Photographic Documentation of Soil Color Change on Exposure to Air

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Photographs of soils are well documented (Soil Survey Staff, 1999) and hydric soils in particular (USDA-NRCS, 2010). Reduced matrix (Vepraskas, 1994) is defined as a soil matrix that has a low chroma in situ, but undergoes a change in hue or chroma within 30 min after the soil material is exposed to air (Soil Science Society of America, 2008).

A photo was taken immediately after the ped interior was exposed to air, less than 1 s (Fig. 1). The right and left ped were exposed to the air for the same amount of time, yet the photo captures the color change seen with the naked eye in the field on exposing a reduced ped to air. The photo is not a before and after picture. It is for educational and demonstration purposes as captured as closely as possible to date what many soil scientists have seen on a few occasions and few have seen on many occasions.

The relatively brightly gleyed color changes to a dull oxidized colored matrix immediately on exposure to air. The majority of the change completed in less than 1 s, but the change progressed to a lesser extent until more fully oxidized. The color change was subtle and mostly instantaneous.

The large soil ped was extracted from a deep test pit in the Green River Valley, Auburn, Washington (47°20′40.25″N 122°15′14.29″W) on February 16, 2011 (Fig. 2). Sample depth was approximately 150 cm below the soil surface. The sample was taken from fluvial sediments and many miles removed from a marine environment.

Three different colors are evident in Fig. 1 depending on the amount of time exposed to air. The right ped face is characteristic of what is seen on immediately opening the ped and estimated from the photo on the computer screen as greenish gray (10Y 6/1) (Gretag-Macbeth, 2000). Color change was immediate and there was only time to take the photo to attempt

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Fig. 1. Right ped face represents reduced colors on a freshly broken ped face; left ped and top of right ped represent oxidized colors after exposure to air (colors vary on viewing screens).

Fig. 2. Deep test pit from which sample was taken; shovel is 150 cm.