

# Position Classification Standard for Soil Science Series, GS-0470

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## SERIES DEFINITION

This series includes positions which involve professional and scientific work in the investigation of soils, their management, and their adaptation for alternative uses. Such work requires knowledge of chemical, physical, mineralogical and biological properties and processes of the soils and their relationships to climatic, physiographic, and biologic influences.

This standard supersedes the standard for the Soil Science Series, GS-0470, published in April 1959.

## COVERAGE OF SERIES

Soil science utilizes principles from such sciences as physics, chemistry, biology, geology, climatology, mathematics and physiography to complement the concepts, principles, and techniques of soil science such as soil genesis, soil management, soil geography, soil classification, and soil morphology. Soil scientists use these knowledges to solve problems or to advance soil science, when the major objectives of the work are concerned with improved soil use, productivity, and management, and the selection of soils for various uses.

Soil scientists must know pertinent principles and techniques of many scientific fields and professions in order to be effective. Soil scientists must consider geological, biological, hydrological climatological, and physical science factors, and

- how the factors interact to govern the uses to which the soil can be put;
- how one or more of these factors can be modified to change the soil and its stability or capability;
- how the activities which are conducted upon a soil cause changes in the soil's characteristics.

## EXCLUSIONS

The following kinds of positions illustrate those *excluded* from the Soil Science Series because of the nature of the paramount qualifications required and the primary emphasis of the work.

Positions that require primarily professional competence:

1. In forestry in relating soil characteristics and management practices to the development, production, conservation, and utilization of forest resources. Such positions are classified in the [Forestry Series, GS-0460](#).

2. In physics or microbiology for the study and investigation of the physical, or microbiological properties and processes of the soils. Such positions are classified in the [Physics Series, GS-1310](#) or [Microbiology Series, GS-0403](#), respectively. However, those positions which have primary responsibility for integrating the planning and findings with or drawing implications about soil science phenomena are classified in the Soil Science Series.
3. In chemistry in the study and investigation of the chemical properties and processes of the soils. Such positions are classified in the [Chemistry Series, GS-1320](#). However, positions that require primarily professional knowledge of soil characteristics, behavior, and phenomena, in order to synthesize laboratory planning and findings with or draw implications about soil science phenomena are classified in the Soil Science Series, GS-0470.
4. In research and investigation of water in the hydrologic cycle and not in its implication for soil management. Such positions are classified in the [Hydrology Series, GS-1315](#).
5. In crop production and crop management as distinguished from competence in soil investigation and soil management practices. Such positions are classified in the [Agronomy Series, GS-0471](#).
6. In the application of a combination of agricultural and natural resource fields in order to bring about sound land use, including water management and prevention of soil erosion. Such positions that emphasize application of techniques and practices used to improve and protect the soil are classified in the [Soil Conservation Series, GS-0457](#).
7. In soil mechanics in order to assess the engineering properties of soils for the design and construction of structures or facilities that involve heavy loads or where the excavations go into deeper soils than those for which soil science techniques and data are reliable. Such positions involve evaluating the soils primarily for their suitability for use around, in, or under engineering works or structures as distinguished from uses based on biological properties and processes occurring in the soils. Such positions are classified in the [Civil Engineering Series, GS-0810](#).

## BACKGROUND INFORMATION

Soil science involves professional work in research, mapping, classification, and advising on soil productivity, suitability, and limitations for use in a broad range of public and private management, planning, and land use activities. Soil scientists work in field, laboratory, and office situations. They work closely with soil conservationists and provide them with specialized information on soils which they need in their work. Also, soil scientists deal with program officials and many other subject-matter specialists--agronomists, geologists, foresters, agricultural economists, civil engineers, agricultural engineers, hydrologists--in order to develop guidelines for the varied types of specialized interpretations needed by those specialists; and to investigate or render soils information relevant to a variety of problems.

In addition, soil scientists spend considerable time working with users of the soils information in State and local government, e.g., regional and community planners, tax assessors, and the general public.

## FUNCTIONAL AREAS

Soil scientists tend to specialize in one of three functional areas because of the needs of the particular agencies in which they are employed. These generally recognized areas are:

- National Cooperative Soil Survey;
- Special purpose investigations (including irrigation investigations) and management services;
- Research.

Some soil scientists perform work in more than one functional area. Each function involves investigation of physical, chemical, and biological characteristics of soils. The majority of soil scientists are involved in the National Cooperative Soil Survey.

### *National Cooperative Soil Survey*

In the National Cooperative Soil Survey effort, soil scientists:

- (1) Classify and map soils based on the study and measurement of their significant characteristics.
- (2) Interpret or explain the implications of soils data for farming, engineering, ranching, natural resource management, and other purposes. They make predictions about the behavior, use, and management of each kind or group of soils under stated conditions. The explanations of soil characteristics and predictions of soil behavior must be done in light of technological advancements such as: new chemicals, new machinery, new

varieties of crops, new methods of construction, and new methods of irrigation. The predictions and explanations that soil scientists present pertain to a great variety of soil uses. Illustrative are:

soil limitations for various recreational uses

soil limitations for various engineering uses

community development

watershed rehabilitation (increasing yield and reducing sedimentation)

- (3) Establish mapping units and establish relationships between different kinds of soils within the framework of a nationwide soil classification system. This process is known as soil correlation.
- (4) Prepare soil maps and reports for publication. Among other things, the reports contain information on: Formation and classification of the soils surveyed, laboratory testing of the soils, productivity, and suitability of the soils for various uses. The maps contained in the reports show the location and extent of each soil in the survey area.

#### *Special purpose investigations*

Many of the same fundamental processes outlined under the National Cooperative Soil Survey are followed by soil scientists who do special purpose investigations. In these investigations the emphasis is on specific soil problems, planning for a specific use, or developing new soil management practices for particular soils in a problem area. These soil scientists are less concerned with the collection of general purpose data and the correlation of the soils into the soil classification system than with solving particular problems or determining a course of action.

Other special purpose investigations are concerned with forecasting the behavior of soils under irrigation. This may involve field mapping, laboratory analysis of soil and water, or special field testing. These soil scientists integrate their findings with those of technical specialists in other fields in order to arrive at development programs, from the standpoint of land utilization, water availability and requirements, payment capacities benefits, and engineering and economic feasibility. This survey identifies and ranks land according to its degree of suitability for irrigation, urban, and related uses. It is used to define such planning factors as the areas to be irrigated, land development cost, farm size, payment capacity of irrigated lands, drainage and irrigation distribution system layouts, and assessments for operation of irrigation districts.

### *Research*

Soil scientists who engage in research perform a broad array of investigations into methods of improving the use of management of soil and water resources; develop empirical data on the origin and nature of soils; investigate methods of classifying, mapping, and evaluating kinds of soils; and investigate soil-plant-animal-water relationships. Physics, geology, chemistry, microbiology, and mineralogy are the principal disciplines employed.

## TITLES

*Soil Scientist* is the authorized title for nonsupervisory positions in this series.

*Supervisory Soil Scientist* is the authorized title for positions which require [supervisory](#) qualifications.

## EVALUATION NOTES

This standard provides grade-level criteria for nonsupervisory, nonresearch soil science positions in grades GS-5 through GS-13. Because nonsupervisory positions at grades above GS-13 are unique or highly individualized, it is not practicable to provide grade-level criteria for such positions. Positions above GS-13 should be evaluated by extrapolation of the criteria in this standard and the application of sound position-classification judgment.

Research positions should be evaluated by reference to the [Research Grade Evaluation Guide](#). The guide may also be used to evaluate the research portion of mixed positions.

Supervisory positions should be evaluated by reference to the [General Schedule Supervisory Guide](#).

## CLASSIFICATION CRITERIA

Grade levels for soil science positions are defined and determined through the use of two broad factors:

I. Nature of assignment

II. Level of responsibility

### *Nature of assignment*

This factor deals with:

Variety and purpose of duties performed; scope and significance of assignments; difficulty or complexity; knowledge requirements and judgment required.

At the lower grade levels, soil scientists engage in detailed survey and investigative activity. They follow standard procedures which are outlined in agency manuals and memorandums. They may perform other duties in regard to specific immediate problems of limited scope.

At the higher levels they engage in varied classification, mapping, or irrigation suitability activities of broader scope, and deal with the more complex soil patterns or soil management problems. The requirement to combine kinds of soils into major management groupings even when found in highly complex patterns, as in generalized surveys where a limited amount of information on a large area must be collected in a short time; or to compile soil association maps, is characteristic of higher levels. Reconnaissance work of this nature is normally conducted by soil scientists of at least GS-11 level, independently or as team leaders. These assignments require well-developed judgment and broad experience in resolving problems for which no suitable precedents exist, or where available guidelines are largely conflicting. Higher level soil scientists have significant involvement in special studies of a troubleshooting and special advisory nature. Assignments may even be somewhat controversial at the GS-12 level and higher. Weight may be given to factors of variety of land use activities and rapid and intensive urbanization. Complicating factors of climate, topography, geology, vegetation, economic activities require special or unusual soils information.

#### *Level of responsibility*

Under this factor are considered such aspects as:

Impact of interpretations or findings; supervision or guidance received; review of recommendations and commitment authority; contacts; available guidelines; adaptation of guidelines; planning responsibility.

At the lower levels, soil scientists receive considerable instruction on unfamiliar phases of the work or those items for which no guides exist. Their methodology, decisions, and findings are reviewed. No significant procedural modification is characteristic of these levels. Personal contacts may be diverse but are for purposes of information exchange, presentation, or gathering.

At the higher levels, since no fully applicable precedents exist for carrying out many of their assignments, emphasis is on extension, adaptation, and development of approaches and guidelines. This is especially true in the matter of interpretations, where the requirements to translate conditions in the work area into meaningful land capability and use information is associated with grade level. Interpretations and determinations are bases for major land management and land use decisions. Contacts are important and varied, with public officials, private groups, landowners, land managers, land users, and others who have need for soils information. Degree of involvement in controversial issues or conflicting land use determinations is important at the upper levels. Technical supervision is primarily exercised through review of the finished product.

At the higher levels, most commitments of a technical nature are conclusive, though in some cases final approval may depend on action by others.

## **SOIL SCIENTIST, GS-0470-05**

### *Nature of assignment*

Assignments orient the trainee in the application of professional concepts and theories to practical work situations. Soil Scientists GS-5 perform varied but not necessarily related tasks. They become acquainted with the role of soil science in the agency programs and how the soil science program is conducted in the agency. They usually work alongside an experienced soil scientist and observe him as he explains procedures and underlying reasons.

The following tasks illustrate the GS-5 level:

- record findings on base maps, usually aerial photographs;
- make traverses;
- excavate soil profiles;
- make laboratory determination of electrical conductivity of soils;
- determine soil acidity or alkalinity.

### *Level of responsibility*

GS-5 soil scientists receive precise instructions and intense supervision. Review of work is thorough.

Personal contacts are limited and for informational purposes. During such contacts GS-5 soil scientists are normally in the company of an experienced soil scientist.

## **SOIL SCIENTIST, GS-0470-07**

### *Nature of assignment*

Soil Scientists GS-7 are at the developmental level. They have been exposed to varied processes in classification and mapping of soils or economic land classification. Their assignments are straightforward, of limited difficulty and complexity, and do not require coordination of several aspects. Specific guides and precedents exist or detailed instructions are given which pertain to all their assignments.

GS-7 assignments are based on the assumption that the soil scientists are familiar with some standard procedures and terminology; however, at the GS-5 level, no prior knowledge is assumed, other than of the concepts and basic work processes which were learned through



formal education or education and specialized experience. GS-7 assignments are designed to expand the soil scientists' knowledges and to enable them to carry projects of limited scope to completion; and to increase their understanding of related processes. The supervisor often specifies or predicts the objectives to be achieved at the time of assignment.

The following assignments illustrate the GS-7 level:

1. Investigate and examine soils in the field in an assigned mapping area to determine their proper classification; draw the soils' boundaries on aerial photo base maps; prepare detailed descriptions of soils which are found describing their physical and chemical properties.
2. Perform detailed irrigation suitability surveys on presently irrigable or potentially irrigable land. Perform basic field analysis of the soils, conduct drainability studies of the substrata, and make other determinations which are necessary to distinguish between classes of land and show delineations on field sheets. Write portions of final technical reports. Screen samples and make routine laboratory determinations to physical and chemical characteristics of soils.

#### *Level of responsibility*

Soil Scientists GS-7 receive assignments in detail. Their work is frequently reviewed while in progress. Sometimes, the supervisor assigns higher grade soil scientists to classify and map soils or classify land adjacent to the GS-7's assigned area. By matching data of two or more adjacent areas, he can determine relative variations; thereby the adequacy of the GS-7's work can be checked. GS-7 soil scientists may draw some tentative conclusions or suggest interpretations informally but they are reviewed in detail. They receive less intense supervision than GS-5 scientists, except on unfamiliar or new phases of the work.

Personal contacts are with agency personnel and landowners in order to exchange information.

## **SOIL SCIENTIST, GS-0470-09**

#### *Nature of assignment*

Soil Scientists GS-9 plan and independently make detailed soil surveys, irrigation suitability surveys, and other conventional projects. This includes the field and laboratory investigations. Their assignments are usually small studies or parts of broad ones. The assigned work area is usually one of diverse topographic conditions and the soils are in complex patterns. GS-9 soil scientists apply and adapt prescribed guidelines and issuances to their survey, investigatory, and advisory work.

GS-7 soil scientists, by comparison, do very little adapting of procedures or guides to their assignments; the guidelines clearly apply and relationships are easily discernible. GS-9 soil scientists make standard interpretations, in contrast to GS-7 soil scientists whose interpretations

are only informal suggestions. Except in instances where the interpretive guides are clearly applicable, interpretation is done with guidance from more experienced soil scientists. GS-9 soil scientists plan and make special soil surveys of predefined scope dealing with such matters as: Proposed sites for revegetation, sites for reforestation, road location, utility line location, open ditch structures, and other uses of soil as an engineering material. They may compile special farm planning maps of designated areas. Involved in these tasks is the gathering of data, analysis, and preparation of reports for use of requesters, containing soil performance predictions. To all their assignments, G-9 soil scientists apply a good knowledge of accepted, standard concepts and practices of classification and mapping, irrigation suitability determination or chemical and physical laboratory testing of soil and water. Also, they apply a working knowledge of how related sciences bear on their work.

GS-9 assignments are broad enough to require coordination of a variety of tasks on a continuing basis. By comparison, GS-7 assignments are frequently of short duration and less involved.

The following assignments illustrate the GS-9 level:

1. Independently perform conventional classification and mapping operations--field and/or laboratory examination, description, classification, and mapping of soils, for a detailed survey.

Typical duties are to:

- prepare significant portions of soils handbook and test for the survey report;
- group soil mapping units into capability units;
- estimate crop yield data for each kind of soil;
- identify alternative soil management practices for kinds or groups of soils;
- prepare field notes concerning mapping problems.

2. Conduct detailed irrigation suitability surveys. In order to carry out these assignments the soil scientist must synthesize field data, laboratory data, agronomic information, and related economic data to develop groups and delineate different classes of land. May perform laboratory analyses of soils to support land classifications.

Typical duties are to:

- prepare tentative farm water requirements;
- prepare narrative descriptions of land classes and sub-classes;
- prepare crop yield data based on soil characteristics and crop adaptability;

- realign land classes in response to changes in land classification standards;
- determine land leveling suitabilities and requirements;
- conduct moisture retention tests of soils.

*Level of responsibility*

GS-9 soil scientists work independently in applying standard procedures to their tasks. They receive occasional checks while work is in progress. Work is reviewed for adequacy, accuracy, and conformance to guidelines when accomplished. The supervisor is not always close at hand because by the nature of soil science field work, party members are usually scattered over a wide area and may not see one another, including the supervisor, for several days.

Soil Scientists GS-9 evaluate alternative approaches, methodology, and guidelines. They apply suitable ones to their tasks. By comparison, GS-7 Soil scientists are told which approach to follow in accomplishing each task.

Findings of GS-9 soil scientists are significant in decisions on land management, land use, and land purchase. Their findings affect the agency image in the locality.

GS-9 soil scientists have contacts with agency personnel, State, and local government representatives, planning groups, landowners, and many others. They exchange and present information or render technical assistance. They give soils information in technical or lay terms for a variety of resource management, farm and other uses.

## SOIL SCIENTIST, GS-0470-11

### *Nature of assignment*

GS-11 Soil scientists independently conduct or oversee the conduct of the full range of types of soil surveys and irrigation suitability surveys. This includes those less detailed and exploratory assignments which require well-developed judgment to combine soils which may be quite dissimilar into major groupings, generalize about their characteristics, and to predict their behavior under stated conditions. GS-9 soil scientists typically conduct detailed surveys.

Sometimes the assigned work areas of GS-11 soil scientists are ones in which no previous mapping or land classification has been done. In other instances the existing coverage is wholly inadequate or badly out of date due to improved technology or different criteria.

The assignments may be in support of an irrigation, forestry, dry farming, or range program or basic mapping of an area. Geographically, the work area may be a county, an Indian reservation, a forest area, a town-and-country planning area, irrigation project, or other designated work area.

Soil Scientists GS-11 are required to be able to recognize and combine significant kinds of soils for interpretation and management. GS-11 soil scientists must frequently adapt procedural manuals and policy issuances to specific local conditions. Considerable judgment and experience are required to do this.

Typically, they write the manuscripts for the published survey reports and for other narrative management reports which their agencies require. They develop work plans and submit regular reports on status of work in progress. Laboratory-based scientists schedule the flow of work in the laboratory and develop techniques for work accomplishment.

GS-11 soil scientists prepare interpretations for a variety of soil uses. This interpretive work requires considerable adaptation of guides and precedents.

The following assignments illustrate the GS-11 level:

1. Independently conduct or lead a soil survey party for an assigned area. This includes (a) identifying, classifying, and mapping soils, (b) grouping soils into capability units, (c) determining content of the soils handbooks, and (d) writing the survey report manuscript. The soils are little known and in intricate patterns. May conduct special investigations to determine soil suitability for high value specialty crops or highways and structures. Furnish technical assistance on soils interpretations for urban, industrial, resource and recreational planning, and land use. Prepare general soils maps, land resource maps, and other general interpretive maps for specific land uses.

2. Evaluate the results of a broad range of laboratory chemical and physical tests of soils and water. The tests are related to drainage, irrigability, soil-water-plant relationships, quality of water, and productivity of lands. Interpret the results of extensive analyses of water in light of soil characteristics to predict crop production. Prescribe measures for treatment, use, and management of the area represented by the samples, as appropriate. Leaching and drainage are examples of such measures.
3. Perform investigations concerned with soil salinity; conduct drainage investigations drainability studies in the field, related to the permeability of the soil, waterholding capacity, field capacity of water in relation to soil erosion control. Investigate the desirability of installing drainage tiles and their spacing; evaluate installed drains.
4. As a member of a watershed analysis team, composed also of a geologist and a hydrologist, plan and conduct soil investigations of a watershed. Gather and integrate data on soil characteristics, geology, geomorphology in the watershed area into an overall appraisal of the watershed. Integrate field data, laboratory data, and field observations to determine water yield limitations and potential; then point out specific problems and make recommendations as to changes in land use practices that will affect water yield, sedimentation, and condition of the watershed. Prepare a narrative report which contains comprehensive mapping unit descriptions, hydrologic groupings, management groupings and interpretations in support of recommendations on suitability of a watershed for treatment.
5. Investigate special soil use problems to provide specialized assistance and advice to other personnel within the agency and to land managers on the interpretation and application of soils data in the solution of forest management problems that pertain to range, timber, recreation, engineering construction, watershed, or other use. Gather the necessary data, assess it in light of influencing factors. Recommend solutions within the limitations of policy and accepted soil principles.
6. Independently conduct or lead a party in a broad range of irrigation suitability investigations of various intensities and the reclassification of land on the basis of utility, economic feasibility, and productivity for irrigation farming. Resolve complex problems, plan and conduct field tests; insure proper integration of field and laboratory data to support findings when preparing narrative reports of findings. Determine general location of potentially irrigable lands for the future. Provide specialized technical interpretations to farmers, technicians, and others.

#### *Level of responsibility*

GS-11 soil scientists are fully-trained professionals and work without close technical supervision. They have the technical responsibility for their assignments. GS-11 soil scientists who engage in field work are frequently remote from their supervisors for weeks or even months at a time. Technical guidance is received from higher level soil scientists, who in the case of field operating scientists come out as required to review the problem with the field men. However, this can also be done by letter, telephone, or having the field man come in. Only in

matters of unusually difficult soil classifications or other situations which require a great deal of adaptation of standard procedures do the GS-11 scientists require technical guidance; or in cases of departure from policy. Project work plans are reviewed and approved by higher level soil scientists.

Higher level soil scientists conduct field reviews and final correlations of GS-11 scientists' work to insure that objectives are being met and to review the adequacy of the work.

Soil Scientists GS-11 work with higher level scientists in developing new criteria. They recommend schedule and procedural changes affecting their work areas to higher authority.

GS-11 soil scientists have technical responsibility for broad and involved assignments. This includes responsibility for the draft survey reports. GS-9 soil scientists, by comparison, have responsibility for portions of these broad assignments or less complex full assignments. GS-11 soil scientists carry out reconnaissance assignments without the close technical supervision that the GS-9 soil scientists receive on such assignments.

Their interpretations have important impact in determining use of land or changes in management practices and construction as at the GS-9 level but are more difficult because of complexities of soil distribution, land use activities, geology, and others.

Contacts are diverse and similar to those at the GS-9 level. In addition, since GS-11 soil scientists frequently represent their agencies in particular localities, they must be even more sensitive to public relations.

## **SOIL SCIENTIST, GS-0470-12**

### *Nature of assignment*

Soil Scientists GS-12 are assigned highly difficult tasks in various aspects of the soil science programs of their agencies. Their experienced judgment enables them to receive assignments in special problem areas where only the objectives to be met are specified. Since guidelines do not necessarily apply, they independently select techniques which require extension, adaptation, or development of guidelines and technical precedents pertinent to-the problem at hand.

GS-12 soil scientists are typically called on to advise on a highly complex combination of soil-forming factors which give rise to a variety of soils arranged in unusual patterns. The complex patterns make mapping difficult. Some especially difficult areas to map are mountainous, glaciated, or alluvial areas. Unstable soils create soil management problems which require highly skilled GS-12 soil scientists to determine their potential for use.

By comparison, GS-11 soil scientists resolve complex problems of more conventional nature which they encounter in their surveys.

GS-12 soil scientists frequently provide technical guidance to less experienced soil scientists who are engaged in soil classification and mapping, soil interpretation, or land classification activities through periodic inspections or progress reviews. During these reviews they check survey adequacy and accuracy, correlate the soils which have been mapped; discuss findings with field personnel, render technical advice and guidance on difficult or unusual problems. Related to the technical guidance function is the development and conduct of training for field party leaders and crews in technical aspects of soil science. Also, they plan and direct short-term training sessions and workshops for various groups.

GS-12 soil scientists play a major role in developing guidelines and criteria for soil interpretations within their work areas. They establish and maintain continuing working relationships with personnel of Federal and non-Federal agencies to coordinate activities and exchange ideas. They also maintain contact with research personnel in the profession and cooperate in experimental work or research investigations. They apply research findings in their work areas.

GS-12 soil scientists project soil interpretations from surveyed areas to other areas for which basic data are not available without benefit of detailed field work.

The following assignments illustrate the GS-12 level:

1. Provide technical guidance and leadership in soil mapping classification, correlation, investigations, interpretations-and soil survey report preparation for an area comparable in complexity to a State or a large segment of a very large State in which two or more soil surveys are being conducted. Establish the initial mapping legends; conduct the initial and progress reviews; write reports of the reviews and correlations. The work area is characterized by a complex distribution of soils, a variety of land uses and modification of soils, such as high-value truck farming and urban expansion. Prepare special reports on novel soil use problems which they have investigated.
2. Direct the irrigation suitability program for a large irrigation project encompassing varied and complex soil conditions. Also, direct reclassification of previously classified lands. Direct and conduct original surveys for the purpose of determining extent and degree of suitability of land for sustained economical production under irrigation. Recommend method of irrigation. Review and recommend changes in land classification standards. Direct and conduct studies of soils, topography, drainage, and other physical characteristics to obtain data needed for determining irrigable area acreage and water allotments. Such soil studies deal with moisture holding capacity, water infiltration rates, water requirements of crops, fertility, and effects of water quality on soils, etc.
3. Direct specialists from other disciplines in making reconnaissance as well as detailed appraisals of a watershed. Survey area is little known and extremely complex. Analyze data collected by the survey team; develop recommendations to improve water yield. Develop special survey procedures, maps, charts, graphs, and technical reports which contain mapping unit descriptions, hydrologic grouping, and interpretations.

4. Conduct reconnaissance investigations when time is a critical factor in extensive areas for which there is little or no soils information and the soil patterns are novel. Provide technical guidance to continuing survey programs on several forest areas. Make special surveys and studies of management problem areas as requested and develop new soil management practices for particular soils. Write reports stressing management solutions which are based on sound principles. Perform troubleshooting in matters of soil characteristics for specific uses or all resource multiple-use management. Develop recommendations which provide the basis for decision or agency position on important matters, such as the method of logging to be followed in a timber sale, when soils considerations are the overriding ones.
5. Work from available maps, tables, reports, aerial photographs, climatological and other data to make interpretations of soil characteristics and capabilities, mainly of foreign areas. The interpretations are done without benefit of onsite field work. Predict soil behavior for engineering uses, cross-country movement, agricultural use and special uses.

#### *Level of responsibility*

Soil Scientists GS-12 operate independently, working within established goals or objectives. They normally require no technical guidance except in significant policy matters. They formulate and recommend policy changes which affect their work areas. Their completed work is reviewed to ascertain compliance with policy and objectives, for soundness of approach, if a novel one is employed, and for overall effectiveness. They are required to possess comprehensive knowledge of agency programs to help insure integration and coordination of assigned activities with overall programs and objectives.

By comparison, GS-11 soil scientists employ novel methodology with prior technical approval or guidance. GS-11 soil scientists are also subject to periodic progress reviews. GS-11 assignments usually require less concern with broader applicability of their findings outside their immediate work areas or immediate problems than is true of GS-12 assignments.

The recommendations and interpretations of GS-12 soil scientists are bases for major private and public program and land use decisions. These may involve large amounts of time, money, and manpower. Their findings can result in initiation or cancellation of major projects and public works.

GS-12 soil scientists contribute ideas to long-range planning efforts. Contacts are varied and they sometimes represent their agencies at hearings on important technical issues.



## SOIL SCIENTIST, GS-0470-13

### *Nature of assignment*

Soil Scientists GS-13 apply great depth of knowledge and comprehensive experience in one or more broad areas of soil science. They serve as expert technical advisors and consultants on technical soil science matters. Their assignments are characterized by complexity and controversy for which they must frequently develop new approaches. GS-13 soil scientists have freedom in selection or development of methodology to the extent that no significant departure from approved policy is involved. Assignments are given to them in terms of objectives to be achieved.

GS-13 soil scientists develop the guidelines based on national policy governing and providing the technical direction to soil science activity within their assigned work areas--classification, mapping, correlation, interpretation, field and laboratory studies, investigations, special studies, management problems. In other instances they provide the same high level of technical direction and problem solving ability to a specific phase of the organization's program within the assigned work area, such as interpretations, correlation, or special investigations.

GS-13 soil scientists are responsible for development and issuance of technical standards, interpretational guides, and other guidelines for use of soil scientists in their work areas. They direct the preparation of technical soils reports and legends, special purpose maps for use of land managers and land use planners. They make periodic field inspections of work which is in progress. During these visits they provide advice and assistance on unusually difficult soils or land classification problems and ascertain compliance with procedures. They review completed survey reports and maps for completeness and conformance to policy.

The following assignments illustrate the GS-13 level:

1. Provide technical direction to a diversified and highly complex soil science program, e.g., for a State. This includes mapping, classification, correlation, interpretation, field and laboratory studies, investigations in soil genesis, morphology, preparation and review of reports for publication and cooperation with other agencies. Recommend policies for the jurisdictional program to the conservationist-in-charge. Conduct progress and final reviews. Undertake or direct solution of extraordinary problems for which no precedents exist or change of policy is involved. In cooperation with supervisor, determine work priorities and negotiate agreements for accelerated or reimbursable mapping or special studies which are to be financed at least in part by local or regional government units.
2. Serve as technical advisor and consultant on technical soils problems related to management of forest resources in a regional area, e.g., several States. Interpret national policy for specific application to development of immediate and long-range objectives of the soils program in the assigned work area. In conjunction with supervisor, establish priorities for survey areas through consideration of land management needs, availability of aerial photographs and base maps, desires of cooperators, and other conflicting factors.

As occasion demands, guide soil investigations on areas posing particularly complex and controversial soil management problems and interpret results in light of purposes for which such areas are to be used. Provide technical direction to soil survey and investigatory activities of agency soil scientists within his jurisdiction.

3. Serve as staff specialist in soil survey interpretation work for a multi-state area. Guided by national policy on soil survey interpretations, guide and train soil scientists in the development of criteria and methods for interpretation of data for many uses. Insure uniformity of interpretations and predictions of similar soils within the jurisdiction. Advise on scheduling and preparation of manuscripts of soil survey reports from individual States. Perform the final technical review of them prior to submission to national headquarters.
4. Provide technical direction to the economic land classification activities and other elements of irrigation project investigation at the regional level. Develop and review specifications before they are applied to projects to insure program uniformity. Guide field people in developing specifications if unusual problems are envisioned or encountered. Make field progress reviews, and review and approve land classification criteria. Serve as consultant on soil and water characteristics, and on agronomic factors as they affect water and drainage requirements. Determine need for specific field studies pertaining to such matters as water requirements, drainage requirements, irrigation practices, crop adaptation and location, cultural practices, and other economic and physical factors as they relate to economic land classification. Direct a soils laboratory in conjunction with or in support of previously mentioned responsibilities.

#### *Level of responsibility*

Since GS-13 soil scientists are considered to be experts in one or more broad areas of the profession, there is no question of technical accuracy of their completed work. Review of their work is essentially for recommendations and policy compliance.

GS-13 soil scientists represent their agencies in cooperative and coordinative activities with other Federal, State, and local agencies in the planning and execution of soils-related activities of common concern.

In their dealings with persons outside the agency GS-13 soil scientists are authorized to commit their organizations to courses of action on technical soils matters. Their responsiveness and sensitivity to the public relations aspects of their broad programs determine to a significant degree the progress and success of these programs. GS-12 soil scientists, by comparison, normally have limited authority in this regard. GS-13 soil scientists also differ from those at the GS-12 level in that their decisions are usually the final technical rulings on extremely complex or sensitive matters.

GS-13 recommendations are important considerations in broad long-range planning and national policy. Decisions and actions of GS-13 soil scientists determine the quality of the soil science activity in their broad work areas.