

**Vegetation Protocols**  
**California Department of Fish and Wildlife Vegetation Classification and Mapping Program**  
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Contents:

Rapid Assessment/Relevé Field Form

Rapid Assessment/Relevé Protocol

Accuracy Assessment Field Form

Accuracy Assessment Protocol

Rapid Assessment/Relevé Data Entry Protocol

Quality Control Instructions for Relevé/Rapid Assessment Database

Mapping Standards and Attributes

**Rapid Assessment/Relevé Field Form  
and Protocol**





# CDFW-CNPS Protocol for the Combined Vegetation Rapid Assessment and Relevé Field Form

(April 27, 2017)

## Introduction

This protocol describes the methodology for both the Relevé and Rapid Assessment (RA) vegetation sampling techniques as recorded in the Combined Vegetation Rapid Assessment and Relevé Field Form. The same environmental data are collected for both techniques. However, the relevé sample is a plot demarcated with a measuring tape, and each species in the plot is recorded along with its cover. The rapid assessment sample is not based on a taped plot, but is based on a visually estimated, usually circular area within a representative portion of the entire stand, with up to 20 of the dominant or characteristic species and their cover values recorded.

For this project, collect rapid assessments in woody vegetation and relevés in herbaceous vegetation. Some parts of this project area have not been sampled before, so RAs in woody vegetation may list more than 20 species.

## Defining a Stand

A stand is the basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small, such as a portion of a vernal pool, and some may be several square kilometers in size, such as a forest type. All samples should be in stands that meet the minimum mapping unit of 1 acre for upland and 0.5 acre for special stands such as small wetlands, riparian and serpentine barrens.

A stand is defined by two main unifying characteristics:

- 1) It has compositional integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or indistinct.
- 2) It has structural integrity. It has a similar history or environmental setting that affords relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest originally dominated by the same species that burned on the upper part of the slopes but not the lower, would be divided into two stands. Likewise, sparse woodland occupying a slope with very shallow rocky soils would be considered a different stand from an adjacent slope with deeper, moister soil and a denser woodland or forest of the same species.

The structural and compositional features of a stand are often combined into a term called homogeneity. For an area of vegetated ground to meet the requirements of a stand, it must be homogeneous (uniform in structure and composition throughout).

### **Selecting a bounded plot (Relevé) or representative area (Rapid Assessment) to sample within a stand**

Stands to be sampled may be selected by evaluation prior to a site visit (e.g., from aerial photos) or they may be selected on site during reconnaissance to determine extent and boundaries, location of other similar stands, etc.

Because many stands are large, it may be difficult to summarize the species composition, cover, and structure of an entire stand. We are usually trying to capture the most information as efficiently as possible. Thus, we are typically forced to select a representative portion to sample.

When sampling a stand of vegetation, the main point is to select a sample that, in as many ways possible, is representative of that stand. This means that you are not randomly selecting a plot; on the contrary, you are actively using your own best judgment to find a representative example of the stand.

Selecting a relevé plot or RA area requires that you see enough of the stand you are sampling to feel comfortable in choosing a representative plot location. Take a brief walk through the stand and look for variations in species composition and in stand structure. In hilly or mountainous terrain, look for a vantage point from which you can get a representative view of the whole stand. Variations in vegetation that are repeated throughout the stand should be included in your plot. Once you assess the variation within the stand, attempt to find an area that captures the stand's common species composition and structural condition to sample.

### **Tracking sampled vegetation types**

For large projects, the number of samples should be tracked daily or weekly by field-assessed Alliance type so that samples are spread as evenly as possible over types and time is not wasted collecting excessive numbers of samples of certain types. When multiple teams are in the field in the same week, daily communication between teams about Alliances sampled can ensure even sampling. *Prior to selecting a stand to sample, determine if what you are going to sample is needed based on this Alliance tracking.*

### **Selecting plots to avoid spatial autocorrelation**

When possible, do not sample adjacent stands. Do not take more than one sample of the same vegetation type within a sub-watershed. Exceptions can be made due to limited access to private lands. For example, samples from different formations, subclasses or classes (e.g., wetlands vs. uplands, lithomorphic vs. mesomorphic) may be sampled in the same sub-watershed, however, avoid sampling a grassland adjacent to an open woodland, even though they are technically different formations.

### **Plot Size**

For this project, the herbaceous relevé plot size is 100 m<sup>2</sup>. In a very few cases, such as vernal pools, the plot size can be less (10 m<sup>2</sup>).

### **Plot Shape**

A relevé has no fixed shape, though plot shape should reflect the character of the stand and is either a square or a rectangle. Adjust the orientation and dimensions of the plot to incorporate the best approximation of stand homogeneity. If the stand is about the same size as a Relevé, the plot boundaries may be similar to that of the entire stand. If we are sampling streamside riparian or other linear communities, our plot dimensions should not go beyond the community's natural ecological boundaries. Thus, a relatively long, narrow plot capturing the vegetation within the stand, but not outside it, would be appropriate. Species present along the edges of the plot that are clearly part of the adjacent stand should be excluded from the plot.

### **Location of GPS Points**

For Relevés, one corner will be considered the plot Identifier (ID point) and should be in the SW corner, if possible. If it is taken in another corner, this should be noted in the Site History section.

## **Definitions of fields in the Field Form**

### **I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION**

**Relevé or RA:** Circle the appropriate survey type.

**Database #:** This is the unique ID number for Relevés and Rapid Assessments, in the form of PPPPxxxx, where PPPP is the 4-character project code and xxxx is a unique 4-digit number (e.g. MOLA0001 for Modoc-Lassen sample #1). If this is a long term plot, a character from A to Z can be added to the unique ID for each re-sampling survey; so the first re-sample for MOLA0001 would be MOLA0001A.

**Date:** Date of the sampling.

**Name of recorder:** The full name of the recorder should be provided for the first field form for the day. On successive forms, initials can be recorded.

**Other Surveyors:** The full names of each person assisting should be provided for the first field form for the day. On successive forms, initials of each person assisting can be recorded.

**Allocation UID:** The ID of a previously assigned point that was created to suggest survey locations. You can find this ID on the field map or the GPS device map.

**Location Name:** The name of the property or park, or the location within large holdings (like USFS or BLM properties).

**GPS name:** The name/number assigned to each GPS unit. This can be the serial number if another number is not assigned.

**Bearing°, left axis at ID point of Long / Short side:** Fill this in for Relevés only. For square or rectangular plots: from the ID Point, looking towards the plot, record the bearing of the axis to your left. If the plot is a rectangle, indicate whether the left side of the plot is the long or short side of the rectangle by circling “long” or “short” side (no need to circle anything for square plots). If there are no stand constraints, set up the plot with boundaries running in the cardinal directions and place the ID Point in the SW corner.

**UTM coordinates:** Easting (**UTME**) and northing (**UTMN**) location coordinates using the Universal Transverse Mercator (UTM) grid. Record the information from your GPS unit. These coordinates are always the base point of the survey. Soil samples and photos are taken from this point, and exposure, steepness, topography, etc. are measured here. If the GPS is not within the stand (i.e., the point is projected), these are the UTM coordinates of the base point.

*For Relevé plots, take the GPS point in the southwest corner of the plot whenever possible or in the center of a circular plot.*

**Zone:** Universal Transverse Mercator zone. Zone 10 is for California west of the 120<sup>th</sup> longitude; zone 11 is for California east of 120<sup>th</sup> longitude. The UTM Zone is 10 for this project.

**NAD83:** This is the default GPS datum. If you use a different one, cross this out and write in the correct datum.

**GPS error: ft./ m./ PDOP:** Circle the appropriate unit of measure and record the error reading from the GPS unit.

**Decimal degrees:** *Use this only if your GPS unit will not record UTM coordinates.* Latitude–Longitude reading in decimal degrees. Record the information from your GPS unit. These coordinates are always the base point of the survey. Soil samples and photos are taken from this point, and exposure, steepness, topography, etc. are measured here.

*For Relevé plots, take the waypoint in the southwest corner of the plot whenever possible or in the center of a circular plot.*

**GPS within stand? Yes / No:** Circle “Yes” to denote that the GPS waypoint was taken directly within or at the edge of the stand being assessed for a Rapid Assessment, or circle “No” if the

waypoint was taken at a distance from the stand (such as with a binocular view of the stand). If the point is taken at the edge of the stand, note the direction to the stand.

**If No, cite from GPS to stand: distance (m), bearing°, inclination°:** From the base GPS point, measure the distance to the projected point using a range finder. Record the compass bearing from the base point to the projected point; record the inclination if the base and projected points are not at the same elevation.

**and record Base point ID:** This is the waypoint # of the base GPS point, where the surveyors were standing to record the distance survey.

**and Projected UTM:** These are the coordinates of the projected point, the point being surveyed. They are generated in the field if the GPS units have the ability to calculate projected points. If the GPS unit does not have this capability, make a note to that effect and leave these fields blank.

**Camera Name:** Write the camera name.

**Cardinal photos at ID point:** Take four photos in the main cardinal directions (N, E, S, W) clockwise from the north, from the ID Point, and record the jpeg numbers here. Try to include the horizon in at least some of these photos. If this is a distance survey to a projected point, take the four cardinal photos at the base point and at least one photo of the stand. A digital camera with a minimum 10 megapixel resolution must be used.

**Other photos:** This may include cardinal photos at additional corners or other relevant photos. Notes regarding photo locations or subjects can go here.

**Stand Size:** Estimate the size of the entire stand in which the sample is taken. As a measure, one acre is about 4,000 square meters (approximately 64 x 64 m), or 208 feet by 208 feet. One acre is similar in size to a football field.

**Plot Size:** If this is a Relevé, circle "100" for a 100m<sup>2</sup> plot, or record the plot size.

**Plot Shape:** Record the length and width of the Relevé plot in meters.

**RA Radius:** Enter the radius in meters of the visually estimated sample area for Rapid Assessments (should be a 20-meter radius at minimum). For a large stand, this limits the area covered by the RA. If you can see and assess the entire stand, the length and width should be recorded. If it is a long, narrow stand, note the width of the stand at your location. If your point is on the edge of the stand, record the radius into the stand, but note your location and the direction to which the RA Radius applies in the Site History section.

**Exposure:** (Enter Actual ° and circle general category): While facing in the general downhill direction, read degrees of the compass for the aspect or the direction you are standing, using degrees from north, adjusted for declination. Average the reading over the entire stand, even if you are sampling a Relevé plot, since your plot is representative of the stand. If estimating the exposure, write "N/A" for the actual degrees, and circle the general category chosen. "Variable" may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures.

**Steepness:** (Enter Actual ° and circle general category): Read degree slope from your compass. If estimating, write "N/A" for the actual degrees, and circle the general category chosen. Make sure to average the reading across the entire stand even if you are sampling in a Relevé plot.

**Topography:** First assess the broad (**Macro**) topographic feature or general position of the stand in the surrounding watershed, that is, the stand is at the top, upper (1/3 of slope), middle (1/3 of slope), lower (1/3 of slope), or bottom. **Circle all of the positions that apply for macrotopography.**

Then assess the local (**Micro**) topographic features or the lay of the area (e.g., surface is flat or concave). **Circle only one of the microtopographic descriptors.**

**Geology code:** Geological parent material of stand. If exact type is unknown, use a more general category (e.g., igneous, metamorphic, sedimentary). *See code list for types.*

**Soil Texture code:** Record soil texture that is characteristic of the plot (e.g., coarse loamy sand, sandy clay loam). See *soil texture key for types*.

**Upland or Wetland/Riparian:** Indicate if the stand is in upland or wetland/riparian setting. (Wetland and riparian are one category.) Note that a site need not be officially delineated as a wetland to qualify as such in this context (e.g., seasonally wet meadow).

**Restoration Code:** Circle the appropriate code. If you observe more than one type of restoration, circle all codes that apply. “6-Other” should only be used if the restoration type is not described by codes 2-5. Describe the type of restoration for code 6 in the Site History.

**% Surface cover:** The abiotic substrates of the plot. The total should sum to 100%. It is helpful to imagine “mowing off” all of the live vegetation at the base of the plants and removing it – you will be estimating what is left covering the surface. Note that non-vascular cover (lichens, mosses, cryptobiotic crusts) is not estimated in this section.

<b>H<sub>2</sub>O:</b>	Percent surface cover of running or standing water, ignoring the substrate below the water.
<b>BA Stems:</b>	Percent surface cover of the basal area of stems at the ground surface. For most vegetation types, BA is 1-3% cover.
<b>Litter:</b>	Percent surface cover of litter, duff, or wood on the ground.
<b>Bedrock:</b>	Percent surface cover of bedrock, including outcrops.
<b>Boulder:</b>	Percent surface cover of rocks >60 cm in the longest dimension.
<b>Stone:</b>	Percent surface cover of rocks >25–60 cm in the longest dimension.
<b>Cobble:</b>	Percent surface cover of rocks >7.5–25 cm in the longest dimension.
<b>Gravel:</b>	Percent surface cover of rocks 2 mm–7.5 cm in the longest dimension.
<b>Fines:</b>	Percent surface cover of bare ground and fine sediment <2 mm in the longest dimension (e.g., dirt, sand).

**% Current year bioturbation:** Estimate the percent of the plot exhibiting soil disturbance by any organism that lives underground. Do not include disturbance by ungulates. Note that this is a separate estimation from surface cover.

**Past bioturbation present?** Circle Yes if there is evidence of bioturbation from previous years in the plot.

**% Hoof punch:** Note the percent of the plot surface that has been punched down by hooves (cattle or native grazers) in wet soil. Depressions must be >2 cm deep.

**Fire Evidence:** Circle Yes if there is visible evidence of fire within the stand, and note the type of evidence in the “Site history, stand age, comments section,” for example, “charred dead stems of *Quercus berberidifolia* extending 2 feet above resprouting shrubs.” If you are certain of the year of the fire, put this in the Site history section.

**Site history, stand age, comments:** Briefly describe the stand age/seral stage, disturbance history, nature and extent of land use, and other site environmental and vegetation factors, such as distribution of species. Examples of disturbance history: fire, landslides, avalanching, drought, flood, animal burrowing, or pest outbreak. Also, try to estimate year or frequency of disturbance. Examples of land use: grazing, timber harvest, or mining. Examples of other site factors: exposed rocks, soil with fine-textured sediments, high litter/duff build-up, multi-storied vegetation structure, or other stand dynamics.

**Disturbance code / Intensity (L,M,H):** List codes for potential or existing impacts on the stability of the plant community. See code list for impacts and definitions of levels of disturbance. Characterize each impact each as **L** (=Light), **M** (=Moderate), or **H** (=Heavy). Disturbance is evaluated on a stand basis.

## II. HABITAT AND VEGETATION DESCRIPTION

### **California Wildlife Habitat Relationships (CWHR)**

For CWHR, identify the size/height class of the plot using the following tree, shrub, and/or herbaceous categories. These categories are based on functional life forms.

**Tree DBH:** Circle one of the tree size classes provided when the tree canopy closure exceeds 10% of the total cover, or if young tree density indicates imminent tree dominance. Size class is based on the average diameter at breast height (dbh) of each trunk (standard breast height is 4.5ft or 137cm). When marking the main size class, make sure to estimate the mean diameter of all trees over the entire stand, and weight the mean toward the larger tree dbh's. The "**T6 multi-layered**" dbh size class signifies a multi-layered tree canopy (with a size class T3 and/or T4 layer growing under a T5 layer and a distinct height separation between the classes) exceeding 60% total cover. Stands in the T6 class need also to contain at least 10% cover of size class 5 (>24" dbh) trees growing over a distinct layer with at least 10% combined cover of trees in size classes 3 (>6-11" dbh) or 4 (>11-24" dbh).

**Shrub:** Circle one of the shrub size classes provided when shrub canopy closure exceeds 10% (except in desert types) by recording which class is predominant in the survey. Shrub size class is based on the average amount of crown decadence (dead standing vegetation on live shrubs when looking across the crowns of the shrubs).

**Herbaceous:** Circle one of the herb height classes when herbaceous cover exceeds 2% by recording the predominant class in the survey. Note: *This height class is based on the average plant height at maturity, not necessarily at the time of observation.*

## III. INTERPRETATION OF STAND

**Field-assessed vegetation Alliance name:** Enter the name of the Alliance following the Manual of California Vegetation, 2<sup>nd</sup> Edition (Sawyer, Keeler-Wolf and Evens 2009). Please use scientific nomenclature, e.g., *Quercus agrifolia* forest. An Alliance is based on the dominant or diagnostic species of the stand, and usually reflects the uppermost and/or dominant height stratum. A dominant species covers the greatest area. A diagnostic species is consistently found in some vegetation types but not others.

The field-assessed Alliance name may not exist in the present classification, in which case you can provide a new Alliance name in this field. If this is the case, also make sure to state that it is not in the MCV under "Explain" below.

**Field-assessed Association name** (optional): Enter the name of the species in the Alliance and additional dominant/diagnostic species from any strata. In following naming conventions, species in differing strata are separated with a slash, and species in the uppermost stratum are listed first (e.g., *Quercus douglasii* / *Toxicodendron diversilobum*). Species in the same stratum are separated with a dash (e.g., *Quercus lobata* – *Quercus douglasii*).

The field-assessed Association name may not exist in the present classification, in which you can provide a new Association name in this field.

**Adjacent Alliances/direction:** Identify other vegetation types that are directly adjacent to the stand being assessed by noting the dominant species (or known type). Also note the distance in meters from the GPS waypoint and the direction in degrees that the adjacent alliance is found (e.g., *Amsinckia tessellata* / 50m, 360° N or *Eriogonum fasciculatum* / 100m, 110°).

**Confidence in Alliance identification: (L, M, H)** With respect to the "Field-assessed Alliance name," note whether you have L (=Low), M (=Moderate), or H (=High) confidence in the interpretation of this Alliance name.

**Explain:** Please elaborate if your "Confidence in Alliance identification" is low or moderate. Low confidence can occur from such things as a poor view of the stand, an unusual mix of species that

does not meet the criteria of any described Alliance, or a low confidence in your ability to identify species that are significant members of the stand.

**Phenology:** Indicate early (E), peak (P), or late (L) phenology for each of the strata. For herbs, this generally indicates if species are in flower and/or fruit and are therefore identifiable. For shrubs and trees, this attribute generally refers to cover, e.g., a tree that is fully leafed out will be considered peak (P) even if it is not in flower. Phenology is useful for cover estimation and species identification issues, and should be elaborated upon in the next field.

**Other identification or mapping information:** Discuss any further problems with the identification of the assessment or issues that may be of interest to mappers. Note if this sample represents a type that is likely too small to map.

#### IV. VEGETATION DESCRIPTION

**Database #:** Copy the database # from Page 1.

##### ***Overall Cover of Vegetation***

Provide an estimate of cover for the life-form categories below. Record a specific number for the total aerial cover or “bird’s-eye view” looking from above for each category, estimating cover for the living plants only. Litter/duff should not be included in these estimates.

The porosity of the vegetation should be taken into consideration when estimating percent foliar cover for all categories below: consider how much of the sky you can see when you are standing under the canopy of a tree, or how much light passes through the canopy of the shrub layer to help you estimate foliar cover.

**% NonVasc cover:** The total cover of all lichens, bryophytes (mosses, liverworts, hornworts), and cryptogamic crust on substrate surfaces including downed logs, rocks and soil, but not on standing or inclined trees or vertical rock surfaces.

**Total % Vasc Veg cover:** The total cover of all vascular vegetation taking into consideration the porosity, or the holes, in the vegetation, and disregarding overlap<sup>1</sup> of the various tree, shrub, and/or herbaceous layers and species.

##### ***% Cover by Layer***

**Conifer Tree /Hardwood Tree:** The total foliar cover (considering porosity) of all live tree species, disregarding overlap<sup>1</sup> of individual trees. Estimate conifer and hardwood covers separately. **Please note:** These cover values should not include the coverage of regenerating tree species (i.e., tree seedlings and saplings).

**Regenerating Tree:** The total foliar cover of seedlings and saplings, disregarding overlap<sup>1</sup> of individual recruits. See seedling and sapling definitions below.

**Shrub:** The total foliar cover (considering porosity) of all live shrub species disregarding overlap<sup>1</sup> of individual shrubs.

**Herbaceous:** The total cover (considering porosity) of all herbaceous species, disregarding overlap<sup>1</sup> of individual herbs.

##### ***Height Class by Layer***

Modal height for conifer tree / hardwood tree, regenerating tree, shrub, and herbaceous categories. Record an average height value for each category by estimating the mean height for each group.

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<sup>1</sup> Porosity reduces the total cover of the canopy. Overlapping strata should not be included in the total cover percent; for instance, if a shrub is growing under a tree, only the cover of the tree will be added into the total; the cover of the shrub will be disregarded, except for the amount by which it fills in the porosity of the tree canopy.

Please use the following height intervals to record a height class: 1 = <1/2 m, 2 = 1/2-1 m, 3 = 1-2 m, 4 = 2-5 m, 5 = 5-10 m, 6 = 10-15 m, 7 = 15-20 m, 8 = 20-35 m, 9 = 35-50 m, 10 => 50 m.

*Note: For the herbaceous layer height, this height class is based on the average plant height at the time of observation, as opposed to how this is recorded in the CWHR section (at maturity).*

**Species List and Coverage**

**For Rapid Assessments:** List up to 20 species that are dominant or that are characteristically consistent within the assessment area. These species may or may not be abundant, but they should be constant representatives in the survey. When different layers of vegetation occur, make sure to list species from each stratum. As a general guide, make sure to list at least 1-2 of the most abundant species per stratum. There is a heavy line on the form under the 20<sup>th</sup> line to limit the RA section of the species list.

*Note: If constant, diagnostic, or interesting species occur outside the assessment area but in the stand, list the species and estimated stand cover in the Site History section.*

**For Relevés:** list all species present in the plot, using a second species list page if necessary.

\*\* If using a second species list page, note “Continued” on the bottom of the first page and be sure to note the **Database #** on the second page.

**For both sample types,** provide the stratum:

**T = Tree.** A woody perennial plant that has a single trunk.

**A = SApling.** 1" - <6" dbh and young in age, OR small trees that are <1" dbh, are clearly of appreciable age, and are kept short by repeated browsing, burning, or other disturbance. Includes trees that are re-sprouting from roots or stumps following fire, logging or other disturbance. These re-sprouts may exhibit a shrubby form, with multiple small trunks, but are species that are generally considered trees. If a majority of the trunks are >6" dbh, then the re-sprouts would be recorded under the “Tree” stratum.

**E = SEedling.** A tree species clearly of a very young age that is <1" dbh or has not reached breast height. Applies only to trees propagating from seed; resprouts are not recorded here even if they meet the size requirements.

**S = Shrub.** A perennial, woody plant, that is multi-branched and doesn't die back to the ground every year.

**H = Herb.** An annual or perennial that dies down to ground level every year.

**N = Non-vascular.** Includes moss, lichen, liverworts, hornworts, cryptogammic crust, and algae.

Be consistent and don't break up a single species into two separate strata. The only time it would be appropriate to do so is when one or more tree species are regenerating, in which case the SEedling and/or SApling strata should be recorded for that species. These may be noted on the same line, e.g.:

Strata	Species	%Cover	C
T/A/E	Quercus douglasii	40/<1/<1	

In some cases, the stratum of a particular species might not be obvious. Some examples are *Juniperus californica*, which has the size and growth habit of a shrub, but it is considered a tree, and mistletoe, which is considered a shrub. It is useful to have a list of species with ambiguous strata for each project. Consult the MCV or contact VegCAMP if you are unsure.

**C.** If a species collection is made, it should be indicated in the collection column with a “C” (for collected). If the species is later keyed out, cross out the species name or description and write the keyed species name in pen on the data sheet. Do not erase what was written in the field, because this information can be used if specimens get mixed up later. If the specimen is then thrown out,

add a "T" to the "C" in the collection column (CT = thrown out after confirmation) or cross out the "C". If the specimen is kept but is still not confidently identified, add a "U" to the "C" in the collection column (CU = collected and unconfirmed). In this case the unconfirmed species epithet should be put in parentheses [e.g., *Hordeum (murinum)*]. If the specimen is kept and is confidently identified, add a "C" to the existing "C" in the collection column (CC = collected and confirmed). If the specimen is later deposited in an herbarium, add a "D" to the existing "C" in the collection column (CD = collected and deposited) and note the receiving herbarium.

Use Jepson Manual nomenclature. Write out the genus and species of the plant. Do not abbreviate except for dominant species that do not have ambiguous codes. If you aren't sure there aren't duplicate codes, don't use a code. When uncertain of an identification (which you intend to confirm later) use parentheses to indicate what part of the determination needs to be confirmed. For example, you could write out *Brassica (nigra)* if you are sure it is a *Brassica* but you need further clarification on the specific epithet.

Provide the % absolute foliar cover for each species listed, considering porosity. When estimating, it is often helpful to think of coverage in terms of the following cover intervals at first:

<1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%.

Keeping these classes in mind, refine your estimate to a specific percentage. All species percent covers may total over 100% because of overlap.

Include the percent cover of snags (standing dead) of trees and shrubs. Use the code "SNAG." Note their species, if known, in the "Species" column (i.e. SNAG – *Quercus wislizeni*).

For Rapid Assessments, make sure that the major non-native species occurring in the stand also are listed in the space provided in the species list with their strata and % cover.

For Relevés, all non-native species should be included in the species list.

Also for Relevés, record the <1% cover in one of two categories: "r" for trace (i.e., rare in plot, or solitary individuals) and "+" for <1% but not rare or solitary individuals.

**Unusual species:** List species that are locally or regionally rare, endangered, or atypical (e.g., range extension or range limit) within the stand. This field will be useful to the Program for obtaining data on regionally or locally significant populations of plants.

**Note:** Field forms are generally filled out in pencil, so that changes may be made easily while working in the plot or stand. Once out of the stand, however, entries on the field form should not be erased, but should be crossed out and corrected in a different-colored ink.

## **Accuracy Assessment Field Form and Protocol**



## Accuracy Assessment Protocol

11/30/2020

This protocol describes accuracy assessment (AA) data collection procedures. The primary purpose of the AA fieldwork is to supply data to test the accuracy of a specific vegetation map. The information collected can also contribute additional data for the classification of vegetation communities. The primary sampling units are the vegetation polygons delineated by photo-interpreters in the creation of the vegetation map.

If an entire AA polygon cannot be fully investigated due to terrain or other reasons, as much of the polygon as can be evaluated should be assessed; **however, at least 20% of the polygon must be viewed for the AA to be counted toward the total and scored.**

Note that a delineated polygon may differ from the conventional definition of a stand of vegetation. A stand is the basic physical unit of vegetation in a landscape. It has no set size. Some stands of vegetation are very small while some may be several square kilometers in size. A stand is defined by two main unifying characteristics:

- 1) It has compositional integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or indistinct.
- 2) It has structural integrity. It has a similar history or environmental setting that affords relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest originally dominated by the same species that burned on the upper part of the slopes, but not the lower, would be divided into two stands. Likewise, sparse woodland occupying a slope with very shallow rocky soils would be considered a different stand from an adjacent slope with deeper, moister soil and a denser woodland or forest of the same species.

The structural and compositional features of a stand are often combined into a term called homogeneity. For an area of vegetated ground to meet the requirements of a stand, it must be homogeneous.

A properly delineated polygon may contain more than one stand. One example is a stand that is below the minimum mapping unit (MMU); it cannot be mapped separately and will be absorbed into the surrounding vegetation type. Another example is vegetation that is difficult to identify accurately on photo imagery. Several similar-looking stands may be grouped into one polygon and assigned a vegetation type at a high level, such as Group.

### **Selecting a location to sample within a polygon (for subsamples only):**

If assessing a large polygon, it may be difficult to summarize the species composition, cover, and structure of the entire area. We are also usually trying to capture the most information as efficiently as possible. Thus, we may be forced to select a representative portion to sample.

When taking a subsample, the main point to remember is to select an area that, in as many ways possible, is representative of that polygon. This means that you are not randomly selecting a sample location; on the contrary, you are actively using your own best judgment to find a representative example of the polygon.

Selecting an assessment site requires that you see enough of the polygon you are sampling to feel comfortable in choosing a representative sample location. If possible, take a brief walk

through the polygon and figure out where the boundary lines are drawn. Look for variations in species composition and in stand structure. In the process, decide whether the polygon includes more than one mappable vegetation type or if the stand boundaries don't seem to match up with the polygon delineation. **If more than one vegetation type is present, fill out an AA form for each type ONLY IF each type is mappable (i.e., it is large enough to meet MMU and can be delineated without creating unreasonably shaped polygons).** Small variations in vegetation that are repeated throughout the polygon should be included in your subsample. Once you assess the variation within the polygon, attempt to find an area that captures the stand's species composition and structural condition to sample. However, do not include in your evaluations any sub-mmU stands of a different type, i.e., do not include species that are in these sub-mmU stands within the polygon, and don't average species covers for species that occur in both the main stand and the sub-mmU stand. Estimate only the cover of the species as it occurs in the main vegetation type.

### **How to enter fields on the form:**

**Recorder:** The full name of the recorder should be provided for the first field form for the day. On successive forms, initials can be recorded.

**Other Surveyors:** The full names of each person assisting should be provided for the first field form for the day. On successive forms, initials of each person assisting can be recorded.

**Date:** The date the AA point was sampled. Use the standard U.S. format of "month-day-year" or use letters to write out the month.

**Waypoint ID:** The Waypoint ID assigned by the GPS.

*Note that the GPS point should be taken away from the edge of the polygon, and near the center of the subsample (if one is used).*

**Polygon UID:** The unique identifier (UID) assigned to each polygon, displayed in the GPS data and on paper maps.

**Location Name:** The name of the property, park, or the location within large holdings (like USFS or BLM properties).

**GPS name:** The name/number assigned to the GPS unit.

**Projected? Yes / No/ Base/ Digitized:** Circle the appropriate option

**Yes** - The point is a projected, or offset point. The surveyors used a bearing, distance, and inclination to project the point into the polygon they are describing.

**No** - The surveyor is within the boundary of the polygon being assessed and the point is where the observer was standing for photographs. This location can also be used as a base location for an offset survey.

**Base** - Base point only. This is where a surveyor was standing when taking an offset survey to describe vegetation not at that point. No plant data or vegetation descriptions are associated with this location. However, cardinal photos taken at this point will be stored in a directory of this name.

**Digitized** – An offset point was created on the GPS unit without taking bearing and distance readings. This option should only be used when the imagery on the GPS unit is unique and unmistakable.

## If Projected = Yes

**Bearing (°):** The compass bearing from the Base point to the Projected point.

**Distance (m):** The distance in meters from the Base point to the Projected point, determined by use of a range finder.

**Inclination (°):** The vertical offset from the Base point to the Projected point.

## If Projected = Yes or Digitized

**Base Waypoint ID:** The location where the surveyor was standing when the information was collected. Cardinal photographs will be taken at this point and will be stored on the computer under this ID. Photographs of the stand vegetation will be taken from this point and will be stored on the computer under the Projected point's ID.

**Base UTM / Projected UTM:** If the point is projected or digitized, circle whether the UTM coordinates of the base point or the projected point have been recorded. These will generally be for the base point.

**UTM coordinates:** Easting (**UTME**) and Northing (**UTMN**) location coordinates using the Universal Transverse Mercator (UTM) grid. Record this information from a GPS unit.

**PDOP:** The accuracy of the GPS location, when taking the UTM field reading using positional dilution of precision (PDOP). It is typical for commercial GPS units to be accurate with a PDOP value of 1 to 5. The lower the error number, the more accurate the GPS reading.

*Note: if your GPS device does not report accuracy in PDOP, cross this out and record the accuracy value and unit instead, e.g. "5m".*

**Decimal degrees:** Use this only if your GPS unit will not record UTM coordinates. Latitude–Longitude reading in decimal degrees to the 6<sup>th</sup> decimal place. Record the information from your GPS unit.

## Species list and coverage

List up to twelve species that are dominant or that are characteristically consistent throughout the stand. These species may or may not be abundant, but they should be constant representatives in the survey. When different layers of vegetation occur in the stand, make sure to list species from each stratum. As a general guide, make sure to list at least 1-2 of the most abundant species per stratum.

## Strata:

**T = Overstory tree.** A woody perennial plant that has a single trunk.

**A = SApling.** 1" - <6" dbh and young in age, OR small trees that are <1" dbh, are clearly of appreciable age, and are kept short by repeated browsing, burning, or other disturbance. Includes trees that are re-sprouting from roots or stumps following fire, logging or other disturbance. These re-sprouts may exhibit a shrubby form, with multiple small trunks, but are species that are generally considered trees. If a majority of the trunks are >6" dbh, then the re-sprouts would be recorded under the "Tree" stratum.

**E = SEedling.** A tree species clearly of a very young age that is <1" dbh or has not reached breast height. Applies only to trees propagating from seed; re-sprouts are not recorded here even if they meet the size requirements.

**S = Shrub** A perennial, woody plant that is multi-branched and doesn't die back to the ground every year.

**H = Herb** An annual or perennial that dies down to ground level every year.

**N = Non-vascular** Includes mosses, liverworts, hornworts, and algae.

**Species:** Use Jepson Manual nomenclature. When uncertain of an identification (which you intend to confirm later) use parentheses to indicate what part of the determination needs to be confirmed. For example, you could write out *Brassica (nigra)* if you are sure it is a *Brassica* but you need further clarification on the specific epithet.

**% cover:** provide the % absolute aerial cover for each species listed. All species percent covers may total over 100% because of overlap.

**C:** If a species collection is made, it should be indicated with a "C" (for collected). If the species is later keyed out, cross out the species name or description and write the keyed species name in pen on the data sheet. Do not erase what was written in the field, because this information can be used if specimens get mixed up later. If the specimen is then thrown out, add a "T" to the "C" in that column (CT = thrown out after confirmation) or cross out the "C". If the specimen is kept but is still not confidently identified, add a "U" to the "C" (CU = collected and unconfirmed). In this case the unconfirmed species epithet should be put in parentheses [e.g. *Hordeum (murinum)*]. If the specimen is kept and is confidently identified, add a "C" to the existing "C" (CC = collected and confirmed). If the specimen is later deposited in an herbarium, add a "D" to the existing "C" (CD = collected and deposited) and note the receiving herbarium.

**Notes:** Describe the stand age or seral stage, disturbance history, nature and extent of land use, and other site environmental and vegetation factors. Include recommendations for line-work revision, discernibility of the vegetation based on season and topography, problems with classification interpretation, homogeneity of vegetation, and unusual sightings of plants or animals.

**Map Unit Name:** Enter the vegetation type name here. Refer to the Vegetation Key to select the type. If the vegetation in this polygon does not exactly match the descriptions in the key, enter the best-fitting vegetation type here and the second-best type in the next field. For further verification of the vegetation, refer to the Stand Tables.

**Secondary** (Optional): Assign a second-best-fitting name for the vegetation within the polygon. Assign a secondary code **only** if there is some ambiguity in assigning the polygon to a primary vegetation. Note the reason for assigning a secondary call within the "Confidence in map unit ID" field below.

**Confidence in map unit ID? L M H Explain:** Note the level of confidence you feel in the map unit identification by circling **Low**, **Moderate**, or **High**. This is an area to describe how well the stand characteristics match the Vegetation Key. Are all diagnostic species present in proper proportions? If not, how do they differ? If a secondary type is identified, what made the stand type ambiguous? **Note that if you choose low or moderate confidence, you should have a secondary call, as an alternative way to classify the vegetation.**

**Linework problems:** Check the box if the polygon boundary line does not surround a distinct vegetation type. Examples for which you would check the box include situations where there is more than one type of mappable vegetation within the polygon, when a portion of the boundary includes part of an adjacent stand, or when the stand continues beyond the polygon boundary. If checked, provide comments in the Notes section to explain.

**More than 1 vegetation type in this polygon:** Check if there is more than one vegetation type within the polygon. If the polygon includes more than one type, take a separate GPS point and fill out an AA form for each **mappable** vegetation type (i.e. above mmu). If these other types are

smaller than the MMU, and therefore would not be expected to be mapped, just note the additional vegetation types in the Notes section.

**Vegetation change since imagery taken:** Check the box if the vegetation in the polygon has changed since the aerial imagery used as the base of the vegetation map was taken. If yes, provide a description in the Notes section of how the vegetation has changed (for example: burned, developed, visible dominance change over time).

**Camera name / Photo #s:** Write the name or the camera, JPG numbers, and direction of photos. *Take four photos in the main cardinal directions (N, E, S, W) clockwise from the north, from the GPS location.* This symbol can be used to indicate the cardinal photos: . Make sure to take additional photos of the general composition of the stand if the cardinal photos do not do an adequate job; note the JPG numbers and a description and direction of each additional photo.

**Conifer Cover:** The total foliar cover (considering porosity) of all live conifer trees, disregarding overlap of individual trees.

**Hardwood Cover:** The total foliar cover (considering porosity) of all live hardwood trees, disregarding overlap of individual trees.

**Total Tree Cover:** The total foliar cover (considering porosity) of all live tree species, disregarding overlap of individual trees. This value may be less than the sum of the conifer and hardwood covers due to overlap.

**Shrub Cover:** The total foliar cover (considering porosity) of all live shrubs, disregarding overlap.

**Herb Cover Class:** The total cover (considering porosity) of all herbaceous species, disregarding overlap. Circle the appropriate cover class range.

**Tree Height:** Circle the height range of the modal tree height.

**Tree DBH:** Circle one of the tree size classes provided. Size class is based on the average diameter at breast height (dbh) of each trunk (standard breast height is 4.5ft or 137cm). When marking the main size class, make sure to estimate the mean diameter of all trees over the entire stand, and weight the mean toward the larger tree dbh's.

**Exotics:** Circle the appropriate level:

None or not visible

1 = Light, less than 33% of total cover is non-native

2 = Moderate, between 33% and 66% of total cover is non-native

3 = Heavy, more than 66% of total cover is non-native

Not Applicable

**Estimated area of identifiable vegetation viewed:**

Enter a rough estimate of the **percent of the polygon** that you were able to assess from your point AND any additional area that you were able to view while driving or walking around or through the polygon.

**Is this a "multiple" point assessment?:**

Circle **NO** or **YES**. If Yes, fill in the sequence and total number of points for this polygon (e.g., 1 of 2 points for this polygon).

**Data Entry Protocol  
for Rapid Assessment/Relevé Database**

## General guidelines

*Keep a journal.* List any questions, ideas, problems, etc. in the journal as you enter the data, and reference each journal entry to the **Stand ID**. This protocol includes instructions on how to resolve some common problems (for example, when surface covers do not add up to 100%). Other errors should be corrected with the help of field staff or your team lead.

*Default values.* An error message box may show up sometimes when entering data, as we have set standards for certain fields (e.g. in the Species list box, you can only enter a **% cover** value that is between 0.1 and 101). You cannot proceed until the field has data entered appropriately. Also, once you start a new record ("Enter full plot info" button) you must enter a Stand ID in order to move on to the next field.

If a field was not filled out on the datasheet by the crew person, it should appear as a blank (or null entry) in the database. Zero should only be used if the field person intended to indicate a zero (for example, a slash through the field "% Surface Cover H<sub>2</sub>O" was meant to indicate a value of "zero"). Some fields have a "not recorded" option or should have "not recorded" typed in if the field was left blank on the datasheet. Some numeric fields default to 999 on the entry screen and must be supplied with legitimate values. Please see instructions for individual fields.

## Data flow

Data is collected for Rapid Assessment (RA) and Relevé field surveys in three places: a GPS device is used to capture basic stand information and spatial location data, a paper data sheet is used to collect environmental and plant data, and photos are taken of the stand. The GPS data is uploaded to an ArcGIS database and the physical location of each survey is verified.

Photos are uploaded from the field cameras and the photos for each stand are placed within the project directory in a folder named with the Stand ID. Photos for projected RAs receive special handling, as described below.

After the GPS data have been verified, it is imported from the ArcGIS database into the production RA/Relevé database, and information from the paper data sheets is added to each survey record.

## Opening the database and entering data in form view

Make sure you have an up-to-date version of the Access database saved to your desktop. There will be a separate front-end database (a shell which stores the forms but not the data) for each project, stored in the "SurveyData" folder in the project directory on the V: drive. You must copy the front-end database to your local hard drive and use that copy for your data entry; **do not** use a front-end database from a different project.

When the database is opened, a "Main Menu" will be presented. These instructions apply only to Rapid Assessment and Relevé data entry, so only the "Edit full plot info" and "Enter full plot info" options will be discussed.

## Enter vs. Edit.

These instructions assume that skeleton records have been imported into the database from GPS units used to collect data in the field. You will begin your data entry session by selecting **Edit full plot info** from the main menu. If you are entering data from scratch, select **Enter full plot info** from the main menu. Enter the information from the data sheet that would normally be imported from the GPS unit. See the section "Description of Individual Fields – Data Entry" at the end of this document for fields that are treated differently when data are not imported from GPS units.

## Starting data entry in the "RA-Relevé Data Edit" Form

When you press the **Edit full plot info** button from the main menu, the "CNPS/CDFW Vegetation RA-Relevé Data Edit Form" will be presented. The cursor will be placed in the "Select Survey ID" field, which will be blank, even though there is information in the rest of the form. Type in the Stand

ID of the record you want to enter or select the Stand ID from the drop-down list. The information that has been imported for that survey will be presented and you can continue to enter information from the data sheet as specified in the “Description of Individual Fields” below.

The entire entry form will not fit on the computer screen; use the scroll bar on the right to access the fields on the bottom of the form.

When you have finished entering the data for a survey, scroll back to the top of the form and select the Stand ID for the next survey you want to enter.

### **Starting data entry in the “RAFPlots – Enter new records” Form**

When you press the **Enter full plot info** button from the main menu, the “CNPS/CDFW Vegetation RA-Relevé Data Entry Form” will be presented. The cursor will be placed in the Survey ID field; when you enter the Survey ID, the Stand ID will be filled in automatically. Enter all data as specified in the “Description of Individual Fields” below.

**Note:** If this is a return visit to a plot that has been previously surveyed, you must append a character to the Survey ID # to make it unique. For example, a revisit to CARR1234 would have a Stand ID of “CARR1234” and could have a Survey ID # of “CARR1234A.”

The entire entry form will not fit on the computer screen; use the scroll bar on the right to access the fields on the bottom of the form.

When you have finished entering the data for a survey (i.e., when you tab out of the “Unusual species” field), the current record will be saved and a blank screen will appear with the cursor in the Survey ID field.

### **To leave the database:**

Once you are finished, you may click the X button at the top-right of the Access window to close the database. All data that you have entered will be saved in the form and associated tables.

## Description of Individual Fields – Data Edit

\* = Field is treated differently on the “Enter new records” screen. See **Description of Individual Fields – Data Entry** below.

**\*Select Survey ID:** Automatically entered when the record is created. This field cannot be changed. Enter a Survey ID to select a survey to edit.

**\*Project code:** Automatically entered when the record is created. This is the 4-character code for the project, such as “PYGM” for Pygmy Forest or “SSNF” for Southern Sierra Nevada Foothills.

**\*Stand ID #:** Automatically entered when the record is created. It will usually be the same as the Survey ID and will not need to be modified. If this is a return visit to a plot that has been previously surveyed, a character will have been appended to the Stand ID to make the Survey ID unique. For example, a revisit to CARR1234 would have a Stand ID of “CARR1234” and could have a Survey ID of “CARR1234A.”

**\*Update name:** Enter your name here. If your name does not appear on the drop-down menu, you may enter it using the “User Settings” button on the main menu.

**\*Update date:** Enter today’s date. Access will fill this in automatically if you press and hold the Ctrl key as you hit the semicolon key.

**\*Survey type:** Automatically entered when the record is created. This should be Relevé or Rapid Assessment; verify against the datasheet. If this is a return visit to a plot that has been previously surveyed, the survey type should be “Multivisit Relevé” or “Multivisit Rapid Assessment.”

**\*Survey Date:** Automatically entered when the record is created. Verify against the datasheet.

**Names of surveyors:** Enter the initials of all the people who participated in the survey. The recorder should be denoted with an asterisk (\*) or tilde (~) (e.g., DEH\*, ANK). If a person who is not a regular member of the surveying crew participates in a survey, his/her name should be entered here using the first initial and full last name (e.g. D. Hillyard).

**Allocation UID:** Enter if provided on the datasheet.

**Location:** Enter the physical location where the survey was taken. This may be the name of a public property, such as a state park, or the name of a private landowner.

**Information restrictions?:** Leave this blank; it will be updated at the end of the project.

**\*GPS name:** Automatically entered when the record is created. Verify against the datasheet.

**GPS waypoint #:** Enter this if recorded on the datasheet.

**Bearing, left axis at SW pt (degrees) of Long or Short side:** (for Relevé only)

For square or rectangular plots: from the GPS point location looking toward the plot, record the bearing in degrees of the axis to your left. If the plot is a rectangle, indicate whether the left side of the plot is the long or short side of the rectangle (no need to enter a side for circular or square plots).

**\*UTM Field reading: UTME, UTMN:** Automatically entered when the record is created. Verify against the datasheet. For a Rapid Assessment where the GPS point is not in the stand (a projected survey), these are the UTM’s of the point where the surveyors are standing (the base point), not the UTM’s of the projected point within the stand.

*Note: Coordinates may be recorded on the datasheet in decimal degrees (LAT-LONG), but they will not be entered in the database that way; they will have been converted to UTM’s.*

**\*Zone:** Automatically entered when the record is created. Verify against the datasheet. Either 10 or 11 for California.

**\*GPS datum:** Automatically entered when the record is created. Verify against the datasheet.

**GPS Error, ft, m, or PDOP:** Type in the error (accuracy) value, and select the appropriate unit from the drop-down menu.

**Is GPS in stand? If No, cite Base Point ID, distance (m) \_\_ bearing (°) \_\_ inclination(°) \_\_:** If **No** is entered, type in the ID of the base point, distance (in meters), bearing (in degrees, between 1 and 360), and inclination (in degrees, negative numbers are valid) as recorded. These will be used to calculate the UTM values for the projected point within the stand (UTME final and UTMN final).

**\*UTM final (Button):** Click this button if values for UTME final and UTMN final are not already filled in. Final UTM values will be calculated from the field readings, including the distance, bearing and inclination for projected RAs.

**\*UTME final and UTMN final:** Automatically entered when the record is created or when the UTM final button is clicked.

**Elevation, ft/m:** Type in elevation, if recorded, and select the appropriate units.

**Cardinal photos:** Enter the camera name first, the range of photo numbers, and then the direction of the photos (e.g., A12: 123-126 > N-W). If this is a projected RA, the cardinal photos will be stored in a folder named for the base point, so a comment should be added to make that clear (e.g., A12: 123-126 > N-W at base point). If this field was left blank on the datasheet, type “Not recorded” here.

**Other photos:** Enter the numbers of any additional photos, with a description of the photo subject (e.g., 127 stand looking NW, 128 ground vegetation, 129 unknown Aster).

**Stand size:** Select a size from the drop-down menu. If this was left blank on the datasheet, select the “Not recorded” option.

**Plot Area:** For a Relevé, select an area from the drop-down menu. A value may be typed into this field if the drop-down menu does not list the plot area for this stand. Select “Not recorded” if this is a Relevé and was left blank on the datasheet.

**Length x width:** For a Relevé, select from the drop-down menu or type in the dimensions of the plot in meters. Select “Not recorded” if this is a Relevé and was left blank on the datasheet.

**RA radius (m):** type in the radius in meters for which the survey applies.

**Survey Shape:** select the survey shape from the drop-down list.

**Actual exposure, General exposure, Actual steepness, General steepness:** First enter the actual value (e.g. 345) in degrees for exposure, then use the drop-down menu to record the general value (e.g. NW) for exposure. Steepness is also recorded in degrees.

Actual exposure and steepness default to “999” on the data entry screen and must be changed to a legitimate value. If the actual exposure or steepness was not measured in the field, change this field to blank, otherwise enter the number written. If the general exposure or steepness was not measured in the field, select the “Not recorded” option from the drop-down. If both general and actual exposure and steepness were recorded, please confirm that the general and actual values are consistent.

**Macro Topography:** Use the pick-list to select the macro-topography, which contains the variety of topographic features that may have been circled on the field form (e.g., upper, mid, lower, or bottom). Select the “not recorded” option if this was left blank on the datasheet.

**Micro Topography:** Use the drop-down menu and select one of the following: convex, flat, concave, undulating, or not recorded.

**Geologic substrate:** Select a code from the drop-down menu. If this is left blank, you can use a geology layer for the project to determine this and fill it in, or you may select the “not recorded” option from the drop-down menu.

**Soil Texture:** Select a soil texture code from the drop-down menu. Select the “not recorded” option if this was left blank on the datasheet.

**Upland or Wetland:** Select one from the pick-list (select 1 for Upland and 2 for Wetland or Riparian). If the field form is lacking this, look at the site history and species list to figure out which it is (or write in your journal that this is missing).

**Restoration code:** Select the Restoration Code from the picklist (you can also type in the first letter of the restoration type to select the code; entering “S” will select “Shrub/tree planting”). If more than one type was circled, select “Other” and type the codes into the Site History field in this format:

Restoration: Juniper removal, Shrub/tree planting.

**% Surface cover:**

**% H<sub>2</sub>O, % Basal Stem, % Litter, % Bedrock, % Boulder, % Stone, % Cobble, % Gravel, % Bare/Fines:** Enter the percentages as recorded on the datasheet. Enter 0.2 for <1%; otherwise, enter the specific value from the datasheet (e.g., 70, 0, etc.). Note that basal stems should not be more than 2-4% in most situations. All these numbers should add up to approximately 100%. If the numbers do not add up correctly, you may alter them by adjusting the value of the largest cover category if it appears obvious that the crew made a simple subtraction error. If the cover values are evenly distributed, then the error should be distributed among them proportionally.

**Check sum (button):** Press this for a pop-up window that shows the total of the surface cover values entered above. This total should be between 98% and 102%.

**% current year bioturbation:** Enter the percent cover of this year’s bioturbation, as seen on the datasheet. Enter 0.2 for <1%; otherwise, enter the specific value from the datasheet (e.g. 3, 0, etc.). This field defaults to “999” on the data entry screen and must be changed to a legitimate value. If the current year bioturbation was not recorded on the datasheet, change this field to blank.

**Past bioturbation present:** Enter yes or no as recorded on the datasheet, or “not recorded” if left blank.

**% hoof punch:** Enter the percent cover of sample or stand surface that has been punched down by hooves (cattle or native grazers) in wet soil. Enter 0.2 for <1%; otherwise, enter the specific value from the datasheet (e.g., 2, 0, etc.). This field defaults to “999” on the data entry screen and must be changed to a legitimate value. If the hoof punch was not recorded on the datasheet, change this field to blank.

**Evidence of fire:** Enter yes or no as recorded on the datasheet, or “not recorded” if left blank. If yes is recorded, there should be a description of the fire evidence in the “Site history” section.

**Site history and comments (may contain notes from the GPS unit – incorporate as appropriate):** If notes were taken on the GPS unit, they will have been automatically entered here when the record was created. These should be added to the information on the datasheet if not already addressed there. Enter what is seen on the datasheet. However, edit to make as readable as possible. If the meaning is unclear, check with the writer of the form. If the writer is not available, check with someone else to see if they can understand what is being said. Use standard rules of punctuation and capitalization (capitalize genus names and not species epithets). Do not leave abbreviations. All plant acronyms must be expanded to avoid confusion in the future. For instance, if QULO is written on the datasheet, Quercus lobata must be typed into the database. If the site history is left blank on the datasheet, type “Not recorded” in this field.

**Type and level of disturbance (sub-form):**

This is a sub-form, in which the cursor will go directly to the CodeImpact field. The Final db # will be automatically filled once you enter a CodeImpact value.

**CodeImpact:** Use the drop-down menu to select the type of disturbance (e.g. 1, for development). If 13 (other) is recorded on the datasheet, a description of the disturbance should have been provided and must be entered in the “Other” field.

**Intensity:** Select an intensity code. If an intensity level is missing on the field form, leave the intensity blank.

**Other:** For an impact that is not listed in the CodeImpact column, enter a code of 13 and type a description of the disturbance (e.g., grading/disking) into this field.

Skip over this sub-form box if no disturbance impacts are listed on the datasheet.

**Tree DBH:** Enter tree size class when the tree canopy closure exceeds 10 percent of the total cover (except in desert types), or if young tree density indicates imminent tree dominance. Select a DBH code from the drop-down menu as indicated on the datasheet. If this is not a tree type, select "N/A" from the drop-down menu. If this is a tree type, but nothing was circled on the datasheet, select "N/R."

**Shrub:** Enter if circled on datasheet by using the drop-down menu. If this is not a shrub type, then "N/A" may be selected from the drop-down menu. If this is a shrub type, but nothing was circled on the datasheet, select "N/R."

**Herbaceous:** Enter if circled on datasheet by using the drop-down menu. If this is not an herb type, then "N/A" may be selected from the drop-down menu. If this is an herb type, but nothing was circled on the datasheet, select "N/R."

**Field Alliance, Field Association:** Use scientific nomenclature for names listed in both the alliance and association. If nothing was recorded under Field alliance, type "Not recorded" in that field. Leave Field Association blank if nothing was recorded there.

When more than one species is named in the alliance or association, use a dash if the species are in the same stratum (e.g., both are shrub species) and a slash when they are in different strata (e.g., tree and shrub, shrub and herb). Leave a space between the dash or slash and the species names. (See *A Manual of California Vegetation* for more explanation.)

For example: *Arctostaphylos patula* – *Ceanothus cordulatus*

*Pinus ponderosa* / *Arctostaphylos viscida*

Pay special attention to the spelling of plant names. To avoid misspellings, you can look up the scientific name in the drop-down menu of the **Species name** field (the lookup list found in the Species, Stratum, and Approximate % Cover sub-form), then cut and paste the name into the alliance or association field.

**Adjacent 1, Adjacent 2, Adjacent 3:** Enter the adjacent alliances, as seen on the datasheet, and the direction of the stand relative to the stand being surveyed. For example, "JUCA 50m / S" on the datasheet would be entered as "*Juniperus californica* 50 m, south" in the database. If there are more than three adjacent alliances listed on the datasheet, you can put more than one in each field. Do not leave abbreviations. All plant acronyms must be expanded to avoid confusion in the future. For instance, if QULO is written on the datasheet, *Quercus lobata* must be typed into the database. If Adjacent 1 was left blank on the datasheet, type "Not recorded" into that field. If Adjacent 2 and/or Adjacent 3 are left blank, they may be left blank on the data entry screen.

**Confidence in identification:** Select L for Low, M for Moderate, or H for High confidence (with respect to the naming of the Alliance), as recorded on the datasheet. Select "Not recorded" if none of these were circled on the datasheet.

**Explain:** Enter the explanation as recorded on the datasheet.

**Phenology: Herbaceous, Shrub, Tree:** Enter as recorded on the datasheet; if not applicable, chose N/A. If there were herbs, shrubs, or trees in the stand, but phenology was not recorded, select "Not recorded" for the appropriate stratum.

**Other ID or mapping info:** Enter if recorded on datasheet, or skip over the field if not.

**% non-vascular cover:** Enter the total cover of all lichens and bryophytes (mosses, liverworts, hornworts) on substrate surfaces including downed logs, rocks and soil, but not on standing or inclined trees, as seen on datasheet. For <1%, enter a value of 0.2. This field defaults to "999" on the data entry screen and must be changed to a legitimate value. If the non-vascular cover was not recorded on the datasheet, change this field to blank.

**Total % vascular veg cover:** Enter the numeric value as recorded on the datasheet. This field defaults to “999” on the data entry screen and must be changed to a legitimate value. If the total vascular veg cover was not recorded on the datasheet, change this field to blank.

**Conifer tree cover, Hardwood tree cover, Regen tree cover, Shrub cover, Herb cover:** Enter a numeric value if recorded on datasheet (e.g. 25). Make sure to enter “0” for fields without representative cover values. For <1%, enter a value of 0.2. Fields should remain null for distance surveys when you are unable to assess cover values for a particular layer (e.g., the herbaceous layer from a distance of 300 meters). These fields defaults to “999” on the data entry screen and must be changed to a legitimate value. If any of these fields were left blank on the datasheet when they should not have been (e.g. the shrub cover was left blank, but there were shrubs in the species list), change that field to blank.

**Conifer height, Hardwood height, Regen tree height, Shrub height, Herb height:** Use the drop-down menu to select the appropriate code. Fields should remain null for distance surveys when you are unable to assess height for a particular layer (e.g., the herbaceous layer from a distance of 300 meters). Select 998 – “Not applicable” for the height of a stratum when the corresponding cover is 0. If the stratum cover is >0, but the height has not been filled in, select 999 – “Not recorded.”

### **Species, Stratum, and Approximate % cover:**

This is a sub-form, in which the cursor will skip directly to the Stratum field. RAPplants ID and Database # will be filled in automatically when the stratum is selected.

Only data that is known to be as accurate as possible should be entered. If the full species name is listed on the datasheet but the identification is not definite (recorded with a “?” or in parentheses), record only the genus or family name into the “CodeSpecies” field. Whatever level of taxonomy is confidently known should appear in the species field (e.g., forb). Any indefinite or uncertain notations should be recorded in the comments field. For example, if the datasheet says “*Bromus (rubens)*”, the plant should be recorded as *Bromus*, with “(*rubens*)” in the Notes field.

**Stratum:** Use the drop-down menu. Enter Herb (H on the datasheet), Shrub (S), Tree (T), Sapling (A), Seedling (E), Non-vasc (N). Please correct the stratum if the field personnel assigned it incorrectly (and try to adjust the total percent cover estimates for the correct strata). In some cases, the stratum of a particular species might not be obvious. For example, in the desert, *Juniperus californica* has the size and growth habit of a shrub, but it is considered a tree. It is useful to have a list of ambiguous strata for each project.

**CodeSpecies and Species name:** After the stratum is entered, go to *either* the **CodeSpecies** or the **Species name** field to select a species name from the drop-down menu, as described below.

If you start typing in a **CodeSpecies**, make sure to type in the first two letters of the genus and then the first two letters of the specific epithet (with no spaces) for that species (e.g., METO for *Melica torreyana*). The drop-down menu will search for all the matching codes with that spelling. Select the appropriate species code. Once a species code is selected, tab over to the **Species\_name** field and the correct name will automatically be filled in. Use this field carefully as many very different plants have codes that are very similar.

You may skip over the CodeSpecies field and type directly into the **Species name** field instead. Start typing the genus name and the drop-down menu will start searching for that name. Continue typing until the species name appears, or you can use the drop-down menu to find the appropriate name. Then tab over to the **% Cover** field, and the CodeSpecies field will be automatically filled in.

*Additional notes for these fields:*

If a plant has only been determined to the genus level, start typing in the genus name in either the “CodeSpecies” or “Species\_name” field. Select the appropriate genus from the drop-down menu, and tab over to the next field.

If a plant has only been determined to the family level, start typing in the family name in the “CodeSpecies” field or “unknown” then family name in the “Species\_name” field. Select the appropriate family from the drop-down menu, and tab over to the next field.

Please be accurate and consistent with use of scientific names, and use the latest Jepson Manual nomenclature. Sometimes collectors of the field data will use nomenclature inconsistent with Jepson, and these “old” names may be found in the drop-down menu. For instance, both *Chrysothamnus albidus* and *Ericameria albida* can be found in the menu, but you should use *Ericameria albida*. Enter “*Chrysothamnus albidus*” in the Notes field to indicate what was entered on the datasheet.

If the lookup list does not contain the species you want, please tell your supervisor, who will need to add a new species code and name to the drop-down menus.

**% Cover:** Type in a numeric value between 1 and 100 as recorded on the datasheet. If the cover value was recorded as “<1” or “+,” enter 0.2. If the cover was recorded as “r,” enter 0.11.

If percent cover was not recorded for a species on the datasheet, leave this field null and enter “% cover not recorded” in the Notes field. If the species is named in the Field Alliance or Association, or is prominent in the stand photos, then check with the field crew to determine a reasonable cover value.

**Collection:** If a species collection has been made and is PRESSED use this data entry column. All plants with a pressed collection should have something entered in this field. Enter **unconfirmed** (a plant was collected and pressed, but the identification is uncertain or not known from this area), **confirmed** (a plant was collected and pressed; it was identified to the extent possible and range issues have been dealt with), **deposited** (a plant was collected and pressed; a label or database info was produced for this specimen and it was given (or is en route) to an herbarium), or **thrown out after confirmation** (a plant was collected and pressed; it was identified to the extent possible and was discarded). The following codes on the datasheet correspond to these entries in the Collection field:

C or CU:	unconfirmed
CC:	confirmed
CD:	deposited
CT or <del>C</del> :	thrown out after confirmation

If a specimen has not been collected, leave the field blank (null).

**Notes:** Enter any notes from the datasheet or clarifications to the species made during data entry. Expand any abbreviations to make the meaning of the notes clear.

**txtCurrPlant:** This field should not be changed during data entry. It is automatically filled in from the PLANTS table with the most current code for this plant.

**Changed:** This is a check box that will not be used during data entry. This will be checked if a species name has changed as a result of a redetermination or update from an herbarium review. The new name will be recorded in the CodeSpecies and Species Name fields, and the old name will be recorded in the Notes field along with any other notes on the name change.

Note: If you make an error and create more records than needed, you can remove these records by doing the following: Move your mouse to the left-hand edge of the row that you want to remove, right click to highlight the row, and then choose Delete Record.

**Calculated veg covers:** When all species have been entered, press the “Get Species Totals” button to populate the “Calculated veg covers” boxes. These totals can be compared to the “Recorded veg covers” to verify that all species have been entered and that the recorded veg covers are reasonable. For instance, if the calculated herb total is 28%, but the recorded herb total is 23%, this can be considered reasonable, as there could be overlap in the herb stratum. However, if the calculated herb total is 28%, but the recorded total is 35%, or if the difference

between the calculated and recorded covers is large, this should be investigated. A species may have been entered in the wrong stratum or the cover may have been entered incorrectly.

**Unusual species:** Type in any species recorded as unusual. However, make sure the species are also entered in the species list sub-form.

**\*Entry name:** Automatically entered when the record is created.

**\*Data entry date:** Automatically entered when the record is created.

**\*Data entry time:** Automatically entered when the record is created.

**Quality Control date:** This field will not be used during data entry. Enter today's date if you are quality-controlling the full plot info. Access will fill this in automatically if you press and hold the Ctrl key as you hit the semicolon key.

**QC:** This is a check box that will not be used during data entry. Check this box if this record has been quality-checked.

## Description of Individual Fields – Data Entry

**Survey ID #:** Enter the Survey ID. The format should be the 4-character project code followed by 4 digits. For example, a stand in the Pygmy Forest project might be “PYGM0123.” If this is a return visit to a plot that has been previously surveyed, you must append a character to the Stand ID to make the Survey id unique. For example, a revisit to CARR1234 would have a Stand ID of “CARR1234” and could have a Survey ID # of “CARR1234A.”

**Project code:** Select the 4-character code for the project from the drop-down menu. If your project does not appear on the list, an entry must be made for it in the RAPProjects table (you may use the “Edit Projects” button from the main menu).

**Stand ID:** This will be automatically filled in after the Survey ID is entered. The Stand ID will be generated as the first 8 characters of the Survey ID and they will usually be the same. The cursor will skip over this field, but you may go back and change it if need be.

**Entry name:** Enter your name, or select it from the drop-down menu. If your name does not appear on the list, you may go back to the main menu and add your name using the “User Settings” button.

**Data entry date:** Automatically entered when the record is created.

**Data entry time:** Automatically entered when the record is created.

**Survey type:** Choose Relevé or Rapid Assessment from the drop-down menu. If this is a return visit to a plot that has been previously surveyed, the survey type should be “Multivisit Relevé” or “Multivisit Rapid Assessment.”

**Survey Date:** Enter the date of the survey.

**GPS name:** Enter the name of the GPS unit from the datasheet.

**GPS datum:** Enter the GPS datum from the datasheet.

**UTM Field reading: UTME, UTMN:** Enter values from the datasheet. For a Rapid Assessment where the GPS point is not in the stand (a projected survey), these are the UTM's of the point where the surveyors are standing (the base point), not the UTM's of the projected point within the stand.

**Zone:** Enter 10 or 11 for California.

**UTM final (Button):** Click this button to calculate final UTM's from the field readings, including the distance, bearing and inclination for projected RAs.

**UTME final and UTMN final:** Automatically entered when the UTM final button is clicked.

**Update name:** Not used on the “Enter new records” form.

**Update date:** Not used on the “Enter new records” form.

**Quality Control Instructions  
for Rapid Assessment/Relevé Database**

These instructions assume you will be looking at the production tables directly in Access, rather than through a data entry form. If you have a standalone database, all records will belong to your project. If you are working with the combined database, you will want to select only the records for your project. In either case, you may want to select only the records for the current season. You can double-click on the table name to get a listing of your data, and then filter on ProjectCode and/or SurveyDate. Or you can create a query to do the same thing.

These instructions list the fields in the RAPlots, RAImpacts, and RAPplants tables and describe any checks you should make for each field.

### **RAPlots table**

#### **SurveyID**

Sort ascending/descending and scroll through the field to make sure that all IDs have the correct number of placeholders and were entered correctly. Also, make sure all letters in the SurveyID field are capitalized. The SurveyID and Stand\_ID should be the same unless the survey is a return visit to a monitored plot (in which case the SurveyID will have an extra character at the end).

#### **ProjectCode**

This should be the code for your project, should be the same in every record, and should be all caps.

#### **Stand\_ID**

Sort ascending/descending and scroll through the field to make sure that all ID's have the correct number of placeholders and were entered correctly. Also, make sure all letters in the Stand\_ID field are capitalized. The SurveyID and Stand\_ID should be the same unless the survey is a return visit to a monitored plot.

#### **Alternative\_ID**

This field is used for allocation "UID"s. It can contain the label of the allocated point where the survey was taken, "none," or nulls. This field doesn't require QC.

#### **SurveyDate**

Sort ascending/descending and look for blank entries, inconsistencies, and errors in data entry.

#### **Surveyors**

Sort ascending/descending and look for blank entries, inconsistencies, and errors in data entry. If there are blank entries, check the corresponding datasheets to see if there are surveyors recorded on the field form. An asterisk (\*) or tilde (~) should follow the name of the person recording the data. For example, if Joe Smith recorded the data and Jane Doe assisted on collecting data, the field should read, "Joe Smith\*, Jane Doe" or "JS\*, JD".

#### **Location\_name**

This field should not be blank. If there is no data here, check the datasheet or look at the map to get a description of the survey location or property name.

#### **Waypoint**

This field is not currently used.

#### **GPS\_Name**

Sort ascending/descending and look for blank entries, inconsistencies, and errors in data entry.

#### **GPS\_datum**

Sort ascending/descending and look for blank entries, inconsistencies, and errors in data entry. Typically, the same GPS datum is used across a project.

#### **GPS\_in\_stand, GPSshiftDeg, GPSshiftM, GPSshiftIncl**

Sort the "GPS\_in\_stand" field ascending/descending and look for blank entries, inconsistencies, and errors in data entry. If an entry reads "No" (0), check the "GPSshiftDeg," "GPSshiftM," and "GPSshiftIncl" fields to make sure values are provided for offset bearing, distance, and inclination. If an entry reads "Yes" (-1), make sure that "GPSshiftDeg,"

"GPSshiftM," and "GPSshiftIncl" are blank. Check the datasheets and make the necessary fixes if these requirements are not met.

### **BaseID**

Any survey with GPS\_in\_stand = "No" (0) should have the SurveyID of the base point here. Check the datasheet or map if this is blank.

### **ErrorMeasurement, ErrorUnits**

Error is generally recorded as "ft" or "m" for points taken in Collector, and as "PDOP" for points taken with ArcPad. These should be entered. ArcPad will report the PDOP value for each point; check to be sure these numbers are reasonable. Collector does not report the error on each survey, so the ErrorMeasurement and ErrorUnits should be recorded as the limit entered in Collector, i.e. if Collector is set not to take a point if the error is greater than 5 meters, then that is what should be entered here.

### **UTME, UTMN**

Scroll through UTMN and UTME fields and check for blank fields or fields with the wrong # of characters. Refer to datasheets and/or waypoint download files to fill in missing values. Since all points in a project are generally recorded in the same UTM zone, the addresses should fall within the same range. For points that are very different, check the datasheet or the map to determine the correct location.

### **UTME\_final, UTMN\_final**

For all points where GPS\_in\_stand = "Yes" (-1), the final coordinates will equal the UTME and UTMN coordinates. When GPS\_in\_stand = "No," the final coordinates will be offset by the bearing, distance and inclination. Check to be sure that these are different.

### **UTM\_zone**

Sort ascending/descending and look for blank entries and errors in data entry. For California, this will be 10 or 11.

### **Elevation**

We are not collecting this information in the field, so blank entries are expected.

### **ft\_mElevation**

We are not collecting this information in the field, so blank entries are expected.

### **Photo\_Ordinals**

The four photos taken in the cardinal directions should be recorded here. Entries should begin with the name of the camera, followed by the photo number(s) and the direction the camera was pointing when the photo was taken, for example: "P12: 710-713 > N-W." This field should not be left blank. If photos were not taken, the reason should be recorded here.

### **Photos\_Other**

Additional photos, such as stand photos or plant photos, should be entered here. Records should contain the photo number followed by a description of the photo. It is not necessary to record the camera name in this field as it should be recorded in the Photo\_Ordinals field. Blanks are acceptable in this field.

### **MicroNum, MicroTopo**

Sort ascending/descending. These should not be blank; if they are, check the datasheet and enter the correct values. Enter "999," "Not recorded" if they were not recorded.

### **MacroNum, MacroTopo**

Sort ascending/descending. These should not be blank; if they are, check the datasheet and enter the correct values. Enter "999," "Not recorded" if they were not recorded.

You can look at the corresponding "Field\_alliance" and "Field\_assocn" names and make sure that the assigned macro topography makes sense. For example, you would not expect "Platanus racemosa – Salix Riparian" to occur on a ridge top.

**Substrate, SubstrateNum, CodeGeology**

Sort ascending/descending. These should not be blank; if they are, check the datasheet and enter the correct values. Enter "Not recorded," "999," "N/R" if they were not recorded.

If a large number of entries are blank, use GIS to create a new CodeGeology field based on existing digital geology layers.

**SoilNum, Soil, Soil\_text**

Sort ascending/descending. These should not be blank; if they are, check the datasheet and enter the correct values. Enter "999," "N/R," "Not recorded" if they were not recorded.

**Upl\_Wet\_text, Upl\_Wetland**

Sort ascending/descending. These should not be blank; if they are, check the datasheet and determine the type based on the description, species list, and field alliance.

You can look at the corresponding "Field\_alliance" and "Field\_assocn" names and make sure that the assigned category makes sense. For example, you would not expect "Typha latifolia" to be an upland type.

**AspectNum, Aspect\_gen**

Sort ascending/descending. These should not be blank; if they are, check the datasheet and enter the correct values. Enter "999," "Not recorded" if they were not recorded.

**Aspect\_actual**

Sort ascending/descending. This field should be blank if the value was not recorded, or if the general aspect is "Flat" or "Variable." If this field contains "999," check the datasheet and set it to blank if the aspect was not recorded.

Make sure that the assigned AspectNum and Aspect\_gen fields correspond to the appropriate Aspect\_actual fields (1-90=NE, 91-180=SE, 181-270=SW, 271-360=NW). **Note:** Due North should be entered as 360, not 0.

**SlopeNum, Slope\_gen**

Sort ascending/descending. These should not be blank; if they are, check the datasheet and enter the correct values. Enter "999," "Not recorded" if they were not recorded.

**Slope\_Actual**

Sort ascending/descending. This field should be blank if the value was not recorded; if this field contains "999," check the datasheet and set it to blank if the aspect was not recorded.

Make sure that the assigned SlopeNum and Slope\_gen fields correspond to the appropriate Slope\_Actual value.

**Site\_History**

Check for spelling errors, blank entries, and incomplete sentences. This field should not be blank; if it is, check the datasheet and if no comments were recorded, make a note to that effect in this field. Replace all species codes and abbreviations with scientific or common names.

Note: This field is hard to check in the list view. You might want to scroll through the surveys in the Edit form to check this or copy this column into a word document, which will also highlight misspellings.

**Field\_Alliance**

Sort ascending/descending and look for spelling errors, blank entries, inconsistencies, and errors in data entry. We expect an entry in the field, so if it's blank, check the datasheet and enter "Not recorded" if it was not recorded. Make sure all species names are spelled out and proper nouns are capitalized, for example, "California Annual Grassland."

**Field\_Association**

Sort ascending/descending and look for spelling errors, blank entries, inconsistencies, and errors in data entry. Blanks are acceptable here, so if there are blanks, it's not necessary to check the datasheet. Make sure all species names are spelled out and appropriate words and proper nouns are capitalized, for example, "California Annual Grassland."

**AdjAlliance1, AdjAlliance2, AdjAlliance3**

Sort ascending/descending and look for spelling errors, blank entries, inconsistencies, and errors in data entry. AdjAlliance1 should not be blank, but should contain "Not recorded" if it was left blank on the datasheet. AdjAlliance2 and AdjAlliance3 can be blank.

The vegetation type should be listed first (spelled out, no abbreviations) followed by the direction from stand (e.g., Quercus lobata, NE). Make sure all species names are spelled out and proper nouns are capitalized, for example, "California Annual Grassland."

**StandSizeNum, Stand\_Size**

Sort ascending/descending and look for blank entries and inconsistencies. Check the datasheet if these are blank and enter "999," "Not recorded" if they were not recorded. Verify that the Stand\_Size is not blank, and that it corresponds to the StandSizeNum.

**Tree**

This field should not be blank. If this is a tree type, a value of "T1"- "T6" should be entered, or "N/R" if it was not recorded on the datasheet. If this is not a tree type, "N/A" should be entered.

**Shrub**

This field should not be blank. If this is a shrub type, a value of "S1"- "S4" should be entered, or "N/R" if it was not recorded on the datasheet. If this is not a shrub type, "N/A" or an "S" code may be entered.

**Herbaceous**

This field should not be blank. If this is an herb type, a value of "H1" or "H2" should be entered, or "N/R" if it was not recorded on the datasheet. If this is not an herb type, "N/A" or an "H" code may be entered.

**PalmJoshua, DesertRip**

These fields are used for desert projects. PalmJoshua can have a value of 1-3, N/A, or N/R. DesertRip can have a value of 1-4, N/A, or N/R.

**Conif\_cover, Hdwd\_cover, RegenTree\_cover, Shrub\_cover, Herb\_cover, Veg\_cover**

Sort each field ascending/descending and look for blank entries, inconsistencies, and unreasonable values. Quickly look at corresponding "Field\_alliance" and "Field\_assocn" names and make sure that all strata represented by the veg type have values. Sum cover of all fields in a column entitled "Sum\_Veg." Compare the Sum\_Veg values to the Veg\_cover values and review corresponding data forms if the difference is greater than can be accounted for by overlap for this Field\_alliance. Zero values should be entered when no cover was observed within a stratum. For distance surveys, cover values should be assigned as null (blank) in the database, unless they were specifically recorded as "0" in the field.

These fields default to "999" before data entry begins. If any records contain 999, check the datasheet for the correct value. If a stratum does not occur in the veg type, the cover should be "0." If the stratum does occur in the veg type, but a cover value was not recorded on the datasheet, the cover should be blank.

**UnderTree\_cover**

We are not currently collecting this in the field. Any values of "999" or "0" in this field should be set to null for consistency's sake.

**Conif\_ht, Hdwd\_ht, RegenTree\_ht, Shrub\_ht, Herb\_ht****Conif\_ht2, Hdwd\_ht2, RegenTree\_ht2, Shrub\_ht2, Herb\_ht2**

Sort each field ascending/descending and look for abnormal height categories such as a tree occurring at <5 meters or an herb occurring at 20-35 meters. Additionally, view corresponding % cover fields for each lifeform/stratum (e.g., look at Conif\_cover and Conif\_ht together) and if one of the 2 fields is missing and the other is present, check the datasheet for the missing value. If the cover value is 0, the height should be N/A. If the cover value is >0, the height should be "Not recorded" if it was left blank on the datasheet.

**UnderTree\_ht, UnderTree\_ht2**

We are not currently collecting this in the field. Any values should be set to null for consistency's sake.

### **Unusual\_spp**

All species names must be spelled out. Make sure that all unusual spp. are entered in species list. If no cover is present, enter a cover value of 0.2%.

### **Confidence\_ID, Confidence\_Explain**

If the Confidence\_ID was entered, it should be L, M, or H. A blank is not a problem. Confidence\_Explain may also be blank; check entries to be sure there are no plant abbreviations.

### **PlotOther1 – PlotOther8**

These fields are project dependent. Verify as appropriate.

### **PlotArea, SurveyDimensions**

These two fields generally apply only to Relevés. The PlotArea is usually "100 sq. m" since our Relevés are usually herbaceous plots. Check the datasheet if an area does not seem reasonable. The SurveyDimensions are recorded in meters. Check that the dimensions multiply out to the area. If either of these is blank for a Relevé, enter "Not recorded" if it is blank on the datasheet.

### **ViewRadius**

This field generally applies only to Rapid Assessments; it is recorded in meters. This was added in 2017 – for RAs before this time, the ViewRadius may be found in the SurveyDimensions field. For stands that are linear in shape, the radius may be entered in SurveyDimensions, for example: "35 x 10 m." This field will be blank if it was not entered on the datasheet.

### **PlotShape**

We are not collecting this in the field at this time. The value may be "circle," "square," "rectangle," or blank.

### **Survey\_Type**

The value in this field may be "Relevé," "Rapid Assessment," "Multivisit Relevé," "Multivisit Rapid Assessment," "Transect," or "Multivisit Transect." It will most commonly be "Relevé" or "Rapid Assessment." If it is any other value, check the datasheet and correct.

### **W\_Axis\_Bearing**

All relevés must have a value in this field. We try to align our plots in a north-south direction, so this will most commonly be 360 (preferred) or 0.

### **W\_Axis\_Size**

For relevés, this will be blank, "short," or "long." If it is left blank, the size is understood to be "long."

### **FireEvidence**

This should be "yes," "no," or "N/R." Blank entries should be checked and changed to "N/R" if it was not recorded on the datasheet.

### **Hoof\_punch**

Sort ascending/descending. Very large numbers should be checked against the datasheet. This field defaults to "999," but should be changed to blank if it was not recorded on the datasheet. If "999" remains, check the datasheet and make corrections.

### **Bioturbation\_past**

This should be "yes," "no," or "N/R." Blank entries should be checked and changed to "N/R" if it was not recorded on the datasheet.

**Bioturbation\_current**

Sort ascending/descending. Very large numbers should be checked against the datasheet. This field defaults to "999," but should be changed to blank if it was not recorded on the datasheet. If "999" remains, check the datasheet and make corrections.

**Bedrock, Boulders, Stones, Cobbles, Gravels, Bare\_fines, Water, Litter, BasalStem**

Sum cover of all surface cover fields in a new field entitled Tot\_Frag. Check for abnormally high and low Tot\_Frag values and review corresponding data forms to make sure values were entered correctly. When total fragment cover exceeds 105% or falls below 95%, multiple all fields by a correction factor. There should not be blanks in these fields. If all fields are set to "0," check the datasheet to be sure that values were not recorded.

**NonVasc\_Veg\_cover**

Sort ascending/descending. This field should contain a number between 0 and 100 or a blank. This field defaults to "999," but should be changed to blank if it was not recorded on the datasheet. If "999" remains, check the datasheet and make corrections.

**Phen\_Gr, Phen\_Sh, Phen\_Tr**

Sort ascending/descending. These fields should not contain blanks. Valid entries are "Early," "Peak," "Late," "N/A," and "Not recorded." Check the datasheet when you find blanks. If a stratum does not apply (like trees in an herbaceous stand), change the blank to "N/A." If a stratum does apply, but was not recorded, change the blank to "Not recorded."

**ID\_or\_mapping\_info**

Blanks are valid and do not need to be verified. Check for plant abbreviations and expand to the full species name.

**TrackingNotes**

We are not collecting this information in the field, so this does not need to be checked.

**ConfidentialityStatus**

We are not collecting this information in the field, so this does not need to be checked.

***RAImpacts table*****SurveyID**

Sort ascending/descending and scroll through field to make sure that all ID's have the correct number of placeholders. Also, make sure all letters in the SurveyID field are capitalized.

**CodeImpact**

Sort ascending. There should not be any blanks; if you find blanks, check the datasheet.

Look for code 13, which stands for "Other." These records should have an entry in the Other field; if they don't check the datasheet.

**Intensity**

Sort ascending/descending. The value should be 1-3.

**Other**

Sort descending. There should be entries for code 13. There may be other comments here, but no check needs to be done.

***RAPlants table*****SurveyID**

Sort ascending/descending and scroll through field to make sure that all ID's have the correct number of placeholders. Also, make sure all letters in the SurveyID field are capitalized.

**Stratum**

Sort ascending/descending. There should not be any blanks; if you find blanks, check the datasheet or assign a stratum based on the species. Valid entries are "Herb," "Shrub," "Tree," "Sapling," "Seedling," "Non-vasc."

**CodeSpecies**

Sort ascending. There should not be any blanks; if you find blanks, check the datasheet or find the correct code for the species in the CANVAZDownload... table.

**Species\_name**

Sort ascending. There should not be any blanks; if you find blanks, check the datasheet.

**SpeciesName**

This field will probably be blank, which is ok. It will be filled with the species name without author at the end of the project.

**Species\_cover**

Sort ascending. Any record that is blank in this field should have an entry in the Notes field saying "% cover not recorded." If it does not, check the datasheet and make corrections. Values between 0.11 and 100 are valid. Very large cover values of species that are not normally dense should be investigated.

**Changed**

This is a yes/no field that is not collected in the field; its value will be "0." You can ignore this.

**Notes**

Sort descending. Make a quick scan of the notes to be sure all plant abbreviations have been expanded.

**Collection**

Sort descending. "Unconfirmed" species require attention, particularly if the cover is >1%. If the species is not good enough to key, note that in the Notes field and change Collection to "confirmed" or "thrown out after confirmation" as appropriate. If the specimen has been sent to an herbarium or other expert for identification, note that in the Notes field and leave Collection at "unconfirmed." Valid entries are blanks, "confirmed," "unconfirmed," "deposited," or "thrown out after confirmation."

**CurrPlantsSymbol**

Sort ascending. There should not be blanks. The correct symbol can be found in the CANVAZDownload... table. Search for your CodeSpecies in the CodeSpp field and enter the AcceptedSymbol from the CANVAZ table in this field. No other checks are done on this field.

***Additional checks on RPlants***

To do this, you'll want to create a query that groups on Species\_name and Stratum, and counts Species\_name. If you are working in the consolidated database, you need to select only your project as well.

**Check for correct Stratum**

Read through the species list. Only tree types should have more than one stratum. Check that the stratum is appropriate for the species; you can use the Jepson Interchange, USDA Plants website, or the MCV to help figure this out. If you change the stratum for a species, make the correction on the datasheet as well.

**Check for out-of-range species**

Once you have resolved the strata, sort ascending on CountOfSpecies\_name. Species that have been reported only once are possible misidentifications. Check to be sure that their normal range includes the project area.

# Mapping Standards and Attributes

## Mapping Standards

Minimum mapping unit (MMU): The minimum mapping size for upland vegetation types is 2 acres (1 ha). For wetlands, the MMU is 0.25 acres. For development, the MMU is 1 acre.

Minimum polygon width: 15 meters average. but small sections of a polygon may occasionally fall below the minimum width in order to keep a stand connected.

Cover breaks: 5 acres for cover class breaks in the overstory, 10 acres for breaks in the understory. Use the cover classes below to determine the break points based on cover.

<u>Woody vegetation</u>	<u>Herbaceous vegetation</u>
<1%	<2%
1-5%	2-9%
>5-15%	10-40%
>15-25%	>40%
>25-50%	
>50-75%	
>75%	

Note: cover breaks on tree height and size class will be agreed upon prior to mapping.

### Map Attributes (minimum)

The following attributes are available for each polygon.

**Alliance\_S:** If using a code for the Alliance name, the final value in this field will be the completely spelled out the name

**Ht\_Code:** Average height of the dominant vegetation within the polygon

- 1 = <0.5 meters
- 2 = 0.5-1 meter
- 3 = 1-2 meters
- 4 = 2-5 meters
- 5 = 5-10 meters
- 6 = 10-15 meters
- 7 = 15-20 meters
- 8 = 20-35 meters
- 9 = 35-50 meters
- 10 = >50 meters

**SIZE\_CATEG:** The size of the dominant tree layer, measured in dbh (diameter at breast height)

- 1 = Seedling (<1")
- 2 = Sapling (1-6")
- 3 = Pole (6-11")
- 4 = Small (11-24")
- 5 = Medium-Large (>24")
- 6 = Multilayer

**PER\_HARDWO:** Percent cover of hardwood trees, in 1% increments

**PER\_CONIFE:** Percent cover of conifer trees, in 1% increments

**PER\_TREE:** Percent cover of all trees, in 1% increments

**PER\_SHRUB:** Percent cover of shrubs, in 1% increments

**HERB\_CODE:** Herbaceous cover, using the following codes

- 1 = <2%
- 2 = 2-9%
- 3 = 10-40%
- 4 = >40%
- 99 = >40% woody cover (so herbaceous cover difficult to determine)

**PER\_TOTAL:** Percent cover of all vascular vegetation, in 1% increments

**ISOLATED\_T:** Presence of isolated trees, i.e. <5% tree cover, scattered, Y or N

**RESTORATIO:** Restoration was observed in the stand. Any combination of codes 2-6 can be entered:

- 1 = None obvious
- 2 = *Juniperus occidentalis* removal
- 3 = Grass/forbs seeding
- 4 = Shrub/tree planting
- 5 = Thinning (pine, juniper)
- 6 = Other (see comments)

**JuniperExpansion:** Young *Juniperus occidentalis* (<6" dbh) are present in the stand, using these cover values:

- 0 = none visible
- 1 = 0-4%
- 2 = 4-10%
- 3 = >10%
- 9 = Not applicable

**CLEARING\_D:** Clearing of vegetation or other disturbance was observed in the stand

- 0 = None visible
- 1 = Low (>0% – 33% of polygon affected)
- 2 = Moderate (>33% – 66% of polygon affected)
- 3 = High (>66% of polygon affected)
- 9 = Not applicable or not evaluated

**Roadedness:** Amount of the polygon affected by paved or unpaved roads or trails

- 0 = None visible
- 1 = Low (at least 67% of the vegetation polygon area is roadless)
- 2 = Moderate (>33% – 66% of polygon is intersected by roads)
- 3 = High (less than <33% of the vegetation polygon lacks roads of any kind)
- 9 = Not applicable or not evaluated

**Development:** Amount of the polygon affected by human development

- 0 = None visible
- 1 = Low (less than 2% of polygon is affected)
- 2 = Moderate (2-5% of polygon is affected)
- 3 = High (>5% of polygon is affected)
- 9 = Not applicable or not evaluated

**INVASIVE\_P:** Presence of exotic plants in stand

- 0 = None visible
- 1 = Patches of exotics visible, but cover not significant (relative cover <33% of total vegetation cover)
- 2 = Exotics (particularly herbaceous) significant and cover may exceed dominant vegetation strata (relative cover <66%)
- 3 = Stand characterized by exotics (vegetation type is "exotic") (relative cover >66%)
- 9 = Not applicable or not evaluated

**COMMENTS:** Any comments on delineation or vegetation

**VISIT\_DATE:** Date the stand was visited by field crew

**FIELD\_CHEC:** Status of field visit

- 1 = Needs visit
- 2 = Needs revisit
- 3 = Visited – update required
- 4 = Visited – no update required
- 5 = Visited – inaccessible
- 6 = Visited – accuracy assessed to Alliance

This field is used by the photointerpreters, but prior to map finalization all visited polys should be classified in the Method\_ID field.

**Method\_ID:** Method used to determine vegetation type

1 = Rapid Assessment (current)

2 = Releve

3 = field verification

4 = photo interpretation

5 = Adjacent stand information or photo

6 = Reconnaissance

7 = Other Information

8 = Older plot information

9 = Older recon information

10 = Accuracy Assessment

60 = Additional recon Information recon doesn't pertain to whole polygon

**Unique\_Id:**

**ASSOCIATION:** If mapped to Association, Association name

**Ortho\_NAIP\_Year:** Year of the NAIP imagery used as base