

APPENDIX C
Nonforested terrestrial protocol and datasheets

**STANDARD OPERATING PROCEDURE
FOR THE QUICK ASSESSMENT PROTOCOL:
NON-FORESTED TERRESTRIAL**

**IN SUPPORT OF
U.S. ENVIRONMENTAL PROTECTION AGENCY**

**UNDER
RCRA ENFORCEMENT, PERMITTING, AND ASSISTANCE (REPA3)
ZONE 2 - REGION 5**

CREATED FOR USE BY EPA REGION 5

**NONFORESTED TERRESTRIAL SOP, REVISION NO. 3
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1.0 Scope and Application

Knowledge of ecosystem health and quality is an important component of successful ecosystem management. Ecological assessments are increasingly used in support of adaptive ecosystem management and informed resource management. Rapid ecological assessment is a common technique that is most often used to objectively assess the biological diversity of a relatively unknown ecological area. However, this assessment technique can also be used to evaluate ecological characteristics other than diversity.

The purpose of this standard operating procedure (SOP) is to detail a rapid ecological assessment protocol for evaluation of the health and quality of non-forested terrestrial ecosystems such as shrublands, prairies, and sparsely vegetated areas. This non-forested terrestrial protocol is one of four protocols originally drafted at a workshop held in June 2003. When using this SOP, the associated Quality Assurance Project Plan (QAPP) should be consulted. The QAPP serves as a generic plan for all data collection activities conducted under the SOPs and offers guidelines for ensuring that data are of sufficient quality and quantity to support project objectives. Decisions regarding the application of data collected while using this SOP should consider the precision, accuracy, and other statistical characteristics of these data.

2.0 Method Summary

This SOP provides instructions for a rapid ecological assessment of non-forested terrestrial ecosystems, using fauna surveys, flora surveys, human impacts surveys, and soil sampling of a 300-m x 300-m plot. Generally, the optimal season for implementing this protocol is during the growing season. Late spring offers the best opportunity for sampling nesting birds in most temperate locations; however, this will not be the ideal time to identify all plants. It is most important to sample all sites in a relatively small window (e.g., mid-May to mid-June, depending on latitude and other climatic factors) to make comparisons across sites.

The protocol requires a four person field team, and is intended to be completed in four hours. A fauna expert conducts 10-minute periods of bird and amphibian observation from four different observation points within the plot, and traverses four transects to look for fauna and fauna signs such as scat. Two of the field team members, one of which is a flora expert, work as a pair to conduct flora surveys at 30 points and ten 0.5-m x 0.5-m quadrats along a 300-m transect which runs through the center of the plot, and takes four soil samples along the transect to determine the depth, color, and composition of soil layers. These two then systematically traverse the entire study plot to develop a complete plant species list for the plot. The fourth field team member assists the fauna expert with the bird and amphibian point counts, and then systematically traverses the entire study plot to record and map signs of human impacts and fauna observations that the fauna expert may miss. Detailed procedures to are provided in Section 7.0.

3.0 Definitions

Canopy cover: Cover provided by tree crowns.

DBH: The diameter of a tree at breast height, or 4.5 ft (1.37 m) above the forest floor on the uphill side of the tree. For the purposes of determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line. (Source: USDA FS 1989)

Designated land cover type: The land cover type that is the primary target of the assessment (i.e., shrublands, prairies, or sparsely vegetated areas for this SOP).

Disturbance indicator: Disturbance is a natural or human-induced (anthropogenic) environmental change that affects an ecosystem's floral, faunal, or microbial communities. Disturbance may include, but is not limited to: roads, gravel, asphalt, trails, berms, ruts in the soil, eroded areas, evidence of digging, wind throw mounds, evidence of fire, litter, tires, refrigerators, manure, power lines, human tracks, off-road vehicle tracks, hydrologic modifications (e.g., ditches, weirs), evidence of mowing or tree felling, loud noise, and bright artificial lights.

Generalist: A species that has a broad ecological niche, capable of utilizing a relatively wide variety of resources.

Habitats of interest: Habitats that add diversity to such non-forested ecosystems as shrubland, prairie, and sparsely vegetated area complexes (e.g., plantings left from prior human occupation) and/or that are regionally scarce (e.g., wetlands).

Health/vigor indicators: For the purposes of this SOP, see description of vegetation stress indicators.

Landscape attributes: Landscape attributes include cliffs, water bodies, habitat types, relative height and distribution of plants having different physiognomy, and other attributes that affect the general appearance of the landscape.

Reproductive status: The flowering and/or fruiting status of a plant.

Soil probe: A 1 ½ inch hollow pipe about 4 feet long that is cut on a 45-degree angle at one end and used for sampling soils. It has closely-spaced holes along one side.

Specialist: A species that has a narrow ecological niche, utilizing a relatively limited set of resources.

Sporulation: Spore formation. Spores are small, usually single-celled, reproductive bodies produced especially by certain bacteria, algae, fungi, and nonflowering plants. They may appear as spots, small sacs, or on stalks and may become black as the spores ripen on surfaces of leaves that have become colonized by fungi.

Vegetation stress indicators: Signs of vegetation stress include: leaves that are yellowing, wilting, or dropping prematurely (for taxonomic groups in which this is uncommon); leaves that are spotted or “burned,” which may indicate herbicide drift from nearby agricultural fields; herbivory in excess; and sporulation or other evidence of fungal infection. For this SOP, galls and brooms are not considered to be signs of vegetation stress because they could represent a normal, healthy condition.

4.0 Health and Safety

Health and safety concerns for field workers in the non-forested terrestrial ecosystem include:

- slips, trips, and falls;
- thermal conditions such as excessive heat or cold;
- inclement weather, especially lightning;
- biological hazards, such as insects or other taxa that may bite and plants that may contain substances causing allergic reactions; and
- hunting (depending upon land use designations).

Field workers should wear closed shoes, long pants and long sleeves, but are individually responsible for selecting footwear, clothing, gloves and outerwear as appropriate to the situation at hand. Field workers should use insect repellent, as appropriate, and take care to avoid holes and other obstacles that may cause slips, trips, and falls. Workers should increase attentiveness to potential hazards during pre-dawn activities. Workers should also determine potential hunting or other human activities that could put them at increased risk, and take steps (such as wearing orange vests and notifying park rangers or other relevant law enforcement agencies of their location) to mitigate these risks.

5.0 Personnel Qualifications

This protocol requires four personnel who comprise the “field team.” One should be an expert in identifying plants in non-forested terrestrial habitats, the second should have some botanical training, the third should be an expert in animal identification, and the fourth can either have expertise similar to the other three or be a relative novice at biological field work. More specific qualification requirements are detailed below.

5.1 Fauna Crew Member

This crew member should have familiarity with terrestrial vertebrate and invertebrate field measurement. In particular:

- Birds: Bird identification skills must be at minimum to genus level, but preferably to species level for all avian individuals observed.
- Mammals: Identification to genus, and preferably to species, by sight, tracks or scat, with help from a field guide.
- Butterflies: Identification by sight of particular species of interest based on field guide or short field sheets.
- Herpetofauna: Identification by sight of common species and of tracks that are obviously reptilian (e.g. snake tracks). Identification of frogs and toads by calls is desirable but not necessary.

Knowledge concerning the use of Global Positioning System (GPS) equipment is also advantageous.

5.2 Flora and Soils Crew Members

At least one of the two flora crew members should be an expert with the ability to identify at least 200 species and with training to discriminate unknown flora. The second flora crew member will act as an assistant, and should be familiar with botanical nomenclature, have knowledge of about 50 common species, and have training in sampling and recording methods. One of the two crew members should also have knowledge concerning the use of GPS equipment. (Note: This protocol assumes the flora crew will be able to identify nearly all plant species in the field, but may occasionally have to collect a transitory specimen for taxonomic verification.) In addition, one of the two crew members should have basic soils knowledge, including differentiating horizons (e.g., organic, A, B, E, etc.) and estimating soil composition (clay, loam, sand).

5.3 Human Impacts Crew Member

This crew member should preferably possess a minimal amount of elementary plant diversity knowledge. He or she could be an entry-level participant or trainee. Knowledge concerning the use of GPS equipment is also advantageous.

6.0 Equipment and Supplies

6.1 General Equipment Needed

- Three digital cameras (and 128 MB memory card) with zoom and panorama capabilities
- Two GPS units and recharger for DC power socket in automobile
- Flagging (three colors)
- Insect repellent
- Sunscreen
- Three clipboards
- Pens with permanent, waterproof ink (or mechanical pencils)
- Permanent ink markers
- First aid kit
- Three flashlights
- Three hand-held compasses
- Thermometer
- Aerial photos, maps, and driving directions to study sites
- Three copies of this SOP
- Three accurate watches
- Three backpacks to carry equipment.

6.2 Additional Equipment Needed for Fauna Crew Member

- Bird binoculars
- Bird, mammal, herpetofauna, spider & insect, and animal scat/tracks field guides
- Butterfly identification field sheet
- Bird song CD
- Frog/toad song CD
- CD player with headphones
- Fauna reference lists, printed on waterproof paper (commonly available from field equipment suppliers)
- Fauna datasheets (N1 through N3), printed on waterproof paper (commonly available from field equipment suppliers).

6.3 Additional Equipment Needed for Flora and Soils Crew Members

- Tree, shrub, forb, and grass field guides
- Two measuring tapes (both 50 m)
- Walking stick or meter stick
- 3-sided PVC (or wood) quadrat frame (0.5 m x 0.5 m)
- DBH tape (5 m)
- Plastic bags (3 to 5 quart size)
- Thin tape (for marking plants)
- 3 metal stakes (for anchoring ends of 300 m tape)
- Mallet to drive stakes (if necessary)
- Trowel (for plant collection)
- Clippers (for plant collection)
- Hand lens (with 10 X and 15 X magnification)
- Flora reference lists, printed on waterproof paper
- Flora datasheets (N3, N4, N6 through N8), printed on waterproof paper.
- Soil probe (with wet and dry core tips)
- Wooden rod (1.25-inch diameter for extracting soil from the soil probe)
- Munsell Chart

6.4 Additional Equipment Needed for Human Impacts Crew Member

- Spray water bottle
- Several 250-ml screw-top jars and labels (for surface water collection)
- Measuring tape (5 m)
- Shovel
- Gloves
- Flora and fauna reference lists, printed on waterproof paper (commonly available from field equipment suppliers)
- Invasive species/human impacts datasheets (N5), plus copy of fauna datasheets (N1 through N3), printed on waterproof paper (commonly available from field equipment suppliers).

7.0 Procedure

This protocol requires a field team of four people to evaluate a 300-m x 300-m plot, and is intended to be completed in approximately four hours. Before formally collecting data in the field, all field team members should practice the protocol at least once in a convenient shrubland, prairie, or sparsely vegetated habitat to make sure they are clear on how to collect the data and complete each of the datasheets. One or more of the team members will perform pre-visit preparations. Subsequently, one team member (the fauna crew) will conduct the fauna portions of the protocol, with support from one of the flora crew members. A pair of workers (the flora crew) will conduct the flora portion of the protocol, and the fourth team member (the human impacts crew) will conduct the human impacts portion of the protocol.

The first activity conducted at the plot is bird and amphibian data collection, which is performed by the fauna crew member and the human impacts crew member, and should begin half an hour before sunrise. In order to create the least amount of disturbance prior to and during this segment of the protocol, the other two field team members should not enter the plot until bird data collection is complete. Once the bird and amphibian data collection is complete, the flora survey should begin. All four field team members will then work simultaneously for the remainder of the four-hour evaluation period.

7.1 Pre-visit Preparations

Listed below are the steps that must be completed before the start of the field event.

- Step 1. Obtain aerial photographs and topographic maps of the site and surrounding area. These materials will familiarize the field team members with the area and provide them with a context for the site.
- Step 2. Determine the pre-assigned four-character site ID number for the study site. The first character of the site ID number should be “N” for nonforested ecosystem, the second character identifies the state in which the site is located (i.e., 1 = Ohio, 2 = Michigan, 3 = Indiana, 4 = Illinois, 5 = Wisconsin, and 6 = Minnesota); and the last two characters should be digits assigned sequentially from 00 to 99.
- Step 3. It may be necessary to obtain permission or a formal permit to access the study site. Check with the land owner or manager to determine the need for such permission or permits. The minimal sample collection envisioned for this protocol will not include vertebrate species and is not expected to require a scientific collecting permit. This should be verified with fish and wildlife, and environmental agencies as appropriate.
- Step 4. Determine corner points of the plot, the four bird observation point locations, and approximate orientation of the 300-m flora transect using aerial photos, topographic maps, and/or Geographic Information System (GIS) data. The transect should run through the plot’s center and be oriented along a major environmental gradient. Also, determine the approximate GPS coordinates of the endpoints of the transect line. By using UTM’s as a coordinate system, the corner points and internal points can be determined from a single starting point (such as one corner), by adding and subtracting meters from the UTM’s of that first point. For example, to add a corner point that is due north or due east of the starting corner point, add either 300 to the northing coordinate or 300 to the easting coordinate. For points that are south or west, subtract 300 from the northing or easting. When finding these points while on the site, walking in the direction of the point while watching the GPS unit can tell you when you’ve reached the desired point (such as one of the bird observation points). Once the coordinates on the GPS unit match the predetermined coordinates of the point, you have arrived.
- Step 5. Create reference lists of local flora and vertebrate fauna species from available databases and resources. For all species: (1) categorize as native or non-native, (2) include state and Federal status, and (3) categorize as invasive or non-invasive. Fauna species should also be categorized as regionally common or rare, and as generalist or specialist.

Useful information sources for determining species status include:

- Illinois Department of Natural Resources:
<http://dnr.state.il.us/espb/datelist.htm> – state list of threatened and endangered (T&E) species.
- Illinois Natural History Survey:
<http://www.inhs.uiuc.edu/cbd/ilspecies/ilsplist.html> – list of flora and fauna occurring in Illinois, including state and federal listing status.
- Indiana Department of Natural Resources:
<http://www.in.gov/dnr/fishwild/endangered/e-list.htm> – lists of T&E fauna;

<http://www.in.gov/dnr/naturepr> – lists of rare, threatened, or endangered (RTE) species by county and a list of Indiana’s RTE vascular plants;

<http://www.in.gov/dnr/fishwild/endangered/frogs.htm> – list of frogs and toads in Indiana;

<http://www.in.gov/dnr/invasivespecies/innatcom03.pdf> – lists of characteristic species found in a variety of community types.

- Michigan Department of Natural Resources:

http://www.michigan.gov/dnr/0,1607,7-153-10370_12142---,00.html – links to T&E lists and a rare plant reference guide;

http://www.michigan.gov/dnr/0,1607,7-153-10370_12145---,00.html – links to fauna information;

http://www.michigan.gov/dnr/0,1607,7-153-10370_12146---,00.html – links to flora information.

- Minnesota Department of Natural Resources:

<http://www.dnr.state.mn.us/ets/index.html> – Minnesota’s list of endangered, threatened, and special concern species;

- Ohio Department of Natural Resources:

<http://www.ohiodnr.com/wildlife/resources/default.htm> – links to a variety of wildlife resources, including T&E lists for fauna;

<http://www.ohiodnr.com/forestry/Education/ohiotrees/treesindex.htm> – list of Ohio’s tree species.

- Wisconsin Department of Natural Resources:

<http://www.dnr.state.wi.us/org/land/er/> – includes lists of state and federal T&E species occurring in Wisconsin, county maps that list known occurrences of T&E species, and a searchable database of T&E species occurrences in Wisconsin.

- U.S. Fish and Wildlife Service:

www.fws.gov – links to a discussion of the endangered species program and a list of Federally threatened and endangered species.

Useful sources of information on invasive species include:

- Indiana Department of Natural Resources: <http://www.in.gov/dnr/invasivespecies>
- Michigan Invasive Plant Council: <http://forestry.msu.edu/mipc>
 - Minnesota Department of Natural Resources: <http://www.dnr.state.mn.us/exotics/index.html>
 - Wisconsin Department of Natural Resources: <http://www.dnr.state.wi.us/org/land/er/invasive>
 - National Park Service, Alien Plant Working Group: <http://www.nps.gov/plants/alien/factmain.htm#pllists>
 - USDA: <http://www.invasive.org>

Step 6. Print reference lists developed in the previous step and field datasheets on waterproof paper (commonly available from field equipment suppliers).

Step 7. The more experienced flora crew member should provide training to the human impacts crew member in invasive plant identification that are likely to occur in the plot. The flora expert

- should also provide training, as necessary, on recognition of evidence of fungal infection in plants.
- Step 8. Assemble information needed for field crew to efficiently and accurately determine the correct location of the study plot (e.g. develop driving directions, provide UTM coordinates).
- Step 9. Assemble field equipment and check it against the list in Section 6.0.
- Step 10. Measure standard walking pace of each field team member and adjust to 1 m per pace so that team members can pace off the longer transects and larger quadrats rather than having to measure them.
- Step 11. Perform reconnaissance of the study site the preceding afternoon, if possible, to make sure it can be found in the dark and to select a parking area.
- Step 12. During the site reconnaissance, use the predetermined transect orientation along with observations in the field to determine the exact location and orientation of the 300-m flora transect. Diagonally opposite bird/amphibian survey locations will be along this transect line. Flag the corner of the plot that is in line with the transect and is closest to the parking area with red flagging. Place additional (differently colored, but not yellow) flags leading from the parking area to the flagged plot corner if any difficulty in finding this corner in the dark is anticipated.
- Step 13. Synchronize the watches of all field team members and the time displayed on the digital cameras to make sure they all show the same time of day.

7.2 Data Recording

Data collected in accordance with this SOP should be recorded as described below.

- The fauna observation data should be recorded on the fauna datasheets N1 and N2. Use as many copies of each sheet as necessary to record all fauna observations. Note that all fauna sightings during the four hour survey period should be recorded, regardless of the activity being performed at the time of the sighting.
- Record flora survey data on the flora datasheets N4 and N6 through N8. Use as many sheets as necessary to record all required information.
- Record human impacts survey data on the invasive species/human impact datasheets N5. Use as many sheets as necessary to record all required information.
- Keep a record of all photos taken on the photo log datasheet N3. Include the time the photo was taken, the subject of the photo, the direction the photographer was facing while taking the photo, a description of the location of the photo, and if appropriate, a map identification number and corresponding datasheet number (e.g., N1). Map identification numbers can be assigned as the photos are taken, and then recorded on the plot sketches at the approximate location of the subject of the photo.
- Before entering the study plot complete the header information on the datasheets, including location, site ID number, UTM coordinates, date, and names of investigators.
- Do not take time in the field to fill out the species categorization columns (e.g., native or non-native) of the datasheets until all other field activities are completed. If time permits, these columns should be completed in the field using the fauna reference lists. Otherwise they can be completed back in the office.
- For some datasheets (e.g., N1), the number of sheets required will vary from plot to plot depending on numbers of species observed. These sheets should be numbered in the spaces provided at the tops of the sheets (i.e., Page __ of __) by the field crew members. Numbering the pages will help keep sheets in order and allow verification that all sheets are present and accounted for at the conclusion of field activities.

- More specific data recording instructions are included in the sections that follow, and on the datasheets themselves. Table 1 describes each of the datasheets and provides cross-references to SOP instructions.

7.3 Fauna Survey

The first hour of the fauna survey is conducted by the fauna crew member with the assistance of the human impacts crew member, and is spent making bird and amphibian observations from four points in the study plot. After this first hour, the flora crew members begin flora surveys, and the fauna crew member and human impacts member work alone. The fauna crew member spends the next two hours walking four 100-m transects looking for other fauna and their signs. After the transect surveys are completed, the fauna crew member should spend any remaining time assisting with the flora survey or the human impacts survey. Detailed instructions for completing the fauna survey are presented below.

7.3.1 Field Set-up

- Step 1. Before arriving at the parking area near the study site coordinates, arrange materials in the car so that the vehicle can be exited quietly and quickly when it is parked.
- Step 2. The human impacts crew member should assist the fauna crew member with Steps 3 through 8 below.
- Step 3. Document the corner of the 300-m x 300-m plot closest to the parking area using the GPS unit. Record coordinates on N1. If a GPS signal cannot be obtained, use topographic features or other landmarks to document an appropriate location for this corner. Record the GPS coordinates at the closest location where there is a signal, and note the approximate distance and direction of the recorded coordinates from the plot corner.
- Step 4. Verify or replace the red flagging at this corner.
- Step 5. Use the GPS unit to find observation point A by walking in the direction of the point from the corner until the GPS UTM coordinates match the predetermined UTM coordinates for that point (Figure 1). If a GPS signal cannot be obtained, pace 100 m down one of the established boundaries of the plot using a compass to continue the established direction of the boundary line. Then turn 90 degrees toward the interior of the plot square and pace another 100 m. At the end of this 100 m, the two field team members should both be at observation point A (Figure 1). Take a GPS reading to document the location of observation point A and mark this point with flagging. Record "NS" on the datasheets to indicate that no GPS signal was used to find the point.
- Step 6. Label observation point A on the flagging using a permanent ink marker.
- Step 7. Note that, since the observation points should be located 100 m apart and 100 m from the boundaries of the 300-m x 300-m plot (Figure 1), point A establishes the first corner of the sampling square.

7.3.2 Field Data Collection

7.3.2.1 Bird and Amphibian Data Collection from Observation Points

- Step 1. The point-count methodology detailed below is based on "extensive point counts" procedures developed by Ralph et al. (1993).
- Step 2. Commence bird and amphibian data collection at observation point A approximately half an hour before sunrise. Make as little noise and other types of disturbance as possible before and during the observation period.
- Step 3. Use N1 for data recording. Complete the weather conditions section and note the start time immediately before observations begin.
- Step 4. Beginning at observation point A, the fauna crew member should observe birds over a 10-min observation period, using binoculars, field guides, and the fauna reference lists as needed. The human impacts crew member should be responsible for data recording.

Record species that are seen or heard within 50 m of the observation point and the approximate number of individuals per species. If necessary, the fauna crew member can verify identification of bird calls after the 10-minute observation period is over using the bird song CD. Bird species of special interest are listed for each type of habitat in Table 2.

- Step 5. Record general behavior of each observation of a bird species (e.g., singing (S), flying (F), perched (P), foraging (O)) and the approximate number of individuals if a number of birds are observed at once. Do not double count individuals that may be moving around their territory.
- Step 6. During the 10-minute observation periods, frog and toad calls should also be identified to species if possible, with the help of the CD. Record species and approximate numbers of individuals for each species.
- Step 7. Record the time at the end of the 10-minute observation period. Record the GPS coordinates at the observation point.
- Step 8. Repeat Steps 4 through 7 at each of the remaining three observation points, moving clockwise around the four observation points and pacing 100 m in the appropriate direction (Figure 1) between each pair of points. Flag and label observation points B, C, and D. Ideally, two of the observation points should be visited during the half-hour before sunrise and two should be visited during the half-hour after sunrise.

7.3.2.2 Fauna Observations from Transects

- Step 1. Conduct observations of fauna (including birds) along four 100 m transect lines (i.e., AB, BC, CD, and DA anchored by the four observation points as shown in Figure 1) according to the instructions that follow. Use N2 for recording all fauna observations in the transects. Identify vertebrate fauna as precisely as feasible, to species level if possible. Invertebrates should be identified to the taxonomic level indicated on N2. Count the numbers of individuals observed, or if too numerous to count (e.g., in an ant colony), estimate numbers as orders of magnitude (e.g., ~10, ~100, ~1000).
- Step 2. Record the time and weather conditions before beginning to walk the transect. Use the digital camera to take a photo in the direction of the transect. Before taking the first photo, be sure that the time set in the camera is the same as the time set on fauna crew members' watches so that time can be used to associate the photographs with the appropriate transects.
- Step 3. Beginning at observation point A, pace 10 m toward point B, and record relevant observations (described in Step 5 below) that occur within 5 m of the transect. Continue to walk the transect, pacing off 10-m intervals for data recording. Spend approximately 30 minutes walking the transect.
- Step 4. Record observations as follows:
 - Mammals
 - Individuals: if any individuals are seen or heard, identify to lowest possible taxon and record number for each taxon.
 - Scats: identify to lowest possible taxon and record number for each taxon.
 - Tracks: identify to lowest possible taxon and record number for each taxon.
 - Mole/gopher/ground squirrel mounds: identify to lowest possible taxon and record number for each taxon.
 - Browse line: record height(s) and lowest possible associated taxa of species that may have created the browse line.
 - Burrows: measure diameter of each burrow, list lowest possible associated taxa, and note any extensive spider webbing. Extensive webbing would

indicate the presence of a wolf spider, which is sensitive to excessive human disturbance. It may also indicate that the burrow is not occupied by a larger animal that would break through the webbing upon ingress/egress.

- Scent marks: record number and associated taxa.
- Other: describe any other fauna signs observed (e.g., tree rubbing, gnaw marks), enumerate if appropriate, and record lowest possible associated taxa
- Birds: record any bird species seen or heard unless they were particularly common during the point counts.
- Herpetofauna: identify to lowest possible taxon and record numbers for each taxon identified by sight, calls, scats, tracks, or skins.
- Butterflies: record identification to lowest possible taxa and approximate numbers per taxa. Species of special note are included on N2, Table 6; other observed species should be added.
- Other invertebrates: record number of beetle species observed and note the presence of invertebrates associated with disturbance, such as tent caterpillars, snails, earthworms, spiders, and crickets/grasshoppers. Record approximate numbers of individuals observed.

- Step 5. If dead animals or their parts are encountered that cannot be identified in the field, put appropriate reference material (e.g., skull, hair, feet, depending on the taxon) in a plastic bag for later identification. A slip of paper with the site ID number, datasheet number, and a temporary sequential taxon number (which is also recorded on the datasheet) should be kept in the plastic bag until the reference material is identified and the correct taxon added to the datasheet. This should be done immediately upon returning from the field and the reference material should then be discarded. The collection of reference material for taxonomic verification should be minimized. Photographs of any questionable taxa should be used preferentially whenever appropriate.
- Step 6. At the end of the transect, record the time again. Take another photo, again facing in the direction of the transect just traversed.
- Step 7. Repeat Steps 2 through 5 for each of the four transects. Move clockwise around the square defined by observation points A through D. Associate all fauna and fauna signs with a single transect (i.e., AB, BC, CD, or DA). Associate observations visible from more than one transect with whichever transect is closest. If no one transect is closest, then associate the observation with the transect along which it was first observed.

7.4 Flora and Soils Survey

Starting an hour after the bird counts begin, the flora crew works together for approximately two hours surveying vegetation along a 300-m transect. The final two hours should be spent conducting a wandering survey in order to amplify data collection. The optimal season for conducting the flora survey is mid-growing season. However, it is important to note that early and late flowering species, especially grasses and composites, will likely be missed or identified only to genus or family level. Detailed instructions for completing the flora survey are presented below.

7.4.1 Field Set-Up

- Step 1. The flora survey will occur along the diagonal of the 300-m x 300-m plot.
- Step 2. To establish a 300-m transect line for the flora survey, begin at the corner of the plot that was flagged during the previous day's reconnaissance. Use a compass or a GPS unit to determine the orientation of the transect, which should be along a major environmental gradient. Note that two of the four bird and amphibian observation points should fall along this line (Figures 1 and 2).
- Step 3. Pace about 62 m along this line. Flag this point to mark the beginning of the 300-m transect.

7.4.2 Field Data Collection

- Step 1. Collection of flora data is done at 30 sampling points and 30 quadrats that are evenly spaced along the 300-m transect that runs diagonally through the center of the study plot (Figure 2). Flora crew members should work together at each sampling point and quadrat, with the less experienced member recording data.
- Step 2. Starting at the beginning of the transect marked in Section 7.4.2 above, run the 300 m tape through the plot, using the GPS unit and compass as necessary. Anchor the beginning and the end of the tape with stakes to prevent the tape from slipping or moving. Flora crew members should record point survey data as instructed in Section 7.4.3.1 below.
- Step 3. Starting at the 5 m mark on the tape and continuing every 10 m, record point survey data as instructed in Section 7.4.3.1 below.
- Step 4. At each sample point (Step 3), place the 0.5-m x 0.5-m sampling quadrat on the ground, positioning the sample point in the center of the quadrat and the sides of the square transect perpendicular or parallel to the transect. Record data as instructed in Section 7.4.3.2 below.
- Step 5. Continue to collect point data and quadrat data every 10 m.
- Step 6. During traversal of the transect, take photos to document the plot's center, transect line endpoints, and half of the sampling points in order to provide supplementary information for post-process analysis. Photos should be taken at every other sampling point prior to any disturbance created by survey activity.
- Step 7. Once a total of 30 points and 30 quadrats has been surveyed, systematically traverse areas outside of the 300-m transect, following the pattern in Figure 1, to develop as complete a species list for the plot as possible. Record data as instructed in Section 7.4.3.4 below.

7.4.2.1 Point Surveys

- Step 1. Record data at each of the 30 sample points on the flora datasheet N6.
- Step 2. Place end of walking or meter stick on the ground at the sampling point (do this without actually looking at the spot on the ground to avoid any potential bias). Record the following at the spot where the stick lands
 - Presence/absence of bare ground and canopy cover.
 - Presence/absence of health/vigor indicators (defined in Section 3.0).
- Step 3. Look up to determine whether canopy cover is present at the sampling point. If present, identify species of canopy cover. For each species present, record: "P," if the plant is present, but not flowering or fruiting; "FL," if the plant is flowering; or "FR," if the plant is fruiting.
- Step 4. Measure and record the distance to nearest tree that is within 5 m of the sampling point, and has a DBH > 10 cm. Also record the DBH of this tree. If no trees greater than 10 cm in DBH occur within 5 m of the sampling point, then record "A" for absent.
- Step 5. Record the presence/absence of disturbance indicators (defined in Section 3.0) within 5 m of the sampling point.

7.4.2.2 Quadrat Surveys

- Step 1. Record data at each of the 30 quadrats on flora datasheet N7.
- Step 2. Record the presence/absence of disturbance indicators (defined in Section 3.0) occurring within the quadrat itself.
- Step 3. Record percent cover of bare ground and canopy cover.
- Step 4. Identify to species level and record all rooted plants occurring in the quadrat. List species that are present and make the following notations in the "Health/Repro" field. It may be necessary to record multiple notations for some species; be sure to record all that apply to each species.

- “P” if species is present and no reproductive or health status notations are needed.
- “FL” if species is flowering.
- “FR” if species is fruiting.
- “E” if species exhibits early leaf fall.
- “W” if species exhibits wilting.
- “Y” if species exhibits yellowing.
- “H” if species exhibits evidence of herbivory.

Step 5. List each species on a separate line on N7, recording percent cover of each species.

Step 6. If any important rooted plants (i.e., those contributing at least 25 percent of the cover in the quadrat) can not be identified to species, a small amount of appropriate reference material may be taken from the field in a plastic bag, so long as the species is known not to be a species of concern in the area. A slip of paper with the site ID number, quadrat number, datasheet number, the taxonomic information that is known, and a temporary sequential taxon number (which is also recorded on the datasheet) should be kept in the plastic bag. Reference material should be identified immediately upon returning from the field, the correct taxon should be added to the datasheet, and the reference material should then be discarded. The collection of reference material for taxonomic verification should be minimized. Photographs of any questionable taxa should be used preferentially whenever appropriate.

7.4.2.3 Soil and Vegetation Stress

Step 1. At 4 points along the 300 m transect (25 m, 100 m, 175 m, and 250 m) take a GPS reading and record data on N4.

Step 2. Observe, record, and photograph direct signs of vegetation stress at each of the four sample sites. Signs of vegetation stress include:

- Leaves yellowing, wilting, dropping prematurely (for taxonomic groups for which this is uncommon).
- Leaves spotted or “burned” (may indicate herbicide drift from nearby agricultural fields).
- Herbivory in excess.
- Sporulation or other evidence of fungal infection. Do not, however, record galls or brooms because they could represent a normal, healthy condition.

Step 3. Take soil samples at each of these four locations according to the following steps.

- Drive a soil probe into the ground with feet or a mallet, if necessary.
- Measure and record the depth that the soil probe can be driven in. Remove the soil probe.
- Measure and record the soil core layer depths (including the darker upper layer or “O-horizon”) by looking through the holes in the soil probe.
- Poke out the soil core with a wooden rod.
- Compare soil layer colors to a munsell chart and record the hue, value, and chroma of each layer.
- Determine soil layer composition by a combination of visual inspection and by moistening a small palm-full of soil with water and rolling it into a ball about the size of a large marble. Classify and record the soil as: “sandy” if the ball will

not hold together, “clay” if soil can be rolled into a ball and molded into a cube, or “loam” if soil can be rolled into a ball but cannot be molded into a cube.

7.4.2.4 Wandering Survey

Step 1. Beginning at the plot corner closest to parking area, walk the plot in a systematic manner, making six traversals at 50-m intervals as shown in Figure 1. Use a compass, if necessary, to assist in walking relatively straight lines.

Record in N5 and photograph, as appropriate, the following features:

- Unique landscape attributes.
- Additions to the list of species present, being sure to include invasive and rare species. If any plants that are important ecosystem components can not be identified in the field, proceed as described in Section 7.4.3.2, step 6, above. Try to develop as complete a species list for the plot as possible.
- Evidence of human management practices or disturbance.
- Habitats of interest such as those increasing the diversity of the shrubland, prairie, and sparsely vegetated area complexes (e.g., plantings remaining from prior human occupation) or regionally uncommon (e.g., wetlands).

Step 2. On the graph provided in N5, sketch the approximate locations of previously noted locations of features on the plot sketch and label using the “Map ID Numbers” assigned when completing Table 2 of N5. Use aerial photos and/or topographic maps as appropriate to sketch locations as accurately as possible.

7.5 Human Impacts Survey

The human impacts survey is conducted by one field team member. During the first hour at the study site, this person should assist the fauna crew member with bird and amphibian point count surveys. The next two hours are spent systematically wandering the plot, noting evidence of human impacts. The remaining hour is spent observing signs of vegetation stress and additional fauna information that the fauna person may have missed. Detailed instructions for completing the human impacts survey are presented below.

7.5.1 Field Set-Up

The human impacts survey will use the same 300-m x 300-m plot established for fauna surveys. No additional set-up is necessary.

7.5.2 Wandering Survey

Step 1. Beginning at the plot corner closest to parking area, walk the plot in a systematic manner, making six traversals at 50-meter intervals as shown in Figure 1. Use a compass, if necessary, to assist in walking relatively straight lines. Using this system, the total distance traveled is about 1.3 miles, to be completed in about two hours. Complete Steps 2 through 8 below concurrently, not sequentially, while walking over the plot.

Step 2. During the walk, stop every 50 m to look for and photograph the following signs of human impacts, including but not limited to:

- Invasive species (from flora references list prepared in advance).
- Trash
- Paths or car tracks (excluding paved or improved dirt)
- Off-road vehicle tracks or damage
- Evidence of human management practices

Each time one of these signs is observed, tally it on N5 in the Designated Land Cover Type table if observed in an area with the designated land cover type (i.e., shrublands, prairies, or sparsely vegetated areas) or in the Other Land Cover Types table if observed in an area with land cover

other than the designated type. For invasive plants, list each species observed and tally each instance the species is observed at the 50-m stopping points. Once the wandering survey is complete, record the total number of times each sign of human impact was encountered.

- Step 3. Record the presence of any fauna encountered during the wandering survey. If any dead animals or animal remains are present, inform the fauna crew member.
- Step 4. Describe visual variation in vegetation that occurs in the plot.
- Step 5. If surface water is encountered during the wandering survey, note whether the surface is oily or soapy. If resources permit, take a water sample in a 250-ml screw-top jar for post-processing analysis. Label the jar with the sample ID number, date, time, and the collector's initials. Sample ID numbers should be assigned as eight-character combinations of numbers and letters: the first four characters are the site ID number, the fifth and sixth characters are "WA" for water, and the last two characters should be digits assigned sequentially (from 01 to 99). Record the sample ID number on Table 4 of N5. Store the water sample in the dark and on ice until returning to the laboratory.
- Step 6. Flag any unusual plants and bring to the attention of the flora crew members.
- Step 7. Briefly describe any streams and riparian zones that occur in the plot.
- Step 8. Carry an aerial photo and/or topographic map of the plot during the survey. Use the map/photo in combination with ground-truthing to sketch a map that delineates areas of human disturbance, the designated cover type, other cover types, ponds, streams, roads, and any other notable features. Note locations of features on the map using "Map ID Numbers" assigned when completing Tables 2 and 3 of N5.

7.6 Exiting the Field Study Site

- Step 1. Remove all flagging, stakes, and other material transported to the study site by the field team.
- Step 2. Check all field equipment against the equipment list to ensure that no equipment is inadvertently left at the study site.

7.7 Post-Visit Activities

The following steps should be completed back in the office after the field event.

- Step 1. Using the reference lists developed during pre-visit preparations (Section 7.1), complete any of the flora and fauna species categorization fields (e.g., native or non-native) that were left blank by the field crew. Using sources recommended in Section 7.1, determine and record appropriate categories for species that were observed in the plot, but not included in the reference lists.
- Step 2. Identify any "Bird Conservation Regions" designated avian species of concern.
- Step 3. Where field crew members have listed common names of species, add corresponding scientific names to the datasheets.
- Step 4. Immediately upon returning from the field, identify any reference material brought from the field in plastic bags to the lowest reasonable taxon, record the taxon on the appropriate datasheet, and discard the reference material.
- Step 5. If water samples were collected, follow proper protocol for laboratory processing according to analytical procedures. Depending on resources available, suggested analyses to detect human disturbance include: nutrients (e.g., nitrogen, phosphorus), anions (e.g., chloride, bromide, sulfate), metals (e.g., copper, iron, zinc), and suspended sediments.

8.0 **Data and Records Management**

Data collected in this project will be made publicly available through an EPA centralized database. Completed datasheets will be kept within ORD according to standard data and records management protocols.

9.0 Quality Assurance Procedures

A Quality Assurance Project Plan (QAPP) is associated with this SOP. It is hereby incorporated into this document by reference. The QAPP should be referred to for details regarding quality assurance protocols associated with this field program.

While analytical assessments conducted in the laboratory can be verified in a number of ways, the accuracy of flora, fauna, and human impact assessments in the field cannot be objectively verified with the same degree of precision. Nonetheless, the use of a two-person team for the flora survey and portions of the fauna survey will allow each team member to verify the observations and documentation of the other. Photographs taken throughout the plot will provide additional verification of the data collected.

10.0 References

Ralph, C.J., G.R. Geupel, P. Pyle, T.E. Martin, and D.F. DeSante. 1993. *Handbook of Field Methods for Monitoring Landbirds*. Gen. Tech. Rep. PSW-GTR-144. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, Albany, CA. pp. 30 - 35.
<http://www.fs.fed.us/psw/publications/gtrs.shtml>

U.S. Department of Agriculture Forest Service (USDA FS). 1989. Interim Resource Inventory Glossary. June 14, 1989. File 1900. Washington, D.C.: U.S. Department of Agriculture, Forest Service. 96 pp.

Table 1. Descriptions of Datasheetss

Datasheets #	Datasheets Title	Description of Datasheets Items	Related SOP Section Numbers
N1	Bird and Amphibian Point Counts	<p>Table 1: GPS readings, weather conditions and times of bird point counts</p> <p>Table 2: Amphibian species, categorization (e.g., threatened, invasive), numbers observed at observation points, behaviors observed</p> <p>Table 3: Bird species, categorization, numbers observed at observation points, behaviors observed</p>	7.3.2.1
N2	Fauna Transect Data	<p>Table 1: Start and end times for transect surveys, weather conditions</p> <p>Table 2: Mammal species, categorization, numbers observed in transects, behaviors observed, identification method (e.g., by tracks or scat)</p> <p>Table 3: For each transect, numbers and characteristics of other mammal signs observed</p> <p>Table 4: Herpetofauna species, categorization, numbers observed in transects, behaviors observed, identification method (e.g., by tracks or scat)</p> <p>Table 5: Bird species, categorization, numbers observed in transects, behaviors observed (for species not observed during point counts)</p> <p>Table 6: Butterfly species, categorization, numbers observed in transects</p> <p>Table 7: Other invertebrate taxa, numbers observed in transects</p>	7.3.2.2
N3	Photo Log	Descriptions of photos taken by all crews	7.2, 7.3.2.2, 7.4.2, 7.4.2.3, 7.5.2
N4	Soil and Vegetation Stress Data	Soil horizon depth, color, and composition; depth reached by Soil probe; and signs of vegetation stress at four sampling points	7.4.2.3
N5	Invasive Species/Human Impacts and Activities	<p>Table 1: Invasive plant species and numbers in designated land cover type and other land cover types</p> <p>Table 2: Disturbance and human management practices in the designated land cover type</p> <p>Table 3: Disturbance and human management practices in other land cover types</p> <p>Table 4: Descriptions of other special features (e.g., visual variation in vegetation, surface water, fauna)</p> <p>Figure 1: Sketch delineating areas of human disturbance, land cover types, surface water bodies, and other features in plot</p>	7.4.2.4, 7.5.2
N6	Point Survey Data	Disturbance indicators, presence or absence of bare ground, plant health indicators, distance to and DBH of nearest tree, presence or absence of canopy cover by species present at each of 30 sampling points	7.4.2.1
N7	Quadrat Survey Data	Disturbance indicators, presence or absence of bare ground, plant health indicators, distance to and DBH of nearest tree, presence or absence of canopy cover by species present at each of 30 quadrats	7.4.2.2
N8	Special Features	Data recorded during traversal of areas outside of the 300-m transect:	7.4.2.4

Datasheets #	Datasheets Title	Description of Datasheets Items	Related SOP Section Numbers
		<p>Table 1: Plant species with categorization, relative abundance in plot, and reproductive/health indicators</p> <p>Table 2: Descriptions of special features</p> <p>Figure 1: Sketch of landscape attributes, disturbance or human management practices, and habitats in 300-m x 300-m plot</p>	

Table 2. Bird Species of Special Interest

Habitat	Generalists	Specialists	Invasives
Shrublands	blue jay American crow tufted titmouse gray catbird yellow warbler field sparrow song sparrow white-throated sparrow indigo bunting northern cardinal Brewer's blackbird	sharp-tailed grouse eastern kingbird loggerhead shrike Bell's vireo brown thrasher blue-winged warbler golden-winged warbler chestnut-sided warbler mourning warbler yellow-breasted chat rufous-sided towhee clay-colored sparrow	European starling brown-headed cowbird house sparrow
Prairies	American kestrel killdeer horned lark American crow common yellowthroat field sparrow song sparrow red-winged blackbird Brewer's blackbird American goldfinch	sharp-tailed grouse loggerhead shrike sedge wren vesper sparrow savannah sparrow Ammodramus sparrows (Henslow's, grasshopper, dickcissel bobolink eastern meadowlark western meadowlark	European starling house sparrow
Sparsely Vegetated Areas	killdeer horned lark field sparrow song sparrow red-winged blackbird Brewer's blackbird	piping plover blue-winged warbler golden-winged warbler prairie warbler	rock dove European starling house sparrow

Figure 1. Fauna and Human Impacts Observation Scheme. For the purposes of this illustration, the study plot corner nearest the access point is assumed to be the northwest (NW) corner; see sections 7.3, 7.4.2.4, and 7.5 for further explanation.

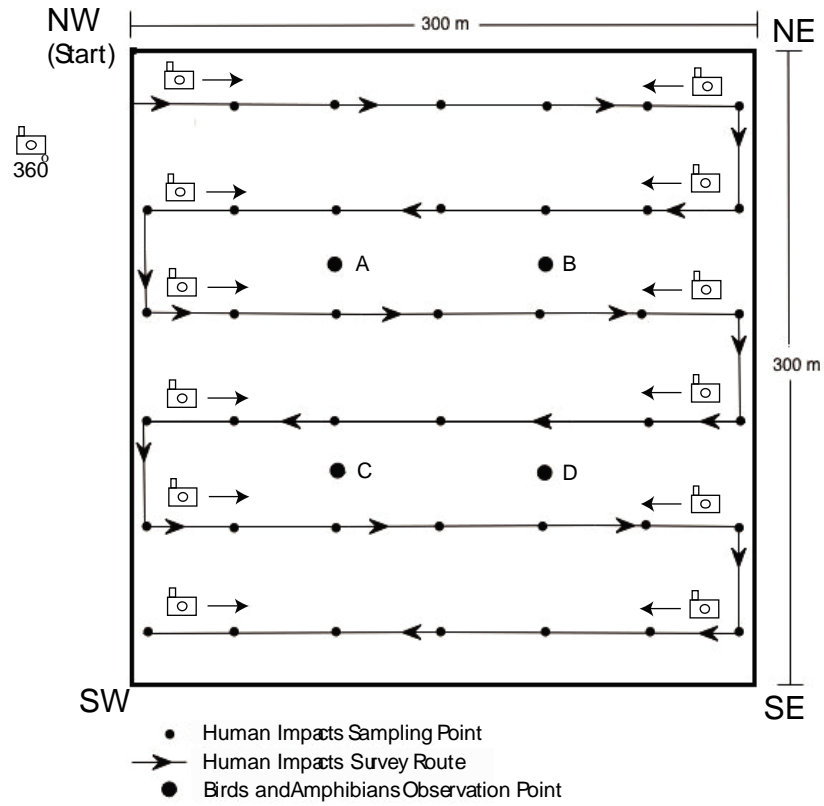
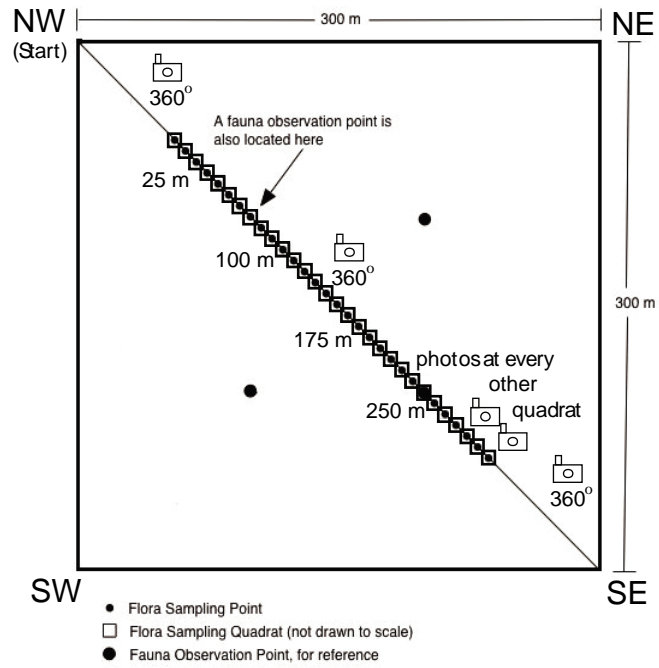


Figure 2. Flora Survey Scheme; see section 7.4 for further explanation. Locations (25 m, 100 m, 175 m, and 250 m) for characterizing soil and vegetation stress (section 7.4.2.3) are indicated.



N 1: BIRD AND AMPHIBIAN POINT COUNTS

Page ____ of ____

Location	
Site ID#	UTM-E UTM-N
Investigators	
Form Completed By	Date
Comments:	

Table 1: Miscellaneous Survey Information

GPS Readings and Point Count Times				
Corner Closest to Parking Area	Point A	Point B	Point C	Point D
N/A	Start time _____ AM End time _____ AM	Start time _____ AM End time _____ AM	Start time _____ AM End time _____ AM	Start time _____ AM End time _____ AM
UTM-E: UTM-N:	UTM-E: UTM-N:	UTM-E: UTM-N:	UTM-E: UTM-N:	UTM-E: UTM-N:
Weather Conditions				
At Start of Point Counts		At End of Point Counts		
<input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> ____% cloud cover <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> clear/sunny <input type="checkbox"/> showers (intermittent) Air Temperature _____°C		<input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> ____% cloud cover <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> clear/sunny <input type="checkbox"/> showers (intermittent) Air Temperature _____°C		

Table 2: Amphibian Point Count Data

Amphibian Species*	Species Categorization*					Numbers at Observation Points			
	Native	Invasive	Common or Rare	G/S	T&E Status	A	B	C	D

*Notes: List each species on a separate line. Use as many sheets as necessary.
 For Native field, record Y if species is native or N if species is non-native. For Invasive field, record Y if species is invasive or N if species is non-invasive. For Common or Rare field, record C if species is regionally common or R if species is regionally rare.
 For G/S field, record G if the species is a generalist or S if the species is a specialist.
 T&E Status Codes: FT= Federal Threatened; FE= Federal Endangered; ST=State Threatened; SE=State Endangered; list others here as needed.

N 1: BIRD AND AMPHIBIAN POINT COUNTS

Page ____ of ____

Location			
Site ID#		UTM-E	UTM-N
Investigators			
Form Completed By		Date	
Comments:			

Table 3: Bird Point Count Data

Bird Species*	Species Categorization*					Behavior*	Numbers at Observation Points			
	Native	Invasive	Common or Rare	G/S	T&E Status		A	B	C	D

*Notes: List each species on a separate line. Use as many sheets as necessary.
 For Native field, record Y if species is native or N if species is non-native. For Invasive field, record Y if species is invasive or N if species is non-invasive. For Common or Rare field, record C if species is regionally common or R if species is regionally rare.
 For G/S field, record G if the species is a generalist or S if the species is a specialist.
 T&E Status Codes: FT= Federal Threatened; FE= Federal Endangered; ST=State Threatened; SE=State Endangered; list others here as needed.
 For Behavior, enter singing (S), flying (F), perched (P), or foraging (O).

N2: FAUNA TRANSECT DATA

Page ____ of ____

Location			
Site ID#	UTM-E	UTM-N	
Investigators			
Form Completed By		Date	
Comments:			

Table 1. Transect Information

	Transect AB	Transect BC	Transect CD	Transect DA
Start Time				
End Time				
Weather Conditions	<input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input type="checkbox"/> ____% cloud cover <input type="checkbox"/> sunny Air Temperature ____°C	<input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input type="checkbox"/> ____% cloud cover <input type="checkbox"/> sunny Air Temperature ____°C	<input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input type="checkbox"/> ____% cloud cover <input type="checkbox"/> sunny Air Temperature ____°C	<input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) <input type="checkbox"/> ____% cloud cover <input type="checkbox"/> sunny Air Temperature ____°C

Table 2. Mammals Identified by Individuals, Scats, Tracks, and Mounds (continued on next page)

Mammal Species	Species Categorization*					Numbers Observed In Transect				
	Native	Inva- sive	C/R	G/S	T&E Status		AB	BC	CD	DA
						Individuals				
						Scats				
						Tracks				
						Mounds				
						Individuals				
						Scats				
						Tracks				
						Mounds				
						Individuals				
						Scats				
						Tracks				
						Mounds				
						Individuals				
						Scats				
						Tracks				
						Mounds				

N2: FAUNA TRANSECT DATA

Page ____ of ____

Location	
Site ID#	UTM-E UTM-N
Investigators	
Form Completed By	Date
Comments:	

Mammal Species	Species Categorization*					Numbers Observed In Transect				
	Native	Inva- sive	C/R	G/S	T&E Status		AB	BC	CD	DA
						Individuals				
						Scats				
						Tracks				
						Mounds				
						Individuals				
						Scats				
						Tracks				
						Mounds				
						Individuals				
						Scats				
						Tracks				
						Mounds				
						Individuals				
						Scats				
						Tracks				

Comments (include physical descriptions of unidentified fauna, any other relevant observations)

*Notes: List each species on a separate line. Use as many sheets as necessary.
 For Native field, record Y if species is native or N if species is non-native.
 For Invasive field, record Y if species is invasive or N if species is non-invasive.
 For Common or Rare field, record C if species is regionally common or R if species is regionally rare.
 For G/S field, record G if the species is a generalist or S if the species is a specialist.
 T&E Status Codes: FT= Federal Threatened; FE= Federal Endangered; ST=State Threatened; SE=State Endangered; list others here as needed.

N2: FAUNA TRANSECT DATA

Page ____ of ____

Location	
Site ID#	UTM-E UTM-N
Investigators	
Form Completed By	Date
Comments:	

Table 3. Other Mammal Signs

Faunal Signs	Transect			
	AB	BC	CD	DA
Browse Line	<input type="checkbox"/> Present <input type="checkbox"/> Absent Height _____ cm Associated Fauna: _____ _____	<input type="checkbox"/> Present <input type="checkbox"/> Absent Height _____ cm Associated Fauna: _____ _____	<input type="checkbox"/> Present <input type="checkbox"/> Absent Height _____ cm Associated Fauna: _____ _____	<input type="checkbox"/> Present <input type="checkbox"/> Absent Height _____ cm Associated Fauna: _____ _____
Burrows	Diameter _____ cm Diameter _____ cm Diameter _____ cm Diameter _____ cm No. of burrows with extensive webbing _____ Associated Fauna: _____ _____	Diameter _____ cm Diameter _____ cm Diameter _____ cm Diameter _____ cm No. of burrows with extensive webbing _____ Associated Fauna: _____ _____	Diameter _____ cm Diameter _____ cm Diameter _____ cm Diameter _____ cm No. of burrows with extensive webbing _____ Associated Fauna: _____ _____	Diameter _____ cm Diameter _____ cm Diameter _____ cm Diameter _____ cm No. of burrows with extensive webbing _____ Associated Fauna: _____ _____
Scent Marks	<input type="checkbox"/> Present <input type="checkbox"/> Absent Associated Fauna: _____ _____	<input type="checkbox"/> Present <input type="checkbox"/> Absent Associated Fauna: _____ _____	<input type="checkbox"/> Present <input type="checkbox"/> Absent Associated Fauna: _____ _____	<input type="checkbox"/> Present <input type="checkbox"/> Absent Associated Fauna: _____ _____
Other: (describe/ enumerate)	Associated Fauna: _____ _____	Associated Fauna: _____ _____	Associated Fauna: _____ _____	Associated Fauna: _____ _____
Other: (describe/ enumerate)	Associated Fauna: _____ _____	Associated Fauna: _____ _____	Associated Fauna: _____ _____	Associated Fauna: _____ _____

N2: FAUNA TRANSECT DATA

Page ____ of ____

Location	
Site ID#	UTM-E UTM-N
Investigators	
Form Completed By	Date
Comments:	

Table 4. Herpetofauna Identified by Individuals, Scats, Tracks, and Skins

Herpetofauna Species *	Species Categorization*					Numbers Observed In Transect				
	Native	Inva- sive	C/R	G/S	T&E Status	AB	BC	CD	DA	
						Individuals				
						Scats				
						Tracks				
						Skins				
						Calls				
						Individuals				
						Scats				
						Tracks				
						Skins				
						Calls				
						Individuals				
						Scats				
						Tracks				
						Skins				
						Calls				
						Individuals				
						Scats				
						Tracks				
						Skins				
						Calls				
						Individuals				
						Scats				
						Tracks				
						Skins				
						Calls				

*Notes: List each species on a separate line. Use as many sheets as necessary.
 For Native field, record Y if species is native or N if species is non-native.
 For Invasive field, record Y if species is invasive or N if species is non-invasive.
 For C/R field, record C if species is *regionally* common or R if species is regionally rare.
 For G/S field, record G if the species is a generalist or S if the species is a specialist.
 T&E Status Codes: FT= Federal Threatened; FE= Federal Endangered; ST=State Threatened; SE=State Endangered; list others here as needed.

N2: FAUNA TRANSECT DATA

Page ____ of ____

Location			
Site ID#		UTM-E	UTM-N
Investigators			
Form Completed By		Date	
Comments:			

Table 5. Bird Species Not Observed During Point Counts

Bird Species*	Species Categorization*					Numbers Observed In Transect			
	Native	Inva- sive	C/R	G/S	T&E Status	AB	BC	CD	DA

*Notes: List each species on a separate line. Use as many sheets as necessary.
 For Native field, record Y if species is native or N if species is non-native. For Invasive field, record Y if species is invasive or N if species is non-invasive. For Common or Rare field, record C if species is regionally common or R if species is regionally rare.
 For G/S field, record G if the species is a generalist or S if the species is a specialist.
 T&E Status Codes: FT= Federal Threatened; FE= Federal Endangered; ST=State Threatened; SE=State Endangered; list others here as needed.

N2: FAUNA TRANSECT DATA

Page ____ of ____

Location	
Site ID#	UTM-E UTM-N
Investigators	
Form Completed By	Date
Comments:	

Table 6. Butterflies

Butterfly Species*	Habitat(s) where species typically occurs	Species Categorization*			Numbers in Transect			
		Inva- sive	G/S	T&E Status	AB	BC	CD	DA
Monarch	P, S							
Little sulphur	P, S							
Leonard's skipper	P, S							
Mottled duskywing	P, S, D							
Wild indigo duskywing	P							
Persius duskywing	S, D							
Comments:								

Notes: Species of special interest are listed; list any other species in spaces provided. Use as many sheets as necessary.
P=Prairies, S=Shrublands, D=Dunes
For Invasive field, record Y if species is invasive or N if species is non-invasive.
For G/S field, record G if the species is a generalist or S if the species is a specialist.
T&E Status Codes: FT= Federal Threatened; FE= Federal Endangered; ST=State Threatened; SE=State Endangered; list others here as needed.

N2: FAUNA TRANSECT DATA

Page ____ of ____

Location			
Site ID#	UTM-E	UTM-N	
Investigators			
Form Completed By		Date	
Comments:			

Table 7. Other Invertebrates

Other Invertebrate Taxa	Numbers in Transect			
	AB	BC	CD	DA
Beetles (no. of spp.)				
Beetles (no. of individuals)				
Tent caterpillars				
Snails and slugs				
Spiders				
Crickets and grasshoppers				
Other:				
Comments:				

Notes: For beetles, record the number of species (or morphospecies) and total number of individuals observed in each transect. For other taxa, record total numbers of individuals only. If taxa can be identified at a lower level, then list species/genera names under "Other."

N3: PHOTO LOG

Page ____ of ____

Location		
Site ID#	UTM-E	UTM-N
Investigators		
Form Completed By	Date	
Camera Type/Number		
Comments		

Time	Subject	Data Sheet #	Location*	Direction	File Name [†]

*For the Location field, record the observation point, transect, etc., where the photo was taken.

†File name to be entered after returning from field and downloading pictures.

N4: SOIL AND VEGETATION STRESS DATA

Page 1 of 1

Location			
Site ID#	UTM-E	UTM-N	
Investigators			
Form Completed By		Date	
Comments			

Soil Horizon		Soil Sampling Point			
		1	2	3	4
GPS Coordinates :					
	UTM-E				
	UTM-N				
O	Depth (cm)				
	Depth (cm)				
	Color (from Munsell chart)	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____
	Composition	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay
A	Depth (cm)				
	Color (from Munsell chart)	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____
	Composition	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay
E	Depth (cm)				
	Color (from Munsell chart)	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____
	Composition	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay
B	Depth (cm)				
	Color (from Munsell chart)	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____
	Composition	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay
C	Depth (cm)				
	Color (from Munsell chart)	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____	Hue_____ Value_____ Chroma_____
	Composition	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay	<input type="checkbox"/> Sand <input type="checkbox"/> Loam <input type="checkbox"/> Clay
Depth (m) reached by soil probe*					
Signs of Vegetation Stress*					

*Notes: Record depth as described in Section 7.4.3.4, Step 3.
Record Signs of Vegetation Stress as follows: E for early leaf fall, W for wilting, Y for yellowing, S for leaves that are spotted or burned, H for excess herbivory, and I for signs of fungal infection. List all that are observed at each sampling location.

N5: INVASIVE SPECIES/HUMAN IMPACTS AND ACTIVITIES

Location		
Site ID#	UTM-E	UTM-N
Investigators		
Form Completed By	Date	
Comments		

Table 1. Invasive Plants

Plant Species*	Tally	Total Number of Occurrences
In Designated Land Cover Type:		
In Other Land Cover Types:		

*Note: List each species on a separate line. Use as many sheets as necessary.

N5: INVASIVE SPECIES/HUMAN IMPACTS AND ACTIVITIES

Page ___ of ___

Location		
Site ID#	UTM-E	UTM-N
Investigators		
Form Completed By	Date	
Comments		

Table 2. Disturbance and Human Management Practices in the Designated Land Cover Type

Map ID Number(s)*	Disturbance Indicator*	Description*	Total Number of Times Encountered	Photo Taken? (Y/N)*
	Paths			
	Car/Vehicle Tracks			
	Off-road vehicle tracks not on well-worn paths			
	Loud noise			
	Bright, artificial lights			
	Evidence of human management practices			
	Trash (appliances/tires)			
	Litter (paper/plastic scraps)			
	Hydrologic modifications (e.g., ditch, weir)			
	Evidence of mowing, tree felling			
	Oily or Soapy Surface Water			
	Other*			

*Notes: Use as many sheets as necessary.
 Map ID numbers should be assigned D1, D2, etc. Use these numbers to identify disturbances drawn on the plot sketch.
 Other disturbance indicators are included in Section 3.0.
 Descriptions of disturbance indicators should include more detailed information about the disturbance, how frequently if was encountered in the plot, and if appropriate, the size of the affected area.
 List any photos taken in N3 (photo log); include the Map ID number in the Subject field of the photo log.

N5: INVASIVE SPECIES/HUMAN IMPACTS AND ACTIVITIES

Page ___ of ___

Location		
Site ID#	UTM-E	UTM-N
Investigators		
Form Completed By	Date	
Comments		

Table 3. Disturbance and Human Management Practices in Other Land Cover Types

Map ID Number(s)*	Disturbance Indicator*	Description*	Total Number of Times Encountered	Photo Taken? (Y/N)*
	Paths			
	Car/Vehicle Tracks			
	Off-road vehicle tracks not on well-worn paths			
	Loud noise			
	Bright, artificial lights			
	Evidence of human management practices			
	Trash (appliances/tires)			
	Litter (paper/plastic scraps)			
	Hydrologic modifications (e.g., ditch, wier)			
	Evidence of mowing, tree felling			
	Oily or Soapy Surface Water			
	Other*			

N5: INVASIVE SPECIES/HUMAN IMPACTS AND ACTIVITIES

Page ___ of ___

Location		
Site ID#	UTM-E	UTM-N
Investigators		
Form Completed By	Date	
Comments		

Table 4. Description of other special features in plot.

Feature	Description
<p>Visual variation in vegetation occurring in the plot</p>	
<p>Streams and riparian zones</p> <p>Water sample(s) collected? <input type="checkbox"/> Y <input type="checkbox"/> N</p> <p>How many? _____</p> <p>(list sample ID numbers in space at right)</p>	
<p>Other surface water</p> <p>Water sample(s) collected? <input type="checkbox"/> Y <input type="checkbox"/> N</p> <p>How many? _____</p> <p>(list sample ID numbers in space at right)</p>	
<p>Fauna/Fauna remains (list species if known)</p>	

N5: INVASIVE SPECIES/HUMAN IMPACTS AND ACTIVITIES

Page ___ of ___

Location		
Site ID#	UTM-E	UTM-N
Investigators		
Form Completed By	Date	
Comments		

Figure 1. Sketch delineating areas of human disturbance, land cover types, surface water bodies, and other features in plot.

N6: POINT SURVEY DATA

Location	Site ID#	UTM-E:	UTM-N:
Investigators	Date	Form Completed By	
Comments			

Table 1. Survey Data for Points 1 through 10

	Sampling Point									
	1	2	3	4	5	6	7	8	9	10
Disturbance Indicators (0 - 20, see codes*)										
Bare Ground (P or A)*										
Plant Health Indicators*										
Distance to Nearest Tree >10cm DBH (m)*										
DBH of Nearest Tree >10cm DBH (cm)*										
Canopy Cover (P or A)*										
Canopy Cover Species* (list below--add N=ative, I=invasive, T/E/S=threatened/endorsangered/threatened in () after all species names.)										

*Notes: Disturbance Indicators: 1-Roads 4-Asphalt 7-Power lines 10-Evidence of digging 13-Tracks (human, vehicle) 16-Loud noise
 (list all that apply, 2-Trails 5-Ruts in soil 8-Berms 11-Wind throw mounds 14-Trash (appliances, tires) 17-Bright, artificial lights
 record 0 for none) 3-Gravel 6-Erosion 9-Manure 12-Fire scars/charcoal 15-Litter (paper, plastic) 18-Hydrologic modifications (e.g., ditches, wiers)
 19-Evidence of mowing, tree felling, etc. 20-Other: _____

For Bare Ground and Canopy Cover fields, record P for present or A for absent.
 If there are no trees >10 cm DBH within 10 m of the sampling point, then record N/A in the Distance to nearest tree and DBH of nearest tree fields.
 Plant Health Indicators: E for early leaf fall, W for wilting, Y for yellowing, S for leaves that are spotted or burned, H for excess herbivory, and I for signs of fungal infection (list all that apply).
 For Distance to Nearest Tree and DBH of Nearest Tree: if no trees >10 cm DBH occur within 5 m of the sampling point, record "A" for absent.
 List canopy cover species observed in blank rows, and at each point where the species occurs, record FL if flowering, FR if fruiting, or P if present, but not flowering or fruiting.

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N6: POINT SURVEY DATA

Page 2 of 3

Location	Site ID#	UTM-E:	UTM-N:
Investigators	Date	Form Completed By	
Comments			

Table 2. Survey Data for Points 11 through 20

	Sampling Point									
	11	12	13	14	15	16	17	18	19	20
Disturbance Indicators (0 - 20, see codes*)										
Bare Ground (P or A)*										
Plant Health Indicators*										
Distance to Nearest Tree >10cm DBH (m)*										
DBH of Nearest Tree >10cm DBH (cm)*										
Canopy Cover (P or A)*										
Canopy Cover Species* (list below--add N=native, I=invasive, T/E/S=threatened/endangered/threatened in () after all species names.)										

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*Notes: Disturbance Indicators: 1-Roads 4-Asphalt 7-Power lines 10-Evidence of digging 13-Tracks (human, vehicle) 16-Loud noise
 (list all that apply, 2-Trails 5-Ruts in soil 8-Berms 11-Wind throw mounds 14-Trash (appliances, tires) 17-Bright, artificial lights
 record 0 for none) 3-Gravel 6-Erosion 9-Manure 12-Fire scars/charcoal 15-Litter (paper, plastic) 18-Hydrologic modifications (e.g., ditches, wiers)
 19-Evidence of mowing, tree felling, etc. 20-Other: _____

For Bare Ground and Canopy Cover fields, record P for present or A for absent.
 If there are no trees >10 cm DBH within 10 m of the sampling point, then record N/A in the Distance to nearest tree and DBH of nearest tree fields.
 Plant Health Indicators: E for early leaf fall, W for wilting, Y for yellowing, S for leaves that are spotted or burned, H for excess herbivory, and I for signs of fungal infection (list all that apply).
 For Distance to Nearest Tree and DBH of Nearest Tree: if no trees >10 cm DBH occur within 5 m of the sampling point, record "A" for absent.
 List canopy cover species observed in blank rows, and at each point where the species occurs, record FL if flowering, FR if fruiting, or P if present, but not flowering or fruiting.

N6: POINT SURVEY DATA

Location	Site ID#	UTM-E:	UTM-N:
Investigators	Date	Form Completed By	
Comments			

Table 3. Survey Data for Points 21 through 30

	Sampling Point									
	21	22	23	24	25	26	27	28	29	30
Disturbance Indicators (0 - 20, see codes*)										
Bare Ground (P or A)*										
Plant Health Indicators*										
Distance to Nearest Tree >10cm DBH (m)*										
DBH of Nearest Tree >10cm DBH (cm)*										
Canopy Cover (P or A)*										
Canopy Cover Species* (list below--add N=ative, I=invasive, T/E/S=threatened/angered/threatened in () after all species names.)										

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*Notes: Disturbance Indicators: 1-Roads 4-Asphalt 7-Power lines 10-Evidence of digging 13-Tracks (human, vehicle) 16-Loud noise
 (list all that apply, 2-Trails 5-Ruts in soil 8-Berms 11-Wind throw mounds 14-Trash (appliances, tires) 17-Bright, artificial lights
 record 0 for none) 3-Gravel 6-Erosion 9-Manure 12-Fire scars/charcoal 15-Litter (paper, plastic) 18-Hydrologic modifications (e.g., ditches, wiers)
 19-Evidence of mowing, tree felling, etc. 20-Other: _____

For Bare Ground and Canopy Cover fields, record P for present or A for absent.
 If there are no trees >10 cm DBH within 10 m of the sampling point, then record N/A in the Distance to nearest tree and DBH of nearest tree fields.
 Plant Health Indicators: E for early leaf fall, W for wilting, Y for yellowing, S for leaves that are spotted or burned, H for excess herbivory, and I for signs of fungal infection (list all that apply).
 For Distance to Nearest Tree and DBH of Nearest Tree: if no trees >10 cm DBH occur within 5 m of the sampling point, record "A" for absent.
 List canopy cover species observed in blank rows, and at each point where the species occurs, record FL if flowering, FR if fruiting, or P if present, but not flowering or fruiting.

N7: QUADRAT SURVEY DATA

Page 1 of 3

Location	Site ID#	UTM-E:	UTM-N:
Investigators	Date	Form Completed By	
Comments			

Table 1. Survey Data for Quadrats 1 through 10

	Sampling Point									
	1	2	3	4	5	6	7	8	9	10
Disturbance Indicators (0 - 20, see codes*)										
Bare Ground (% cover)										
Plant Health Indicators*										
Distance to Nearest Tree >10cm DBH (m)*										
DBH of Nearest Tree >10cm DBH (cm)*										
Canopy Cover (% cover)										
Canopy Cover Species* (list below—add N=ative, I=invasive, T/E/S=threatened/ndangered/threatened in () after all species names.)										

C-44

*Notes: Disturbance Indicators: 1-Roads 4-Asphalt 7-Power lines 10-Evidence of digging 13-Tracks (human, vehicle) 16-Loud noise
 (list all that apply, 2-Trails 5-Ruts in soil 8-Berms 11-Wind throw mounds 14-Trash (appliances, tires) 17-Bright, artificial lights
 record 0 for none) 3-Gravel 6-Erosion 9-Manure 12-Fire scars/charcoal 15-Litter (paper, plastic) 18-Hydrologic modifications (e.g., ditches, wiers)
 19-Evidence of mowing, tree felling, etc. 20-Other: _____

If there are no trees >10 cm DBH within 10 m of the sampling point, then record N/A in the Distance to nearest tree and DBH of nearest tree fields.

Plant Health Indicators: E for early leaf fall, W for wilting, Y for yellowing, S for leaves that are spotted or burned, H for excess herbivory, and I for signs of fungal infection (list all that apply).
 For Distance to Nearest Tree and DBH of Nearest Tree: if no trees >10 cm DBH occur within 5 m of the sampling point, record "A" for absent.
 List canopy cover species observed in blank rows, and at each point where the species occurs, record FL if flowering, FR if fruiting, or P if present, but not flowering or fruiting.

N7: QUADRAT SURVEY DATA

Page 2 of 3

Location	Site ID#	UTM-E:	UTM-N:
Investigators	Date	Form Completed By	
Comments			

Table 2. Survey Data for Quadrats 11 through 20

	Sampling Point									
	11	12	13	14	15	16	17	18	19	20
Disturbance Indicators (0 - 20, see codes*)										
Bare Ground (% cover)										
Plant Health Indicators*										
Distance to Nearest Tree >10cm DBH (m)*										
DBH of Nearest Tree >10cm DBH (cm)*										
Canopy Cover (% cover)										
Canopy Cover Species* (list below—add N=ative, I=invasive, T/E/S=threatened/angered/threatened in () after all species names.)										

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*Notes: Disturbance Indicators: 1-Roads 4-Asphalt 7-Power lines 10-Evidence of digging 13-Tracks (human, vehicle) 16-Loud noise
 (list all that apply, 2-Trails 5-Ruts in soil 8-Berms 11-Wind throw mounds 14-Trash (appliances, tires) 17-Bright, artificial lights
 record 0 for none) 3-Gravel 6-Erosion 9-Manure 12-Fire scars/charcoal 15-Litter (paper, plastic) 18-Hydrologic modifications (e.g., ditches, wiers)
 19-Evidence of mowing, tree felling, etc. 20-Other: _____

If there are no trees >10 cm DBH within 10 m of the sampling point, then record N/A in the Distance to nearest tree and DBH of nearest tree fields.
 Plant Health Indicators: E for early leaf fall, W for wilting, Y for yellowing, S for leaves that are spotted or burned, H for excess herbivory, and I for signs of fungal infection (list all that apply).
 For Distance to Nearest Tree and DBH of Nearest Tree: if no trees >10 cm DBH occur within 5 m of the sampling point, record "A" for absent.
 List canopy cover species observed in blank rows, and at each point where the species occurs, record FL if flowering, FR if fruiting, or P if present, but not flowering or fruiting.

N7: QUADRAT SURVEY DATA

Location	Site ID#	UTM-E:	UTM-N:
Investigators	Date	Form Completed By	
Comments			

Table 2. Survey Data for Quadrats 21 through 30

	Sampling Point									
	21	22	23	24	25	26	27	28	29	30
Disturbance Indicators (0 - 20, see codes*)										
Bare Ground (% cover)										
Plant Health Indicators*										
Distance to Nearest Tree >10cm DBH (m)*										
DBH of Nearest Tree >10cm DBH (cm)*										
Canopy Cover (% cover)										
Canopy Cover Species* (list below--add N=ative, I=invasive, T/E/S=threatened/angered/threatened in () after all species names.)										

C-46

*Notes: Disturbance Indicators: 1-Roads 4-Asphalt 7-Power lines 10-Evidence of digging 13-Tracks (human, vehicle) 16-Loud noise
 (list all that apply, 2-Trails 5-Ruts in soil 8-Berms 11-Wind throw mounds 14-Trash (appliances, tires) 17-Bright, artificial lights
 record 0 for none) 3-Gravel 6-Erosion 9-Manure 12-Fire scars/charcoal 15-Litter (paper, plastic) 18-Hydrologic modifications (e.g., ditches, wiers)
 19-Evidence of mowing, tree felling, etc. 20-Other: _____

If there are no trees >10 cm DBH within 10 m of the sampling point, then record N/A in the Distance to nearest tree and DBH of nearest tree fields.

Plant Health Indicators: E for early leaf fall, W for wilting, Y for yellowing, S for leaves that are spotted or burned, H for excess herbivory, and I for signs of fungal infection (list all that apply).

For Distance to Nearest Tree and DBH of Nearest Tree: if no trees >10 cm DBH occur within 5 m of the sampling point, record "A" for absent.

List canopy cover species observed in blank rows, and at each point where the species occurs, record FL if flowering, FR if fruiting, or P if present, but not flowering or fruiting.

N8: SPECIAL FEATURES

Page ___ of ___

Location		
Site ID#	UTM-E	UTM-N
Investigators		
Form Completed By	Date	
Comments		

Table 1. Additions to Species List

Plant Species (List only those not already recorded in N6 & N7)	Species Categorization*			Relative Abundance in Plot*	Health Indicators*	Reproductive Status*
	Native	Invasive	T&E Status			

*Notes: List each species on a separate line. Use as many sheets as necessary.
 For Native field, record Y if species is native or N if species is non-native. For Invasive field, record Y if species is invasive or N if species is non-invasive.
 T&E Status Codes: FT= Federal Threatened; FE= Federal Endangered; ST=State Threatened; SE=State Endangered; list others here as needed.
 For Relative Abundance in Plot, record C for common, F for frequent, U for uncommon, or R for rare.
 For Health Indicators, record E for early leaf fall, W for wilting, Y for yellowing, and H for herbivory. List all that apply.
 For Reproductive Status, record FL for flowering or FR for fruiting. List all that apply.

N8: SPECIAL FEATURES

Page ___ of ___

Location		
Site ID#	UTM-E	UTM-N
Investigators		
Form Completed By	Date	
Comments		

Table 2. Special Features

Map ID Number*	Description of Feature*	Magnitude*	Photo Taken? (Y/N)*

*Notes: Use as many sheets as necessary.
 Map ID numbers should be assigned as follows: number landscape attributes as L1, L2, etc.; number disturbance and human management practices as D1, D2, etc.; number habitats of interest as H1, H2, etc. Use these numbers to identify features drawn on the plot sketch. In the Description of Features, list both dominant (D) and other (O) habitat or subhabitat types, being sure to include the D or O designator. In the Magnitude field, give some description of the magnitude of the feature (e.g., approximate area of a particular habitat type, length and width of a path).
 List any photos taken on N3 (photo log); include the Map ID number in the Subject field of the photo log.

N8: SPECIAL FEATURES

Page ___ of ___

Location		
Site ID#	UTM-E	UTM-N
Investigators		
Form Completed By	Date	
Comments		

Sketch of landscape attributes, disturbance or human management practices, and habitats in 300 m x 300 m plot.

