Restoration Highlights

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Happy Hill Shrub-Steppe Restoration Case Study

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The Happy Hill properties were purchased by the Washington Department of Fish and Wildlife with state grant funding from the Washington Wildlife and Recreation Program in 1991. Acquisition funding was provided for critical habitats and species recovery, in this case the Columbian Sharp-tailed grouse. The Happy Hill area is part of the Scotch Creek Wildlife complex. BPA accepted the Scotch Creek project for enhancements and O&M funding in 1996, as mitigation for wildlife losses due to the construction of hydro dams on the Columbia River. Since that time the WDFW has been actively converting old agricultural fields into native shrub-steppe. We have accomplished approximately 3,500 acres to date on units of the Scotch Creek Wildlife Area. A case history of restoration projects is compiled and can be accessed electronically from the WDFW website here: http://wdfw.wa.gov/publications/01330/FinalCaseHistoryLibrary.pdf

The Happy Hill restoration project, located in Okanogan County in north-central Washington, was converted to non-native grasses (intermediate wheatgrass) by the previous owner and managed as a Percheron horse ranch since the early 1970's. Native species had been completely replaced with non-native grasses and invasive weeds, including diffuse knapweed. Historically, the site provided sharp-tailed grouse habitat but sharp-tailed grouse no longer use the site. The soil at the site was Conconully gravelly ashy loam, 0 to 25 percent slopes and extremely stony. The adjacent land use and condition was native shrub-steppe to west and north, previously restored shrub-steppe to the east, and private rangeland to the south.

The project's ecological goals were that the site: 1) would acquire the species and structural composition necessary to provide sharp tail grouse nesting and brood rearing habitat; 2) the historically dominant functional group (structurally diverse native bunchgrasses) would be restored; 3) forbs would provide diversity and food for young sharp-tailed grouse; and 4) the restored ecosystem will consist of indigenous species to the greatest practicable extent. There was an additional goal of eliminating weed sources that could impact neighboring land owners. The historically low level of shrubs would not be restored; it is presumed that shrubs would spontaneously invade from surrounding seed sources.

Restoration consisted of implementing a variety of site preparation activities (See Table 1, below), planting a seed mix (See Table 2, below), and post-planting weed control. The seed mix was planted in early November 2007 with a Tye native grass seed drill at a rate of 13 lbs/acre.

Three years post-planting, native grasses and forbs were established and the restoration site was dominated by native bunchgrass species (Figures 1 and 2). Yarrow was abundant, and scattered buckwheat and lupine plants were present. Intermediate wheatgrass and Russian knapweed were also present but at low levels. Aside from yarrow, forb establishment is slow. Weed sources that could impact neighboring land owners have been successfully suppressed but further work is needed. In the future, it is expected that the site will continue to develop a mixed stand of native grasses and shrubs will slowly invade, although it is possible that intermediate wheatgrass could regain prominence.

Figure 1. Plant establishment three years post-seeding (Sept. 2010). Recently mowed restoration site to control annual weeds.

Figure 2. Plant establishment three years post-seeding (September 2010). Non-mowed area.

Shrub-Steppe and Grassland Restoration Manual for the Columbia River Basin

In 2010, restoration practitioners at the Washington State Department of Fish and Wildlife (WDFW), the Bonneville Power Administration (BPA) and the Bureau of Land Management (BLM) recognized the need for a technical manual focused on shrub-steppe and grassland restoration in the Columbia River Basin. These practitioners had accumulated decades of hard-earned knowledge, mainly through trial and error, but this anecdotal information had never been compiled or widely disseminated. As retirement approached for experienced practitioners, this body of knowledge and experience had the potential to be lost. This manual was developed to capture restoration experiences and disseminate knowledge to new practitioners, thereby ensuring more successful and cost-effective habitat restoration projects in the future. The manual includes technical information that veteran shrub-steppe and grassland restoration practitioners in the Columbia Basin indicated were necessary for new restoration project managers to properly plan and successfully execute habitat restoration projects. This manual, however, does not treat all subjects equally. The manual focuses disproportionately on technical topics which restoration experts indicated are in greatest need of attention to ensure success. In addition to providing general guidance, this manual provides specific recommendations, tools and templates to help people quickly take advantage of existing resources and

contribute to the growing restoration knowledge base. The Restoration Manual can be accessed at the WDFW website: http://wdfw.wa.gov/publications/01330/

About the authors

Jim Olson is the manager of the Wildlife Area complex, and oversees the implementation of each part of the restoration projects, in addition to many other duties on the wildlife area. The compiler and co-author of the restoration manual, Richard Tveten, worked hard to reach out to many experts in the field who contributed to the manual. Owner Jerry Benson and staff at Benson Farms Inc. provided the majority of expertise that has been acquired over a lifetime of professional experience including collection and propagation of source identified native seed.

Table 1: Sequence of site preparation activities

Month	Action	Objective
April	Spray	Kill pre-existing plants
April	Moldboard plow	Remove residue and bury weed seed bank
May thru September	Disk and harrow	Keep weed free seedbed
Early October	Remove rocks	To make mowing available as a management tool
Late October	Culti-pack	Firm seedbed
Early November	Drill seed native grass/forb mix	To place dormant seed mix for 2008 emergence

Table 2: Composition of seed mix (since 2007 all seed is source-identified)

Species	Pounds pure live seed/acre
Wheatgrass, Whitmar	2
Bluebunch Wheatgrass, Goldar	2
Snake River Wheatgrass, Secar	2
Idaho Fescue	1
Sandberg Bluegrass	0.5
Western Yarrow	0.05
Blue Flax	0.5
Snow Buckwheat	1
Lupine	1
Arrowleaf Balsamroot	3
Antelope Bitterbrush	1