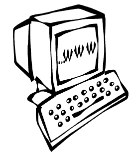
Region One Vegetation Classification, Mapping, Inventory and Analysis Report



$\bar{x} = \frac{\sum x}{n}$

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R1 Multi-level Vegetation Classification, Mapping, Inventory, and Analysis System

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Introduction
Vegetation is the primary natural resource managed by Region 1. The agency is responsible for managing vegetation for a variety of uses while maintaining the integrity of ecosystem components and processes at the broad, mid-, and project levels. One of the fundamental informational needs is consistent and continuous existing vegetation data of sufficient accuracy and precision to address resource planning, analysis, and monitoring objectives. These analyses rely on data and associated models produced from vegetation classification, mapping, and/or inventory processes. This paper discusses the integration and utilization of these data sources in Region 1.

The **R1** Vegetation **C**lassification, **M**apping, **I**nventory and **A**nalysis system (**R1-CMIA**) provides the means to derive estimates, with known reliability, of current condition and monitor changes in vegetation attributes, temporally and spatially. There is not one set of inventory data or map that is appropriate for addressing all levels of analysis on a Forest but there is a relationship, developed and supported by the Region 1 Regional Office, which provides consistency and integration.

This integrated approach addresses three levels of analysis: broad, mid, and base. Broad-level generally provides information for Regional, multi-Forest, or Forest analysis. Mid-level generally provides information for large landscapes such as mountain ranges and 4th-code hydrologic units. Base-level generally provides information for project-level planning and decision making.

General Relationship of Classification, Mapping, and Inventory

Classification, mapping, and inventory of existing vegetation are three separate, but related, processes. Many of the analyses needed to address resource issues are essentially analyses of vegetation pattern and process relationships. All of these analyses rely on the products produced from vegetation classification, mapping, and/or inventory. The general relationship of these three is as follows:

Classification is the process of grouping similar entities into named types or classes based on shared characteristics. Vegetation classification defines and describes vegetation types and/or structural characteristics. In other words vegetation classification answers the question “What is it?” To be most useful, classifications need to be consistently applied to inventory data and map products, hierarchical, mutually exclusive, exhaustive, and mappable, if a spatial depiction is needed.

Mapping is the process of identifying the geographic distribution, extent, and patterns of vegetation types and/or structural characteristics. Vegetation mapping entails the spatial delineation of vegetation patches and assigning attribute labels to those patches. In other words, vegetation mapping answers the question “Where is it? “ To be most useful, a map needs to be consistently derived and attributed.

Inventory is the process of applying an objective set of sampling methods to quantify the amount, composition, and condition of vegetation within specified limits of statistical precision. Vegetation inventory quantifies the amount, composition, and condition of vegetation, and the reliability of the estimates. Vegetation inventory answers the question “How much is there?” To be most useful, the inventory needs to have a statistically valid sample design, be non-biased, and provide both population estimates and an indication of their reliability.

The conceptual relationships between R1 classification, mapping, and inventory are schematically depicted in figure 1.

A one-to-one relationship between vegetation types from a classification and vegetation map units is uncommon given the limitations of mapping technology and the level of floristic detail in most classifications. Mapping, therefore, usually entails trade-offs among thematic resolution, spatial resolution, and accuracy, as well as cost. The goal is constrained optimization, not perfection. This problem is reduced when classification algorithms for vegetation types, such as dominance types, and structural classifications, such as size, are designed to be specifically applied to mapping projects.

Similarly, there is rarely a sufficient inventory sample size to quantify all vegetation types occurring across a geographic area, especially at the mid- and broad-levels. Inventory compilation usually involves trade-offs to generalize and aggregate vegetation types and/or structural classes to achieve a sample size needed to provide statistically valid estimates consistent with the intended analysis applications.

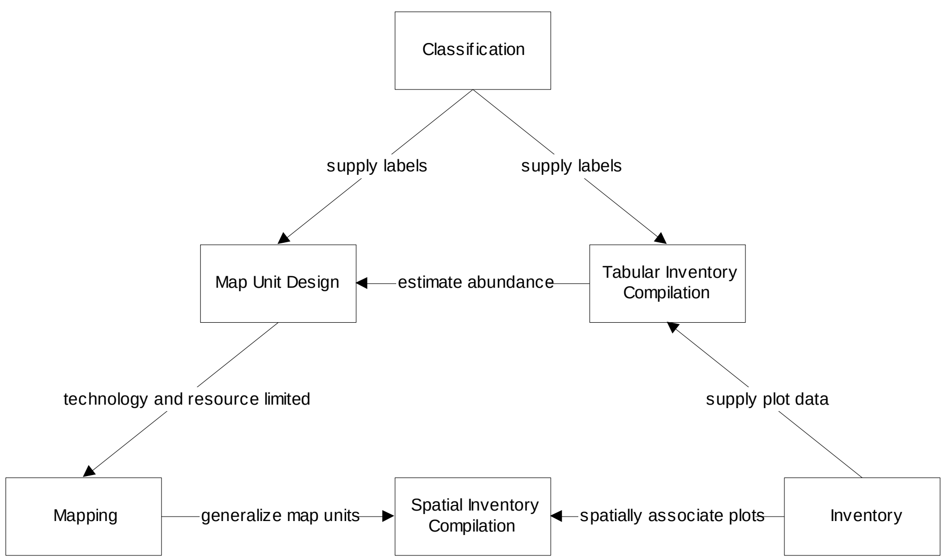

Figure 1: Relationships of vegetation classification, mapping, and inventory.

The R1-CMI System: Classification, Map Products, and Inventory used in R1 for Existing Vegetation

Classification:
The Region 1 Vegetation Council has developed a classification scheme for forest vegetation (Barber et al., 2009), R1 ExVeg Classification. The forested classification includes lifeform, dominance type, canopy cover, size (i.e., diameter) class, and vertical structure. R1 ExVeg Classification is hierarchical and mutually exclusive. A non-forest classification recently was developed. It provides an exhaustive classification system across all vegetation types found in the Region. Furthermore, the classification system was developed to work with the inventory and map products so the classification can be consistently applied. R1 ExVeg Classification meets the requirements of an existing vegetation classification system as defined in the National Technical Guide (Brohman and Bryant, 2005).

Mapping:
Map products derived from satellite imagery, available since the mid-1990s, provide consistent and continuous data of varying levels of accuracy and utility. Gains in remote-sensing technology, computing capability, and the development of skills and personnel within the Agency continue to increase their utility and accuracy.

R1-VMap (Northern Region Vegetation Map) (Brewer and others, 2004), a polygon-based map, is currently available for the west-side of R1. An east-side product is under development, which will replace SILC. R1-VMap will be available for the Custer, Gallatin, Lewis & Clark, and Helena National Forests in 2009. Development for the Beaverhead-Deerlodge NF and Dakota Prairie Grasslands will be initiated in 2009. These spatial datasets are designed to meet, and in some cases, exceed the requirements of the Existing Vegetation Classification and Mapping Technical Guide (Brohman and Bryant, 2005).

R1-VMap is a consistent and continuous geospatial database for existing vegetation and associated attributes available at three different spatial resolutions; broad-level (R1-VMap-BRD), mid-level (R1-VMap-MID), and base-level (R1-VMap-BAS, R1-Vmap-RAW). These efforts provide a vegetation dataset across all ownerships within the Region of known accuracy that can be engaged at the appropriate level of analysis.

These spatial databases contain a wealth of information including spectral and biophysical data. Standard map products that are associated with the database include existing vegetation lifeform, dominance type for trees, shrubs, and herbaceous vegetation communities, canopy cover for trees and shrubs, and tree size class. Not all attributes listed are available in all areas of the Region. Because R1-VMap is a geospatial database, customized derived products can also be developed such as range suitability, wildlife habitat, and fire and fuels maps. The Region currently has a maintenance program for R1-VMap which adheres to the Existing Vegetation Classification and Mapping Technical Guide’s requirements to ensure the spatial information represents current condition.

Inventory:

There is no “one size fits all” inventory dataset that meets analysis needs of all levels. The inventory used over a geographic area must be a statistically valid sample for the geographic area of interest. This will allow estimates and associated measures of reliability to be derived for various attributes of interest.

At the broad- and mid-level, vegetation is mapped across the entire area of interest and the inventory occurs on a statistically based sample of the area. At the base-level, all polygons of interest are inventoried. This process allows us to focus resources where information is needed to support decisions or analyses leading to decisions.

Analysis

At all levels of analysis, inventory data can be associated with map products in two different ways; by the use of map unit descriptions or map feature descriptions. In the R1-CMIA framework, a *map unit* is defined as the collection of all individual map features (e.g., polygons) for a specific map label. Map unit descriptions describe the range of variability for a map label, where as *map feature* descriptions describe the modal condition of all the features with the same map label. There are instances where each of these options is appropriate and applicable to use.

Map unit descriptions are derived by intersecting inventory plot locations with a map product and summarizing the plot data by map label or strata. Due to variations in map accuracy, the range of variability for a map label may be large. For example a map strata of [PSME, 10-15" diameter, 25-40% canopy cover] will likely contain plots dominated by PICO or PIPO, with smaller average tree sizes, and higher tree canopy covers. The result is a high degree of variability in the map unit's composition resulting in larger confidence intervals around the averages of the map unit's attributes of interest (e.g., snags per acre, elk thermal cover). If a spatially balanced sample of inventory plots exists and a statistically reliable estimate of the attribute of interest is needed, this is the preferred method of associating inventory data to map products.

Map feature descriptions require no spatial intersection with the inventory data. The inventory plots are aggregated and summarized by the same map labels or map strata that are depicted on the map product. For example, all inventory plots that are [PSME, 10-15" diameter, 25-40% canopy cover] are summarized for the attribute of interest. This method assumes that the map product is 100% accurate in spatial depiction and thematic labeling. This is rarely the case. Therefore, this method requires some measure of the map accuracy for interpretation of these data. This method is recommended when available inventory data was purposively sampled (e.g., stand exams) or low variability in the attribute of interest is more important than statistical reliability (e.g., creating input layers for modeling analyses such as an average crown base height map for input into FLAMMAP).

Multi-level R1-CMI

The components and characteristics of classification, mapping, and inventory products, and resulting analysis are summarized in Table 1. The following sections briefly describe the general approach to the multi-level integration of classification, mapping, inventory, and analysis in Region One.

Table 1: Multi-level existing vegetation mapping, inventory, and analysis components and characteristics.

Level	Geographic Extent	Map Database	Inventory	Analysis Purpose

Broad-level	2 to 50+ million acres
	• Region
	• Multi-Forest
	• Forest
	• Eco-province
	• Eco-section
		R1-VMap-BRD
		• Continuous geospatial database consistent across all ownerships
		• Classification Thematic Resolution
		  ◦ 5 Lifeforms including shrubs and grasses
		  ◦ 8-10 Dominance broad classes for coniferous trees
		  ◦ 2-3 Tree size classes
		  ◦ 2-3 tree canopy cover classes
		• Spatial Resolution
		  ◦ 20 Ac minimum map feature
		• Temporal Resolution
		  ◦ Maintained annually: harvest/fire
		  ◦ 5 year update schedule
			FIA Grid Data
			• With "all condition" inventory on non-forested conditions supported by Region 1
			• Re-measure every 10yrs
			• R1 Summary Database for inventory compilation and analysis
				• Forest-wide cumulative effects analysis
				• Monitoring Forest Plan standards and guidelines
				• Developing and monitoring desired condition over time
				• Regional assessments
				  ▪ Wildlife species viability
				  ▪ Integrated restoration and protection strategy
				  ▪ Vegetation diversity matrix

Mid-level	50,000 to 5,000,000 ac.
	• Geographic Area
	• Landscape Area
	• HUC4 Watershed
	• Eco-subsection
	• Ranger District
	• Mountain Range
		R1-VMap-MID
		• Continuous geospatial database consistent across all R1 National Forest lands
		• Classification Thematic Resolution
		  ◦ 5 Lifeforms including trees, shrubs, and grasses.
		  ◦ 10-15 Coniferous tree dominance type groups
		  ◦ 7-10 shrub, herbaceous, riparian, and coniferous tree dominance type groups
		  ◦ 3-5 Tree size classes
		  ◦ 3-5 Tree canopy cover classes
		  ◦ 2-3 Shrub canopy cover classes
		• Spatial Resolution
		  ◦ 2-5 acre minimum map feature
		• Temporal Resolution
		  ◦ Maintained annually: harvest/fire
		  ◦ 5 year update schedule
			R1-Intensified Inventory
			• spatially balanced across geographic extent of interest
			• R1 CSE protocols that mimic FIA protocols
			• R1 Summary Database for inventory compilation and analysis
			or
			
			Stratified Random Sampling
			• R1 Summary Database for inventory compilation and analysis
				▪ Project area cumulative effects analysis
				▪ Land management plans
				▪ Forest-level program of work
				▪ Landscape assessments
				▪ EAWS
				▪ Allotment management plans
				▪ Condition, trend, priority setting strategies to meet Forest and Ranger District goals

Level	Geographic Extent	Map Database	Inventory	Analysis Purpose

Base-level	< 50,000 acres
	
	▪ Project
	▪ HUC5 or 6 watersheds
	▪ Compartment
	▪ Ecosystem Mgmt Area
		R1-VMap-BAS and R1-Vmap-RAW
		• Classification Thematic Resolution
		  • 5 Lifeforms
		  • 15-25 Tree dominance types/alliances
		  • 10-20 shrub, herbaceous, riparian, and coniferous tree dominance types depending on analysis need
		  • 3-7 Tree size classes
		  • 5-10 Canopy cover classes for tree and shrub depending on analysis need
		• Spatial Resolution
		  • 0-2 acre variable min. map feature
		• Temporal Resolution
		  • Maintenance and updated only to support local project needs
			R1-Common Stand Exam Protocols
			• R1 FSveg Web-based reports for inventory compilation and analysis
			• National FSVeg reports
			• Forest Vegetation Simulator (FVS) to address effects of treatment, fire, and future condition
			• R1 Summary Database for inventory compilation and analysis
			
			Vegetation Inventory and Monitoring protocols (previously called Range Protocols)
				▪ Stand-level, site specific direct and indirect effects
				▪ Silvicultural Diagnosis and Prescription
				▪ Range allotment inventory and monitoring

1. Broad-level

Broad-level products provide the vegetation information used for forest, multi-forest, and regional-level assessments. They aid in development of regional and forest strategies that focus on broad-level values at risk and desired conditions to prioritize work. Broad-level datasets are used for region-wide coarse-filter monitoring, assessment of cumulative effects, and to set the management context for projects occurring on Forests. Coarse-filter monitoring will aid in the Region's efforts to assess changes in wildlife ecosystem diversity and sustainability over time. Additionally, the broad-level inventory can provide information to monitor other forest-plan desired conditions, standards, and guidelines and forest-wide cumulative effects.

1.1 Classification

At the broad-level the R1-ExVeg classification includes 10 forest dominance type broad classes, 3 tree size classes, and 3 canopy cover classes. For more information, see: *Region One Existing Vegetation Classification and its Relationship to R1-VMap and Inventory Data* In addition, a non-forested vegetation dominance type classification has been developed for the eastside forests in Montana. However, the Dakota Prairie Grassland is not a part of this classification. There are approximately 20 herbaceous and 20 shrub dominance types described. The final classification will be available in June of 2009.

1.2 Mapping
The broad-level map, used to depict existing vegetation, is developed from R1-VMap and potentially other sources (e.g., GAP, LANDFIRE). R1-VMap-BRD provides a consistent and continuous vegetation dataset across all ownerships within the Region of known spatial and thematic accuracy. It supports an existing vegetation classification for both forested and non-forested areas. The geospatial database can be integrated with other spatial databases and used to derive additional general classifications, such as bark beetle hazard or current fire regime.

1.3 Inventory
Forest Inventory and Analysis (FIA) data (http://www.fia.fs.fed.us/) provides a statistically-based inventory appropriate to use for broad-level planning and analysis. Unbiased estimates and confidence intervals for attributes associated with vegetation can be derived for large landscapes such as National Forests, landscapes, and ecological section. The FIA sampling frame uniformly covers all forested lands, regardless of management emphasis. Therefore, wilderness areas, roadless areas, and actively managed lands all have the same probability of being sampled. More details on the statistical foundation of using FIA data on National Forests is found in: *Application of Forest Inventory and Analysis (FIA) Data to Estimate the Amount of Old Growth Forest and Snag Density in the Northern Region of the National Forest System,* Czaplewski, 2004.

FIA plots are re-measured over a 10-year cycle, providing a temporally and spatially reliable dataset for monitoring changes in vegetation over time. Historically, FIA collected data on all lands that are "forested"[1]. Consistent information on non-forested conditions has been collected by IW-FIA since 2006 in Montana and Idaho. Protocol development and implementation was a collaborative effort between Region 1 and Interior West FIA (IW-FIA). Starting in 2009, these protocols were used to collect data in North Dakota and South Dakota, part of the Northern FIA (NO-FIA). This is called the All Condition Inventory which collects information on all grid locations, not just those locations that meet the FIA definition of forested. For further information on protocols, see the All Condition Inventory Field Guide at http://fsweb.r1.fs.fed.us/forest/inv/.

1.4 Analysis Tools
The Region has developed the R1-FIA Summary Database (Bush and others, 2006), which integrates FIA data with various spatial datasets important for the Region's use in broad-level cumulative effects analysis, planning and monitoring, and various other Regional and Forest-level analysis purposes. The database is comprised of seven tables that store actual measurements (slope, aspect, elevation, etc.), calculated attributes (trees per acre, basal area, trees per acre within a specified diameter class of a specific species, etc.), classification information (dominance type, vertical structure, old growth, goshawk habitat, etc.) and spatial information. This database was a collaborative effort between the Region, the Inventory and Monitoring Institute (a WO detached unit), and Interior West FIA (IW-FIA).

2. Mid-level

Mid-level map and inventory products are intended to support forest and district needs for implementation of integrated vegetation treatment plans to meet forest plan objectives. Examples of the analysis these products support are ecosystem analysis at the watershed scale (EAWS), NFMA analysis, project development, cumulative effects analysis to support project NEPA compliance and forest plan monitoring. Mid-level products are useful for validating and refining regional and forest strategies that prioritize work, such as the recent Integrated Restoration and Protection Strategy. Mid-level datasets are used for further assessment of forest and district-wide cumulative effects and to set the management context for individual projects. Mid-level map products are typically developed consistently across all administrative units and land ownerships from a variety of remotely-sensed data.

2.1 Classification

At the mid-level, the R1 Existing Vegetation classifications are more detailed than at the broad-level. There are 3 standard classifications; each lends itself to specific analysis and accuracy needs. They include 18-20 forest and XX nonforest dominance types, 4 tree size classes, and 3-4 canopy cover classes. For more information, see: *Region One Existing Vegetation Classification and its Relationship to R1-VMap and Inventory Data.*

2.2 Mapping

R1-VMap provides the mid-level map product. The mid-level map provides a consistent and continuous vegetation dataset across all ownerships within the Region of known spatial and thematic accuracy. Eastside R1-VMap for non-National Forest System lands may be derived from other sources (e.g., GAP, LANDFIRE). It supports an existing vegetation classification for both forested and non-forested areas. Thematic resolution for non-coniferous types is much higher for Eastside Forests than for the Westside. The geospatial database can be integrated with other spatial databases and used to derive other general classifications, such as bark beetle hazard or current fire regime.

The mid-level VMap (R1-VMap-MID) is derived from the raw (R1-VMap-RAW) database. The standard mid-level map has a variable minimum map-unit size (depending on lifeform) for Westside units. The minimum map unit size for Eastside units is consistent at one acre across all lifeforms. Additional R1 mid-level VMap products can be constructed to meet specific analysis needs using different aggregation and classification methods with the R1-VMap raw databases.

Historically in R1, stands associated with Timber Stand Management Record System (TSMRS) generally meet the definition of a mid-level map. Stand maps have historically been a result of delineation and classification of aerial photography done at the district-level. This often resulted in inconsistent map-feature size and labels, and a map product of unknown accuracy. In many cases, these maps (and the inventory associated with them) no longer reflect the current vegetation conditions due to harvest, fire, insect or pathogen disturbance.

2.3 Inventory

At the mid-level, inventory is conducted only on those lands where there is a need for vegetation information within specific geographic areas. The intensity of the inventory is based on information needs and funding.

Note: all lands mapped at a mid-level may not have a mid-level inventory nor need one. For larger geographic areas, Ranger Districts, etc. more general mid-level management questions can be answered using the base FIA grid data to describe R1-VMap features.

There currently are two approaches to mid-level inventory supported in Region 1: intensification of the existing FIA grid, which allows maximum flexibility in analysis; or a stratified random sampling approach, in which areas that need additional information are delineated and an inventory is collected across the strata of interest. All analysis is tiered back to the initial stratification scheme.

The most flexible approach to mid-level inventory supported in Region 1 is intensification of the FIA grid (Berglund and Bush 2006) which allows maximum flexibility in analysis to meet multi-resource information needs. Furthermore, plot locations are monumented, allowing a Forest to re-measure in order to monitor changes in vegetation attributes over time. These efforts can be targeted to those plots affected by natural or person-caused events which alter the vegetation so that an updated existing condition can be assessed and changes due to an event can be determined.

The Region has developed tools for determining the number of plots needed to meet information needs (Berglund and Leach, 2006) and locating the plots (Zeiler and others, 2007). Field inventory protocols for intensification are similar to those used by IW-FIA for data collection. The data is collected using modified Common Stand Exam protocols to mimic the FIA protocols (Region 1 Grid Intensification using CSE Protocols Field Procedures). Data resides in the FSVeg database and is ultimately loaded into an Intensified Grid Summary Database. Other inventory protocols such as line intercept, cover frequency, nested rooted frequency, and density (quadrats/belt transects) may be used in conjunction with the intensification protocols to collect additional information, as needed.

The stratified random sampling strategy is similar to the “Compartment Exam” approach that was established in the Region in 1985. While common at one time in the Northern Region, it is infrequently used for mid-level inventory today. The geographic area of interest is pre-stratified according to similar vegetation or physiographic attributes based on the assumption that for the particular information needed, the within stratum variability is less than the between strata variability. Stratified Random Sampling is an efficient sampling strategy when additional information is needed on particular vegetation communities, such as aspen, old growth, or riparian. Once the area(s) of interest are clearly defined, the sampling strategy can then be polygon or point based, as either polygons within the stratum of interest are then randomly chosen with exams collected within the subject polygons with probability of selection proportional to size or a spatially balanced sample of plots is installed across the entire stratum. The data is collected according to Common Stand Exam protocols. Since the stands or plots are selected in a random manner, the combined estimates from the stand exams or plots represent estimates for their particular stratum. Confidence intervals about the estimates can also be derived.

There are several factors to keep in mind if stratified random sampling is selected for mid-level inventory. The strategy behind a stratified random sample is to gain sampling efficiency by stratifying the geographic area into strata of similar entities, thereby reducing variability, thus decreasing the total amount of sampling units that need to be inventoried. With many resources at the table, it may be difficult to determine the optimum stratification scheme. Once a stratification scheme is developed, all analysis *must* tier to that scheme. Furthermore, as communities change over time, membership in a particular stratum may change, due to an event, such as fire or harvest, a new stratified random sample must be done.

2.4 Analysis Tools

Since intensification of the grid is similar to existing FIA data, all applications associated with the R1-FIA Summary Database are available as analysis tools. For further information on the R1 FIA Summary Database see *Overview of R1 FIA Summary Database* (Bush and others, 2006). Intensification of the grid allows for maximum flexibility in analysis as the plots can be post-stratified according to various resource needs. For a stratified random sample, an R1 Summary Database is created with analysis based on each stratum.

For a discussion on attributing inventory data with map products see the analysis section of R1-CMI system overview.

3. Base-level

Base-level products represent the highest thematic detail (i.e., number of classes), spatial resolution (i.e., size of polygons), and precision (i.e., amount of specificity or detail contained in the data) that may be required. Products at this level are needed primarily for silvicultural diagnosis and prescription, range allotment analysis, treatment implementation, and monitoring. Monitoring information needs are usually limited to assess the effectiveness of individual treatments. Base-level information, whether inventory or mapping, is least likely to be spatially extensive due the cost of development and maintenance of the inventory and map products.

3.1 Classification

The most detailed classification from R1 ExVeg Classification is utilized at this level. For categorical data, such as of dominance type, there may be hundreds of classes. For continuous variables, such as canopy cover, multiple classes, ranging from a 0% to 80% can be delineated. For more information, see: *Region One Vegetation Council Existing Forested Vegetation Classification System and Application to Inventory and Mapping Projects.*

3.2 Mapping

The raw VMap database (R1-VMap-RAW), is used to construct base-level map products (R1-VMap-BAS) for project specific analysis objectives. The R1-VMap-RAW database is produced using procedures that incorporate image processing of satellite-based remotely sensed data. These procedures are automated and make the resulting database consistently derived across large landscapes. No minimum map feature algorithms have been applied to the base-level product. The R1-VMap-RAW database was constructed to have the ability to produce accurate base-level map products with additional investments by both the Forest/Grassland unit and the Northern Region Geospatial Group. Base-level maps do not need to be continuous across all NFS lands, nor is there money currently available to develop such a product that would meet national accuracy standards. A unique map unit design can be constructed using the R1-ExVeg system (Barber et al., 2009) for guidance to meet specific analysis needs for dominance type, biomass, and shrub canopy cover.

3.3 Inventory

The focus of inventory, at this level, is on those stands, or polygons, that have a likelihood of treatments or that detailed information is needed in order to assess specific vegetation information needs such as habitat criteria. Existing stands within the geographic area of interest should be reviewed for accuracy. One approach is to derive stands from multiple R1-VMap-B polygons. Legacy data, such as stand exams residing in FSVeg or summarized data residing in other databases, need to be reviewed to ensure that the data represents the current vegetation in the stand.

The inventory of individual polygons is collected using Common Stand Exam protocols that are defined in the Common Stand Exam Field Guide for Region 1 (http://fsweb.r1.fs.fed.us/forest/inv/cse_exams/index.htm). These protocols are similar to the stand exam protocols used by the Region for many years for forested polygons. For attributes and collection protocols not currently available in CSE, the Region is working towards integrating “rangeland” protocols with the current stand exam protocols.

To determine the number of plots to install in an exam, variability in the attributes of interest is determined, using older data or from polygons with similar characteristics, in order to derive the number of plots to sample within the stand to achieve the desired reliability of estimates. The R1 Sample Size Calculator can be used for this purpose (Berglund and Leach, 2006).

3.4 Analysis Tools

The Region uses standard FSVeg Reports, R1 FSVeg web-based reports, and project-level summary databases, similar to the R1 FIA Summary Database, for analysis. R1 ExVeg Classification is available through the regionally supported reports. The Forest Vegetation Simulator (FVS) can be used to model effects of various activities within the project area. The Stand Classifier, an FVS post-processor, classifies FVS output files into R1 ExVeg Classifications.

For a discussion on attributing inventory data with map products see the analysis section of R1-CMI system overview.

The Region is working on developing a multi-level, analysis toolset which integrates R1-VMap, activity information from FACTS, stand exam information from FSVeg, and other spatial datasets through the Geospatial Interface, a Forest Service NRIS application, to assist with project-level information needs.

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