

WHAT IS THE FOREST SOIL DISTURBANCE MONITORING PROTOCOL TOOLKIT?

The Forest Soil Disturbance Monitoring Protocol (FSDMP) Toolkit contains several resources that can be used by field soil scientists and watershed specialists and also other natural resource professionals, or the public. These resources can be used to evaluate and describe physical soil disturbance in a forested setting. The common definitions and consistent disturbance classes ensures reliable use of the protocol. The toolkit includes the following:

- Forest Soil Disturbance Monitoring Protocol **Volume I: Rapid Assessment**
- Forest Soil Disturbance Monitoring Protocol **Volume II: Supplementary Methods, Statistics, and Data Collection**
- Forest Soil Disturbance Monitoring Protocol **Volume III: Scientific Background for Soil Monitoring on National Forests and Rangelands**
- Soil-Disturbance Field Guide – Visual photo guide



FOREST SOIL DISTURBANCE MONITORING PROTOCOL

Volume I: Rapid Assessment

The rapid assessment outlines a framework for monitoring soil disturbance from forest management during both the assessment (pre-activity) and monitoring (post-activity) phase. Monitoring soil disturbance pre-activity and post-activity enables the Forest Service to assess

the success of management activities in meeting legal, regulatory, and policy objectives. By using a consistent monitoring approach, forests in every Forest Service region can build soil resource programs to meet their specific requirements in accord with their soil quality standards and guidelines.

The FSDMP rapid assessment defines visual physical soil indicators that can be measured consistently, efficiently, and economically. The FSDMP provides estimates of soil disturbance and confidence intervals around the monitoring results. The estimates are based on sample sizes calculated from the onsite variability estimated from the first 30 monitoring points in the sample and a predetermined confidence level.

Volume II: Supplementary Methods, Statistics, and Data Collection

Volume II: Supplementary Methods, Statistics, and Data Collection describes why we monitor, defines key terms, explains the development of a statistically sound data collection method, describes how data should be stored, and interpretation of monitoring results.

Volume III: Scientific Background for Soil Monitoring on National Forests and Rangelands

Volume III: Scientific Background for Soil Monitoring on National Forests and Rangelands includes the proceedings from a workshop held to define the state of the science. This volume (to be published in early 2010) includes papers on monitoring for sustainable forestry, examples of international monitoring protocols, definitions of soil quality, and how the FSDMP can relate to long-term studies.

SOIL-DISTURBANCE FIELD GUIDE

The field guide provides detailed descriptions and photographic examples—over a wide range of climatic and vegetative conditions—of the undisturbed soil condition and three soil-disturbance classes. The soil scientist or watershed specialist can use the visual guide when conducting the FSDMP rapid assessment.

The field guide is also intended to help land managers in the following areas:

- **Communication** – To clearly understand the potential effects of soil disturbance on vegetative growth and other ecosystems functions requires that everyone speak the same language to help develop a soil-management prescription. Land managers can use the field guide to help define desired condition with a contractor. The timber sale administrator can discuss concerns of rutting with the equipment operator as they identify locations that may be more vulnerable to rutting. The fuel management specialist can use the guide to discuss desired surface-soil attributes including soil cover and burn severity with contractors or field crews.
- **Training** – Soil disturbance observations work effectively if they are supported by a disciplined training program, frequent checking by experienced individuals, and training of observers. This field guide is intended to promote a high level of uniformity and consistency when conducting the FSDMP rapid assessment. Silviculturists, contract inspectors, fuel management specialists, and other resource managers will be able to identify soil disturbance classes.

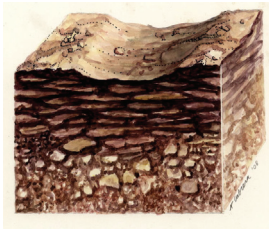
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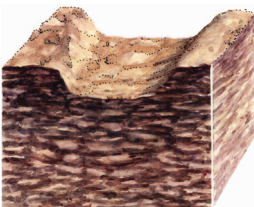
CLASS 0



CLASS 1



CLASS 2



CLASS 3

Drawings by Natalie Cabrera

Soil-disturbance class visual indicators and their definitions.

Indicator	Definition
Forest floor impacted	Forest floor material includes all organic horizons above the mineral soil surface.
Topsoil displacement	The surface mineral soil primarily includes the A-horizon, but if the A-horizon is shallow or undeveloped, it may include other horizons. This disturbance is usually due to machinery but does not include "rutting" described below.
Rutting	Ruts vary in depth but are primarily the result of equipment movement. Ruts are defined as machine-generated soil displacement or compression.
Burning severity (light, moderate, high)	Burning severity includes only effects on the forest floor and mineral soil, not on above-ground vegetation.
Compaction	Compaction by equipment results in either a compression of the soil profile or increased resistance to penetration.
Platy structure/ massive/puddled	Flat-lying or tabular structure in the mineral soil. "Massive" indicates no structural units are present and soil material is a coherent mass. Puddled soil is often found after wet weather harvest operations. Soil pores are usually smeared and prevent water infiltration.



A joint program between San Dimas Technology and Development Center and Rocky Mountain Research Station. For more information contact Carolyn Napper at cnapper@fs.fed.us or Deborah Page-Dumroese at ddumroese@fs.fed.us.