,4D, Telar XP, Escort, Milestone, Journey, and the surfactant Syltac (Appendix A). A blue dye was also used where needed to track treated areas. All applications were tracked and recorded in the Oregon Department of

Agriculture's Pesticide Use Reporting System (PURS). In general, a total of 81 gallons of chemical and 13.4 gallons of surfactant were used on the project. We used 68 ounces of Round-up, 9829.5 ounces of Banvel, 193.3 ounces of Telar XP, 9 ounces of Escort XP and 48 ounces of Milestone. There was left over chemical in storage that was used; 19 ounces of LV400 and 192 ounces of Weedar 64. Both have the same active ingredient as Banvel. Application rate was determined by the label. No Journey was used due to staff changes and losses.

All of established meadow grasses received a Telar treatment, the newly establishing native grass (2007-2008) received Weedmaster 2,4D applied at a low dose mixture.

Historically, we have coordinated with the Malheur County weed inspector's office to control skeleton weed (*Lygodesmia juncea*) on the Project. At the end of 2006, only 3 plants had remained so it was not necessary for them to return. A field review in 2008 found multiple plants (50+) in the tributaries to the west of Indian Creek (Figure7). It is recommended to spot spray this area in the spring with Milestone by Wilbur-Ellis in Caldwell, ID.

Figure 7: Skeleton weed and native grass planting location.

Planting Projects

Several planting projects were scheduled for 2008 including: the Conservation Reserve and Enhancement Program (CREP), native grass planting, weed control grass planting, creating an alfalfa field, and black cottonwood tree planting.

CREP

First stages of planting began in April when Natural Reclamation Service (NRS) laid 1,084,511 lineal square feet of permeable mulch fabric, 5,815 feet of fence and 900 pounds of native grass

seed (Great Basin wildrye (*Leymus cinereus*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Sherman big bluegrass (*Poa secunda*) and thickspike wheatgrass (*Elymus lanceolatus*)). Problems arose when lack of communication between all parties (NRCS, Tribe, FSA and ODSF) involving the amount of mulch fabric allowed and location. This resulted in no payment for NRS until all parties could agree on what species and numbers of plants would be allowed in mulch fabric. This means that a new planting plan was developed (Attachment B). Planting will occur in February 2009.

Native Grass

Native grass mixture was used in the medusa head treatment area (Figure 7). The mixture consisted of 35% western wheatgrass (*Pascopyrum smithii*), 25% thickspike wheatgrass, 15% Idaho fescue (*Festuca idahoensis*), 10% bluebunch wheatgrass, 5% Sandberg bluegrass (*Poa secunda*), 5% squirreltail (*Elymus elymoides*) and 5% Indian ricegrass (*Achnatherum hymenoides*). Seed was supplied by Great Basin Seed, LLC, Ephraim, Utah. Two thousand four hundred and fifty pounds were purchased at \$6.39 a pound. Seed was no-till drilled at 10 lbs/acre on ~60% of the treatment site.

Plans to broadcast seed in the remaining treatment site will occur at 14 lbs/acre. Broadcast timing is determined when at least 1 inch of snow is on the treatment site. If no significant accumulation of snow occurs, broadcast will take place in spring before a rain event. The remaining seed will be planted in areas that were unsuccessful in the 2007-2008 native grass fields and CREP boundary. This work will be completed in 2009 statement of work.

The Oregon Youth Authority propagated two thousand native grass plugs in their greenhouse for transplant on the Project. The grass seed used to grow the plugs was from the same native grass mixture used in the 2008 CREP planting. Grass plugs were hand planted by shovel during the fall in fields 5, 12 and 13.

Weed Control Grass

A weed control mix was purchased to combat the excess production of noxious weeds in the project site (Figure 8). The mixture consisted of crested wheatgrass (*Agropyron cristatum*) (30%), intermediate wheatgrass (*Thinopyrum intermedium*) (15%), pubescent wheatgrass (*Agropyron intermedium* var. *trichophorum*) (15%), smooth brome (*Bromus inermis*) (30%) and Russian wildrye (*Psathyrostachys juncea*) (10%). Stock was purchased from Great Basin Seed in Ephraim, UT. One thousand pounds of seed was purchased at \$2.60 a pound. Seed was planted with an ATV drill and/or a tractor drill at 20 lbs/acre.

Alfalfa

Field 7 was converted into alfalfa production (Figure 8). Eighteen acres were hayed, plowed, and seeded with alfalfa. Seed was provided by JD Seeds Nampa, ID. Surpass 5 star coated alfalfa was used. Due to the high cost of alfalfa and the lack of local alfalfa stock, alfalfa hay has become very hard to find.

Black Cottonwood

One hundred and forty black cottonwood trees (*Populus balsamifera*) were planted in areas not included in CREP (Figure 9). Stock was purchased locally from Genie's Jungle. One hundred of the cottonwoods were purchased at \$25 a plant and the remaining plants were \$13. There was a difference in price because the quality of the plants. The 40 plants were stressed (not watered) in summer for a week leaving them stunted. The nursery did a good job rejuvenating them but still had to sell them at a lower price. The 40 stressed plants were placed in and around the wetter sites to ensure better survival.

Figure 8: Weed control grass (green) Alfalfa (red).

Figure 9: Black cottonwood planting.

Research and Monitoring

Several studies and monitoring projects continued in 2008. Projects included fish studies, greater sage grouse lek counts, migratory bird surveys, small mammal population analysis, bat surveys, and stream monitoring.

Fish

The Burns Paiute Tribe Natural Resource Department continued redband trout life history studies on mainstem Malheur River tributaries in 2008. The aquatic habitats of the Malheur River Wildlife Mitigation Property are commonly utilized by redband trout. Objectives for 2008 were: 1) Determine population trend for redband trout, and 2) Describe the genetic makeup of redband trout. Research efforts have been funded through the project entitled Evaluation of the Life History of Native Salmonids in the Malheur River Subbasin.

Redband trout populations for the property and associated area have only periodic inventory assessments prior to 2007. In 2007, the Tribe and Oregon Department Fish and Wildlife conducted a Subbasin wide population estimate utilizing backpack electrofishing methodologies and determined the population of 1+ redband trout (>70mm fork length) to be approximately 156,200 (Schwabe et al. 2008). Trend data is needed to track population response to

environmental conditions versus management actions. The Burns Paiute Tribe is developing a Malheur River Subbasin Native Salmonid Monitoring Plan that shall create a sampling protocol and incorporate inter-agency participation.

The Malheur River Wildlife Management Plan (Ashley 2004) lays out a preliminary framework that will allow for evaluation of the efficacy of employed strategies in achieving Project habitat objectives. In 2008, the Tribe enrolled tributaries of the Malheur flowing through the property into CREP. According to our contractual agreements, CREP riparian plantings will occur in 2009. The Management Plan defines the need to evaluate success of habitat management strategies, via monitoring of wildlife species response. It is proposed that the Tribal Natural Resource Department intend to maintain native fish monitoring sites associated with the property to determine population trend of native salmonids, particularly redband trout, starting in 2010. Nevertheless, insufficient number of sites was identified for the Subbasin limiting population trend data for the property. Therefore, the Tribe has included a total of 5 sites to schedule so that independent, precise monitoring can be implemented. The sample schedule illustrated in Table 2 is on a 5 year cyclic sampling regime.

Redband genetic samples were taken from tributaries in the mainstem Malheur Wildlife Mitigation Site area in 2007 and 2008. Redband tissues were collected from several tributaries including: 1) Black Canyon Creek, 2) Canyon Creek, 3) Hunter Creek, 4) Pole Creek, and 5) Hog Creek. Genetic samples consisted of pelvic fin clips up to 3mm maximum length in any dimension. The goal of the genetic research is to determine genetic integrity of redband trout and assist managers directly by:

- Assessing current and future genetic risks,
- Preserving existing genetic variability,
- Delineating and prioritizing local populations for conservation and management purposes,
- Estimating effective population size,
- Understanding genetic population structure,
- Identifying suitable populations for translocations and reintroductions,
- Identifying suitable populations for broodstock development, and
- Addressing genetic concerns in possible future ESA petitions.

Table 2: Native Fish Monitoring Sites

Sample Year	Population Site ID	Stream	Zone	Start UTM Easting	Start UTM Northing
1	MalRiv-0031	Hog Creek	11	439238	4849561
1		Hunter Creek	11	423722	4841299
2	MalRiv-0047	Black Canyon Creek	11	428918	4849847
2		Canyon Creek	11	422795	4840889
3		Pole Creek	11	423519	4851250
4		Hunter Creek	11	420305	4844132
5		Black Canyon Creek	11	429103	4850457

Greater Sage Grouse Lek Counts

Sage grouse surveys were conducted in coordination with ODFW. Counts occurred primarily on Tim's Reservoir and Roy Reservoir, but four additional lek sites were observed, i.e. Antelope Swale, McCloud Reservoir, Upper Decon Flat and Bull Canyon Reservoir (Appendix C).

To ease information transfer, Oregon Department of Fish and Wildlife has assigned the following lek sites with site numbers:

Roy Reservoir = Squaw Creek Lek or Site # MA0075-01

Tim's Peak Reservoir = Tim's Peak Lek or Site # MA0077-01

McCloud Reservoir = McCloud Reservoir or Site # MA0076-01

We contacted Christian Hagen, the ODFW Sage Grouse Conservation Coordinator, to receive any historical lek count data he had on file for leks on the Property. The absence of regular lek counts on ODFW record made it difficult to draw any conclusions on population trends of individual leks. In general, attendance at Roy's Reservoir seems to have declined since 1987, the counts at Tim's Peak are consistent with data dating back to 1984, and only two counts from 1996-2008 at Upper Decon Flat show attendance relatively consistent (Appendix C). Data suggests McCloud Reservoir is no longer an active lek. Bull Canyon, whose attendance in 1994 was only 3 birds, may be inactive now as well, based on a single visit in 2008 (Appendix C).

Receiving lek count data from Christian Hagen pointed to some missteps in the communication process between ODFW and BPT. For example, ODFW had some volunteer lek counters in 2006 and 2007 submitting data on leks we were already visiting on a regular basis. In some cases the volunteer counters had arrived after us to a lek on the same day we'd made a count. The pool of volunteer lek counters is small compared to the number of leks that go uncounted in Harney and Malheur Counties in a given year. The miscommunication meant a waste of valuable volunteer resources at the state level.

Looking over the data revealed other miscues between ODFW and BPT. For one, ODFW records had a Tim's Peak Reservoir 1 and 2 listed whereas we were only aware of a single lek in the area. Similar problems were revealed in the records of Upper Decon Flat, where historically an Upper Decon Flat 1, 2 and 3 had been recorded. Again we were only aware of a single lek at Upper Decon Flat, although data from the leks suggest the other two are likely inactive. The final problem discovered in cross-referencing lek count data was the name ascribed to a particular lek. The lek we visited named Antelope Swale Reservoir could have been one of two leks named differently by ODFW, either Wildhorse Basin or Big Swale Reservoir.

We discussed these problems at length with Christian Hagen. We decided to meet on January 22, 2009 to accomplish the following:

- Compare lek waypoints to discover discrepancies in the naming of leks. Assign site numbers to all leks on the Project to alleviate future confusion.
- Get locations of Project leks previously unknown to BPT biologists, even those suspected of being inactive.

- Coordinate lek visits between agencies so BPT is responsible for specific leks. This will allow count volunteers to be better allocated to other leks in the county.
- Review sampling protocol used by ODFW to make sure count data and number of visits/year are consistent with the state agency's goals for mapping lek attendance.

Migratory Bird Surveys

Bird surveys were conducted on three occasions beginning on May 13th, May 27th, and June 12th. We utilized protocols developed by Huff et al. (2000). All 2008 data was provided to the Interactive Habitat and Biodiversity Information System for the Columbia Basin (IBIS) for inclusion in their database.

Five transects were monitored within 4 different habitat types. The five transects were divided between day 1 and day 2 surveys so two transects were completed on survey day 1 and three transects were completed on survey day 2. This enabled us to complete surveys within the assigned time period relating to early morning bird activity. Within each transect, 5 locations were established as points to conduct the counts (Table 2). Individual birds detected by sight or sound during the 5 minutes at each survey point were counted only once. Detections were classified as a Typical Detection or as a Flyover Detection.

Typical Detections were further classified by distance from the survey point (0-50m or >50m) and by the timeframe the detection was recorded (during minutes 0-3 at the survey point or during minutes 3-5). Flyover Detections were further classified by the timeframe the detection was recorded (similar to a Typical Detection) and then as an Associated Flyover or Independent Flyover. By definition an Associated Flyover occurred when a bird was detected in flight that could be found utilizing the habitat the survey was taking place in. Conversely, Independent Flyover was a bird detected in flight that was likely just passing through, i.e. the species had no known affinity to the habitat type being surveyed. Independent Flyovers could also be a bird seen far in the distance, like a soaring raptor, that were not currently using the habitat but potentially could. Birds heard that were suspected of being within earshot only from an adjacent habitat were not counted in the survey. For instance, the calls of a sandhill crane from a riparian area that could be heard while surveying in the upland habitat was not counted as a detection.

Two analyses were conducted with the assistance of FLIGHT ATTENDANT 4 (www.fs.fed.us/pnw/bird-populations) (Brown and Huff 2000), to compare 2006, 2007 and 2008 data. The first analysis compared bird species presence between year and habitat type (Appendix C pg. 2-5). In 2006 each transect was surveyed only once. Bird species presence between year and habitat type in 2006 are thus recorded as whole numbers representing actual count. Beginning in 2007, and continued in 2008, the survey protocol was expanded so each transect was visited three times with a two week timeframe between visits. The Bird Species Presence between Year and Habitat Type data for 2007 and 2008 in Appendix C (pg. 2-5) is a total of individual species detected for each transect of the corresponding year divided by the number of visits in that year (3). As habitat restoration continues on the Project, we hope to document higher occurrences of rare, endemic and habitat-specific species over common birds and habitat

generalists. In this manner avian detections will help us quantify restoration successes between habitat types as they move towards historical conditions.

The second analysis (Appendix C pg. 6-9) tabulated avian relative abundance within the surveyed habitat types. Relative abundance data provides insights into changes in species' importance on the landscape over time in relation to the total number of avian individuals utilizing the habitat. Relative abundance also mitigates for survey variables between visits. For example, poor weather, such as rain or high wind, would likely decrease the number of detections of all species during a given visit. However, species relative abundance would remain relatively static vs. count data which, in the example of inclement weather, would undoubtedly fluctuate.

We expect in coming years, when the bird survey dataset grows, we will be able to do more complex analysis of the data. A larger sample size, a greater number of years available for cross-reference, and an increasing depth in temporal variation for our habitat improvements will lead us to more poignant insights and evaluations.

Table 3: Point Count Locations (NAD 27 CONUS)

Day 1		Day 2	
Transect #1 Meadow		Transect #3 Wetlands	
Easting	Northing	Easting	Northing
a. 425388	4849929	a. 425159	4849380
b. 425505	4849875	b. 425253	4849528
c. 425632	4849828	c. 425371	4849267
d. 425782	4849741	d. 425676	4849282
e. 425921	4849647	e. N/A	
Transect #2 Riparian		Transect #4 Uplands	
Easting	Northing	Easting	Northing
a. 426189	4849429	a. 425830	4848924
b. 426302	4849460	b. 425860	4848805
c. 426373	4849527	c. 425993	4848803
d. 426479	4849609	d. 426151	4848837
e. 426608	4849679	e. 426050	4848958
		Transect #5 Uplands	
		Easting	Northing
		a. 426629	4847763
		b. 426691	4847890
		c. 426601	4848048
		d. 426693	4848165
		e. 426698	4848283

Small Mammals

An assessment of small mammal population trends was conducted for the second consecutive year. Trapping protocol was adapted from the Monitoring and Evaluation Plan for the Albeni Falls Wildlife Mitigation Project (2002). A scientific taking permit was acquired from ODFW

prior to the trapping effort, and a trap report was submitted upon conclusion to complete the reporting requirements of the permit. Capture was accomplished using Sherman live traps and a rolled oat and peanut butter bait within three distinct habitat types, i.e. sagebrush steppe, riparian and an agricultural field.

In the sagebrush steppe and agricultural field habitat types, 100 Sherman live traps were spaced 10m apart in a 100m x 100m area. The origin for the trap area in the sagebrush steppe was at UTM E425895 N4849287 (NAD 83). The first trap was set at the origin. From the origin traps were set every 10m along two perpendicular lines running to the south and to the east, to a distance in each direction of 100m. Traps were then set within the right angle of the two lines created to make a 100 trap grid design. With the trap area origin of UTM E426349 N4849497 (NAD 83), an identical trap design was employed in the agricultural field. However from the origin in the agricultural field the perpendicular trap lines were run to the south and to the west.

The trap setting protocol had to be slightly amended in the riparian habitat. Only 83 traps were set in the riparian, because a continuation of the trap grid design further from the designated trap area origin at UTM E425734 N4849710 (NAD 83) would have led to the remaining 17 traps being set out of the riparian area into the adjacent meadow. Otherwise the trap setting protocol in the riparian remained consistent. The two perpendicular lines ran to the south and to the west from the trap area origin.

Fifteen individuals of three different species were captured during a total of 566 trap nights. In the sagebrush steppe, 200 trap nights (100 traps x 2 days) yielded one species; the deer mouse (*Peromyscus maniculatus*) ($n=2$). One hundred sixty-six trap nights in the riparian (83 traps x 2 days) yielded 3 species; deer mouse ($n=10$), montane vole (*Microtus montanus*) ($n=1$), and Great Basin pocket mouse (*Perognathus parvus*) ($n=1$). In the agricultural field, 200 trap nights (100 traps x 2 days) caught only 1 deer mouse. Upon capture, individuals were weighed, sexed and aged. Individuals trapped during the first capture event were marked for potential recapture by shaving a small patch of fur from the rump. All 5 deer mice caught on the first night in the riparian were recaptured, along with 5 new captures, on the second night. The Great Basin pocket mouse captured in the riparian on night 1 was also recaptured on night 2.

In 2007 population analysis was conducted using the Lincoln-Petersen estimator (Williams et al. 2002). However the number of captures was so low that the formula for estimating population size was ineffective. Also, upon further research we discovered that if we wanted to continue to estimate population size using this model, our trapping effort would need to be of a much larger scale for our estimates to be accurate.

Looking into our options further, we found an accepted methodology of mapping small mammal trend data consistent with the scope of our current trapping effort. The methodology involves extrapolating on the catch with the actual number of traps set to find the estimated number of individuals that would be caught if 1000 traps were placed. The output is derived in the following manner:

$$N/\text{actual trap nights} = \text{catch unit per effort}$$

N is equal to the number of individuals of each species caught in the habitat type over the two night period. N is then divided by actual trap nights for the habitat type (in our case 200 equal to 100 traps x 2 days in the sagebrush and agricultural *or* 166 equal to 83 traps x 2 days in the riparian) to derive the catch unit per effort. Next:

$$\text{catch unit per effort} \times 1000 = \text{estimated catch per 1000 traps}$$

Estimated catch for 2008 is summarized in Table 4.

Table 4: Summary of Small Mammal Trapping Effort

Estimated Catch Per 1000 Traps								
	Deer Mouse		Montane Vole		Ord's Kangaroo Rat ¹		Great Basin Pocket Mouse	
Location	2007	2008	2007	2008	2007	2008	2007	2008
Riparian	6	90	-	5	-	-	-	12
Field 16	-	5	-	-	-	-	-	-
Sagebrush	-	10	-	-	-	-	-	-

¹Ord's Kangaroo Rat was caught in a previous trapping effort but was not recaptured in 2007 or 2008.

Individuals will still be marked on the first night of capture so we can continue to record recapture data as a potential secondary analysis tool in the future. Individuals caught twice under the new system will be counted twice. In 2009 we plan to implement trap pre-baiting three days prior to the two day trap event in an effort to increase the number of small mammals caught. Otherwise the trapping protocol will remain the same.

Bat Surveys

Four sites were established in 2008 using Bat Draft Protocol (Appendix E). Four sites utilized acoustic sampling methods (Deadhorse Creek, Hunter Creek, Jonesboro Canal and Sidehill springs) with mist netting only occurring in Deadhorse Creek. No bats were caught with the mist nets. U.S. Forest Service helped conduct the bat surveys. Pat Ormsbee, Bat Specialist directed Aimee Hart (technician) to assist with the surveys.

Eight bat calls were collected at Deadhorse Creek (UTM NAD 27 11 T 426647, 4845194) – long-eared myotis (*Myotis evotis*) and western small-footed myotis (*Myotis ciliolabrum*) were confirmed from these calls. In addition to western small-footed myotis calls, there were calls with characteristic frequencies of 40 KHz that could not be identified to species. Other such species would include little brown bat (*Myotis lucifugus*) and long-legged myotis (*Myotis volans*). Because Deadhorse Creek is in shrub-steppe habitat, the likelihood of finding long-legged myotis was reduced as they tend to be associated with forests. Because they can be difficult to identify acoustically, both species are best detected via capture methods.

Fifteen bat calls were collected at Hunter Ck (UTM NAD 27 11 T 427450, 4839373) – western small-footed myotis and pallid bat (*Antrozous pallidus*) were confirmed and there was strong evidence for little brown bat.

Sixteen bat calls were collected at Jonesboro Canal (UTM NAD 27 11 T 424975, 4849530) – western small-footed myotis, silver-haired bat (*Lasionycteris noctivagans*), and hoary bat (*Lasiurus cinereus*) were confirmed, there was strong evidence that little brown bat was present. Calls with 50 KHz characteristic frequencies also were collected, but it could not be determined conclusively if they were yuma myotis (*Myotis yumanensis*) or California myotis (*Myotis californicus*).

Fifty-seven Bat calls were collected at Sidehill Spring Trough (UTM NAD 27 11 T 427348, 4844378). Western small-footed myotis and long-eared bat were confirmed and there was strong evidence that little brown bat also could have been present.

This data is from 1 night of survey in September, 2008. One night of survey is inadequate to establish a species list for this area of interest. Additionally, to establish a species list associated with the reproductive season (summer), surveys need to be conducted June-August. Based on these results, there are indications that each of these sites provide foraging, watering, or commuting habitat for bats. Additional surveys, including capture and acoustic methods, would result in a more complete inventory of bat species associated with these sites and a better understanding of the importance of the sites as bat habitat. Additionally, the presence of pallid bat, a sensitive species in Oregon, warrants further investigation as to its prevalence and demographics.

Stream Surveys

Stream photos were taken at 9 points on the Project to monitor vegetative components and changes in stream structure due to the enrollment of CREP (Appendix F). An upstream-downstream azimuth was obtained to make the direction of the photograph was taken in repeatable on subsequent visits. Stream photos were not taken to quantify changes; rather the photos will be used as a qualitative analysis tool for visual historic reference.

Administration

Cultural Resources

Federally funded projects require an environmental review of all ground disturbing activities before project implementation can begin. This often entails a cultural resources survey with Tribal and SHPO consultation. The 2008 cultural survey report (Peterson, 2008) was received in August, available for review within Tribal and SHPO records.

Grants

Two substantial floods occurred in 2006. The first occurred in January when an ice dam broke upstream containing a major amount of water. The resulting rush of water destroyed the irrigation dam and breached the banks of the river. All the meadows were flooded, and damage was caused to irrigation canals as the amount of water entering the system was uncontrollable.

After limping through 2 irrigation seasons, ODFW engineers decided they didn't want to place a fish passage structure on the damaged irrigation dam. This left the Tribe with a successful grant from USFWS of \$49,962. After asking the Malheur OWEB grant agency what funds would be available to repair the dam, they suggested removing the old dam entirely and replacing it with a fish passage rock weir dam constructed by USFWS. The Tribe's plan is to apply over the winter of 2008 for BPA's Budget Oversight Group (BOG) grant to cover the remaining cost of construction.

Access

A large number of access permits were requested in 2008. The main land use for the request was for upland bird hunting. A summary of hunter effort and success is provided (Table 4). The table summarizes all reports that provided both hunter hours and harvest information. Six additional permits provided a harvest of 9 upland birds and 42 waterfowl but did not report hours, therefore were not included in the harvest statistics. Three fishing permits were issued with 0 fish taken. There were 6 geese harvested; 4 white-fronted and 2 Canada. This was the first time geese have been harvested on the Project's access reports.

Tribal members were allotted five deer and five elk Land Owner Preference tags. Five tags of each species were utilized, resulting in no harvest.

Table 5: Access Requests and Harvest Statistics

Year	Permits Issued	Returned Reports	Hunter Days	Hours Hunting Upland*	Hours Hunting Waterfowl	Upland Harvested*	Waterfowl Harvested	Birds/ Hunter Hours
2005	47	24	125	230	-	200	-	0.87
2006	58	36	189	225.25	51.5	238	61	1.08
2007	35	29	194	205	73	122	66	0.68
2008	30	15	45	105	45.5	63	35	0.65

* 2005 data did not separate between upland and waterfowl for both hours hunted or harvest.

Project Income

The Projects memorandum of agreement (MOA) requires the reporting of all project generated income and the expenditures covered by the income. A summary of all activities is included (Table 6).

Staff

The Project's success can be attributed to the following staff members:

Lawrence Schwabe – Natural Resources Director
David Speten – Former Wildlife Program Manager
Jason Kesling – Wildlife Program Manager
Chad Abel – Wildlife Biologist

Neil Lunt – Ranch Manager
Daniel Brown – Fish Technician
Lucas Samor – Technician
Dave Watson – Technician

Accounting of Project Generated Income		
Description	Amount	Balance
Beginning Balance		\$283.68
House Rental	\$2,900.00	\$3,183.68
Interest Income	\$1,291.84	\$4,475.52
Grazing Income	\$25,462.62	\$29,938.14
CREP	\$61,916.00	\$91,854.14
Hay Sales	\$7,808.05	\$99,662.19
Misc. Income	\$120.00	\$99,782.19
Land Repurchase (ODOT)	\$7,179.27	\$106,961.46
Property Taxes	-\$3,666.07	\$96,116.12
Indirect	-\$2,705.50	\$93,410.62
Supplies	-\$1,953.25	\$91,457.37
Misc. Expenditures	-\$2,500.98	\$88,956.39
Salaries and Fringe	-\$4,867.15	\$84,089.24
Capital Equipment	-\$6,000.00	\$78,089.24
Land Purchase	-\$4,941.00	\$73,148.24
Ending Balance		\$73,148.24

Table 6: Project Generated Income and Expenses Covered

REFERENCES

- Albeni Falls Interagency Work Group. 2002. Monitoring and evaluation plan for the Albeni Falls Wildlife Mitigation Project.
- Ashley, Paul R. 2005. Malheur River Wildlife Management Plan. Lone Pine Butte Consulting. Spokane, Washington.
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- Huff, Mark H.; Bettinger, Kelly A.; Ferguson, Howard L.; Brown, Martin J.; Altman, Bob. 2000. A habitat-based point-count protocol for terrestrial birds, emphasizing Washington and Oregon. Gen. Tech. Rep. PNW-GTR-501. Portland, OR: U. S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 39p.
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- U.S. Forest Service. 1993. North Fork Malheur scenic river management plan. Malheur National Forest, John Day, Oregon.
- Williams, B.K., J.D. Nichols, and M. J. Conroy. 2002. Analysis and Management of Animal Populations. Academic Press, San Diego, CA. 817p.

Appendix A

Noxious Weed Chemical Tables

Telar Mix Sheet

Use Telar to control Blue Mustard, Tumble Mustard, Perennial Pepperweed, Whitetop, Poison Hemlock, Puncture Vine, Kochia, Bur Buttercup, and Russian Thistle.

The amounts of product to mix are calculated at application rates of:

Telar 1.5 oz/Acre

Weedmaster/Banvel 2,4-D 1.5 pt/Acre

Syltac 2 oz/Acre

Mixing Instructions

- 1) Fill a 1 gallon bucket with water and 2 tablespoons of household ammonia then add Telar and mix until dissolved*
- 2) Fill sprayer 1/4 full of water*
- 3) Add Telar solution, then weedmaster 2,4-D, and then Syl-tac*
- 4) Finish filling sprayer with water*

Amount of Product to Measure for Each Sprayer

3 Gal Sprayer: 1.3 grams Telar + 1 oz. 2,4-D + .5 oz. Syl-tac
Spot Spray Solution
(100 gallons/acre)

15 Gal. ATV Sprayer: .2 oz. Telar + 5 oz. 2,4-D + 2.5 oz. Syl-tac
Spot Spray Solution
(100 gallons/acre)

20 Gal. ATV Sprayer: .3 oz. Telar + 6 oz. 2,4-D + 3 oz. Syl-tac
Spot Spray Solution
(100 gallons/acre)

25 Gal. ATV Sprayer: .4 oz. Telar + 8 oz. 2,4-D + 4 oz. Syl-tac
Spot Spray Solution
(100 gallons/acre)

200 Gal. Tractor Sprayer: 7.5 oz. Telar + 2 gallons 2,4-D + Broadcast
Spray Solution 32 oz. Syl-tac
(40 gallons/acre)

Milestone Mix Sheet

Use Milestone to control thistle, Rush Skeleton weed and knapweed species.

The amounts of product to mix are calculated at application rates of:

Milestone 6 oz/Acre

Syltac 6.4 oz/Acre

Mixing Instructions

- 1) Fill sprayer 1/4 full of water*
- 2) Add Milestone and then Syl-tac*
- 3) Finish filling sprayer with water*

Amount of Product to Measure for Each Sprayer

3 Gal Sprayer: .2 oz. Milestone + .5 oz. Syl-tac
Spot Spray Solution
(100 gallons/acre)

15 Gal. ATV Sprayer: .9 oz. Milestone + 2.5 oz. Syl-tac
Spot Spray Solution
(100 gallons/acre)

20 Gal. ATV Sprayer: 1.2 oz. Milestone + 3 oz. Syl-tac
Spot Spray Solution
(100 gallons/acre)

25 Gal. ATV Sprayer: 1.5 oz. Milestone + 4 oz. Syl-tac
Spot Spray Solution
(100 gallons/acre)

200 Gal. Tractor Sprayer: 30 oz. Milestone + 32 oz. Syl-tac
Broadcast Spray Solution
(40 gallons/acre)

Journey Mix Sheet

Use Journey to control Medusahead Rye and Cheatgrass. Journey will also control Bur Buttercup and Annual Mustards.

The amounts of product to mix are calculated at application rates of:

Journey 12 oz/Acre

Syltac 6.4 oz/Acre

Mixing Instructions

- 1) Fill sprayer 1/4 full of water*
- 2) Add Journey, and then Hasten*
- 3) Finish filling sprayer with water*

Amount of Product to Measure for Each Sprayer

3 Gal Sprayer: 2.5 oz. Journey + .5 oz. Syl-Tac
Spot Spray Solution
(100 gallons/acre)

15 Gal. ATV Sprayer: 12 oz. Journey + 2.5 oz. Syl-Tac
Spot Spray Solution
(100 gallons/acre)

20 Gal. ATV Sprayer: 16 oz. Journey + 3 oz. Syl-Tac
Spot Spray Solution
(100 gallons/acre)

25 Gal. ATV Sprayer: 20 oz. Journey + 4 oz. Syl-Tac
Spot Spray Solution
(100 gallons/acre)

200 Gal. Tractor Sprayer: .5 gallons Journey + 32 oz. Syl-Tac
Broadcast Spray Solution
(40 gallons/acre)

Banvel / Weedmaster/ 2,4-D Mix Sheet

Use to control Blue Mustard, Tumble Mustard, Perennial Pepperweed, Whitetop, Poison Hemlock, Puncture Vine, Kochia, Bur Buttercup, and Russian Thistle within native grass plantings.

The amounts of product to mix are calculated at application rates of:

Chemical 1.5 qt/Acre

Syltac 6.4 oz/Acre

Mixing Instructions

- 1) Fill sprayer 1/4 full of water*
- 2) Add Journey, and then Hasten*
- 3) Finish filling sprayer with water*

Amount of Product to Measure for Each Sprayer

3 Gal Sprayer: 1 oz. Chemical + .5 oz. Syl-Tac
Spot Spray Solution
(100 gallons/acre)

15 Gal. ATV Sprayer: 5 oz. Chemical + 2.5 oz. Syl-Tac
Spot Spray Solution
(100 gallons/acre)

20 Gal. ATV Sprayer: 6 oz. Chemical + 3 oz. Syl-Tac
Spot Spray Solution
(100 gallons/acre)

25 Gal. ATV Sprayer: 8 oz. Chemical + 4 oz. Syl-Tac
Spot Spray Solution
(100 gallons/acre)

200 Gal. Tractor Sprayer: 2 gallons Chemical + 32 oz. Syl-Tac
Broadcast Spray Solution
(40 gallons/acre)

Appendix B

CREP Planting Plan

Tree/Shrub Establishment

Conservation Practice Job Sheet

Natural Resources Conservation Service, Oregon

612a-OR-JS

APRIL 2006

Client: Burns-Paiute Tribe

Photo courtesy of NRCS

Tree/Shrub Establishment

Establishing woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration.

Purposes

- establish woody plants for forest products
- wildlife habitat
- long term erosion control and improvement of water quality
- treat waste
- Improve or restore natural diversity
- store carbon in biomass
- energy conservation
- enhance aesthetics.

Where Used

- On any area where woody plants can be grown.

General Requirements

On forestland, Oregon's Forest Practices Act, requires the landowner to obtain a permit for planting and associated activities. The landowner shall obtain all necessary permits prior to commencing practice installation.

Planting dates, and care in handling and planting of the seed, cuttings or seedlings will ensure that planted material have an acceptable rate of survival. Plant trees and/or shrubs, when dormant, and the soil is not frozen (see table 1). Plant high elevation areas shortly after snow melt. Plant on cloudy, high humidity, calm days.

Only viable, high quality and adapted planting stock or seed will be used. Rooted seedling stock shall be a "Plug" (one season in a container) or a 2+0 bareroot seedling. The first number indicates number of seasons in a nursery bed, and the second number indicates seasons in a transplant (outside) bed. Cuttings and whips shall be a minimum of 12 inches long, have a minimum small end diameter of 1/4" for shrubs and 3/8" for trees, and contain at least 3 lateral buds. Buds shall be firm and show no evidence of new growth.

Where frost heaving occurs, plant bareroot stock only.

Where moisture is limiting, summer heat is intense, or plant competition is severe, plant seedlings with well developed root systems, such as Plug + 1 or 2 + 1. A 1:1 shoot to root ratio is desirable.

Where moisture is not limiting, but plant competition and/or browsing problems are significant, plant tall, well developed seedlings, such as 1 + 1 or 2 + 1.

Shrub plantings shall be either containerized or bare root stock. Container plantings shall not be larger than 2 gallon. Bareroot stock shall not be larger than 24 inches in height, unless extenuating environmental circumstances call for taller plants. Shoot to root ratio shall not exceed 1.5 : 1.

Where disease is a concern, limit planting stock to species that are resistant or immune to the disease. Such as, sites infected with Laminated root rot (*Phellinus weirii*), which is very common in western Oregon, plant species listed below:

Resistant Species

- Incense cedar, Ponderosa pine, Western red cedar

Immune Species

- Bigleaf maple, Red alder,
- Pacific madrone, Tanoak,
- Oregon Ash, Poplar, Cottonwood

Site preparation shall be sufficient for the site. See practice 490 Tree/Shrub Site Preparation for specifications.

Timing and use of planting equipment will be appropriate for the site and soil conditions. A tree planting machine is efficient on flatter slopes. Use on slopes less than 10 percent. Hand plant any site.

TREE/SHRUB ESTABLISHMENT SPECIFICATION SHEET**Planting Dates For All Plantings**

Table 1. General planting dates by MLRA and elevation

MLRA	Elev Range	Start Date	End Date
A1	0- 3700	12/1	4/1
A2	0- 499	12/1	3/1
A2	500- 1700	12/15	3/15
A3	650- 1999	12/15	3/15
A3	2000- 2999	3/15	5/31
A3	3000- 3999	4/1	6/1
A3	5000- 6000	4/15	6/15
A4	0- 2999	12/1	4/15
A5	2000- 2999	11/15	4/15
A5	3000- 3999	3/15	5/15
A5	4000- 5000	4/1	6/15
B6	950- 1999	3/15	5/15
B6	2000- 2999	3/15	6/1
B6	3000- 3999	4/1	6/15
B6	4000- 4999	4/15	6/15
B6	5000- 7000	5/1	6/15
B7	800- 1600	3/15	5/1
B8	800- 3400	3/15	5/15
B9	1600- 2999	4/1	6/15
B9	3000- 5000	4/15	6/15
B10	2200- 3999	4/1	5/15
B10	4000- 6000	4/15	6/1
B11	2100- 3000	3/15	5/1
D21	4000- 6000	4/1	6/1
D23	4400- 5999	4/1	5/1
D23	6000- 8000	4/15	5/15
D24	3900- 5999	4/1	5/1
D25	4500- 5999	4/15	5/15
E43	1300- 2999	3/15	5/15
E43	3000- 4999	3/15	6/1
E43	5000- 6999	4/1	6/1
E43	7000- 9600	4/15	6/15

Planting for Forest Products

Planting or seeding rates will be adequate to accomplish the planned purpose. Below are recommended planting rates, trees per acre, (for timber production) based on site productivity.

MLRA 1,2,3,4,5	SITE CLASS		
SPECIE	I, II	III	IV,V
Douglas fir	436	360	302
Grand/Noble fir	436	360	302
Western hemlock	436	360	302
Sitka spruce	436	360	302
Ponderosa/Sugar pine	302	258	194
Western red cedar	436	360	302

MLRA 6,8,9,10,21,23,24,25,43	SITE CLASS		
SPECIE	I, II	III	IV,V
Douglas fir	302	258	222
Ponderosa pine	258	194	150
Lodgepole pine	436	302	222
Western Larch	302	258	222
White/Grand fir	302	258	222
W. white pine	302	258	222

Trees per Acre

- 436
- 360
- 302
- 258
- 222
- 194
- 150

Spacing (ft)

- 10 x 10
- 10 x 12
- 12 x 12
- 12 x 14, or 13 x 13
- 14 x 14
- 15 x 15
- 17 x 17

Species will be adapted to site conditions and suitable for the planned purpose.

For Christmas tree production, plant no closer than 4x4 or farther than 8x8. Exact spacing should be based on cultivation or spraying equipment.

Seedling Protection for All Plantings

Seedlings shall be protected from any agent that will inhibit growth or cause mortality. These are competing vegetation, browsing animals, excess heat and drought.

Competing Vegetation

Competing vegetation will be kept away from planted seedling. See Forest Stand Improvement specification for detailed information.

Mulch may be used to control some types of vegetation. Paper, geo-textile, plastic, rock, etc. may be used. See Mulching specification #484 for additional detail.

Browsing Animals

Protection of seedlings from browsing animals can be accomplished by one of the following:

- Fencing (see Fencing spec. # 382)
- Whole tree nets of 6-15 mil photodegradable polypropylene mesh.
- Whole tree protectors of 50 mil photodegradable polypropylene mesh tubes, photodegradable polypropylene solid tree tubes, or of spun polyester (Reemay) sleeves, 2-5 inches in diameter, and 2-3 feet in length.
- Terminal bud protectors of 50 mil photodegradable polypropylene mesh tubes, or of spun polyester (Reemay) sleeves, 1-3 inches in diameter, cut to length of enclose the leader and leave 4-8 inches above the end of the leader to allow for growth.
- Budcaps shall be of spun polyester (Reemay) sheets or weatherproof paper cut into 4 by 5 inch rectangular pieces.

• Protective devices shall be secured:

- Fold budcaps lengthwise and staple around the terminal leader and bud, forming a protective cylinder.
- Staple leader tubes to small branchlets along the leader to prevent coming off during high winds.

TREE/SHRUB ESTABLISHMENT SPECIFICATION SHEET

- Secure net tubes with pins of 9 gauge wire, ≥ 12 inches long, hooked through the mesh and pressed into the ground.
- Support sleeves and tubes with a 3-4 foot stake, wood or bamboo, driven into the soil next to the seedling and secured to the stake by ties.

Maintenance of Protective Devices

- Inspect and replace, repair, remove, or adjust devices.
- Budcaps and sleeves may need adjustment (upward) to protect trees until beyond grazing or browsing.
- Nets and tubes may require physical removal (generally on north slopes) to prevent girdling.

Chemical repellants may be used. See Forestry Tech Note # 23. Repellants must be applied correctly or damage to seedlings may occur. Most will need reapplication; inspect for reapplication needs.

Physical removal of animal pests by trapping and/or hunting is feasible. Follow State and local hunting and trapping regulations.

Protection from Excessive Heat

Where excessive heat causes mortality (generally south facing slopes), apply shade cards or collars to newly planted seedlings. Shade cards may be made of heavy weatherproof cardboard, wood, styrofoam, etc. Cards shall be 8" x 12", collars shall be 3" in diameter and 4 inches high. Attach cards to wire or wood stake to hold in place. Place 3 inches from seedling. Place on the south side of the seedling with an east-west orientation. Place shade card as close to the ground as possible. Inspect at least annually until successful seedling establishment

Protection from Drought

If soil moisture is very limited and irrigation water is available apply water at a rate of 1 gallon per tree soon after planting. Recommended rates are 1 gallon per week the 1st growing season, two gallons per week the 2nd growing season and 3 gallons per week the 3rd growing season. See Irrigation system and irrigation water management.

Discontinue watering in the late summer to allow trees and shrubs to harden off. In late fall, if soil moisture is depleted, a deep watering is recommended to prevent winter desiccation damage.

Planting for Wildlife Habitat

Establish multiple plant species for wildlife habitat specie diversity. Plant species desirable to targeted wildlife. The area shall be comprised of trees and shrubs. If trees are present plant adapted shrubs. If shrubs are present plant adapted trees. Establish plants in a non-linear planting regime. Plant native species, when feasible. Non native species are acceptable if they do not spread.

Planting for Storing Carbon in Biomass

Plant tree species that sequester high quantities of carbon. Plant at rates that fully stock the stand. Base planting rates on the soil site index for the specie being planted, or amount of carbon to be sequestered.

Plans and Specifications

Specifications shall be prepared for each site and purpose and recorded using approved specification sheets, such as Tree/Shrub Establishment 612 OR-Specification or other acceptable documentation.

Operation and Maintenance

The area of treatment will be periodically inspected and protected from adverse impacts from insects, disease, livestock, competing vegetation, wildlife and fire damage.

Trees/shrubs shall be replanted to maintain adequate stocking to accomplish the intended purpose. Removal, incorporation, bio- or photo-degradation of tree protective devices and associated materials shall be consistent with the intended purpose and site conditions.

Operation of equipment near and on the site shall not compromise the intended purpose of the tree planting.

Properly collect and dispose of artificial materials after intended use.

Competing vegetation will not impede seedling growth. See Forest Stand Improvement specification for additional details.

Natural Resources Conservation Service, Oregon

TREE/SHRUB ESTABLISHMENT SPECIFICATION SHEET

Client	Burns-paiute Tribe	Farm/Tract	2470
Location		County/SWCD	Malheur-Ontario
Planner	Ed Petersen	Date	9/5/08
Project Size	24 acres	Topo. Map	

DESIGN APPROVAL:

Practice Code NO.	PRACTICE	LEAD DISCIPLINE	CONTROLLING FACTOR	UNITS	JOB CLASS				
					I	II	III	IV	V
612	Tree/Shrub Establishment	BCSD For	Precipitation	Inches	>25	18-25	12-17	8-11	All
This practice is classified as Job Class (check one):					☐	☐	☐	☒	☐

Design Approved by:/s/ Eric L. L. L.Date: 11-9-08Job title: Senior Forest Manager, ODF

CLIENTS ACKNOWLEDGEMENT STATEMENT:

The Client acknowledges that:

- They have received a copy of the specification and understand the contents and requirements.
- It shall be the responsibility of the client to obtain all necessary permits and/or rights, and to comply with all ordinances and laws pertaining to the application of this practice.

Accepted by:/s/ Don AdamsDate: 12-5-08

CERTIFICATION:

I have completed a review of the information provided by the client and certify this practice has been applied.

Certification by:/s/ _____ Date: _____

Job title: _____

TREE/SHRUB ESTABLISHMENT SPECIFICATION SHEET

Client: Burns Paiute Tribe

Date: 5/31/07

Practice Purpose (check one or more that apply)			
☐	Forest Products	☒	Wildlife Habitat
☒	Improve water Quality	☐	Treat Waste
☒	Long term erosion control	☐	Carbon Sequestration
☐	Energy conservation	☒	Enhance Aesthetics
Specification Requirements			
Tree specie	Seed Zone or Elevation*	Tree Spacing	# of seedlings to order
See Attachment 1	See Attachment 1	See Attachment 1	See Attachment 1
Shrub specie		Shrub Spacing	# of seedlings to order
See Attachment 1		See Attachment 1	See Attachment 1
Minimum Seedling Size: +1 Plug		Container size: 10" Containerized	
Planting Dates: February/March 2009			
Seedling Protection Needed: ☒ YES ☐ NO			
TYPE: ☒ Whole Tree Protectors ☐ Whole Tree Nets ☐ Terminal Bud Protectors			
☐ Bud Caps ☐ Fencing ☐ Other: _____			
Moisture Conservation Needed ☒ YES ☐ NO			
Method of Control ☒ Hand ☒ Mechanical ☒ Chemical* ☒ Mulch ☐ Other: _____			
Specie(s) to Control: Weeds on the Malheur County noxious weed list. Of special concern are perennial pepperweed, poison hemlock and whitetop.			
*WIN-PST will be used to evaluate potential human and water resource concerns. A WIN-PST hazard rating of Intermediate or higher requires mitigation. Required mitigation shall consist of: Refer buffers for CREP approved chemicals (herbicides) attached.			

Additional Information: Cluster plantings of shrubs for wildlife food/cover along streambanks. Where sod grass cover is present, use of non-paper mulch mats or approved chemicals for grass control is required. For non-willow or cottonwood plantings, control grass for a two-foot or larger radius around new seedlings in grassy areas. Use a non-paper mat at least 2' X 2' square. Contact the NRCS District Conservationist for technical questions on methods for grass control. A list of CREP approved chemicals (herbicides) has been attached to the specification sheets for this project. Contact ODF Stewardship Forester with any questions related to herbicide use on this project or list of CREP chemicals.

*Select seedlings from the listed seed zone and elevation or a geographic area of similar climate within an elevation of 500 feet higher or lower and within 100 miles north to 100 miles south of the planting site. Stock for introduced species must be from a proven, adapted source.

TREE/SHRUB ESTABLISHMENT SPECIFICATION SHEET

Additional project notes / calculations:

Approx. area of all mats = 820,076 sq ft / 43,560 sq ft / ac = 18.8 acres

Total # of plants to cover 18.8 mat acres = 8,174 (435 stems / ac -- average)

612 Tree and Shrub Planting

Tree Specie**	Seed Zone or Elevation	Tree Spacing*	# of seedlings to order	Mat identification
Black Cottonwood	3400' to 2200' elevation	10 feet	200	A
Shrub Specie**		Shrub Spacing*	# of seedlings to order	Mat identification
Woods Rose		10 feet	2500	A & B
Blue Elderberry		10 feet	2500	A & B
Chokecherry		10 feet	1000	A & B
Golden Currant		10 feet	400	B & C
Mock Orange		10 feet	400	A & B
Columbia Hawthorne		10 feet	574	B & C
Bitterbrush		10 feet	600	C

Mat identification	Distance from River	Approx distance
A	First mat next to river	(15' to 55')
B	Second mat from to river	(55' to 85')
C	Third mat from to river	(85' to 115')

* Minimum spacing all species, all mats, is 10 x 10 ft. Spacing on Mat A & B can vary from 10 x 10 ft to 13 x 13 ft. Spacing on Mat C can be up to variable depending on remaining stock. Mat A should have the highest planting density. Mat B should have a slightly lower average planting density.

Mat C should have the lowest average planting density. Any remaining stock from Mats A or B may be planted in Mat C.

Overflow stock from Mat A may be used to complete planting in Mats B and C with the exception of Black Cottonwood which must be confined to Mat A.

Spacing recommendations above assume all plants will be irrigated (driest months) for life of contract.

**Woods Rose and/or Blue Elderberry can be partially, or totally substituted for Chokecherry, Golden Currant, Mock Orange, Columbia Hawthorne or Bitterbrush. If sufficient stock is, available, strongly recommend substitution of Woods Rose and/or Elderberry for all Bitterbrush.

**Species should be grouped on each mat. For example, one portion of mat can be planted to Woods Rose; another portion to Blue Elderberry, etc.

**Species recommendations above assume all plants will be irrigated (driest months) for life of contract.

Additional information and calculations on Sheet 2.

TREE/SHRUB ESTABLISHMENT SPECIFICATION SHEET

SEEDLING INSPECTION: While at the nursery or before accepting delivered seedlings, check that seedlings match the seed zone and elevation specified on the order. This information should be printed on the container. Open several packages at random. While protecting exposed seedlings from drying, check for the following signs of damage:

- Dry roots
- White tip roots
- Swollen or burst buds
- Presence of mold on needles or stems
- Presence of sour odors
- Physical damage to seedlings
- Seedlings frozen in a solid block of ice
- Ripped or crushed bags or boxes exposed to circulating air

Remove a few seedlings from each opened package and strip areas of bark along the roots and stem with a fingernail or knife edge to reveal the woody tissues. The cambium layer of the stem must be green and moist with a light-colored sapwood beneath. Moist and consistently light colored woody tissue should be found along the stripped root.

DO NOT ACCEPT DAMAGED SEEDLINGS: The seedlings must be alive, dormant, and disease free. Immediately contact the nursery staff for further instructions.

TEMPORARY STORAGE INSTRUCTIONS: Bareroot seedlings and cuttings may be stored for up to 7 - 10 days at temperatures from 36 to 45 degrees F. If snow is available storage can be provided by constructing a cavity for the packaged seedlings (on a north facing slope or under shade if possible). If Planting has to be delayed or cold storage is not available, unpack bareroot seedlings and "heel in": 1) Dig a V-shaped trench in a moist, shady place; 2) Break bundles and spread seedlings out evenly, 3 or 4 thick, in an upright position to a depth equal to the root collar; 3) Fill in with loose soil, and water; 4) Complete filling in soil and pack firmly.

Unrooted cuttings and whips can be soaked in cold water (lower 1/3 to 1/2 is sufficient) for 48 hours prior to planting to enhance root formation.

SITE PREPARATION: Clear the planting area to mineral soil. Size of clearing must be large on sites with dense grass or herbaceous cover. Follow more specific instructions on the Forestland Site Preparation specification worksheet.

CARE AT PLANTING TIME: Keep seedlings roots moist at all times after removal from shipping packages or heel-in trench. At the field site store seedlings in the shade or under a reflective space blanket. Do not use canvas to protect seedlings from solar heating. Use suitable container (bucket, bag, or planting tray) for carrying the trees during the planting operation. Keep wet material around roots to prevent their damage through exposure. Never carry a handful of trees exposed to the sun and wind. Take one tree at a time from the container and plant it immediately. Trim excessively long roots with a sharp hatchet, machete, shears, or scissors. Do not tear or rip roots. Containerized stock roots shall be kept moist at all times.

TIMING OF PLANTING: Avoid planting on hot, windy days. Planting site must be free of snow and the soil frost-free. Do not carry more seedlings than can be planted in 1 hour (warm, windy, dry day) to 2 hours (calm, humid day). Utilize debris and stumps to provide shade for newly planted seedlings wherever possible.

PLANTING METHODS:

Bareroot Seedlings - Open a hole or slit deeper than the root size to be planted to accommodate the root system with all roots pointing down (no "J" or "L" shaped roots). Plant seedlings slightly deeper than they grew in the nursery (indicated by a change in bark characteristics) with roots naturally positioned. Do not twist or bunch roots. In slit planting, push the tree down to the bottom of the slit, then with a shaking motion, raise it gently back to the correct level. While holding the tree in an upright position, at the correct depth, bring loose, moist soil in around the root system. Do not let dry soil or surface litter fall into the hole. When the slit or hole is filled, pack the moist soil down firmly. No roots should be exposed or foliage covered.

Plugs - Plugs are easily planted due to their shape. Plugs are grown in cylindrical containers. Larger size plugs, i.e. 20 cubic inch, have larger root systems and grow quickly. Open a hole and place plug in hole at the same depth as grown in the container. Place moist soil around the plug and pack. Firm up soil completely around plug to remove any air pockets.

TREE/SHRUB ESTABLISHMENT SPECIFICATION SHEET

Un-rooted Cuttings - For un-rooted cuttings and whips open a hole or slit deep enough to allow cuttings to be inserted so at least 1/2 - 2/3 of the cutting length is below ground. Insert cutting vertically with buds pointing up, insuring that one to three bud remain above ground. Firm the soil around the cutting so good contact with the soil is obtained.

Containerized - Containerized plants are best planted in the spring, summer and fall. Dig a hole at least 50 percent wider than the container. Plant the root ball top at or just below natural ground level. Root-bound plants should have the root system slit and flared out over a mound of soil in the planting hole. Cut off any long roots before planting. Refill hole with soil and pack well to remove air-pockets. If available, water plant. Prune off diseased or damaged branches, suckers, etc.

An optional, slow release fertilizer can be placed in the bottom of the planting whole. Make sure that initially there is no contact between the fertilizer and seedling roots.

MOISTURE CONSERVATION: Control competing vegetation for at least 2 years, using one of the following methods.

Hand or Mechanical - Use a hoe, shovel, brush cutter or chainsaw to control all competing vegetation in the immediate area (4 foot minimum diameter) of the seedling. Repeat as necessary until trees are free to grow.

Chemical - Apply herbicides according to label directions. The herbicide selected must be formulated and registered for use on forestland. Consult a local weed specialist for rates, timing and restrictions. Repeat as often as needed to control competing vegetation. An area 3 foot in diameter shall be treated.

Mulch - Spread mulch material (paper, plastic, geotextile, etc.) around the base of seedling for a minimum of 1.5 radius around the seedling. See Mulching Specification #484 and complete job sheet if using mulch.

SEEDLING PROTECTION - Where browsing pests damage seedlings, seedlings will be protected. Protection techniques will be commensurate with the pest causing damage. Acceptable methods include fencing, tree tubes, bud caps, repellants, whole tree protectors

Operation and Maintenance: The buffer must be inspected periodically and protected from damage so proper function is maintained. Replace dead or dying tree and shrub stock and continue control of competing vegetation to allow prper establishment. Periodic harvesting of trees and shrubs in zones 1 and 2 may be necessary to maintain the health and vigor of mature stands. Additional requirements: Exclude livestock from the planting areas.

391-Riparian Forest Buffer

Conservation Practice Job Sheet

391-OR-JS

Natural Resources Conservation Service, Oregon

APRIL 2006

Client: Burns Paiute Tribe

NRCS Photo

Riparian Forest Buffer

An area of predominantly trees and/or shrubs located adjacent to and up-gradient from watercourses or water bodies.

Purposes

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes.

- Create shade to lower water temperatures to improve habitat for aquatic organisms
- Create or improve riparian habitat and provide a source of detritus and large woody debris
- Reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow ground water
- Reduce pesticide drift entering the water body
- Restore natural riparian plant communities
- Increase carbon storage in plant biomass and soils

Condition Where Practice Applies

Riparian Forest Buffers are applied on areas adjacent to permanent or intermittent streams, lakes, ponds, wetlands. They are not applied to stabilize stream banks or shorelines.

Conservation Management System

Riparian Forest Buffer is the key component of a conservation management system in woody riparian

buffer zones. A diversified riparian area is key in maintaining or improving ecological conditions and providing habitat for wildlife. Other facilitating and accelerating practices may be utilized in the system to treat other identified resources concerns.

Plans and Specifications

Plans and specifications will be developed in each field or management unit where the practice will be applied. The plan and specifications will include:

- Site preparation requirements
- Tree or shrub species to plant
- Number of tree/shrubs to plant
- Control of vegetation in years 2-3+
- Protection needs for tree/shrubs
- Location of tree/shrubs being planted
- Practices to control off-site erosion influences
- Livestock exclusion, if applicable
- Other facilitating practices, as needed

If the landscape varies enough for the need to require different plants, site preparation, etc., they will be identified and treatment described.

Operation and Maintenance

All operations will comply with applicable federal state laws, and local laws and regulations during the installation, operation, and maintenance of the practice.

The area of treatment will be periodically inspected and protected from adverse impacts from insects, disease, livestock, wildlife and fire damage.

Competing vegetation will be controlled until the desired species are well established or have grown above the competition.

Trees/shrubs shall be replanted to maintain adequate stocking to accomplish the intended purpose. Removal, incorporation, bio- or photo-degradation of tree protective devices and associated materials shall be consistent with the intended purpose and site conditions.

Natural Resources Conservation Service, Oregon

RIPARIAN FOREST BUFFER SPECIFICATION SHEET

Client	Burns Paiute Tribe	Farm/Tract	T2470
Location	Jonesboro, Malheur River	County/ SWCD	Malheur
Planner	E. Petersen	Date	9/5/2008
Project Size	51 acres	Topo Map	Jonesboro and South Mountain Quads

DESIGN APPROVAL:

Practice Code NO.	PRACTICE	LEAD DISCIPLINE	CONTROLLING FACTOR	UNITS	JOB CLASS				
					I	II	III	IV	V
391	Riparian Forest Buffer	BCSD For	Strip Width Strip Length	Feet Feet	20 500	50 1000	75 5000	100 All	All All
This practice is classified as Job Class (check one):					☐	☐	☒	☐	☐

Design Approved by: /s/ Kir LindDate: 11-15-08Job title: Stewardship Forester, ODF**CLIENTS ACKNOWLEDGEMENT STATEMENT:**

The Client acknowledges that:

- They have received a copy of the specification and understand the contents and requirements.
- It is the responsibility of the client to obtain all necessary permits and/or rights, and to comply with all ordinances and laws pertaining to the application of this practice.

Accepted by: /s/ Deane Callaway Date: 12-5-08**CERTIFICATION:**

I have completed a review of the information provided by the client and certify this practice has been applied.

Certification by: /s/ _____ Date: _____

Job title: _____

Natural Resources Conservation Service

RIPARIAN FOREST BUFFER SPECIFICATION SHEET

Client: Burns Paiute Tribe

Date: 7/25/2007

Practice Purpose (check one or more that apply)

☐	Create shade to lower/maintain water temp.	☐	Reduce pesticide drift into a water body
☐	Provide detritus and large woody debris	☒	Restore riparian plant community
☐	Increase carbon storage in plants/soil	☒	Other: Wildlife Habitat
☐	Reduce Excess Sediment, O.M., Nutrients, Pesticides in surface runoff and Other Chemicals in Shallow Groundwater Flow		

Buffer Prescription

Describe the treatment needed for each side. When different treatments are needed on each side, identify by widths, areas, or location and describe each treatment. **Right and left sides are determined by looking upstream**

Right Side Treatment*: Treatment on the east and west end of the property in cultivated fields will be mainly in the riparian corridor (0 to 15 feet). A treatment of occasional trees and shrubs with grass seeded away from the stream on the remainder of the stream corridor will be made.

Left Side Treatment*: Most of this area will have a treatment of occasional trees and shrubs with grass seeded away from the stream. Treatment on the west end of the property in the cultivated field will be mainly in the riparian corridor (0 to 15 feet).

*minimum width is 35 feet if excess sediment, nutrients, pesticides are in surface waters and excess nutrients and other chemicals are in shallow ground water flow.

Buffer length (ft):

Additional Information: In areas with established vegetation, 2x2 or 3x3 non-paper mulch mats are to be used. Areas with existing sagebrush will be left as is with some broadcast seeding of native grasses.

SITE PREPARATION shall be completed PRIOR to seedling establishment. Follow 490-Tree/Shrub Site Preparation job/specification worksheet for site preparation requirements.

Tree/Shrub Requirements

Tree Specie*	Location to Plant ¹	Ave. Tree Spacing	Trees/Ac	No. of Trees/ Stock Type ²
				/
				/
				/
				/
				/
				/
Shrub Specie*	Location to Plant ¹	Ave Shrub Spacing	Shrubs/ Acre	No. of Shrubs/ Stock Type ²
Willow Species	Coyote and Yellow willow cuttings. At bank edge or normal water mark	clump	685/ac	5-10/clump/cu
			34,935	/
Choke-cherry	Within 15 feet of stream bank	2 plants /spot	38 / ac	2 spots per 100 ft/co
	above Willow plantings		1974	/
Blue elder-berry	Within 15 feet of stream bank	2 plants /spot	38 / ac	2 spots per 100 ft/co
	above Willow plantings		1974	/

Natural Resources Conservation Service

RIPARIAN FOREST BUFFER SPECIFICATION SHEET

- 1 – Describe location where plants will be planted (i.e. at bank edge, 0-15 feet from bank, etc.)
2 -- ba-bareroot, pl-plug, co-containerized, cu-cutting

Additional Planting Information: Areas that have vegetation will have minimum disturbance. Existing sagebrush and meadowgrass will be left with broadcast seeding of grasses in the sagebrush and mixed plantings using 2x2 or 3x3 non-paper mulch mats to limit competition from established meadow grasses.

Chemical Use: If chemicals are planned to control competing vegetation, at any time, the chemical(s) will be evaluated with the WIN-PST program. A rating of intermediate or higher will require mitigation through the use of the Pest Management specification. Attach the hazard ratings to the specification worksheet.

RIPARIAN FOREST BUFFER SPECIFICATION SHEET**SEEDLING AND PLANTING INFORMATION**

Select seedlings from the appropriate seed zone and elevation or a geographic area of similar climate within an elevation of 500 feet higher or lower and within 100 miles north to 100 miles south of the planting site. Stock for introduced species must be from a proven, adapted source.

SEEDLING INSPECTION: While at the nursery or before accepting delivered seedlings, check that seedlings match what's specified on the order. This information should be printed on the container. Open several packages at random. While protecting exposed seedlings from drying, check for the following signs of damage:

- Dry roots
- White tip roots
- Swollen or burst buds
- Presence of mold on needles or stems
- Presence of sour odors
- Physical damage to seedlings
- Seedlings frozen in a solid block of ice
- Ripped or crushed bags or boxes exposed to circulating air

Remove a few seedlings from each opened package and strip areas of bark along the roots and stem with a fingernail or knife edge to reveal the woody tissues. The cambium layer of the stem must be green and moist with a light-colored sapwood beneath. Moist and consistently light colored woody tissue should be found along the stripped root.

DO NOT ACCEPT DAMAGED SEEDLINGS: The seedlings must be alive, dormant, and disease free. Immediately contact the nursery staff for further instructions.

TEMPORARY STORAGE INSTRUCTIONS: Bareroot seedlings and cuttings may be stored for up to 7 - 10 days at temperatures from 36 to 45 degrees F. If snow is available storage can be provided by constructing a cavity for the packaged seedlings (on a north facing slope or under shade if possible). If Planting has to be delayed or cold storage is not available, unpack bareroot seedlings and "heel in": 1) Dig a V-shaped trench in a moist, shady place; 2) Break bundles and spread seedlings out evenly, 3 or 4 thick, in an upright position to a depth equal to the root collar; 3) Fill in with loose soil, and water; 4) Complete filling in soil and pack firmly. Store container plants in a cool area. Unrooted cuttings and whips can be soaked in cold water (lower 1/3 to 1/2 is sufficient) for 48 hours prior to planting to enhance root formation.

SITE PREPARATION: Clear the planting area to mineral soil. Size of clearing must be large on sites with heavy grass or herbaceous cover. Follow specific instructions on the [490-Tree/Shrub Site Preparation job/specification worksheet](#).

CARE AT PLANTING TIME: Keep seedlings roots moist at all times after removal from shipping packages or heel-in trench. At the field site store seedlings in the shade or under a reflective space blanket. Do not use canvas to protect seedlings from solar heating. Use suitable container (bucket, bag, or planting tray) for carrying the trees during the planting operation. Keep wet material around roots to prevent their damage through exposure. Never carry a handful of trees exposed to the sun and wind. Take one tree at a time from the container and plant it immediately. Trim excessively long roots with a sharp hatchet, machete, shears, or scissors. Do not tear or rip roots.

TIMING OF PLANTING: Avoid planting on hot, windy days. Planting site must be free of snow and the soil frost-free. Do not carry more seedlings than can be planted in 1 hour (warm, windy, dry day) to 2 hours (calm, humid day). Utilize debris and stumps to provide shade for newly planted seedlings wherever possible.

Natural Resources Conservation Service

RIPARIAN FOREST BUFFER SPECIFICATION SHEET**PLANTING METHODS:**

Bareroot Seedlings - Open a hole or slit deeper than the root size to be planted to accommodate the root system with all roots pointing down (no "J" or "L" shaped roots). Plant seedlings slightly deeper than they grew in the nursery (indicated by a change in bark characteristics) with roots naturally positioned. Do not twist or bunch roots. In slit planting, push the tree down to the bottom of the slit, then with a shaking motion, raise it gently back to the correct level. While holding the tree in an upright position, at the correct depth, bring loose, moist soil in around the root system. Do not let dry soil or surface litter fall into the hole. When the slit or hole is filled, pack the moist soil down firmly. No roots should be exposed or foliage covered.

Plugs - Plugs are easily planted due to their shape. Plugs are grown in cylindrical containers. Larger size plugs, i.e. 20 cubic inch, have larger root systems and grow quickly. Open a hole and place plug in hole at the same depth as grown in the container. Place moist soil around the plug and pack. Firm up soil completely around plug. An optional, slow release fertilizer can be placed in the bottom of the planting whole. Make sure that initially there is no contact between the fertilizer and seedling roots.

Un-rooted Cuttings - For un-rooted cuttings and whips open a hole or slit deep enough to allow cuttings to be inserted so at least 1/2 - 2/3 of the cutting length is below ground. Insert cutting vertically with buds pointing up, insuring that one to three bud remain above ground. Firm the soil around the cutting so good contact with the soil is obtained. An optional, slow release fertilizer can be placed in the bottom of the planting whole. Make sure that initially there is no contact between the fertilizer and seedling roots.

Containerized - Containerized plants are best planted in the spring, summer and fall. Dig a hole at least 50 percent wider than the container. Plant the root ball top at or just below natural ground level. Root-bound plants should have the root system slit and flared out over a mound of soil in the planting hole. Cut off any long roots before planting. If more than 20% of the root system is cut off, remove (proportionately) the same amount of leaf area. Refill hole with soil and pack well to remove air-pockets. If available, water plants. Prune off diseased or damaged branches, suckers, etc.

MOISTURE CONSERVATION: Control competing vegetation for a minimum of 2 years after planting, using one of the following methods.

Mechanical - Use a hoe, shovel, brush cutter or chainsaw to control all competing vegetation in the immediate area (3 foot minimum diameter) of the seedling. Repeat as necessary to

Chemical - Apply herbicides according to label directions. The herbicide selected must be formulated and registered for use on forestland. Consult a local weed specialist for rates, timing and restrictions. Repeat as often as needed to control competing vegetation. Treat all vegetation within 1.5 ft of the seedling (3 ft. diameter). Run WIN-PST and attach hazard ratings for selected chemical (s).

Mulch - Spread mulch material (paper, plastic, geotextile, etc.) around the base of seedling for a minimum of 1.5 radius around the seedling. See Mulching Specification #484 and complete spec. sheet if using mulch.

SEEDLING PROTECTION - Where browsing pests damage seedlings, seedlings will be protected. Protection techniques will be commensurate with the pest causing damage. Acceptable methods include fencing, tree tubes, bud caps, repellants, and whole tree protectors.

Additional Specification Requirements and Operation and Maintenance: Precautions will be taken to prevent "J" rooting while planting containerized stock. Trees and shrubs that do not live will be replaced to insure successful riparian zone. Annual inspection of plants will be completed. If needed, plant protection will need to be provided against beaver and deer.

Tree/Shrub Site Preparation

Conservation Practice Job Sheet

490-OR-JS

Natural Resources Conservation Service, Oregon

APRIL 2006

Client: Burns Paiute Tribe

Definition

Treatment of areas to improve site conditions for establishing trees and/or shrubs.

Purposes

- Encourage natural regeneration of desirable woody plants
- Permit artificial establishment of woody plants

Where used

On all lands where establishment of woody plants (trees, shrubs, vines, etc.) is desired

Conservation Management Systems

Tree/Shrub Site Preparation is a practice that is part of a conservation management system for any lands desiring to establish woody plants. The practice is used to make ready an area for the establishment and growth of woody plants for future harvest, improved ecological conditions, watershed enhancement, aesthetics, etc. A thorough investigation and understanding of competing vegetation and soils is the key to the successful establishment of woody plants. Controlling the re-growth of competing vegetation is also part of the

conservation management system. A post treatment controlling competing vegetation that is inhibiting tree/shrub growth is usually needed to allow seedlings to develop a robust root system and to grow at an unimpeded growth rate. Use Exclusion (472) may be needed to protect trees or shrubs from domestic livestock, people or vehicles.

Plans and Specifications

On forestland Oregon's Forest Practices Act requires permits when conducting an operation. The landowner must notify ODF at least 15 days prior to commencement of any forest operation.

Plans and specifications shall include the required vegetation control and acceptable site preparation methods; timing of application; deep ripping or discing; and any erosion control measures needed. Instructions will be prepared for each site and purpose and recorded using approved specification sheets.

Operation and Maintenance

Repair erosion control measures as necessary to ensure proper function. Access by vehicles during site preparation or after should be controlled to minimize erosion problems, compaction and other impacts to the site.

Monitor and control undesirable vegetation in treated areas. On forestland use Forest Stand Improvement (666), on other lands use Brush Management (314) to plan any follow-up treatment of any undesirable vegetation.

All chemicals will be applied in accordance with label guidelines; Oregon's Forest Practices Act; and will comply with federal, state, and local laws and regulations during the installation, operation and maintenance.

Client	Burns Paiute Tribe	Farm/Tract	T2470
Location	Jonesboro, Malheur River	County/ SWCD	Malheur
Planner	E. Petersen	Date	8/5/2008
Project Size	24 acres	Quad Map	Jonesboro & South Mountain

DESIGN APPROVAL:

Practice Code NO.	PRACTICE	LEAD DISCIPLINE	CONTROLLING FACTOR	UNITS	JOB CLASS				
					I	II	III	IV	V
490	Tree/Shrub Site Preparation	BCSD For	Acre	Acre	20	80	160	640	All
This practice is classified as Job Class (check one):					☐	☒	☐	☐	☐

Design Approved by: /s/ John Deery Date: 11-18-08Job title: Stewardship Forester, CDF - John Deery**CLIENTS ACKNOWLEDGEMENT STATEMENT:**

The Client acknowledges that:

- They have received a copy of the specification and understand the contents and requirements.
- It is the responsibility of the client to obtain all necessary permits and/or rights, and to comply with all ordinances and laws pertaining to the application of this practice.

Accepted by: /s/ John Deery Date: 12-5-08**CERTIFICATION:**

I have completed a review of the information provided by the client and certify this practice has been applied.

Certification by: /s/ _____ Date: _____

Job title: _____

Client: _____ Date: _____

The Natural Resources Conservation Service provides leadership in a partnership effort to help people
Conserve, maintain and improve our natural resources and environment.

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Natural Resources Conservation Service, Oregon

TREE/SHRUB SITE PREPARATION SPECIFICATION SHEET☒ **Site Preparation on Pasture or Crop Land**

Site preparation on pasture or cropland shall include: 1) deep ripping to break up any compacted layer(s), and 2) disking or spraying chemicals (see below) to kill any growing vegetation. Deep ripping shall be completed, at a minimum, in the late summer of the year PRIOR to seedling establishment. Disc to smooth, as soon as possible. Vegetation re-growth will be treated at the time most beneficial to killing unwanted vegetation. Perform final disking to smooth planting site and/or kill competing vegetation, PRIOR to seedling establishment. When soil erosion is a concern, establish a temporary cover in the area of concern using Critical Area Planting specification # 342.

Additional Information: In areas of irrigated pasture and cropland, non-paper fabric mats are to be used for plantings. 820,076 square feet of matting is to be installed in the area between 15' and 180' from the riverbank.

☐ **Site Preparation on Forest/Grazed Forest Land**

Site preparation can be accomplished by hand, heavy equipment, or chemicals (see below). Hand site preparation can be accomplished with a chainsaw, brush cutter, or machete to cut down brush or small trees. A hoe, shovel, pulaski, etc., can be used when removing brush, grasses or forbs. The spot to be planted will have an area no smaller than 4 feet in diameter cleared. All competing plants will be severed from their roots. Re-growth of competing vegetation, after seedling establishment, will be controlled, for a minimum of 2 years after seedling establishment.

Limit the use of heavy equipment to slopes less than 30 percent. To minimize soil compaction limit equipment use to when soil moisture is low (mid-summer to early fall). A brush rake shall be used when piling or windrowing trees/brush. Attach brush rake to, or in place of regular blade. Slash material can be chopped or crushed in place. After treatment, slash material shall be no larger than 6 inches in diameter and no longer than 4 feet.

Hand piled slash will not exceed 6' x 6' x 6', when leave trees are present. Mechanically piled windrows will be no more and 10 feet high, 20 feet wide, at the base, and placed on the contour. When soil erosion is a concern, establish a temporary cover in the area of concern using Critical Area Planting specification # 342.

Additional Information:

☒ **Site Preparation on Grazed Range Land**

Site preparation can be accomplished by hand, heavy equipment, or chemicals (see below). Hand site preparation can be accomplished with a chainsaw, brush cutter, or machete to cut down brush or small trees. A hoe, shovel, or pulaski, etc., can be used when removing brush, grasses or forbs. The spot to be planted will have an area at least 4 feet in diameter cleared. All competing vegetation in the planting area will be severed from their roots. Re-growth of competing vegetation, after seedling establishment, will be controlled, for a minimum of 2 years after seedling establishment.

Limit the use of heavy equipment to slopes less than 30 percent. To minimize soil compaction limit equipment use to when soil moisture is low (mid-summer to early fall).

Slash material can be chopped or crushed in place. After treatment, slash material shall be no larger than 6 inches in diameter and no longer than 4 feet.

When soil erosion is a concern, establish a temporary cover in the area of concern using Critical Area Planting specification # 342.

Additional Information: Minimum site prep will be required. Most areas need weed control/management for noxious weeds. In areas to be planted with clumps, non-paper mulch fabric mats are to be used to give plants protection from competition. On-site inspection by NRCS prior to planting to identify areas for planting.

TREE/SHRUB SITE PREPARATION SPECIFICATION SHEET☒ **Chemical Site Preparation for All Landuses**

Herbicides shall be applied according to federal, state, local regulations and label directions. Herbicides shall be registered for the current landuse. All herbicides shall be evaluated by running WIN-PST. WIN-PST will be used to evaluate potential human and water resource concerns. A WIN-PST hazard rating of Intermediate or higher requires mitigation. Required mitigation shall consist of:

- **Aerial/Ground**

Buffer strips shall be establish around streams, riparian zones, wetlands, residential areas, orchards and crop fields. Buffer strips shall comply with State or local regulations.

- **Backpack sprayer**

For small or irregularly shaped areas a backpack sprayer may be used. Do not use a backpack sprayer on vegetation over 5 feet tall. Use backpack sprayers for basal treatment application. Buffer strips shall be established and comply with State or local regulations.

- **Injection**

Hard to kill species can be controlled by herbicide injection. Herbicides can be injected by a "hypo-hatchet", or applied with the "hack and squirt" method. A hypo-hatchet injects a metered amount, depending upon the herbicide and tree specie being controlled. Hack and squirt requires one to spray herbicide from a squirt bottle into the opened wound create by a hatchet. Label directions will be followed.

- **Timing**

Timing of application is critical, and will depend upon the vegetation being treated. Consult with a licensed applicator, ODF forester, or extension agent for recommended dates. Follow all label directions. Re-apply as necessary.

SAFETY -- When applying herbicides, do the following: 1) Wear protective clothing and safety devices (safety glasses, air filtering mask, etc.) as recommended on the label. Bathe after each use; 2) Read and follow all label directions closely, even if you have read them before; 3) Be cautious when applying herbicides. Know your legal responsibility as a pesticide applicator. You may be liable for any and all injury or damage resulting from pesticide application.

Additional Information:

☒ **Site Preparation on Wildlife Land** – See Pasture/Crop, Forest/Grazed Forest, or Grazed Range depending upon types of vegetation present.

☐ **Information on Burning Piles**

Slash and brush piles can be burned. To burn slash, allow to dry over a summer. Cover a portion of slash with plastic, waterproof paper, etc. to allow for ignition in the winter. Clear a 1-2 foot area, around slash pile, of materials that will allow fire to escape when burned. Acquire permits, if needed, to burn slash piles.

Additional Requirements:

Operation and Maintenance Information: Weeds that are on the County Noxious weed list are to be managed by chemical or mechanical means. (ie: Whitetop, Perennial pepperweed, and thistles).

Handout #1

CREP Herbicide Use Check List

Oregon Department of Forestry March 18, 2008.

The following topics need to be reviewed by the Stewardship Forester for each CREP plan that involves the use of herbicides. Appropriate information and guidance is to be provided to the landowner based on the applicability of each topic to the project.

- ✓ (1) Pesticide licensing [general information] ----- Handout #2
- ✓ (2) Pesticide reporting [general information] -----Handouts #2 & #3
- ✓ (3) WTC Court Ordered buffers -----Handout #2
- ✓ (4) Endangered Species Protection Bulletins -----Handout #2
- ✓ (5) CREP Herbicide Use Best Management Practices -----Handout #3
- ✓ (6) CREP Herbicide List [active ingredients] -----Handout #4
- ✓ (7) CREP Herbicide Use [buffers/ methods] -----Handout #5
- ✓ (8) CREP Herbicide Reference [ingredients / product name] -Handout # 6

[End of check list]

(Handout #2) --- Reference

Considerations for Herbicide Applications in CREP Forest Buffer Projects

Oregon Department of Forestry

March 18, 2008

1. Pesticide Applicator Licensing and Record Keeping

Persons applying pesticides or making recommendations for pesticide use must be licensed by the Oregon Department of Agriculture except in the following circumstances:

- Application of a “general-use” pesticide on an individual’s own (or leased) property, or that of his/her employer while acting as an employee. “General-use” pesticides are those which do not bear a “restricted-use pesticide” statement on the front panel of the label.
- Consulting on the use of “general-use” pesticides.
- Employees of public agencies or utilities who apply pesticides on property owned or managed by the employer and who do **not** use restricted-use pesticides or apply any pesticide (general or restricted-use) with machine-powered equipment in the course of their application work.

Licensed applicators must record detailed application information on a daily basis. In addition, any person applying pesticides outside urban areas must report at least annually to the Oregon Department of Agriculture Pesticide Use Reporting System. Any person who applies or who makes recommendations for applying “restricted use pesticides” must be licensed. There are additional, federal requirements for keeping application records for restricted use pesticides.

For more information on pesticide licensing and reporting, see <http://oregon.gov/ODA/PEST/>.

2. U.S. Environmental Protection Agency Endangered Species Protection Plan

Under the Endangered Species Act (ESA), the government protects endangered and threatened plants and animals (listed species) and the habitats upon which they depend. The ESA requires federal agencies to ensure that any action it authorizes, funds, or carries out, does not "adversely impact" any listed species, or "destroy or adversely modify" any critical habitat for that species.

EPA's Endangered Species Protection Program (ESPP) helps promote the recovery of listed species. If EPA, in consultation with federal fish and wildlife agencies, determines a pesticide product may affect a listed species, the product label will direct the pesticide user to EPA's Endangered Species Protection Bulletins, which are available online or through a telephone call. The bulletins contain the following information:

- Map of the county to which it applies
- Description of the species being protected
- Pesticide(s) of concern
- Pesticide use limitations
- Month for which the Bulletin is valid

Important Notes

- When referenced on a pesticide product label, bulletins are part of the label. ***Applicators must comply with all product label and bulletin requirements.***
- Bulletins may be accessed up to six months prior to pesticide application. An applicator must follow the correct Bulletin for the month of the pesticide application.

- EPA recommends printing and saving a copy of the county bulletin for a specific application.

More information in the ESPP is available at <http://www.epa.gov/espp/>.

3. Update on Court-Ordered Pesticide Buffers

Introduction

In a 2002 federal suit, the Washington Toxics Coalition alleged that the Federal Endangered Species Act required the U.S. EPA to consult with NOAA Fisheries on registrations for pesticides likely to adversely affect salmon. The judge ordered EPA to review potential effects of 54 pesticides on salmon. As an interim step, in 2004 EPA was ordered to prohibit applications of those pesticides within 300 feet (by air) or 60 feet (by ground) of "salmon supporting streams," which are shown on county maps provided by the Oregon Department of Agriculture (ODA) at <http://oregon.gov/ODA/PEST/buffers.shtml>. There are variances for some specific types of applications (see the ODA website). The buffers are required only along the stream segments actually shown on the maps; upstream tributaries not depicted on the map are exempt from the court-ordered buffers.

Current Situation

Through a series of actions, many pesticides have been removed from the list. The only forestry herbicide still on the list is the *triclopyr ester* formulation. This formulation includes products such as Garlon 4, Pathfinder II, Tahoe 4E, and probably some others). You can look on the triclopyr product label and see if it contains an ester (subject to the buffers) or amine product (not subject to the buffers).

Note: You might see that 2,4-D is shown on some of the ODA county maps. In those instances, 2,4-D is followed by "aquatic uses only." ODA has stated that this means terrestrial uses (applications outside water bodies) of 2,4-D are not subject to the court-ordered buffers.

In March 2006, the court removed the Oregon Coast Coho ESU entirely from the area in which the buffers are required (March, 2006), based on another court decision that removed coho in that ESU from the federal threatened or endangered list. Recently, the federal government relisted coho in the Oregon Coast Coho ESU as threatened. It appears that this means streams in this ESU are again subject to the court-ordered buffers, but ODF has received no official confirmation of this.

Always check the ODA county maps at <http://oregon.gov/ODA/PEST/buffers.shtml> to be sure about application of a specific pesticide in a specific area. It would be helpful to become familiar with the county maps in your area and check them periodically for updates.

CREP Technical Advisor Role

None of the agencies involved as CREP technical advisors administers or enforces the court-ordered pesticide buffers. The role of the technical advisor is to alert landowners and applicators to the existence of the buffers, and to avoid recommending application of triclopyr ester products (or other products, if there are changes as shown at the ODA website) where such application is prohibited by the court order. Application of pesticide products in violation of the court order may cause forfeiture of CREP payments.

HERBICIDE BMP PORTION OF FINAL DRAFT BA FOR OREGON CREP

4.3.1.4. Best Management Practices (BMPs) to Minimize Effects to Listed Species

4.3.1.4.1. General BMPs for all herbicide applications

- Do not apply herbicides if precipitation is likely within 24 hours unless using soil-activated herbicides, which can be applied as long as label is followed.
- When consistent with label instructions, use water when diluting herbicides prior to application. When oil carriers are needed, only crop oils will be used. Use of diesel oil is prohibited.
- A spill cleanup kit will be available whenever herbicides are used, transported, or stored. The cleanup kit will include, at a minimum, the herbicide Material Safety Data Sheet, the herbicide label, emergency phone numbers, and absorbent material such as cat litter to contain the spill.
- Anyone that applies herbicides on a CREP project would be required to provide FSA with a written herbicide application summary. The summary would indicate who applied the herbicide, what was applied, how it was applied, when it was applied, the location of the application on the project map, and the rate of application.
- All herbicide applications will be reported to the Oregon Department of Agriculture (PURS) as required by state law.
- When adjuvants are added to a herbicide formulation, Agri-dex and LI-700 will be the only adjuvants used within 200 feet of the high-water mark.

4.3.1.4.2. BMPs for herbicide applications along streams, lakes, and ponds

- Herbicides will not be applied on CREP projects with Hutton tui chub.

BMP's for Basal Bark herbicide applications from HWM to outer edge of project

- Dilute herbicide with a crop oil (vegetable oil). (Use of diesel oil is prohibited).
- Avoid unnecessary run off when applying herbicide to stems of undesirable vegetation.
- Apply using lowest nozzle pressure that will allow adequate stem coverage.
- Apply spray from the stream bank into the project area (applicator should have back to the stream).
- Do not apply during periods of rain, snow, or melting snow.

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BMP's for spot spraying or patch spraying herbicide within 15 feet of HWM:

- If possible, spraying is to take place only during calm periods (no breeze), except when a temperature inversion exists. Temperature inversions may increase the likelihood of off-target drift. Read and follow all product label requirements related to temperature inversions.
- Spraying may take place IF there is a breeze of 6 mph or less AND the direction of the breeze is away from the creek or other sensitive resources.
- Allow post-application rain free period according to herbicide label requirements.
- Herbicide will be applied such that the spray is directed towards the project area away from the creek [person applying the spray will generally have their back to the creek or other sensitive resource.]
- Nozzles will be adjusted [to minimize fine particle size] such that spray does not drift off of the project site or away from the target vegetation.
- The spray nozzle will be kept within four feet of the ground when herbicide is being applied.
- To the extent possible, the spray will be directed away from all desirable vegetation.
- Protect "listed" native plants by physically shielding them from spray drift.

BMP's for spot spraying or patch spraying herbicide from 15 feet to outer edge of project:

Same as requirements as "within 15 feet of HWM" except that herbicide can be applied with nozzle that is held up to six feet above the ground if needed to treat taller clumps of competing vegetation.

BMP's for ground broadcast spraying herbicide from 15 feet out from HWM to outer limit of project boundary.

- If possible, spraying is to take place only during calm periods (no breeze).
- Spraying may take place IF there is a breeze of 6 mph or less AND the breeze is blowing away from the creek or other sensitive resource.
- Allow post-application rain free period according to herbicide label requirements
- Spray will be applied in swaths parallel to the creek.
- Spray boom will be mounted such that nozzles are no more than four feet above the ground.
- Nozzles will be adjusted to minimize fine particle size such that spray does not drift off of project site.
- Nozzle pressure will be the adjusted to the lowest practical level (psi) while still providing for reasonable spray converge.
- Drift control agents will be used if necessary to prevent any spray from drifting off of the project site.

BMP's for Cut Surface application from HWM to outer edge of project boundary.

- Applications will be made in a manner that prevents herbicide runoff onto the ground.
- Do not apply herbicide during periods of rain, snow, or melting snow.

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BMP's for Hack & Squirt / Injection application from HWM to outer edge of project boundary.

- Applications will be made in a manner that prevents herbicide runoff onto the ground.
- Do not apply herbicide during periods of heavy rainfall.

BMP's for spot application of dry granule [Pronone].

Same as “BMP's for spot or patch spraying herbicide from 15 feet to outer edge of project” with the following exception:

Applications can be accomplished during a breeze of up to 10 mph IF the direction of the breeze is away from the creek or other sensitive resources.

4.3.1.4.3. BMPs for herbicide applications on sites with listed plants or Fender's blue butterfly

The following BMPs will be used to locate applications to minimize effects on listed terrestrial species.

- All CREP sites within Benton, Lane, Linn, Polk, and Yamhill Counties will be surveyed for listed plants and Fender's blue butterfly host plants.
- On sites with Fender's blue butterfly host plants, spraying will occur while larvae are in diapause (mid-August through February), or may occur outside of diapause if host plants can be covered during spraying.
- Only the following herbicides will be applied on listed plant and butterfly host plant sites: glyphosate, imazapyr, clopyralid, triclopyr BEE, and triclopyr TEA. We believe this subset of herbicides will provide effective control of weeds while minimizing impacts to sensitive plants.
- Glyphosate, clopyralid, and the triclopyrs may be hand-applied up to or within the plant patch to control competing vegetation.
- A 10-foot buffer will be maintained between the plant patch and the hand-application area for imazapyr.
- Broadcast sprays will only occur at a distance from listed plants where the hazard quotient identified from SERA risk assessment worksheets is below 1. Table 15 summarizes the application distances that will be used for broadcast sprays.
- From the edge of the listed or host plant site to the edge of the broadcast spray zone, only the following herbicide application methods would be used: cut stump, basal bark, injection, hack & squirt, wick-wipe, spot spray, patch spray. Equipment used would be hand sprayer or hand pump backpack sprayer.
- Plants will be covered with buckets or some other cover to protect them from drift.
- Nectar plants will be seeded on sites with listed invertebrates.
- Nozzles will be held as close to the ground as possible, and adjusted to minimize drift as much as possible.

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Table 15. Summary of buffers to be used for broadcast applications at listed and host plant sites.

Herbicide	Application buffer (feet)
Clopyralid	900
Glyphosate	50
Imazapyr	900
Triclopyr acid	300
Triclopyr BEE	300

BMP's for Basal Bark herbicide applications from edge of listed plant site to outer edge of project

- Dilute herbicide with a crop oil (vegetable oil). (Use of diesel oil is prohibited).
- Avoid unnecessary run off when applying herbicide to stems of undesirable vegetation.
- Apply using lowest nozzle pressure that will allow adequate stem coverage.
- Applicator should apply facing away from plant site.
- Do not apply during periods of rain, snow, or melting snow.

BMP's for spot spraying or patch spraying herbicide from edge of listed plant site out 50 feet

- If possible, spraying is to take place only during calm periods (no breeze).
- Spraying may take place **IF** there is a breeze of 3 mph or less **AND** the direction of the breeze is away from the sensitive resource.
- Allow post-application rain free period according to herbicide label requirements.
- Herbicide will be applied such that the spray is directed towards the project area away from the sensitive resource [person applying the spray will generally have their back to the plant site or other sensitive resource.]
- Nozzles will be adjusted [to minimize fine particle size] such that spray does not drifting off of the project site or away from the target vegetation.
- The spray nozzle will be kept within four feet of the ground when herbicide is being applied.
- To the extent humanly possible, the spray will be directed away from all desirable vegetation.
- Protect "listed" native plants by physically shielding them from spray drift.

BMP's for spot spraying or patch spraying herbicide from 50 feet from edge of listed plant site to outer edge of project

Same as requirements as "within 50 feet from edge of LISTED plant site" except that herbicide can be applied with nozzle that is held up to six feet above the ground if needed to treat taller clumps of competing vegetation.

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BMP's for ground broadcast spraying herbicide from 50 feet from edge of listed plant site to outer edge of project

- If possible, spraying is to take place only during calm periods (no breeze).
- Spraying may take place IF there is a breeze of 3 mph or less AND the breeze is blowing away from the sensitive resource.
- Allow post-application rain free period according to herbicide label requirements
- Spray boom will be mounted such that nozzles are no more than four feet above the ground.
- Nozzles will be adjusted to minimize fine particle size such that spray does not drift off of project site.
- Nozzle pressure will be the adjusted to the lowest practical level (psi) while still providing for reasonable spray converge.
- Drift control agents will be used if necessary to prevent any spray from drifting off of the project site.

BMP's for Cut Surface application from edge of listed plant site to outer edge of project

- Applications will be made in a manner that prevents herbicide runoff onto the ground.
- Do not apply herbicide during periods of rain, snow, or melting snow.

BMP's for Hack & Squirt / Injection application from edge of listed plant site to outer edge of project

- Applications will be made in a manner that prevents herbicide runoff onto the ground.
- Do not apply during herbicide during periods of heavy rainfall.

BMP's for spot application of dry granule [Pronone].

Same as "BMP's for spot or patch spraying herbicide from 50 feet of edge of listed plant site to outer edge of project" with the following exception:

Applications can be accomplished during a breeze of up to 10 mph IF the direction of the breeze is away from the creek or other sensitive resources.

4.3.2. BMP for Other Chemical Effects

Other chemicals that may be used on CREP projects are associated with vehicle or pump use. These chemicals include fuels and other fluids normally needed to operate farm equipment or other vehicles.

To minimize potential impacts, the following BMPs will be used.

- Appropriate materials and supplies (e.g., shovels, disposal containers, absorbent materials, first aid supplies, and clean water) will be available on-site to cleanup any small accidental spills in accordance with product Material Safety Data Sheets and labels. Significant hazardous spills will be reported to the Oregon Emergency Response System at 1-800-452-0311 (system available 24 hours a day). (Also see

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ODEQ emergency response web site at <http://www.deq.state.or.us/wmc/cleanup/spl0.htm> for more information.) The Oregon Poison Control Center will be contacted at 1-800-222-1222 (24 hours) for assistance in responding to emergency exposures. Project managers will ensure that each applicator is familiar with spill response procedures before commencing herbicide application operations.

- Locate staging and refueling areas at least 150 feet from any stream or other water body.
- Limit the size of staging and refueling areas and only store enough supplies, materials, and equipment onsite to complete the project.
- All equipment must be cleaned to remove external oil, grease, dirt, and mud before beginning operations below the high water mark of a stream.
- All equipment operated within 150 feet of an aquatic habitat must be inspected daily for fuel leaks before leaving the equipment staging area. All detected leaks must be repaired in the staging area before the equipment resumes operation.
- All stationary power equipment (e.g., generators) operated within 150 feet of any aquatic habitat must be diaped to prevent leaks and/or enclosed in a containment device (e.g., non permeable drip plan) of adequate capacity to retain equipment fluids (e.g., gasoline, diesel fuel, and oil) if a leak occurs.

4.3.1.4.4. BMP for herbicide applications on sites where Columbian white-tailed deer may graze

- On sites where deer may graze within Clatsop and Columbia counties, herbicide applications will be limited to the following.
 - Aminopyralid
 - Clopyralid
 - Glyphosate (no higher than typical application rate)
 - Hexazinone (granular form only)
 - Imazapyr
 - Metsulfuron methyl

(We'll try to spell this out better where exactly these restrictions would apply. They would be within Clatsop and Columbia counties only – the Douglas population was delisted)

BMP for In stream Work

To prevent disturbance and harm to fish species from instream work, the following BMP will be used.

- Oregon guidelines for the timing of in-water work will be followed for each affected stream reach, unless the ODFW and NOAA Fisheries approve an extension based on current year site-specific conditions.

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BMPs for Mechanical Activities

To minimize sediment delivery to streams from mechanical activities and possible physical effects to fish and critical habitat, the following BMPs will be used.

- Use existing roads or travel paths to access project sites whenever possible.
- Survey any potential spawning habitat within 300 feet downstream of a proposed stream crossing. Do not construct a stream crossing at known or suspected spawning areas, or within 300 feet upstream of such areas if spawning areas may be affected.
- Vehicles and machinery must cross streams and riparian areas at right angles to the main channel whenever possible.
- Minimize the use of equipment in or adjacent to a stream channel to reduce sedimentation rates and channel instability.
- Hand planting is the preferred technique for all plantings, except for filter strips. Plantings will occur during the appropriate seasonal period for the respective plant species involved.
- Stream bank shaping will only be implemented where stream bank stability is extremely poor or where necessary to restore riparian functions. Stream bank modification for planting purposes will be thoroughly documented, and on each CREP contract where more than 30 linear feet of stream bank is shaped by mechanical equipment, USDA will consult with the Services (this consultation only covers projects that involve shaping of up to 30 linear feet of stream bank). Design of all stream bank modification projects will recognize the important wildlife values provided along naturally eroding outside meander curves. Any soil control structures will be bio-engineered to the extent possible. No riprap will be used under this program for stream bank stabilization. No stream bank stabilization activity will reduce natural stream functions or floodplain connection.
- The boundary of a project site must be flagged to prevent soil disturbance to areas outside the site. Confine construction impacts to the minimum area necessary to complete the project.
- Limit the removal of any native vegetation to the amount that is absolutely necessary to complete a construction activity.
- Slash materials should be gathered by hand or with light machinery to reduce soil disturbance and compaction. Avoid accumulating or spreading slash in upland draws, streams, and springs. Slash control and disposal activities must be conducted in a manner that reduces the occurrence of debris in aquatic habitats.
- Disturbed areas will be reseeded.
- Filter strips will be left between disturbed areas and streams.

Shade vegetation, while beneficial to most species, may decrease food availability for the Hutton tui chub because it feeds primarily on filamentous algae. To prevent potential negative effects to this fish from CREP projects, the following BMPs will be used.

- CREP sites within the Alkali sub basin will be surveyed for the Hutton tui chub prior to designing the planting plan.
- Planting plans will be designed not to create excessive shade that will reduce algae production.

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BMPs for Off-Stream Watering Facilities

- Springs will always be fenced when spring developments are constructed to provide off-stream watering for livestock for CREP projects. Water will be piped from the spring development to troughs and watering facilities. All troughs and other watering facilities will be equipped with float valves to minimize mud and runoff.
- On CREP projects where listed species within NOAA Fisheries jurisdiction may be affected, pumps must meet NOAA Fisheries' fish screen criteria and be self-cleaning or maintained and operated properly by a designated responsible party.
- On CREP projects where listed fish species within USFWS jurisdiction may be affected, pumps may be installed under this BA if water delivery is under 0.5 cfs (minor volume diversions), self-maintaining pumps are used, and NOAA Fisheries screen criteria are used.
- All pumps must be sized to only use water amounts that fall within the allowances of the landowner's documented or estimated historic water use and legal water right(s).
- Periodic maintenance of fish screens (e.g. cleaning debris buildup and replacement of parts) must be conducted to ensure they are properly functioning.
- Spring development projects will not occur from springs where listed species occur, and water will not be redirected from springs where listed species occur.

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(Handout #4) March 18, 2008

[This document is to be used with companion document “Summary of Proposed Methods and Equipment for Herbicide Use on CREP Projects” – Handout #5.]

HERBICIDE PORTION OF FINAL DRAFT BA FOR OREGON CREP

2.3.1.1 Herbicide Applications

The following section includes a general description of each herbicide [active ingredient] used, the formulations [permitted for use] on CREP projects, and the application methods and equipment [permitted]. Application methods and equipment are described by zones along streams, lakes, and ponds.

The use of specific equipment within different zones along streams is designed to minimize potential effects to listed species and critical habitat.

In addition, as described in more detail later in this chapter, BMPs and application zones will also be used to minimize effects to terrestrial and inland listed species.

Aminopyralid

Description

Aminopyralid is a new selective systemic herbicide that has been developed for the control of broadleaf weeds in rangeland, non-crop areas, and grazed areas. In addition to non-agricultural applications, aminopyralid is also registered for applications to wheat.

Use Zones, Application Equipment, and Application Methods

Aminopyralid may be applied 15 feet upland from the high water mark using wick/wipe, spot spray, and patch spray methods. Squirt bottles, hand pump sprayers, or hand pump backpack sprayers would be used for these applications. The hand pump backpack sprayer is the preferred equipment to apply aminopyralid in this zone and the spot spray is the preferred application method.

Beyond 15 feet to the outer edge of the CREP project, spot spraying and ground broadcast sprays may be used to apply aminopyralid. Equipment used would be squirt bottles, hand pump sprayers, hand pump backpack sprayers, boomless sprayers, or boom sprayers.

Aminopyralid may be applied across ephemeral channels, intermittent channels, and ditches.

Clopyralid

Description

Clopyralid is a selective herbicide used primarily in the control of broadleaf weeds. It is effective on the sunflower, legume, nightshade, knotweed and violet families. It is also particularly effective at treating thistles. It has little effect on grasses as well as members of the mustard family.

Use Zones, Application Equipment, and Application Methods

Clopyralid may be applied 15 feet upland from the high water mark using wick/wipe and spot spray methods. Squirt bottles, hand pump sprayers, or hand pump backpack sprayers would be used for these applications. The hand pump backpack sprayer is the preferred equipment to apply clopyralid in this zone and the spot spray is the preferred application type.

Beyond 15 feet to the outer edge of the CREP project, spot spraying and ground broadcast sprays may be used to apply clopyralid. Equipment used would be squirt bottles, hand pump sprayers, hand pump backpack sprayers, boomless sprayers, or boom sprayers.

The same zones will apply to ephemeral channels, intermittent channels, and ditches.

Dicamba

Description

Dicamba is recommended for the control of a variety of broadleaf weeds and woody vegetation.

Use Zones, Application Equipment, and Application Methods

This herbicide will only be used when absolutely necessary to control weeds that cannot be controlled for another herbicide. It will be used in eastern Oregon.

Dicamba would be used beginning 15 feet from the high water mark extending to the outer edge of the project, using spot spray, patch spray, or ground broadcast spray. Equipment used would be hand pump, hand pump backpack, boomless sprayer, or boom sprayer. Dicamba may also be applied across ephemeral channels as long as the label for the specific formulation allows this.

Glyphosate

Description

Glyphosate is a non-selective systemic herbicide. It is the general herbicide of choice for use in the 15-foot zone along the high water mark for the plant species that it will effectively control.

Use Zones, Application Equipment, and Application Methods

Glyphosate may be applied between the high-water mark and the water's edge, as well as to emergent plants. Equipment used would be squirt bottles, hand pump sprayer, or hand pump backpack sprayer. Application methods would be wick/wipe, cut surface, stem injection, or spot spray.

Glyphosate may be applied across ephemeral channels, intermittent channels, and ditches.

In a 15-foot zone along the high water mark, glyphosate may be applied by wick/wipe, cut surface, hack & squirt/injection, stem injection, spot spray, or patch spray. Squirt bottles, hand pump sprayers, or hand pump backpack sprayers would be used for application.

Beyond 15 feet to the outer edge of the project, cut surface, hack & squirt injection, stem injection, spot spray, patch spray, or ground broadcast sprays would be used. Application equipment would be squirt bottle, hand pump sprayer, hand pump backpack sprayer, boomless sprayer, or boom sprayer.

When using the stem injection method, applicators must carefully monitor application rates to make sure glyphosate is applied within the allowable limits.

Hexazinone

Description

Hexazinone is a triazine herbicide that comes in granular and liquid formulations. The dry granule is spot applied around pine trees.

Use Zones, Application Equipment, and Application Methods

Between 15 feet and 25 feet upland from the high water mark, spot spray and patch spray methods would be used to apply hexazinone. Squirt bottles, hand pump or hand pump backpack sprayers would be used. Beyond 25 feet to the outer edge of the project, cut surface, hack & squirt injection, stem injection, spot spray, patch spray, or ground broadcast sprays would be used. Application equipment would be squirt bottle, hand pump sprayer, hand pump backpack sprayer, boomless sprayer, or boom sprayer.

In addition, the granular form would be spot applied around pine trees between 15 feet from the high water mark to the outer edge of the project. To apply the granular form, the applicator uses a hand-held meter device that deposits the dry granules around each tree. The herbicide is applied to an area of approximately 4 X 4 feet, with the amount being regulated by the application device. During application, the granules fall straight to the ground and are not subject to offsite drift. This method is required for establishment of pine on many sites in central and eastern Oregon. One application is often sufficient to get the pine established.

Hexazinone may be applied across ephemeral channels, intermittent channels, and ditches.

Imazapyr

Description

Imazapyr is a systemic plant growth inhibitor. The primary use is on woody vegetation as a foliar spray, applying to cut stumps or injecting into the plant.

Use Zones, Application Equipment, and Application Methods

Imazapyr would be applied between the water's edge to 25 feet upland from lakes, ponds, and flowing streams using wick/wipe, cut surface, stem injection, or spot spray methods. Aquatic formulations would be applied to emergent plants. Equipment used would be squirt bottles, or hand pump sprayer, or hand pump backpack sprayer. When using the stem injection method, applicators must carefully monitor application rates to make sure imazapyr is applied within the allowable limits.

From the zone 25 feet from the high water mark to the outer edge of the project, imazapyr would be applied through cut surface, hack & squirt/injection, stem injection, spot spray, patch spray, or ground based broadcast application. Application equipment includes squirt bottle, hand pump sprayer, hand pump backpack sprayer, boomless sprayer, or boom sprayer.

Imazapyr may be applied directly across ephemeral channels.

Metsulfuron methyl

Description

Metsulfuron methyl is a selective pre-emergence and post-emergence sulfonyl urea herbicide used primarily to control many annual and perennial weeds and woody plants.

Use Zones, Application Equipment, and Application Methods

From the high water mark out 25 feet, spot spray or patch spray would be used. Hand pump or hand pump backpack sprayers would be used.

From 25 feet to the outer edge of the project, spot spray, patch spray or ground broadcast sprays would be used, using hand pump, hand pump backpack, boomless sprayers, or boom sprayers.

The same zones will apply to ephemeral channels, intermittent channels, and ditches.

Picloram *[Restricted Use Product]*

Description

Picloram is a herbicide used in the control of a number of broadleaf weeds and undesirable brush.

Use Zones, Application Equipment, and Application Methods

This herbicide will only be used when absolutely necessary to control weeds that cannot be controlled with another herbicide. It will be used in eastern Oregon.

Picloram would be used beginning 15 feet from the high water mark extending to the outer edge of the project, using spot spray, patch spray, or ground broadcast spray. Equipment used would be hand pump, hand pump backpack, boomless sprayer, or boom sprayer.

Picloram may be applied in ephemeral channels using cut-stump, hack & squirt, or injection methods. Application equipment would be squirt bottles, hand pump sprayers, or hand pump backpack sprayers.

Sulfometuron methyl

Description

Sulfometuron methyl is a broad-spectrum pre- and post-emergent herbicide. It is less selective than chlorsulfuron or metsulfuron methyl and is effective against broadleaf and grass species. It has residual activity and is an important tool on sites where it is critical to get long-term weed control with one application.

Use Zones, Application Equipment, and Application Methods

Beginning at the high water mark and extending 25 feet out, spot spray and patch spray will be used to apply sulfometuron methyl. Hand pump backpack and hand pump sprayers will be used.

From 25 feet to the outer edge of the project, spot spray, patch spray, and ground based broadcast application methods will be used. Hand pump backpack, boomless sprayers, or boom sprayers are the application equipment.

The same zones will apply to ephemeral channels, intermittent channels, and ditches.

Triclopyr

Description

Triclopyr (used in Garlon) is a selective systemic herbicide. It is used on broadleaf and woody species.

Use Zones, Application Equipment, and Application Methods

Triclopyr BEE:

Beginning at 25 feet from the high water mark and extending to the outer edge of the project, triclopyr BEE may be applied using cut surface, hack & squirt/injection, basal bark spray, spot spray and patch spray. Application equipment is hand pump sprayer or hand pump backpack sprayer.

Triclopyr BEE may also be applied to emergent vegetation, from high water mark to water's edge, and upland of high water mark with cut-stump, hack & squirt, and injection, as long as this is allowed by the product label.

The same zones will apply to ephemeral channels, intermittent channels, and ditches.

Triclopyr Amine:

Between the high water mark and water's edge, triclopyr amine can be applied using squirt bottles, hand pump sprayers, and hand pump backpack sprayers. Application methods would be cut-stump or injection, basal spray, and hack & squirt.

Beginning at the high water mark and extending 25 feet out, triclopyr amine may be spot sprayed with squirt bottles, hand pump sprayers, or backpack sprayers. Beginning 25 feet out from the high water mark and extending to the outer edge of the project, triclopyr amine would be broadcast sprayed using a boomless or boom sprayer. It would be used when deemed essential on relatively flat, large acreage sites.

Triclopyr amine may be applied directly across ephemeral channels.

2,4-D

Description

2,4-D is used to control a variety of broadleaf weeds. Both the amine and ester forms will be used in CREP projects.

Use Zones, Application Equipment, and Application Methods

2,4-D will be used only when absolutely necessary to control weeds that cannot be effectively controlled by other herbicides. It will be used primarily in Eastern Oregon.

From the high water mark out 15 feet, 2,4-D would be applied with a squirt bottle, hand pump or hand pump backpack sprayer in spot spray or patch spray treatments.

Beyond 15 feet to the edge of the project, 2,4-D may be applied as a spot spray, patch spray, or ground broadcast spray, using hand pump, hand pump backpack, or boom sprayer.

The same zones will apply to ephemeral channels, intermittent channels, and ditches.

4.3.1.2. Description of Application Methods

BKP (Hand pump back pack sprayer) -- general discussion and description:

The BKP is equivalent to a HP (hand pump sprayer) except that it is more efficient and effective. The BKP is more efficient because it has more fluid capacity. This allows the worker to make fewer trips back to the mixing and storage site. This way the worker can use most of his/her energy and concentration in carefully applying the herbicide. It will also avoid the temptation to move the storage/ mixing area down closer to the application area to save time and energy in refilling the sprayer. This provides further assurance that the herbicide container is kept a safe distance from the streamside zone.

BKP's are easier for the worker to operate since the pressure can be maintained (with the side mounted hand pump) without having to balance the sprayer on the ground and pump it from the top (as is done with the smaller hand pump style). This also reduces the hazard of a spill since the BKP does not need to be put on the ground to pump up the pressure. The nozzle size on the BKP is similar (or the same in some cases) as that of the HP. The nozzle on both types of sprayers can be adjusted to get the spray pattern and droplet size required to prevent off target drift.

The BKP is commonly available to contractors and landowners and is relatively easy to operate and maintain. Requiring contractors and landowners to purchase special herbicide application equipment (HP vs. BKP) for CREP projects would create an unnecessary added cost and a disincentive to participate in the program.

BKP (Hand pump back pack sprayer) used for BB (Basal Bark application)

description:

This method may be used for site preparation or to "release" existing trees and shrubs from competing vegetation. With this method, a BKP is used to apply herbicide directly to the bark (from ground level up eighteen inches) at the base of the plant. The herbicide is pre-mixed with crop (vegetable) oil - the oil allows the herbicide to stick to and penetrate into the bark of the plant. The BKP nozzle is held approximately four to twelve inches from the stem as the herbicide is applied. This method is effective in treating difficult to control woody species (such as Scotch broom) that have stems from two to six inches in diameter. This method is used where other methods such as SS or PS would not be feasible or effective.

BKP (Hand pump back pack sprayer) used for PS (Patch Spray application)

description:

With this method a back pack sprayer to apply herbicide onto patches of noxious weeds or competing vegetation to prepare an area for tree / shrub planting or control vegetation competing vegetation around existing tree / shrub plantings. The herbicide is directed away from desirable vegetation. A continuous weed patch might be from 0.01 acre up to 0.3 acre.

This treatment method is required in situations commonly found on many riparian rehabilitation areas. For example, many sites (particularly in Western Oregon) are covered with patches of Himalaya blackberries. To get and maintain adequate control of this aggressive brush species it is often necessary to treat brush patches at least once to allow the desirable trees / shrubs to become established. Failure to control the larger brush patches results narrow individual "silos" around desirable trees / shrubs. The trees and shrubs often struggle to get adequate light to survive as the adjacent brush patch continues to grow and dominate the site.

On some sites, there may be patches of noxious weeds that (per CREP program requirements) must be controlled in addition to controlling the weeds immediately adjacent each tree / shrub planting location.

BKP (Hand pump back pack sprayer used for SS (Spot Spray application)

description:

With this method, planting spots (of approximately 4 ft x 4 ft) are treated for site preparation before trees / shrubs are planted. An area of about the same size is treated to release existing desirable tree / shrub from competing vegetation. Research has shown generally that competing vegetation in an area of at least 3 ft x 3 ft must be controlled to allow establishment of desirable vegetation.

Approximately 80% of the time, the vegetation controlled will be non-native, invasive and/or noxious. Some native grasses and perennials will need to be controlled since they also compete with desirable trees and shrubs for moisture and nutrients. Competing native vegetation will be controlled only to the extent necessary to allow trees / shrubs to become established.

SS is needed because application methods such as WKP (wicking or wiping) are extremely labor intensive (and expensive). WKP can be effective and feasible on very small (typically less than one acre) projects. However, virtually all CREP projects are greater than one acre - the average project size is approximately 22 acres. Individual plant treatments (such as WKP) are not feasible on most CREP projects because of the amount of time it would take to apply herbicide on each acre.

CS (Cut surface application) description:

With this method, the stems of the weeds are cut several inches above the ground. Soon after the stems are cut, the herbicide is applied directly to the cut surface using squirt bottle, brush, wick or equivalent technique. The herbicide is absorbed into the stem by the effect of plant "wicking" and gravity. Most herbicides are usually applied at a relatively high concentration. Depending on the weed species involved and product to be used, application of undiluted herbicide may be required. With this method, the herbicide has contact with the cut surface (top) of the weed, and, to some degree, with the side of the stem.

This method is used where other methods such as SS, PS, or BB are not feasible or effective.

HS/I (Hack & Squirt / Injection application) description:

With this method, herbicide is placed inside the stem of the weed. This is accomplished using an injection device (Hypohatchet, 22 shell injector, or a simple hatchet and squirt bottle). The end result is the injection of a small volume of herbicide into one or two puncture bores in the plant stem. The volume injected is approximately one to four milliliters per puncture. That would be about the same volume that would be in four "eye-dropper" drops. Depending on the product being used, the herbicide concentration may range from 50% diluted to undiluted. Using this method the herbicide remains inside the plant.

BM (Boom or boomless sprayer) for GBC (ground broadcast spray application) description:

BM - GBC is using a boom sprayer to apply a herbicide in strips or across continuous areas. With a boom sprayer, a boom spray device is attached to an ATV or farm tractor such that swaths of six to twelve feet wide can be sprayed on each pass. With a boomless sprayer, spray nozzles are attached directly to the back of an ATV.

This treatment is often done to prepare a site prior planting trees / shrubs. This treatment is required where the project area consists of very long and/or wide relatively flat areas

that are dominated by continuous cover of noxious, invasive, or other highly competitive weeds. (Typically these are low laying annual / perennial grasses and/or broadleaves.)

This treatment method is particularly important on some sites in Central and Eastern Oregon because:

- 1) some CREP projects can be two (or more) miles long;
- 2) many landowners have the boom spray equipment;
- 3) many landowners do not have the time to use slower application methods
- 4) many landowners are not willing to pay someone else to use slower application methods
- 5) there is a limited number of contractors available to do back pack applications

SS - Pronone (Spot application with dry granule) description:

With this method, a dry granule form of Hexazinone (Pronone) is applied using a hand-held meter device that deposits the dry granules around each tree. The herbicide is applied to an area of approximately 4 ft x 4 ft, with the amount being regulated by application device. During application, the granules fall straight to the ground and are not subject to off site drift. This method is required for establishment of pine on many sites in Central and Eastern Oregon. One application is often sufficient to get the pine established.

WKP - (Wick / Wipe application) description:

With this method, herbicide is applied using any device that transfers the herbicide by direct contact to the weed foliage.

(Handout #5) – [To be used with companion document Handout #4.]

DRAFT

**Summary of Proposed Methods and Equipment for Herbicide Use
on CREP Projects**

Oregon Department of Forestry

March 2008

DRAFT

Aminopyralid: Methods and Equipment

Clopyralid: Methods and Equipment

Dicamba: Methods and Equipment

High water mark

15 feet

Methods:
-Do not use dicamba in this zone.

Stream

Methods:
-spot or patch spray
-ground broadcast

Equipment:
-hand pump sprayer (backpack or hand-held)
-boom or boomless sprayer

To project outer edge

Comments

1. Use dicamba only in eastern Oregon and only when necessary to control weeds other herbicides will not control.
2. Dicamba may be applied across ephemeral channels if allowed by product label.
3. Comply with all product label requirements. Verify that application methods are allowed by label.

Glyphosate: Methods and Equipment

Hexazinone: Methods and Equipment

Metsulfuron methyl: Methods and Equipment

Picloram: Methods and Equipment

Sulfometuron methyl: Methods and Equipment

Triclopyr (ester): Methods and Equipment

Triclopyr (amine): Methods and Equipment

2,4-D: Methods and Equipment

(Handout #6)

Pesticide Product Active Ingredient/Product Name Cross Reference

Oregon Department of Forestry March 18, 2008

The cross-reference table in this document is intended to assist field staff in recommending herbicides for management of competing vegetation in CREP forest buffers. The list contains pesticide products that, to the best of the Oregon Department of Forestry's knowledge, are:

- Included in the draft biological assessment for CREP. Note that the assessment is draft at this point and may change as it is reviewed by federal agencies.
- Registered for use in forest buffer establishment. Based on consultations with the Oregon Department of Agriculture, herbicide products with forest-use labels may be used for forest buffer establishment.
- Registered with the Oregon Department of Agriculture for use in Oregon. Note: The cross reference table in this document is intended as a guide, but is not the official list of pesticide products registered for use in Oregon. For the official designations, visit the Oregon Department of Agriculture, Pesticides Division webpage at http://oda.state.or.us/dbs/pest_productsL2K/search.lasso, or contact the division at 503-986-4635.

An updated version of the cross-reference table in this document is available at <http://www.odf.state.or.us/pcf/chem/pesticides.asp>.

IMPORTANT NOTICE:

The applicator is always responsible to read and follow all directions on the label that comes with the actual pesticide product. Sample labels from the Internet or other sources are for information and guidance only and do not substitute for the label that comes with the pesticide product.

Herbicide Active Ingredient/Pesticide Product Cross Reference for CREP Training March 18, 2008

Common Name of Active Ingredient	Registrant	Product Brand Name	EPA Registration Number (numeric identifier for national and state registration)
2,4-D	Agrilience LLC	2,4-D Amine 4	1381-103
2,4-D	Agrilience LLC	E-99	62719-365-1381
2,4-D	Agrilience LLC	SWB 2,4-D LV4	42750-22-9779
2,4-D	Agristar by Albaugh, Inc.	2,4-D LV4	42750-15
2,4-D	Agristar by Albaugh, Inc.	2,4-D Amine 4	42750-19
2,4-D	Agristar by Albaugh, Inc.	2,4-D LV6	42750-20
2,4-D	Agristar by Albaugh, Inc.	Five Star	42750-49
2,4-D	Agristar by Albaugh, Inc.	Solve 2,4-D	42750-22
2,4-D	Dow Agrosiences LLC	DMA 4 IVM	62719-003
2,4-D	EDM Industries, Inc.	Weedaxe	68292-2
2,4-D	Helena Chemical Company	Barrage HF	5905-529
2,4-D	Helena Chemical Company	Hardball	5905-549
2,4-D	Helena Chemical Company	2,4-D Amine 4	42750-19-5905
2,4-D	Nufarm, Inc.	Esteron 99 Concentrate	62719-9-71368
2,4-D	Nufarm, Inc.	Turret	228-95-71368
2,4-D	Nufarm, Inc.	Tenkoz Lo-Vol 4 2,4-D	228-139-55467
2,4-D	Nufarm, Inc.	Weedone LV4 EC	228-139-71368
2,4-D	Nufarm, Inc.	Weedar 64	71368-1
2,4-D	Nufarm, Inc.	Weedone LV6 EC	71368-11

Herbicide Active Ingredient/Pesticide Product Cross Reference for CREP Training March 18, 2008

Common Name of Active Ingredient	Registrant	Product Brand Name	EPA Registration Number (numeric identifier for national and state registration)
2,4-D	Nufarm, Inc.	Tenkoz Lo-Vol 6 2,4-D	71368-11-55467
2,4-D	Nufarm, Inc.	Weedone LV4	71368-14
2,4-D	Nufarm, Inc.	Tenkoz LO-Vol 4	71368-14-55467
2,4-D	PBI Gordon Corporation	Amine 400 2,4-D	2217-2
2,4-D	PBI Gordon Corporation	Hi-Dep	2217-703
2,4-D	Riverdale Chemical Company (Nufarm)	Formula 40	228-357
2,4-D	Riverdale Chemical Company (Nufarm)	Solution Water Soluble	228-260
2,4-D	Riverdale Chemical Company (Nufarm)	Solution Water Soluble IVM	228-260
2,4-D	Riverdale Chemical Company (Nufarm)	Weedestroy Amine 40 Salt	228-145
2,4-D	Riverdale Chemical Company (Nufarm)	2,4-D L.V. 4 Ester	228-139
2,4-D	Riverdale Chemical Company (Nufarm)	2,4-D L.V. 6 Ester	228-95
2,4-D	Tenkoz Inc.	LO-VOL 4 2,4-D	42750-15-55467
2,4-D	Tenkoz Inc.	LO-VOL 6 2,4-D	42750-20-55467
2,4-D	United Agri Products	Amine 4 2,4-D Weed Killer (Loveland)	34704-120
2,4-D	United Agri Products	Low Vol 6 Ester Weed Killer (Loveland)	34704-125
2,4-D	United Agri Products	Saber Herbicide (Loveland)	34704-803
2,4-D	United Agri Products	Salvo Broadleaf (Loveland)	34704-609

Herbicide Active Ingredient/Pesticide Product Cross Reference for CREP Training March 18, 2008

Common Name of Active Ingredient	Registrant	Product Brand Name	EPA Registration Number (numeric identifier for national and state registration)
2,4-D	United Agri Products	Savage Dry Soluble (Loveland)	34704-606
2,4-D	Wilbur-Ellis	Amine 4	2935-512
2,4-D	Wilbur-Ellis	LV4	2935-511
2,4-D	Wilbur-Ellis	LV6	228-95-2935
2,4-D	Wilbur-Ellis	LV4 Low Volatile	42750-15-2935
2,4-D	Wilbur-Ellis	Amine 4 Herbicide	42750-19-2935
2,4-D	Wilbur-Ellis	LV6 Low Volatile	42750-20-2935
2,4-D and Picloram	Dow Agrosciences LLC	Pathway	62719-31
2,4-D and Picloram	Dow Agrosciences LLC	Tordon RTU	62719-31
2,4-D and Picloram	Dow Agrosciences LLC	Tordon 101 Mixture <i>(RESTRICTED USE PRODUCT)</i>	62719-5
Clopyralid	Dow Agrosciences LLC	Transline	62719-259
Clopyralid	United Phosphorous, Inc.	Clopyr AG	70506-94
Dicamba (3,6-dichloro-o-anisic acid)	Syngenta Crop Protection, Inc.	Vanquish	100-884
Dicamba (3,6-dichloro-o-anisic acid)	Nufarm Americas, Inc.	Vanquish	228-397
Glyphosate	Agrilience LLC	Cornerstone	42750-60-1381

Herbicide Active Ingredient/Pesticide Product Cross Reference for CREP Training March 18, 2008

Common Name of Active Ingredient	Registrant	Product Brand Name	EPA Registration Number (numeric identifier for national and state registration)
Glyphosate	Agrilience LLC	Cornerstone	71368-20-1381
Glyphosate	Agrilience LLC	Cornerstone	1381-191
Glyphosate	Agrilience LLC	Rascal	1381-191
Glyphosate	Agrilience LLC	Agrisolutions Rascal	42750-60-1381
Glyphosate	Agristar by Albaugh, Inc.	Gly Star 5	42750-59
Glyphosate	Agristar by Albaugh, Inc.	Gly Star Original	42750-60
Glyphosate	Agristar by Albaugh, Inc.	Forest Star	42750-61
Glyphosate	Chemical Products Technologies, LLC	Clearout 41 Plus	70829-3
Glyphosate	Cheminova, Inc.	Glyfos X-TRA	4787-23
Glyphosate	Cheminova, Inc.	Glyfos	4787-31
Glyphosate	Dow Agrosiences LLC	Accord Concentrate Supplemental: Injection for knotweed control Supplemental: Aquatic sites	62719-324
Glyphosate	Dow Agrosiences LLC	Accord SP	62719-322
Glyphosate	Dow Agrosiences LLC	Accord XRT	62719-517
Glyphosate	Dow Agrosiences LLC	Accord XRT II	62719-556
Glyphosate	Dow Agrosiences LLC	Glyphomax Supplemental (forestry)	62719-323
Glyphosate	Dow Agrosiences LLC	Glypro	62719-324

Herbicide Active Ingredient/Pesticide Product Cross Reference for CREP Training March 18, 2008

Common Name of Active Ingredient	Registrant	Product Brand Name	EPA Registration Number (numeric identifier for national and state registration)
Glyphosate	Dow Agrosciences LLC	Glypro Plus	67219-322
Glyphosate	Dow Agrosciences LLC	Rodeo Supplemental: Injection for knotweed control	62719-324
Glyphosate	E.I. duPont de Nemours and Company, Inc.	Glyphosate	352-607
Glyphosate	E.I. duPont de Nemours and Company, Inc.	Glyphosate VMF	352-609
Glyphosate	Farmsaver.com LLC	Glyphosate 4	72167-23-73220
Glyphosate	Griffin LLC (DuPont)	Glyphosate Original	352-607-1812
Glyphosate	Helena Chemical Company	Rattler	524-445-5905
Glyphosate	Helm Agro US Inc.	Helosate Plus	74530-4
Glyphosate	Lesco, Inc.	Prosecutor (see Lesco, Inc webpage; Label/MSDS search)	228-366-10404
Glyphosate	Nufarm, Inc.	Credit	71368-20
Glyphosate	Nufarm, Inc.	Credit Duo	71368-25
Glyphosate	Nufarm, Inc.	Credit Duo Extra	71368-25

Herbicide Active Ingredient/Pesticide Product Cross Reference for CREP Training March 18, 2008

Common Name of Active Ingredient	Registrant	Product Brand Name	EPA Registration Number (numeric identifier for national and state registration)
Glyphosate	Nufarm, Inc.	Extra Credit 5	71368-43
Glyphosate	Riverdale Chemical Company (Nufarm)	Razor	228-366
Glyphosate	Riverdale Chemical Company (Nufarm)	Razor Pro	228-366
Glyphosate	Riverdale Chemical Company (Nufarm)	Forester's Nonselective	228-381
Glyphosate	Ritter Chemical LLC	Alecto 41 HL	9468-33
Glyphosate	Syngenta Crop Protection, Inc.	Touchdown Pro	100-1121
Glyphosate	Tenkoz Inc.	Buccaneer	524-445-55467
Glyphosate	Tenkoz Inc.	Buccaneer	55467-10
Glyphosate	United Agri Products	Mirage	524-445-34704
Glyphosate	United Agri Products (Verdicon)	Kleenup Pro	228-366-65783
Glyphosate	Universal Crop Protection Alliance	Gly-4	42750-60-72693
Glyphosate and 2,4-D	Nufarm, Inc.	Recoil	71368-35
Glyphosate & Imazapyr	BASF Corporation	OneStep	241-414
Hexazinone	E.I. duPont de Nemours and Company, Inc.	Velpar L	352-392
Hexazinone	E.I. duPont de Nemours and Company,	Velpar DF	352-581

Herbicide Active Ingredient/Pesticide Product Cross Reference for CREP Training March 18, 2008

Common Name of Active Ingredient	Registrant	Product Brand Name	EPA Registration Number (numeric identifier for national and state registration)
	Inc.		
Hexazinone	E.I. duPont de Nemours and Company, Inc.	Velpar ULW	352-450
Hexazinone	Proserve	Pronone 10G (Oregon Registration Cancelled)	33560-21
Hexazinone	Proserve	Pronone MG (Oregon Registration Cancelled)	33560-21
Hexazinone	Proserve	Pronone 25G (Oregon Registration Cancelled)	33560-45
Hexazinone and sulfometuron methyl	E.I. duPont de Nemours and Company, Inc.	Westar	352-626
Imazapyr	BASF Corporation	Chopper	241-296
Imazapyr	BASF Corporation	Arsenal Applicator's Concentrate	241-299
Imazapyr	BASF Corporation	Stalker	241-398
Imazapyr	Nufarm Americas, Inc.	Polaris AC	241-299-228
Imazapyr	Nufarm Americas, Inc.	Polaris SP	241-296-228
Metsulfuron methyl	E.I. duPont de Nemours and Company, Inc.	Escort	352-439
Metsulfuron methyl	E.I. duPont de Nemours and Company, Inc.	Escort XP	352-439
Metsulfuron methyl	Microflo Company	Metsulfuron 60 EG IVM	51036-367
Metsulfuron methyl	Riverdale Chemical Company (Nufarm)	Patriot	228-391

Herbicide Active Ingredient / Pesticide Product Cross Reference for CREP Training March 18, 2008

Common Name of Active Ingredient	Registrant	Product Brand Name	EPA Registration Number (numeric identifier for national and state registration)
Metsulfuron methyl	Vegetation Management LLC	Metsulfuron Methyl DF	74477-2
Picloram	Dow Agrosciences LLC	Tordon K (RESTRICTED USE PRODUCT) Supplemental (basal with Garlon 4)	62719-17
Picloram	Dow Agrosciences LLC	Tordon 22K (RESTRICTED USE PRODUCT)	62719-6
Sulfometuron methyl	E.I. duPont de Nemours and Company, Inc.	Oust XP	352-601
Sulfometuron methyl	Gro-Pro, LLC (Etigra)	SFM E-Pro 75 EG Supplemental (buffers for helicopter application)	79676-16
Sulfometuron methyl	BASF Corporation	Sulfometuron Max	51036-405
Sulfometuron methyl	Riverdale Turf and Specialty (Nufarm)	Spyder	228-408
Sulfometuron methyl	Vegetation Management LLC	SFM 75 Supplemental (helicopter application on forest sites)	72167-11-74477
Sulfometuron methyl and metsulfuron methyl	E.I. duPont de Nemours and Company, Inc.	Oust Extra	352-622
Triclopyr	Dow Agrosciences LLC	Garlon 3A Supplemental (forestry)	62719-37
Triclopyr	Dow Agrosciences LLC	Garlon 4 Supplemental (basal with TordonK)	62719-40

Herbicide Active Ingredient/Pesticide Product Cross Reference for CREP Training March 18, 2008				
Common Name of Active Ingredient	Registrant	Product Brand Name	EPA Registration Number (numeric identifier for national and state registration)	
Triclopyr	Dow Agrosciences LLC	Garlon 4 Ultra	62719-527	
Triclopyr	Dow Agrosciences LLC	Forestry Garlon XRT	62719-553	
Triclopyr	Dow Agrosciences LLC	Pathfinder II	62719-176	
Triclopyr	SePRO Corporation	Renovate 3	62719-37-67690	
Triclopyr and aminopyralid	Dow Agrosciences LLC	Milestone VM Plus Supplemental: Control of Herbaceous Broadleaf Weeds and Woody Plants in Forests	62719-572	

Appendix C

Sage Grouse Lek Count Data

MALHEUR RIVER WILDLIFE MITIGATION AREA

Current and Historical¹ Lek Count Data

Tim's Peak Reservoir

YEAR	DAY	MALE	FEMALE	UNKN	TOTAL
1984	4-Apr	-	-	14	14
1996	28-Apr	-	-	-	0
2005	21-Apr	5	-	-	5
2005	28-Apr	-	-	-	0
2006	29-Mar	-	-	-	0
2006	7-Apr	5	2	-	7
2006	12-Apr	7	2	-	9
2007	30-Mar	12	-	-	12
2007	6-Apr	10	-	-	10
2007	17-Apr	6	-	-	6
2007	27-Apr	16	1	-	17
2007	4-May	7	-	-	7
2008	28-Mar	7	-	-	7
2008	9-Apr	2	-	1	3
2008	25-Apr	5	-	-	5

Roy Reservoir

YEAR	DAY	MALE	FEMALE	UNKN	TOTAL
1987	15-Apr	-	-	60	60
1996	28-Apr	-	-	45	45
2005	21-Apr	11	-	-	11
2005	28-Apr	41	1	-	42
2006	29-Mar	24	6	-	30
2006	7-Apr	43	5	-	48
2006	12-Apr	7	2	-	9
2007	30-Mar	14	-	-	14
2007	6-Apr	15	1	-	16
2007	17-Apr	13	1	-	14
2007	27-Apr	13	1	-	14
2007	4-May	20	-	-	20
2008	28-Mar	15	11	-	26
2008	9-Apr	15	-	-	15
2008	25-Apr	15	-	-	15

¹ Historical data, represented in bold print, was provided by Christian Hagen, the Sage Grouse Conservation Coordinator for ODFW.

McCloud Reservoir

YEAR	DAY	MALE	FEMALE	UNKN	TOTAL
1984	4-Apr	16	-	-	16
1996	28-Apr	-	-	-	0
2007	4-May	-	-	-	0
2008	28-Mar	-	-	-	0

Upper Decon Flat

YEAR	DAY	MALE	FEMALE	UNKN	TOTAL
1996	28-Apr	24	-	-	24
2008	25-Apr	14	3	-	17

Bull Canyon Reservoir

YEAR	DAY	MALE	FEMALE	UNKN	TOTAL
1994	29-Apr	3	-	-	3
2008	25-Apr	-	-	-	0

Appendix D

Bird Survey Data

MALHEUR RIVER

Bird Presence between Year and Habitat Type

Species	Year	Wetland	Upland 1	Upland 2	Meadow	Riparian
American Coot	2006	21	-	-	-	-
	2007	18.6	-	-	-	-
	2008	12.7	-	-	-	-
American Kestrel	2006	-	1	-	-	-
	2007	0.3	-	-	0.3	0.3
	2008	-	-	-	-	-
American Robin	2006	-	-	-	4	-
	2007	-	-	-	2	-
	2008	0.3	0.7	-	1	0.7
American Wigeon	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	0.7	-	-	-	-
Barn Swallow	2006	25	-	-	8	5
	2007	2.6	-	0.3	5	2.3
	2008	8.7	-	-	2.7	1
Black-Billed Magpie	2006	-	-	1	5	-
	2007	0.3	0.3	-	-	-
	2008	4	-	1.3	1.3	-
Black-Crowned Night Heron	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	-	-	-	0.3	-
Black-Necked Stilt	2006	-	-	-	-	-
	2007	2	-	-	-	-
	2008	-	-	-	-	-
Brewer's Blackbird	2006	-	44	2	19	2
	2007	2.6	-	4	31	6.6
	2008	0.3	5	0.7	27	15.3
Brewer's Sparrow	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	-	1.7	2	-	-
Bullock's Oriole	2006		7	-		4
	2007	1	1	0.6	0.6	2
	2008	0.3	0.7	-	0.7	1.3
Blue-Winged Teal	2006	-	-	-	-	-
	2007	0.3	-	-	-	-
	2008	-	-	-	-	-
Blue Grouse	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	-	-	-	-	0.3
Cattle Egret	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	-	-	-	3.3	-
Canada Goose	2006	-	-	-	-	-
	2007	-	-	-	1.3	0.6
	2008	-	-	-	-	2.7

Species	Year	Wetland	Upland 1	Upland 2	Meadow	Riparian
California Quail	2006	4	3	-	-	-
	2007	1	-	-	1.6	0.3
	2008	2	-	-	-	-
Chipping Sparrow	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	-	0.7	-	-	-
Chukar	2006	-	-	8	-	-
	2007	-	-	3.6	-	-
	2008	-	0.7	1.7	-	-
Cinnamon Teal	2006	2	-	-	-	-
	2007	2.3	-	-	1.3	-
	2008	2.7	-	-	1	1
Cliff Swallow	2006	17	6	21	41	9
	2007	25	1.6	1	13.6	14.6
	2008	11	0.3	-	1.3	3.3
Common Merganser	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	0.3	-	-	-	-
Common Nighthawk	2006	17	3	-	-	-
	2007	1.6	-	-	1.3	-
	2008	-	-	-	-	-
Common Raven	2006	-	3	-	7	-
	2007	4.6	2	0.6	4.3	2.3
	2008	1	0.3	-	1.7	1.3
Common Snipe	2006	2	-	-	2	-
	2007	3	-	-	7.6	5.3
	2008	1	-	-	7.7	2.3
Common Yellowthroat	2006	-	-	-	-	-
	2007	2	-	-	-	-
	2008	2.7	-	-	-	1
Double-Crested Cormorant	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	-	-	-	-	0.3
Eared Grebe	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	0.3	-	-	-	-
Eastern Kingbird	2006	-	-	-	-	-
	2007	-	-	-	-	0.6
	2008	-	-	-	-	0.7
European Starling	2006	-	-	-	-	-
	2007	-	-	-	0.6	0.6
	2008	0.3	-	-	1.3	1
Forster's Tern	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	-	-	-	-	0.7
Gadwall	2006	59	-	-	2	4
	2007	20	-	-	4	2
	2008	13.7	-	-	3.3	3.3

Species	Year	Wetland	Upland 1	Upland 2	Meadow	Riparian
Great Blue Heron	2006	1	-	-	1	-
	2007	-	-	-	0.3	0.3
	2008	-	-	-	-	1
Gray Flycatcher	2006	-	-	-	-	-
	2007	-	-	1.6	-	-
	2008	-	-	0.3	-	-
Hairy Woodpecker	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	-	-	-	0.3	-
Killdeer	2006	3	1	-	3	1
	2007	7	0.3	-	3.6	3
	2008	3.3	0.7	-	5.3	3.3
Lark Sparrow	2006	-	-	26	-	-
	2007	-	4	9.3	-	-
	2008	-	10	10	-	0.7
Long-Billed Curlew	2006	-	-	-	-	-
	2007	0.3	-	-	5.6	0.3
	2008		-	-	7.3	1.7
Mallard	2006	17	-	-	4	7
	2007	12.6	-	-	22	5.3
	2008	8.7	-	-	20.7	3
Marsh Wren	2006	1	-	-	-	-
	2007	1.6	-	-	-	-
	2008	0.7	-	-	-	-
Mourning Dove	2006	4	3	1	6	25
	2007	1.3	2.6	3.6	4.6	2.6
	2008	1.3	24	0.7	3.3	0.3
Northern Flicker	2006	-	-	-	-	-
	2007	0.3	0.6	-	0.6	-
	2008	-	0.3	-		-
Northern Harrier	2006	-	-	-	1	1
	2007	-	-	-	-	-
	2008	0.3	-	-	0.7	0.7
Northern Shoveler	2006	-	-	-	-	-
	2007	0.3	-	-	0.3	0.6
	2008	2.3	-	-	0.3	-
Pied-Billed Grebe	2006	-	-	-	-	-
	2007	1.6	-	-	-	-
	2008	-	-	-	-	-
Prairie Falcon	2006	-	-	1	-	-
	2007	-	-	-	-	-
	2008	-	-	-	-	-
Red-Tailed Hawk	2006	-	-	-	-	-
	2007	-	-	0.3	-	-
	2008	-	-	-	0.3	-
Red-Winged Blackbird	2006	54	-	-	21	29
	2007	40	1.3	1	29.6	36.6
	2008	36.7	3.3	-	20	19.3

Species	Year	Wetland	Upland 1	Upland 2	Meadow	Riparian
Sandhill Crane	2006	3	-	-	-	-
	2007	0.6	-	-	1.6	-
	2008	-	-	-	1	-
Say's Phoebe	2006	-	3	5	-	-
	2007	0.3	-	-	-	-
	2008	-	-	-	-	-
Sora Rail	2006	1	-	-	-	-
	2007	1	-	-	-	-
	2008	1	-	-	-	-
Song Sparrow	2006	-	-	-	5	4
	2007	1.6	2.6	-	4.6	12.6
	2008	4.3	1.3	-	4	6
Unknown	2006	-	-	-	-	-
	2007	1	-	1	-	0.3
	2008	-	-	-	-	-
Western Kingbird	2006	-	-	-	-	-
	2007	-	-	-	1.6	0.3
	2008	-	1	1.3	1.3	-
Western Meadowlark	2006	-	8	5	-	4
	2007	-	8	12	6	7
	2008	3	12.3	11.3	17.3	3.3
Western Tanager	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	-	-	-	2	1
White-Faced Ibis	2006	-	-	-	-	-
	2007	-	-	-	1.3	-
	2008	-	-	-	-	-
Wilson's Phalarope	2006	-	-	-	-	-
	2007	2	-	-	-	-
	2008	-	-	-	-	-
Yellow Warbler	2006	-	-	-	-	-
	2007	-	-	-	0.3	-
	2008	-	-	-	-	2
Yellow-Headed Blackbird	2006	35	-	-	-	-
	2007	26.6	-	-	6.6	7.6
	2008	18	-	-	2	0.3

MALHEUR RIVER

Avian Relative Abundance within Surveyed Habitat Types

Jones Meadow

Common Name	Relative Abundance		
	2006	2007	2008
American Kestrel	-	0.2	-
American Robin	3.1	1.2	0.7
Barn Swallow	6.2	3.0	1.9
Black-Billed Magpie	3.9	-	1.0
Black-Crowned Night Heron	-	-	0.2
Brewer's Blackbird	14.7	18.8	19.5
Bullock's Oriole	-	0.4	0.5
California Quail	-	0.8	-
Canada Goose	-	1.6	-
Cattle Egret		-	2.4
Cinnamon Teal	-	0.8	0.7
Cliff Swallow	31.8	8.3	1.0
Common Nighthawk	-	0.8	-
Common Raven	5.4	2.6	1.2
Common Snipe	1.6	4.6	5.5
European Starling	-	0.4	1.0
Gadwall	1.6	2.4	2.4
Great Blue Heron	0.8	0.2	-
Hairy Woodpecker	-	-	0.2
Killdeer	2.3	2.2	3.8
Long-Billed Curlew	-	3.4	5.3
Mallard	3.1	13.3	14.9
Mourning Dove	4.7	2.8	2.4
Northern Flicker	-	0.4	-
Northern Harrier	0.8	-	0.5
Northern Shoveler	-	0.2	0.2
Red-Tailed Hawk	-	-	0.2
Red-Winged Blackbird	16.3	17.9	14.4
Sandhill Crane	-	1.0	0.7
Song Sparrow	3.9	2.8	2.9
Western Kingbird	-	1.0	1.0
Western Meadowlark	-	3.6	12.5
Western Tanager	-	-	1.4
White-Faced Ibis	-	0.8	-
Yellow Warbler	-	0.2	-
Yellow-Headed Blackbird	-	4.0	1.4

Jones Riparian

Common Name	Relative Abundance		
	2006	2007	2008
American Kestrel	-	0.3	-
American Robin	-	-	0.8
Barn Swallow	5.3	2.0	1.3
Brewer's Blackbird	2.1	5.8	19.4
Blue Grouse	-	-	0.4
Bullock's Oriole	4.2	1.7	1.7
Canada Goose	-	0.6	3.4
California Quail	-	0.3	-
Cinnamon Teal	-	-	1.3
Cliff Swallow	9.5	12.8	4.2
Common Raven	-	2.0	1.7
Common Snipe	-	4.6	3.0
Common Yellowthroat	-	-	1.3
Double-Crested Cormorant	-	-	0.4
Eastern Kingbird	-	0.6	0.8
European Starling	-	0.6	1.3
Forster's Tern	-	-	0.8
Gadwall	4.2	1.7	4.2
Great Blue Heron	-	0.3	1.3
Killdeer	1.1	2.6	4.2
Lark Sparrow	-	-	0.8
Long-Billed Curlew	-	0.3	2.1
Mallard	7.4	4.6	3.8
Mourning Dove	26.3	2.3	0.4
Northern Harrier	1.1	-	0.8
Northern Shoveler	-	0.6	-
Red-Winged Blackbird	30.5	31.9	24.5
Song Sparrow	4.2	11.0	7.6
Unknown	-	0.3	-
Western Kingbird	-	0.3	-
Western Meadowlark	4.2	6.1	4.2
Western Tanager	-	-	1.3
Yellow Warbler	-	-	2.5
Yellow-Headed Blackbird	-	6.7	0.4

Jones Upland 1

Common Name	Relative Abundance		
	2006	2007	2008
American Kestrel	1.2	-	-
American Robin	-	-	1.1
Black-Billed Magpie	-	1.4	-
Brewer's Blackbird	53.7	-	7.9
Brewer's Sparrow	-	-	2.6
Bullock's Oriole	8.5	4.2	1.1
California Quail	3.7	-	-
Chipping Sparrow	-	-	1.1
Chukar	-	-	1.1
Cliff Swallow	7.3	7.0	0.5
Common Nighthawk	3.7	-	-
Common Raven	3.7	8.5	0.5
Killdeer	1.2	1.4	1.1
Lark Sparrow	-	16.9	15.9
Mourning Dove	3.7	7.0	38.1
Northern Flicker	-	2.8	0.5
Red-Winged Blackbird	-	5.6	5.3
Say's Phoebe	3.7	-	-
Song Sparrow	-	11.3	2.1
Western Kingbird	-	-	1.6
Western Meadowlark	9.8	33.8	19.6

Jones Upland 2

Common Name	Relative Abundance		
	2006	2007	2008
Barn Swallow	-	0.8	-
Black-Billed Magpie	1.4	-	4.5
Brewer's Blackbird	2.9	10.2	2.3
Brewer's Sparrow	-	-	6.8
Bullock's Oriole	-	1.7	-
Chukar	11.4	9.3	5.7
Cliff Swallow	30.0	2.5	-
Common Raven	-	1.7	-
Gray Flycatcher	-	4.2	1.1
Lark Sparrow	37.1	23.7	34.1
Mourning Dove	1.4	9.3	2.3
Prairie Falcon	1.4	-	-
Red-Tailed Hawk	-	0.8	-
Red-Winged Blackbird	-	2.5	-
Say's Phoebe	7.1	-	-
Unknown	-	2.5	-
Western Kingbird	-	-	4.5
Western Meadowlark	7.1	30.5	38.6

Jones Wetland

Common Name	Relative Abundance		
	2006	2007	2008
American Coot	7.9	10.0	8.9
American Kestrel	-	0.2	-
American Robin	-	-	0.2
American Wigeon	-	-	0.5
Barn Swallow	9.4	1.4	6.1
Black-Billed Magpie	-	0.2	2.8
Black-Necked Stilt	-	1.1	-
Brewer's Blackbird	-	1.4	0.2
Bullock's Oriole	-	0.5	0.2
Blue-Winged Teal	-	0.2	-
California Quail	1.5	0.5	1.4
Cinnamon Teal	0.8	1.3	1.9
Cliff Swallow	6.4	13.4	7.8
Common Merganser	-	-	0.2
Common Nighthawk	6.4	0.9	-
Common Raven	-	2.5	0.7
Common Snipe	0.8	1.6	0.7
Common Yellowthroat	-	1.1	1.9
Eared Grebe	-	-	0.2
European Starling	-	-	0.2
Gadwall	22.2	10.7	9.6
Great Blue Heron	0.4	-	-
Killdeer	1.1	3.8	2.4
Long-Billed Curlew	-	0.2	-
Mallard	6.4	6.8	6.1
Marsh Wren	0.4	0.9	0.5
Mourning Dove	1.5	0.7	0.9
Northern Flicker	-	0.2	-
Northern Harrier	-	-	0.2
Northern Shoveler	-	0.2	1.6
Pied-Billed Grebe	-	0.9	-
Red-Winged Blackbird	20.3	21.5	25.9
Sandhill Crane	1.1	0.4	-
Say's Phoebe	-	0.2	-
Sora	0.4	0.5	0.7
Song Sparrow	-	0.9	3.1
Unknown	-	0.5	-
Western Meadowlark	-	-	2.1
Wilson's Phalarope	-	1.1	-
Yellow-Headed Blackbird	13.2	14.3	12.7

Appendix E

Bat Protocol

Bat Grid Draft Protocol

Pat Ormsbee 6/27/07

Introduction

This protocol has been specifically developed for application with the Bat Grid (BG). It is designed to be implemented in conjunction with the annual Bat Grid training. The Bat Grid training is required for all individuals who formally participate in the Bat Grid effort.

The sampling design was developed after reviewing several survey efforts formally conducted in the Pacific Northwest (H. Ober, T. Rodhouse, S. Langenstein, S. Scott, R. Roninger, P. Ormsbee, M. Lacki, B. Betts) and considering practical and biological constraints such as:

- The geographic area that can be reasonably covered in 1 field season when conducting the survey methods provided in this protocol.
- Access issues such as land ownership and road systems
- Habitat heterogeneity at a coarse scale (forest, non-forest) that influences species presence.
- Represents an area large enough to encompass the summer activity areas of all species of bats expected in the area.

A 10 km x 10 km sample unit was originally selected to mimic the breeding bird atlas sampling scales and also to tie to the Western Bat Working Group Survey Protocol.

The target species for this protocol are:

Corynorhinus townsendii (Townsend's big-eared bat)

Antrozous pallidus (Pallid bat)

Euderma maculatum (Spotted bat)

Myotis thysanodes (fringed myotis)

Myotis volans (long-legged myotis)

Myotis lucifugus (little brown bat)

Myotis evotis (western long-legged myotis)

Eptesicus fuscus (big brown bat)

Myotis yumanensis (Yuma myotis)

Myotis californicus (California myotis)

Myotis keenii (Keen's myotis)

Myotis ciliolabrum (western small-footed myotis)

Tadarida brasiliensis (Mexican free-tailed bat)

Pipistrellus hesperus (western pipistrelle)

Lasionycterus noctivagans (silver-haired bat)

Lasiurus cinereus (hoary bat)

Objectives

The objectives of the Bat Grid (BG) are:

- To inventory the presence of bat species using a standardized survey effort and sample unit across the region.
- To collect baseline data on acoustic, morphologic, and genetic characteristics that serve as references for identifying all bat species in the region.
- For select sample units (SUs) monitor changes in:
 - Occupancy
 - Detection Probabilities
 - Species distribution and relative rarity

Sampling design

The sampling design is comprised of 3 hierarchical scales of data collection:

- The BG cell - 50 x 50 km (5 sample units on a side, 2500 sq km), assists with sampling distribution
- The sample unit – 10 km x 10 km (100 sq km), defines the area to be sampled
- Sample site or location – a fixed location where surveys occur, such as a pond or bridge within the sample unit.

Figure 1: Bat Grid sampling design showing 50 km x 50 km cells that are divided in to 10 km x 10 km sample units.

Bats are sampled while in flight, typically in association with drinking at a water body, or while they are roosting. A site is sampled using several methods:

- In flight:
 - Acoustic
 - Visual
 - Capture (mist net or harp trap)
- Roosting:
 - Visual
 - Capture (handnet, mistnet, or harp trap)
 - Guano analysis

The survey methods are used to establish species presence at a specific location and within a sample unit. Capturing bats is required to establish a relational baseline of morphometrics, acoustics, and genetics as a reference standard to characterize species.

The area of interest is the states of Oregon and Washington.

The 50 km x 50 km cell is used to insure a reasonable sampling distribution of 10 km x 10 km sample units across the region. Sample units are selected randomly within each 50 km x 50 km cell and are stratified on 2 gross vegetative conditions (Forest, non-forest), to insure sampling of habitat that supports all potential species in the cell.

In cells that are heterogeneous (forest and non-forest habitat occurs), when a single SU lacks representation of both habitat types, a 10 km x 10 km SU is randomly selected for each vegetative stratification, so that 1-2 primary SUs are selected for each cell. Alternate SUs (as many as 2 per vegetative stratification/cell) also are selected when specific habitat features associated with target species are lacking in the primary SU(s) and it is necessary to expand a search for these features outside of the primary SU(s).

If surveys are conducted in SUs that are not randomly selected, such as in association with a project, the data must be collected using the protocol provided in this document to contribute to the Bat Grid. Data collected in non-random SUs may contribute to an inventory of species presence, defining species distribution, and providing data to assess survey effort.

Surveys

Surveys are conducted June 1 – September 1.

Assess all of the potential survey sites and select priority sites in the SU by:

- 1) good probability of identifying numerous species
- 2) practical to conduct survey
- 3) good probability of identifying target species

If you are not familiar with the SU, you may need to do this assessment on the fly as you begin to conduct surveys.

Mist netting or harp trapping

This is the primary sampling method used to collect data for the Bat Grid. The majority of bat species in Oregon and Washington will be detected most efficiently using this method. Additionally, baseline data on species-specific acoustic, morphometric, and genetic characteristics can only be collected from captured individuals.

Consider the following features as survey sites

- Water sources that are:
 - Slow, wadable, or accessible by float tube
 - Small enough to span the width with 1 or more mist nets or harp traps, or can be enclosed by a few mist nets.
 - Offer an open flyway for bats to access the site, yet may have adjacent vegetation or landforms that serve to funnel bats to the water feature
 - Removed from other water sources, representing the sole drinking source for a large area

The larger and more numerous the water bodies, the more difficult it will be to successfully net concentrations of bats.
- Roads, trails, and dry water courses that may serve as flyways are options for mist netting and sometimes harp trapping when water sources are not available.

Acoustic sampling

Acoustic sampling is generally the secondary sampling method for collecting data for the Bat Grid. However, it is the primary method for detecting *Euderma maculatum* and *Lasiurus cinereus* and sometimes *Antrozous pallidus* and *Tadarida brasiliensis*. Also, when mist-netting conditions or options are limited, acoustic methods may become the primary method of detection. Conduct acoustic surveys in the following areas:

- Water sources or microhabitats that are difficult to net
- Meadows and dry water courses, especially when surveying for *Euderma maculatum* or *Antrozous pallidus*
- Roads or trails that may serve as flyways
- Forest edges and riparian habitats where bats may forage or commute

Roost surveys

Roost surveys are used to augment netting/trapping and acoustic surveys. Additionally, it is the primary sampling method for detecting *Corynorhinus townsendi* or *tadarida brasiliensis*.

Consider the following roost sites:

- Bridges that are used for day or night roosting, often by numerous species, are excellent sites for hand netting and collecting guano.
- Caves, mines that are used for day and night roosts sometimes by multiple species can be good places to mist net, conduct internal surveys, handnet with caution, collect guano, and sometimes conduct acoustic surveys of emerging bats.
- Buildings that are used for day and night roosts sometimes by multiple species can be good places to mist net, conduct internal surveys, handnet with caution, collect guano, and sometimes conduct acoustic surveys of emerging bats.

Species Inventory

Phase 1: Prepare a list of species you expect to occur in the 50 km x 50 km cell. Additionally, prepare a list of species that could potentially occur in the cell, but are generally unexpected.

Conduct 1-3 mist net surveys, each in a different location whenever possible, in the randomly selected SU(s). Additionally, if possible, conduct manual or auto-record acoustic surveys in the same vicinity of the mist net survey but in locations that represent different micro-habitats from where the mist nets are located. These acoustic surveys are typically conducted to attempt to specifically detect: LACI, ANPA, EUMA, and MYTH, that may be in the area, but not caught through mist netting.

When acoustic equipment is available, simultaneously conduct a remote, auto-record acoustic survey using a digital recorder and Pettersson's D240x placed at a stationary location at least 1.5 km from any mist net survey location **or** closer if there is topographic separation so that different individuals are likely to be detected at each site. The acoustic data collected during this remote survey is treated as separate and independent from the mist-net survey.

After 1-3 mist net surveys or 1-3 mist net surveys and remote auto-record acoustic surveys, review the species list, compare it to what species you have detected, and assess if:

- roost, remote acoustic, or additional mist-net surveys are needed to improve success of detecting species remaining on your list.
- habitat elements that support specific species on your list are available in the SU.

Phase 2: Continue survey efforts using the most efficient approach to detect species that have not yet been detected.

At any point in phase 1 or phase 2, if:

- you determine that habitat elements are not available in the SU to support one or more species, in particular, ANPA, COTO, EUMA, TABR, PIHE, MYTH, or MYCI,
- one or more of these species is on your list,
- **AND** all other species on your list have been detected,

Randomly selected an alternate SU with habitat features that support the species. Conduct 2-3 surveys per species at select habitat features that support the missing species within the alternate SUs.

Phase 3: Once you have detected all species on your list, or you have conducted a total of 12 surveys and a minimum of 2 surveys (e.g. 1 mist net, 1 remote acoustic) in the SU, the survey protocol has been met. If additional surveys are conducted for specific species in alternate SUs, as described above in phase 2, the total number of surveys may exceed 12.

Mist net surveys

Mist net surveys are conducted spanning June 1 – September 1. Mist net surveys can be conducted anywhere in the SU and whenever possible, should be conducted at distinct sites to maximize the number of sites surveyed. Repeat visits to the same site are conducted when sufficient mist net sites are lacking elsewhere in the SU or when the site is associated with monitoring (see below). If this occurs, allow 1 week between repeat visits to the same site to prevent depression of capture success and to take advantage of potential shifts in bat activity that may occur across the summer.

Conduct mist net surveys at features in the following order of priority:

- Small water features (eg creek, spring, pond, exposed guzzler or tank), especially where water may be a limiting factor.
- Larger water features (eg small river or lake) where mist netting is an effective method of capture.
- Arroyo, roadway, or other potential flight corridors.

Use your professional judgment on mist net numbers and placement to achieve the most effective captures. One to 3 nets are generally adequate as well as manageable. Document net sets by photos, drawings, and maps, so that the configuration can be repeated in the future if desired.

Surveys are conducted by at least 2 people who are qualified and trained to do all aspects of the mist net survey, and if there is an additional acoustic component, the acoustic survey as well.

Mist net only during dry weather or in situations where nets will stay dry. Windy conditions also should be avoided.

Nets need to be in place to begin captures at dusk or sooner if active bats are detected, allow 1-2 hours to set up for net captures. Keep nets furled until deployment for capture to avoid catching birds.

Mist net 3.5 hr. after civil sunset or until 1 hr. has passed without visual or acoustic detection of bats in the vicinity.

Be certain to record start and stop time and date.

Acoustic surveys

In conjunction with mist-net surveys

When equipment is available, collect manual or auto-record acoustic data simultaneously with mist net surveys and in the vicinity of the mist-net location. If only 1 detector is available, collect manual or auto calls between zipline and hand release efforts. Attempt to conduct at least 1 hour of acoustic survey effort during each mist net survey. Target microhabitats other than those covered by the mist nets. The acoustic data collected in conjunction with mist netting is treated as part of the mist-net survey and does not constitute a separate survey.

Efficiently screen the collected calls that night or following day to determine if there are good quality calls for species that you did not detect via mist netting. Typically, these species will be LACI, ANPA, EUMA, and MYTH. If you are uncertain about species identification of calls, validate call identification of species by someone with call-interpretation experience.

Be certain to use the appropriate file-naming conventions established for the Bat Grid to label files.

Once calls are validated, enter the results of the call data on the data sheet or excel spreadsheet for that mist-net site.

Save all the quality calls. After completing the survey protocol for your SU, if you are missing other species from your expected list, you may want to confer on select calls that you suspect could be remaining target species. Validate the more difficult species to identify acoustically with Joe Szewczak.

Independent remote acoustic surveys

When acoustic equipment is available, conduct a remote, auto-record acoustic survey simultaneously with mist-net surveys. Place a digital recorder and Pettersson's D240x at a stationary location at least 1.5 km from any mist-net survey location **or** closer if there is topographic separation so that different individuals are likely to be detected at each site.

The acoustic data collected during this remote survey is treated as separate and independent from the mist-net survey.

Review call files that night or following day to confirm species. Only assess good-quality calls. If you are uncertain about species identification from a call, file it separately and have it assessed by someone with call-interpretation expertise.

Use the appropriate file naming conventions established for the Bat Grid to label files. Enter data from calls to a data sheet or excel spreadsheet specific to the remote auto-record survey site.

Save all the quality calls. After completing the survey protocol for your SU, if you are missing other species from your expected list, you may want to confer on select calls that you suspect could be remaining target species. Validation of these more difficult species to identify acoustically is required by Joe Szewczak.

Collecting acoustic calls of captured bats

Attempt to collect 5 calls per species per site. Use the zipline and/or light tag and hand release method to collect calls from captured Adult bats. Do not use a zipline or light tags on juveniles or on late-stage pregnant or lactating females. In these situations, attempt to collect calls from hand-released bats without attaching light tags.

Collect zipline calls whenever you want to insure that you get a call from an individual. This is typically when you have:

- A rare species (eg *Myotis keenii*)
- Confounding species where you lack call data for that area and/or want to use the call to validate species (eg *Myotis ciliolabrum*/ *Myotis californicus*)

For all other situations, attempt to collect light-tag or hand release calls from 5 individuals of each species at each site. In particular, collect light-tag calls from *Lasionycteris noctivagans*, *Antrozous pallidus*, *Myotis lucifigus*, and *Myotis volans*.

Zipline/hand release surveys are conducted by at least 2 people who are qualified and trained to do all aspect of the acoustic surveys.

Use the appropriate naming-conventions established for the Bat Grid to label call files.

Genetic Data Collection

Collect a 3 mm wing biopsy from captured adult bats using the tissue biopsy protocol established for the Bat Grid. Attempt to collect biopsy samples from 5 individuals per species per Cell surveyed. Also collect biopsies when genetics are required to identify species.

Use the appropriate naming convention for labeling the biopsy samples established for the Bat Grid.

Roost surveys

When roost sites are present in a SU, conduct roost surveys to target specific species on your list. Also, in situations where bridges, rather than mist-net surveys may be more productive, conduct bridge surveys in lieu of mist-net surveys.

Avoid disturbing maternity roosts by timing roost surveys prior to the end of June and after mid-July to avoid harming or killing pups. Do not capture bats at a maternity roost. At any point if you detect altricial pups during a roost survey, stop the survey and leave the roost site. Focus survey efforts on night roosts, or collecting guano from day roosts if bats are present.

Bridges

Conduct bridge surveys when:

- The initial 3 mist net surveys are not productive, and there are multiple bat-friendly bridges in the SU that can be surveyed in lieu of mist netting.
- To augment mistnet surveys by targeting specific species that roost under bridges.

Remember, not all bat species can be found roosting under bridges.

If there are numerous bridges in the SU, be selective and prioritize which bridges to survey by selecting bridges that:

- Are located in habitats associated with target species
- Are located in a variety of habitats
- Vary in size as does the associated waterway

Where bridges are solitary, a bridge survey is comprised of 1 daytime search and 3 or more night searches at least 45 minutes apart at the single bridge within a 24 hour period. Where multiple bridges exist in a single drainage, a bridge survey is comprised of 1 daytime search and 1 or more night searches at least 45 minutes apart at each bridge in the drainage within a 24 hour period. The combination of the day and night searches are counted as 1 survey.

Day time

Conduct reconnaissance of bridges during daytime, being certain to identify the safest access to the underside of the bridge. Check for day roosting bats and attempt to identify them to species without handling them. Capture bats for identification during daytime only when they are roosting solitarily. Clustered bats are likely to be maternity colonies and should not be disturbed. As an alternative, collect and bag guano separately under day roosting clusters for species identification using genetics. Be sure to label collected guano with date, location, and PI, using the naming convention established for the Bat

Grid. Under all situations, collect as much guano as possible at each bridge. Bag and label guano collected at each bridge site separately.

Night time

Surveys are conducted by at least 2 people who are qualified and trained to do all aspect of the bridge survey.

Begin surveys at least 2 hours past civil sunset. Using white light to negotiate footing and redlight to search for bats, quietly enter under the bridge and use handnets to capture roosting bats. Do not disturb sites used as daytime maternity sites. Once bats are captured, return to the surface and process bats. If doing repeat searches at the same bridge, do so at least 45 minutes apart.

Buildings

Building surveys are conducted by 1 or more individuals who are qualified and trained to conduct building survey. If there are safety issues, be certain that at least 2 people are present, although the second person does not need to be experienced in conducting building surveys.

Day time

Conduct reconnaissance of buildings during daytime, Check for day-roosting bats and attempt to identify them to species without handling them. Capture bats for identification during daytime only when they are roosting solitarily. Clustered bats are likely to be maternity colonies and should not be disturbed, Collect guano under day roosting clusters for species identification using genetics. Be sure to label collected guano with date, location, and PI, using the naming convention established for the Bat Grid.

Night time

Time a visit to the site to observe flyout of maternity colonies. Note the time and path of flight the bats use when emerging from the building. If it is possible to set mist nets or a harp trap in the flight path, yet far enough away so that the bats don't equate the capture with the roost, plan to return the next night to conduct mist net or harp trap surveys. Set nets so that you are likely to sample at least 10% of the estimated colony and not directly over the roost opening.

If a site is used strictly for night roosting, begin internal surveys at least 2 hours past sunset. Attempt to identify bats without capture, or collect guano for genetic identification. Capture only if necessary to identify species and only if the site is not used as a daytime maternity roost.

Caves and Mines

Cave and mine surveys are conducted by 2 or more individuals who are qualified and trained to conduct cave or mine surveys. Mine surveys require the supervision of a qualified minerals expert. Safety issues are always a concern for surveying mines and these surveys require 1 individual to remain outside the mine while at least 2 people enter the mine, 1 must be a certified minerals expert. At least 1 other person should be qualified and trained in conducting bat surveys underground.

Internal

Daytime

Whenever possible, conduct internal surveys of caves and mines during the day. Check for day roosting bats and attempt to identify them to species without handling them. Capture bats for identification during daytime only when they are roosting solitarily. Clustered bats are likely to be maternity colonies and should not be disturbed. Collect guano under day roosting clusters for species identification using genetics. Be sure to label collected guano with date, location, and PI, in accordance with the naming convention established for the Bat Grid.

Nighttime

If there are indications of nighttime activity, and no bats are present, consider conducting an internal nighttime survey, or external mist net survey only if the site is not a maternity site.

External

All external surveys are conducted at night. Visual and acoustic surveys can be conducted outside of a cave or mine entrance to detect bats emerging from a day roost. However, emergence calls may not be characteristic of free-flying reference calls and visual identification can be difficult for other than COTO.

If a site is used exclusively for watering or night roosting, mist nets and/or harp traps can be set up over or close to the entrance of caves and mines. These sites can be used by a large number of bats, so take care to avoid capture of more bats than you can handle by:

- If possible, spend a night observing where bats enter the cave or mine, and the general numbers of individuals that use the site. Return a second night to conduct capture surveys using mist nets or harp traps, based on your observations, or
- Set a single net close to and across a mine or cave openings, but avoid covering the entire opening. Have at least 2 people at each net, and be prepared to close a net if you are overwhelmed by bats.

Species Monitoring

Sample units that have been randomly selected and assigned for monitoring are monitored by conducting surveys at the same sites each year. Methods used for monitoring are the same as those previously described in the inventory section of this protocol.

Conduct 3 mist net surveys, each in a different location whenever possible, in the randomly selected SU(s). Conduct manual or auto-record acoustic surveys in the same vicinity of the mist net survey but in locations that represent different micro-habitats from where the mist nets are located. Attempt to collect at least 1 hour of free-flying acoustic calls.

Simultaneously conduct a remote, auto-record acoustic survey using a digital recorder and Pettersson's D240x placed at a stationary location at least 1.5 km from any mist net survey location **or** closer if there is topographic separation so that different individuals are likely to be detected at each site. The acoustic data collected during this remote survey is treated as separate and independent from the mist-net survey.

If equipment availability is a limitation, conduct remote, auto-record acoustic surveys on separate nights than the mist-net surveys, making sure that the locations are at least 1.5 km from mist-net sites **or** closer if there is topographic separation so that different individuals are likely to be detected at each site.

Additionally, when roost sites are present in a SU, conduct at least 2 roost surveys during the day to target specific species such as *Corynorhinus townsendii*. Identify bats visually or at sites that are not maternity sites (solitary roosters present), using captures. Otherwise, collect guano for DNA analysis of species presence.

Survey locations should be selected to maximize the number of species detected. Locations for the mistnet, remote acoustic, and roost surveys are fixed and repeat surveys will occur in the same locations each year for multiple years. Be certain to GPS and to document the locations for the monitoring sites so that others can find the fixed locations in the future.

Habitat data

Be certain to collect the following habitat data for each site as they are critical covariates for our monitoring analysis:

- ***Habitat microsite:*** Bridge, building, guzzler, hollow tree/snag, natural water tank, pothole or road rut, pond, road, spring, stock tank, stream, river, lake, trail, arroyo, mine, cave, rock outcrop, cliff, talus, rock outcrop, other.
- ***Width:*** estimate width of microsite such as width of pond or stream.
- ***Length:*** estimate length of microsite of finite feature.
- ***Seasonality:*** primarily of water features
- ***Habitat type:*** forest, woodland, meadow, shrub-steppe, clearcut, forest opening, forest/open edge.
- ***Distance to forest or woodland:*** distance from detection location to nearest forest cover.
- ***Distance to water:*** distance from detection location to water source.
- ***Distance to rock feature:*** distance from detection location to a rock feature such as cliff, talus slope, etc.
- ***Start and stop temperature:*** recorded at beginning and end of survey.

Data collection

Data is collected using the data standards in the Bat Grid data dictionary and using the Bat Grid field forms. Other forms can be used as long as the same data and data standards are followed.

Location data is recorded using a GPS unit, preferably with an antenna to increase location accuracy. Location data is reported in UTM's and includes UTM Zone and NAD.

Data is submitted electronically to Pat Ormsbee using the data template or excel spreadsheet by October 1 each year. Please check your data before sending it to us as we will return data to you if it needs corrections. Also submit a copy of call files (on CD), biopsies, and hard copy of data sheets.

Appendix F

Stream Photos Points

Photopoint	Easting	Northing	Photopoint	Easting	Northing
M 1	423882	4849072	M 6	427913	4850189
M 2	425611	4849652	M 7	428430	4849484
M 3	426369	4849712	M 8	430760	4848741
M 4	424657	4849612	M 9	429459	4849507
M 5	425681	4849679			

Map Datum: NAD 83

Table 6: Stream Photo Locations

Figure 9: Stream Photo Locations

M #1 Upstream

M #1 Downstream

M #2 Upstream

M #2 Downstream

M #3 Upstream

M #3 Downstream

M #4 Upstream

M #4 Downstream

M #5 Upstream

M #5 Downstream

M #6 Upstream

M #6 Downstream

M #7 Upstream

M #7 Downstream

M #8 Upstream

M #8 Downstream

M #9 Upstream

M #9 Downstream