Revised OHV Trail Monitoring Form
(GYR Form)
and Training Guide

prepared for

USDA-Forest Service, Pacific Southwest Region

by

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1.0 Introduction

The purpose of the OHV trail condition rating process is to gather information that can be used to monitor OHV trail condition, prioritize maintenance, program funds, and provide a basis for managing OHV trails and areas.

The current trail condition form—also called the GYR Form—was originally developed on the Los Padres National Forest as an aid to scheduling maintenance. This method of rating OHV trail condition into green, yellow, and red condition classes was incorporated into the *1991 Soil Conservation Guidelines/Standards for Off-Highway Vehicle Recreation Management* as Section G, Monitoring System. Although the GYR trail rating process has been in use for over 12 years, it has produced inconsistent results, especially when used by individuals with limited experience in erosion and sediment control. The USFS issued a reformatted and slightly revised version of the form in 2000.

In 2003, a small interagency team of earth scientists and OHV specialists was organized to develop a revised version of the GYR trail rating form. The goal was to develop a revised GYR form that (1) was focused on water management and soil conservation, (2) would give consistent GYR ratings, (3) included an evaluation of the off-site impacts of OHV trails, and (4) was simple enough and clear enough to be used consistently by non-specialists such as recreation technicians, summer interns, and laypersons with minimal training. Members of the interagency team are listed in Appendix 5.5.

This project was completed under Natural Resources Professional Services Contract 53-91S8-NRM08, Natural Resources Management Corporation, prime contractor. Subcontractor Roger Poff served as the team leader, edited the revised form, wrote the instructions on how to use the form, and wrote the final report.

2.0 Methods

In May 2003, a USFS Region 5 soil scientists' workshop was held in Auburn, CA. On a field trip to the Sugar Pine OHV Area near Foresthill, the USFS 2000 version of the GYR trail condition form was used in a field exercise. The participants provided many valuable suggestions on how the form could be improved. In early summer 2003, the Stanislaus National Forest used this information as a starting point to develop a revised GYR form. After several drafts, including field testing on both the Stanislaus and Lassen National Forests, the Stanislaus developed the version included as Appendix 5.4.

The GYR form developed by the Stanislaus incorporated several significant changes that greatly improved the form as compared to the 2000 version. Some of the more important changes included (1) the ability to rate multiple sections of a trail or trail segment on one sheet, (2) a focus on indicators of soil erosion and sedimentation to define trail condition, (3) definitions for green conditions as well as for yellow and red conditions, and (4) a logical order and arrangement of condition classes for easy comparison.

Because the Stanislaus version of the GYR form had already incorporated the recommendations made at the Foresthill soils workshop, and since it had been field tested, the team used the Stanislaus form as a starting point in developing its revision. However, the Stanislaus form had not been extensively field tested outside the Sierra Nevada. To test the GYR form under a broader range of conditions, the team members conducted field trips on September 22-26 and November 25, 2003. Team members visited ten representative OHV areas in California, including southern California, State SVRAs, and desert OHV areas administered by the BLM.

The sites visited are listed in Appendix 5.6. Notes taken during the field trips were summarized by topics as findings, and are presented in the following section.

The findings from the field trips and the Stanislaus draft GYR form provided the basis for the team's first draft of the GYR form. This draft was circulated to team members and other interested individuals, who provided extensive comments. These comments were incorporated into a second draft, which was again circulated for comment. The comments were incorporated into the final version included in this report as Appendix 5.1. A detailed set of instructions on how to use the GYR form was then written and circulated for review. The final version of these instructions is included in this report as Appendix 5.2.

3.0 Findings

The following is a summary of the observations and discussion that took place during the team's field trips. These notes are included only to show the range of the ideas discussed and considered in revising the form. Some of the ideas discussed were not incorporated in the revised form. Some ideas were conflicting; some were rejected; and some were modified during subsequent drafts of the form. Although the extensive comments received during the reviews of draft versions of the GYR form are not included in this report, the findings section does provide a good overview of the team's discussion and dialog. References to the GYR form in the findings section are to the Stanislaus draft (Appendix 5.4) which was being reviewed, not to the final version of the form.

3.1 Specific Changes to the Stanislaus Draft Form

The following specific changes to the current GYR form (Appendix 5.3) and to the Stanislaus draft form (Appendix 5.4) were identified as necessary to develop a form suitable for statewide application:

- **Stream crossing condition codes that use "fines in pools" as criteria.** Delete and revise conditions G7/Y7/R7. This criterion is too difficult to determine for non-specialists. Even watershed specialists would find it difficult to apply "fines in pools" consistently, since a small amount of erosion and deposition from OHV approaches at crossings could result in observable fines in pools at low flows, while a large amount of erosion and deposition could be flushed out in channels with higher flows. The team proposed evaluating stream crossings using (1) agency-specific criteria and (2) an evaluation of trail condition on crossing approaches. A crossing approach is the section of trail from the last cut-off waterbreak to the channel. Additional discussion of crossings is included in Section 3.5, Stream Crossings.
- **Trail gradient.** While trail gradient (% slope of the tread) is very useful information, not all evaluators may have access to a clinometer or know how to use one, so some agencies may choose not to make this measurement mandatory. Keep it on the form, but as an optional item.
- **Awareness of resource protection is lacking.** This is too subjective to be used consistently as a criteria for a GYR rating. Delete it.
- **Photo number.** Add a column to record photo number. While photos are optional, it is highly recommended that photos at least be taken of sub-segments [sections] rated red.
- **Land management agency presence lacking.** This is too subjective to be used consistently as a criteria for a GYR rating. Delete it.

- **Barriers lacking.** Barriers are a treatment, and lack of barriers is a cause. Need to define lack of barriers in terms of resource damage.
- **Excess moisture at time of use.** This is a cause, and should be so listed and defined. Cover effects under ruts or some other trail damage.
- **The R2 rating.** Need to match up with gully definition.
- **G2/Y2/R2.** Need to tune up the definitions for amount of soil loss, The current <4, 4-6, >6 inches is too narrow a range. More appropriate breaks may be 0-6, 6-12, >12 or 0-8, 8-16, >16 inches. In any event, these depths should be used as guidelines coupled with other criteria for the GYR ratings, not as absolutes. Also, how tread loss is measured where berms along the sides of trails are present needs to be clearly defined.
- **Soil type and/or soil texture.** As with slope, this is important information, but beyond the capability of most non-specialists to evaluate. Add a space to include as an optional item.
- **Condition of signs.** The team questions whether the GYR form should gather this type of information. If it is included on the form, it should be in some section that does not affect the GYR rating.
- **Intensity of storms not typical.** When evaluating OHV trails, assume the rating is for average rainfall and storm conditions. If condition is caused by an unusual event, document under comments. Some other cause codes could be dealt with in the same way.
- **Not designed for major type of use.** This is a cause, not a condition criteria. Need to add a header section defining the trail management objective. Include this concept under a GYR criteria for trail widening combined with a cause code.
- **"Needs additional drainage."** This could trigger red rating or a NEPA review. Clean up the language.
- **Y3 User-created trails.** Should be deleted, because it is a red, not a yellow condition.

3.2 Basic Erosion and Sedimentation Processes

During the field visits, the need to stay focused on basic erosion and sedimentation processes was a recurring topic. Criteria for evaluating trail condition should be based on observable indicators of water management and erosion, and on trail widening. Also, conditions should be distinguished from causes. The following items related to basic erosional processes were discussed.

- **Need to keep the focus on effective water control.** Is runoff water under control? Has concentrated water been effectively dispersed? Need to keep coming back to these basics. It was an eye-opener to discover that the gully on the trail observed in the desert (Dove Springs area) was actually caused by concentrated flow from the impervious surface of the nearby parking area. This reinforces the fact that the basic principles of water control are important everywhere. Need to have a cause code for this.
- **Trail width.** What is the width relative to the designed trail standards or to the trail management objectives? Is the trail growing in width? Does buried vegetation indicate trail widening? Criteria for widening need to be evaluated against specified standard widths, for example, single track 1.5-3 feet. Need standard widths for ATV, 4x4, etc. This should tie back to the trail management objective. Also, if numbers are used they should be specified as guidelines, not as absolutes.

- **Waterbreak outlets and water dispersal from trails.** Need to include rating criteria for disposal of water from waterbreaks. Is water drained to an effective biofilter? Does it cascade onto another trail below? Does it reach a stream channel? Does it cause a gully? Examples: G=effective biofilter; Y or R = dumps onto another trail, gets into a channel, or causes a gully. May need a separate category for sediment traps, where present.
- **Off-site effects.** These can occur in two ways: (1) effects related to water quality, such as delivery of sediment to a stream; and (2) by formation of gully without delivery of sediment, such as erosion of fill slopes and side cast. How much soil loss or sedimentation should be recognized as an impact?
- **Tread condition.** Tread condition, trail gradient, and approach length may be useful criteria for evaluating stream crossing approaches.
- **Exposed roots and rocks.** Need to deal with this in relation to what is not red; how much of this is acceptable to stay in green? May be a safety issue. Could also be important as a challenge, especially rocks. Effects could be covered under trail widening?
- **Rills and gullies as indicators of tread loss.** On many trails, rills and gullies are obliterated by traffic, especially on sandy soils in southern California. Rills and gullies are often only visible during ideal conditions, such as during or just after a storm. Need to avoid placing too much emphasis on rills and gullies as indicators of tread loss. Could include as one of several indicators, or as optional indicator. Need to cover this adequately in the training and manual.
- **Riding off designated trails as GYR criteria.** This is a big issue in designated OHV areas for BLM in the desert, and is the main reason trails get rated red. Trail widening is also a problem, but a minor one by comparison. Consider developing GYR criteria based on number of trails per mile (or some other distance), trails on slopes (hillclimbs), amount of resource damage (one or two tracks of single passes could be included in green, well-defined illegal tracks and hillclimbs would be yellow/red)
- **Landform, soil type, and natural erosion rates.** Consider these factors when developing criteria for condition. For example, erosion to bedrock in places may be acceptable on ridgetops with very shallow soils, and natural erosion rates may be higher in badlands and desert areas.
- **Trail length and gradient.** Consider these as criteria (guidelines only) for evaluating distance between water control structures.
- **Soil loss on fillslopes and adjacent to trails without sediment delivery.** Need to consider a rating for off-site impacts to slopes and soils adjacent to trails. There could be resource damage (for example a gully where runoff leaves a trail) that does not involve sediment delivery to a watercourse. There could be erosion on fillslopes or sidecast; is this a different category from effectiveness of filtration at waterbreak outlets, or can it be included in this category? This would be resource damage or erosion that is independent of sediment delivery to watercourses.
- **Waterbreaks.** Should waterbreaks have their own set of indicators instead of being lumped into G1/Y1/R1? Should each individual waterbreak be monitored? Can effectiveness of waterbreaks in a trail sub-segment [section] be grouped to include several waterbreaks? Some combination of both?
- **Tread loss vs. waterbreak failure.** Need to be able to differentiate between tread loss and waterbreak failure.

- **Development of berms on trails.** Need to differentiate between tread loss and the typical U-shaped profile treads acquire as outside berms develop. This needs to be factored in when evaluating depth of trail entrenchment. However, cross-drains are still needed to get water concentrated by the berms off the trail.
- **High erosion rates in desert.** Desert areas have naturally high erosion rates. Need to accept some damage as part of system and use in these areas?
- **Water discharge and sediment retention.** Control of water discharge and sediment retention should be rated as a separate category. Is concentrated runoff being appropriately dispersed? Is concentrated runoff causing erosion for short distances but not delivering sediment to a channel? Is sediment being retained in the sediment trap? Is outlet hardening, sediment retention, or additional dispersal needed? Has concentrated water discharge developed a gully? Is sediment being delivered to a channel?
- **Poor trail drainage (wet spots).** Poor drainage was a problem the team observed on a Sierra NF trail. Wet spots can be caused by seeps and springs. Is poor drainage an issue? Should this be a category, or is the real issue the trail widening or rutting it causes? Should it be in a cause code instead?
- **Root exposure.** Root exposure is an indicator of trail erosion that could be added to the condition statements for trail erosion. Is the real problem the trail widening that results? The damage to the vegetation? Or is this a safety issue?
- **Concave or U-shaped trails.** These are not necessarily bad—they keep riders on trails. If not too long, then water control is not an issue. The guidance or indicators for G2 (tread loss condition statements) should clarify that a concave trail does not necessarily indicate tread loss or ongoing tread loss.
- **Signage, safety, brushing.** Some concerns that should be monitored are not soil and water related—for example, signage, trail brushing, and safety. Maybe these should not be part of the GYR form, or at least not criteria for GYR ratings, even if they are included on the field form.
- **Drainage structures.** Evaluate hydraulic performance of the trail and each drainage element starting from a pass/fail or presence/absence basis. Examples: drains present and working, or not enough drains, or drains failed (lack of maintenance), etc.
- **Redundancy in drainage structures.** A topic discussed frequently was whether or not a drainage structure that may have failed had a functional back-up down slope, not whether each drainage structure was working or needed improvement, which is how the current State Checklist is written.

3.3 Cause Codes

Most of the cause codes on the Stanislaus draft the team field tested had not been changed from the current State GYR form. The cause codes need to be reworded and coordinated with the GYR evaluation criteria.

- **GYR classes of cause codes.** Some cause codes need to be listed by GYR classes. Consider having definitions for the cause codes by columns for G, Y, R.
- **Multiple cause codes.** Need to have provision for the use of multiple cause codes.
- **Through cuts.** Some trail erosion is the result of water trapped on the trail by impediments such as through cuts. In places it is impossible to get the water off the trail.

Some sections of trail are not easy to drain. Alternatively, could rate a new sub-segment [section] where the through cut begins.

- **Stacked trails.** Stacked trails can lead to drainage problems. Maybe there should be a cause code for it. This could be used with the rating for effectiveness of water dispersal.
- **Maintenance of waterbreaks and sediment traps.** Water breaks or sediment traps need maintenance. Need to make two cause codes for this: (1) for waterbreaks and (2) for sediment traps; for example, yellow = need maintenance; red = failed.
- **Maintenance**. Cause codes by themselves could indicate a need for maintenance.

3.4 Sample Segments

There was considerable discussion on what should serve as a sample unit for the form, and on the terminology to use. The form is designed so small lengths of a sampled trail can be rated individually. Some of the discussion follows.

- **Rating trail intersection to intersection.** Use the form for a segment of trail between two intersections. Many named trails go for some distance and through several intersections, so the sampled trail would often be only part of a trail. The term trail segment was suggested for the sample unit (a whole form), with the term "sub-segment" suggested for the individual rated portions of trail on each line of the form. [Section was the term finally used.]
- **Starting and ending points.** For starting point can use intersection of trail, UTM, odometer, wheel and feet (route system for GPS).
- **Milepoints or UTM coordinates.** This issue was raised several times. Using milepoints to identify a starting location on a trail can necessitate extra travel to start from the O milepoint. The monitoring system should allow identifying locations either by milepoints or by GPS coordinates. GIS functions on milepoints, not GPS points; but GIS should be able to translate from a GPS location to the nearest milepoint on a trail.
- **Terminology.** Trail segments and sub-segments is a question of terminology. We might want to avoid using the term "trail segment" to refer to the parts of trails between milepoints. It is common to use the term segment to refer to the part of a trail between two intersections. The revised GYR form collects trail information on trails between milepoints. When we talk about the section of trail from milepoint 0.1 to 0.2, we might want to use the term sub-segment or bit or sector. This leaves segment as the term for the trail from intersection A to intersection B: what is rated on a whole form.
- **Line and point data.** Need to work with GIS experts on how to handle point data. GIS handles point data in different tables from line data—although it should be possible to combine them in an event table. At least should be able to record both on one form; any splitting could come in data entry forms for point and line data.
- **Trail closures.** How a trail is sampled and segmented has an effect on trail closure. Trails need to be closed intersection to intersection. How do you close a trail rated red? How much red is needed to close a trail? (manager preference). When is the closure effective? Should this be related to the budget cycle, or to when the rainy season occurs?
- **How active or serious is erosion?** R6 category. Is the gully active or benign? Has the gully caused resource damage? Sediment loading? This may require a higher review, or even review by a watershed specialist.

- **Preliminary rating.** The rating system is a two-phase process—a preliminary rating by volunteers and others unauthorized to make a closure, and a final or approved rating by OHV experts or resource specialists as authorized by a line officer.
- **Red and yellow ratings tentative until reviewed.** Volunteers and laypersons should not be allowed to rate a trail Y or R, except as a tentative assessment. Needs some higher level of approval before the rating is official. Trails rated Y or R need to be looked at and approved by a line officer, OHV manager, watershed specialist, or ID team. Raters unauthorized to rate a trail yellow or red could sign and date the form, and check off whether an authorized person was notified of the rating.
- **Management review.** What does a red rating mean if done by a layperson or untrained individual? A red rating requires repair or closure. Cannot have non-trained or non-authorized people ordering a closure. Is the rating subject to management review? To IDT review? To specialist review?

3.5 Stream Crossings

The State checklist or GYR form only superficially covers the off-site impacts of OHV trails on water quality. The Stanislaus draft form incorporates a rating for stream crossings that is more quantitative. Ideally, the determination of whether or not an OHV trail crossing a stream is affecting water quality or beneficial uses of water should be made by a hydrologist, fisheries biologist, or watershed specialist. The team agreed that stream crossings need to be rated, but that the criteria used need to be simple enough for people with limited training to use consistently. The following is some of the discussion regarding stream crossings.

- **Fines in pools.** Delete the section on fines in pools. This is far too difficult for most people to determine. Need to focus on erosion and sediment delivery on the trail approaches to the crossing. Use a twofold approach: (1) crossing meets/does not meet agency BMPs or regulations (each agency could attach their own criteria or forms); and (2) delivery of sediment from the road/trail approach to the crossing, which is primarily a function of the length and gradient of the trail from the stream to the first cut-off waterbreak. The assumption is that any erosion from the approaches is 100% delivered to the channel.
- **What qualifies as a crossing?** To be a crossing it should have a defined channel (continuous?) with evidence of scour (at least 4 inches wide?). Categorize as (a) perennial stream or (b) intermittent streams and dry washes. This is about as complicated as most non-specialists can deal with.
- **Probability of crossing failure.** The probability for water to run down the road/trail if the crossing should fail. Discussed at some length. This is a common evaluation for culvert crossings on roads. Even though this is important, the team decided against including it because (a) it is predictive, not an assessment of present conditions, and (b) it is too difficult for an untrained person to assess consistently.
- **Rating of approaches.** Approaches to crossings need ratings independent of other trail segments. The format of the form allows this to be done easily by rating both crossing approaches as sub-segments, and the crossing itself as a point (or a short sub-segment if a wide stream). If needed, special criteria could be developed to rate the approaches.
- **What should be collected on approaches?** Approaches and the crossing itself could all be rated. Both approaches should be rated. What data should be gathered? Length to cutoff waterbreak, slope gradient, width, and substrate (soil or bedrock type) are the basic

factors.

- **Washes and dry crossings.** If there is a scoured channel, group with intermittent streams.
- **Biological resources.** Even dry washes in the desert are important, if not because of water quality, at least because of biological habitat.
- **Dry washes.** Crossings of dry washes in the desert do not seem to be as much of a problem as riding up and down the length of the wash, which could impact biological resources. Need to add as a category?

3.6 Trail History

The form needs to have a place to record the history of the trail segment being rated. The intent is not to make excuses for the current condition, but to provide a context in which to assess whether conditions are static, deteriorating, or improving.

- **Trail origin.** Was the trail originally a skid trail, logging road, ranch road, fuel break, etc., or was it designed as an OHV trail?
- **Trail stability and trends.** Ultimately, the best way to document trends in trail condition would be to have the trail rated and photographed over a number of years. However, where this has not been done, there still may be local knowledge on how trail condition has changed over time. There should be some place on the form to capture this information if it is available.
- **Focus on existing condition.** Need to focus on current and ongoing resource problems, not on signs of old problems. The trail may be entrenched because of a legacy of prior management or construction, but could now be stable. Need to rate on the basis of what is there now and not get bogged down in historical problems.
- **Use levels may be changing.** The level and type of use may have changed or be changing, e.g., from motorcycles to ATVs. This should at least be reflected in a cause code, even though it should not affect the condition rating.
- **Chronic vs. episodic perturbation.** Something to consider is whether erosion and sediment from a trail are infrequent and the result of a large storm event, or if the effects are chronic. Are recreation technicians or those with minimal training capable of evaluating this?

3.7 Definitions

- **Sediment traps.** Need to be careful to not use the term "basins," which has specific design criteria for BMPs and NPDES implications. Consider calling them traps, pans, or collectors.
- **Gullies and rills.** Use standard definitions from the NRCS or the "Yellow Book" (*1991 Soil Conservation Guidelines/Standards for Off-Highway Vehicle Recreation Management*). Need to be consistent.
- **Accelerated erosion.** For CalTrans there must be a gully present to be called accelerated erosion.

3.8 Miscellaneous

Many other topics were discussed that are not easily categorized. Some have relevance to

revising the GYR form; some do not. Some have more to do with implementation and use of the GYR form. They are all included here, in no particular order.

- **Existing condition vs. prediction.** The monitoring should focus on evaluating existing conditions, not on prediction of what might happen. True in most cases.
- **Trail gradient.** Need to explain (in the training manual?) that grade by itself is not a criteria for rating a trail GYR, although it is a very important factor.
- **Cultural resources.** Archaeology, cultural resources, sensitive species, etc., should be recorded somewhere in the trail monitoring, but do not belong on the GYR form. The GYR form should be a simple, generic form. Individual management units can add items or additional forms as appropriate for their inventory protocols.
- **Calibration cards.** The Mojave OHV project developed a system with calibration cards (photos of typical GYR conditions) for their area to keep the trail ratings consistent between crews. A good idea to recommend.
- **Reconstruction.** Need to check on current language and accepted terminology for "reconstruction." What does it mean? Does the need for reconstruction trigger red? What triggers a NEPA/CEQA analysis?
- **Landforms.** Should there be a place to describe landform? What about ecological zone, too? One-third of California is in deserts. Need to be sure the rating system is suitable for use in desert areas.
- **Open OHV riding areas.** The best way to monitor condition of open OHV areas may be by using remote sensing. SVRA manager was interested in this approach. Technology is available to pull satellite data into ArcView.
- **Hill climbs, open riding areas, staging areas.** These areas typically have OHV impacts on broad areas in contrast to a narrow tread and may need a separate GYR form to deal with the issues unique to them. CNPS protocols were being used to monitor open areas, and to make transects.
- **Remote sensing.** Hungry Valley SVRA was interested in developing the use of remote sensing and satellite imagery for monitoring open riding OHV areas. NOAA-NASA was suggested as a possible cooperator. Ground plots would be needed for calibration. The techniques used in rating burn severity could be applied, and the Remote Sensing Applications Center (RSAC) in Salt Lake City might be a cooperator. The San Dimas Technology Center might also be a possible collaborator.
- **Level 2 roads.** The main arterials within FS OHV riding areas are not under the review or management of OHV managers. These routes fall under the jurisdiction of Engineering and are inventoried separately as Level 2 roads. The concern is that these routes are used by the OHV riders and are seen by the public as part of the trail system, but although their condition can affect the overall soil loss budget of the riding area, they are not recognized by OHV.
- **Preprinted monitoring forms.** Field monitoring forms could be preprinted from the GYR database with information such as route number, last monitoring date, last condition, etc.
- **Options for revising the GYR form.** In addition to structural changes, options for revision include (1) changing the language in the existing form; (2) defining what the existing language means—interpreting it; or (3) some combination of both. Some items

could be covered or expanded on in the training manual. Place more emphasis on basic concepts of soil erosion and sedimentation.

4.0 Discussion and Recommendations

All of the items included in the State's Section G version of the GYR form, and in the USFS 2000 version of it, have been incorporated into the revised form in one way or another. However, the revised form has many improvements over the existing versions. Some of these improvements are:

- a greater focus on water control, soil loss, and tread condition
- expanded recognition of off-site impacts and watercourse crossings
- evaluation of multiple trail sections on one field sheet
- easier integration with GIS and data bases
- parallel definitions of condition classes, easier to understand
- definition of what is acceptable for green condition
- definitions of green condition classes to help define yellow condition classes
- use of management codes to recognize management problems without affecting ratings
- more precise definitions of cause codes
- readily understandable definitions and a set of instructions

Several team members and reviewers felt that all GYR condition classes should be defined in quantitative terms. This approach was tried in early drafts of the form, but the quantitatively defined classes did not perform well in field tests. OHV trails in California occur in situations far too variable to be reduced to a few measurements. In the end, quantitative classes were used as guidelines where it was thought that there was a good chance that their application would produce consistent and realistic ratings. The mix of qualitative and quantitative condition classes may not satisfy everyone, but it does keep the rating system simple enough to be used consistently by non-specialists and individuals with limited experience.

The team recommends that individuals who are going to use the form receive at least one day of field training on its use. Ideally, this training should be provided by a journey level earth scientist familiar with the form and with OHV trail management. The team also recommends developing calibration cards for local areas (photos of typical condition classes) to help keep ratings consistent.

The team recommends that the revised form be extensively field-tested in OHV areas all across California, and modified as necessary, before it is adopted.

	Green Conditions		Yellow Conditions		Red Conditions
G1	**Water control** is provided by enough functional waterbreaks to divert runoff from the trail before it has the volume and velocity to cause erosion. Where present, rills occur on less than 1/3 of the distance between waterbreaks.	Y1	Waterbreaks do not divert all runoff from the trail because they are nearly filled to capacity and/or are partially breached, or spaced too widely. Where present, rills occur on more than 1/3 of the distance between waterbreaks	R1	Waterbreaks no longer divert runoff from the trail because they are full and/or have been breached, or are absent or spaced too widely. Gully or rill erosion may be present.
G2	No accelerated **erosion off-trail.** Runoff at waterbreak outlets and on slopes adjacent to the trail is dispersed effectively. All sediment is filtered by vegetation or litter.	Y2	Rill erosion and/or sediment deposition occurs at waterbreak outlets and/or on slopes adjacent to the trail. All sediment is filtered or deposited before it reaches a watercourse with a scoured channel.	R2	Gully erosion occurs at waterbreak outlets or on slopes adjacent to the trail and/or sediment is transported to an intermittent or perennial watercourse.
G3	**Sediment traps**, where present, are all functional and have adequate capacity for at least one season of use. Trapped sediment can be retrieved during normal maintenance.	Y3	Where present, most sediment traps are full or nearly full, but still functional. Most trapped sediment can be retrieved during normal maintenance.	R3	Where present, sediment traps have been breached and have a plume of sediment and/or a gully below the breach. Most sediment cannot be retrieved.
G4	**Tread wear** is minimal. Tread is generally incised less than 6 inches. Tread wear is generally evident on less than 1/3 of the distance between waterbreaks or on less than 1/3 of the tread width.	Y4	Tread wear is evident. Tread is generally incised 6 to 12 inches and tread wear is generally evident on more than 1/3 the distance between waterbreaks and on more than 1/3 of the tread width. If present, “whoops” or “stutterbumps” and high berms are well-developed.	R4	Tread wear is severe. Tread incision is generally greater than 12 inches deep and tread wear is generally evident on the entire distance between waterbreaks. If present, deep “whoops” and “stutterbumps” force traffic off the trail.
G5	**Tread width** is generally no greater than 1.5 times the design width for the designated use.	Y5	Tread width is generally greater than 2 times the design width for the designated use and appears to be increasing.	R5	Tread width is generally greater than 3 times the design width for the designated use and has caused or is causing severe resource damage.
G6	Unauthorized **user-created trails** are limited to single tracks or single passes generally less than 300 feet long. Tracks are not eroded and have little effect on water control.	Y6	Unauthorized user-created trails are common, well-defined, and generally greater than 300 feet long. Water control is inadequate. Areas with resource damage can be revegetated/restored with ordinary effort.	R6	Unauthorized user-created trails have caused severe resource damage such as gully erosion, eroded hillclimbs, or extensive damage to vegetation and/or sensitive habitat. Restoration will usually require a major effort (e.g., large equipment, topsoil replacement, etc.)
G7	**Approach to watercourse crossing** is short and has a gentle gradient. Tread is stable, shows little evidence of erosion, and is at design width. No damage to riparian vegetation outside the tread.	Y7	Approach to watercourse crossing is short and steep or long and gentle. Tread may show some evidence of erosion and may show evidence of widening. Minimal damage to riparian vegetation.	R7	Approach to watercourse crossing is both steep and long and/or tread is unstable and shows evidence of accelerated erosion. Approach may be widening and damaging riparian vegetation.
G8	Other: (explain in notes)	Y8	Other: (explain in notes)	R8	Other: (explain in notes)

Cause Codes

C1	Waterbreaks not constructed to design standards
C2	Waterbreak spacing is too wide for conditions
C3	Cascading runoff from a trail or road upslope
C4	Cascading runoff from an impervious surface upslope
C5	Wet area caused by a seep or spring
C6	Excess soil moisture at time of use
C7	Trail section is poorly located (describe)
C8	Trail gradient is too steep for the type and/or amount of use occurring
C9	Segment was not designed for the type or amount of use occurring
C10	Brush or log is blocking trail
C11	Rocks or roots exposed in tread
C12	Barriers (natural or constructed) to control traffic are lacking
C13	Mechanical erosion makes maintenance ineffective
C14	Storm intensity unusual or unique for the area (not for use in deserts)

Management Codes

M1	Segment is overgrown with brush
M2	Signing is inadequate to control use and protect resources
M3	Barriers (natural or constructed) are inadequate or lacking
M4	Trail is not designated for type of use occurring
M5	Rutting or vegetation damage in meadow, spring, or wet area
M6	Damage to sensitive plant habitat or other sensitive area
M7	Unauthorized traffic in dry washes
M8	Vandalism (e.g. shooting signs, destroying barriers, etc.)
M9	Users lack an awareness of need for resource protection
M10	Land management agency presence is lacking
M11	Other:
M12	Other:
M13	Other:
M14	Other:

A **gully** has a cross-sectional area of at least 1 square foot and can be any length; a **rill** is (1) at least 2 inches deep at the upslope end if found singly, or greater than 1 inch deep at the upslope end where there are two or more, and (2) is/are longer than 10 feet if on a tread surface or of any length when located elsewhere.

OHV Trail Condition Rating Form (Proposed)

Trail Name _____ **Trail No.** _____ **USGS Quad** _____ **Begin Segment** _____ **End Segment** _____

RATING (GYR) _____ **GPS Ref** _____ **Rated By** _____ **Date** _____ **Reviewed By** _____ **Date** _____ **Page** ___ **of** ___

Section B = Begin E = End	Section Length	G-Y-R Condition Codes	Cause Codes	Trail Gradient	Crossing Approach L	 R	Management Codes and Comments	Photograph Number(s)
B E								
B E								
B E								
B E								
B E								
B E								
B E								
B E								
B E								
B E								
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B E								
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B E								

How to Use the GYR OHV Trail Condition Rating Form

Introduction

The GYR Trail Condition rating form is designed to rate one segment of a trail. A trail segment is defined as a portion of trail that can be logically maintained, closed, or otherwise managed as required by the results of the rating. In most cases a segment will be from a trail junction to a trail junction. The form allows observations to be recorded for up to 14 sections of the rated segment. Additional pages of the form can be used when observations are made on more than 14 sections of a trail segment.

The primary purpose of the rating system is to identify trails that need maintenance. The red condition classes mean the trail condition is serious enough to be brought to the immediate attention of management. Trails rated red are to be repaired or closed within six months. Management action could include an evaluation by an IDT or a qualified specialist.

Management units are encouraged to develop calibration cards for each of the trail condition classes using photos taken locally or regionally.

Office Preparation

Gather information on the history of the trail before going to the field. Although the trail ratings are based on current conditions, information on trail management objectives, design, and origin is needed to make some evaluations. Recognizing trends in trail condition also requires a knowledge of prior condition.

If possible, make notes on the following:

- **Trail management objective** What is the designated use for the trail?
- **Design standards** What type of use was the trail designed for?
- **Trail origin** Was the trail designed as an OHV trail? Or was it originally a mining trail, skid trail, logging road, ranch road, fuel break, user-created trail, etc? How long has the trail been used by OHVs?
- **Use levels** What is the level and type of use? Does it include equestrian and mountain bikes as well as OHVs? Has the intensity or type of use changed recently?
- **Special events** Has the trail been used for Enduros or other special events? When? Under what conditions?
- **Season of use** What time of the year is the trail used most heavily? How does this relate to moisture conditions? Too dry? Too wet?
- **Unusual storm events** Has the trail recently been subjected to an unusually intense storm event? Note that unusual storm events do not apply in desert areas, since storms in desert areas are typically intense and infrequent.

- **Trail stability and trends** Is there local knowledge about how trail conditions have changed (or not changed) over the years? Are previous monitoring records and photos available?
- **Watercourse crossings** Have the watercourse crossings already been rated by a hydrologist or biologist?
- **Maintenance history** When was the trail last maintained? With what equipment? By whom (e.g., maintenance crew, volunteers, special events groups, etc.)?

If possible, pre-print the rating forms with the header information already filled in. A summary sheet listing the above items may be available on the management unit.

Form Header Information

Fill out the form header information as follows:

Trail Name Enter the name of the trail for the rated segment.

Trail No. Enter the trail number for the rated segment.

USGS Quad Enter the name of the USGS topographic map quadrangle on which the rated segment occurs.

Begin Segment Enter the location where the rated segment starts. This could be a GPS location (UTM or Lat/Long), a named trail junction, a mile post, etc.

End Segment Enter the location where the rated segment ends. This could be a GPS location (UTM or Lat/Long), a named trail junction, a mile post, etc.

RATING (GYR) Enter this information as the *final step* in completing the form. This is the recommended overall rating for the whole segment.

Enter only *one* letter for the rating: a "G", "Y", or "R." Do not enter G/Y, R/Y, etc. This rating for the entire segment is based on the evaluator's best judgment of overall trail condition. The rating should be based on the number and length of trail sections where problems have been identified by condition codes, and on how serious the noted problems are. For example, a trail segment with many hundreds of feet of recorded red condition classes would probably be rated red. However, a few feet of trail in a red condition may not justify an overall red rating. Similarly, a few short sections coded in yellow classes might be acceptable in an overall green rating. This rating must be reviewed and approved by an official who has the authority to close the trail. Trail segments rated red must be repaired or closed within six months.

GPS Ref Enter the primary GPS coordinates. For example, if using UTM enter the Zone, and first two digits of Easting and Northing so these numbers do not have to be repeated in Column 1 every time a location is noted. Use a similar approach for Lat/Long coordinates.

Rated By Enter your name or initials as the rater.

Date Enter the date the field observations were made and recorded.

Reviewed By Signature of responsible official who reviewed and acted on the rating.

Date Date reviewed by responsible official.

Page __ of __ Enter page number and total number of pages used to rate the segment.

Column 1 - Trail Section

Enter either (1) the location of the beginning and ending points (B, E) of the section being evaluated, or (2) the location of the approximate center point of the observed section. This location can be given in feet, yards, meters, or tenths of miles from the starting points given in the header, or by GPS coordinates in UTM or Latitude/Longitude format. GPS coordinates need not repeat the primary coordinates already listed in the header under "GPS Ref."

Note that the rated trail sections can overlap. Example: A trail segment could include a section with Y1 & Y3 condition codes starting at 300 feet and continuing to 600 feet; another section from 800 to 900 feet coded R4; and a third section coded M4 starting at 0 and continuing to 1,500 feet.

Coded sections may also overlap where a center point is used to locate a problem section. Feet are used in the following example to demonstrate the overlap. Example: At a problem section center point 1,500 feet down the trail segment, a section 500 feet long is coded Y1 (this equates to a Y1 condition from 1,250 to 1,750 feet). At 2,000 feet another section 800 feet long is coded Y6 (this equates to a Y6 condition from 1,600 to 2,400 feet). In this example, condition classes Y1 and Y6 overlap from 1,600 to 1,750 feet.

The form allows a great deal of flexibility in documenting observed trail conditions. But this flexibility also makes it easy to get too detailed rather than focus on the major problems. Inexperienced evaluators should start out using contiguous, non-overlapping sections until they are familiar with the system. Overlapping sections are more likely to occur when problem sections are located by a single center point and section length is visually estimated.

Column 2 - Section Length

Enter the length of the section being evaluated. Note the units used (0.1 mile, feet, yards, meters, etc.) at the top of the column. Also note whether the length is an estimate or has been measured.

Column 3 - GYR Condition Codes

Enter the appropriate condition code using the described indicators of trail conditions listed on the back of the form as guidelines. Green conditions are described to help define the break between green and yellow conditions. Each green condition code does not have to be entered in column 3, although it would be a good idea for inexperienced raters to do this until they become familiar with the form. Field conditions are too variable to cover all conditions in brief descriptions. Where uncommon situations are encountered, the rater will have to use good judgment using the condition codes as an overall guide.

1 Water Control

G1 Green *Conditions: Water control is provided by enough functional waterbreaks to divert runoff from the trail before it has the volume and velocity to cause erosion. Where present, rills occur on less than 1/3 of the distance between waterbreaks.*

Y1 Yellow *Conditions: Waterbreaks do not divert all runoff from the trail because they are nearly filled to capacity and/or are partially breached, or spaced too widely. Where present, rills occur on more than 1/3 of the distance between waterbreaks.*

R1 Red *Conditions: Waterbreaks no longer divert runoff from the trail because they are full and/or have been breached, or are absent or spaced too widely. Gully or rill erosion may be present.*

Discussion Water Control is by far the most important criteria for evaluating trail condition. Trails and roads are impervious surfaces that concentrate runoff, Trails also intercept surface and subsurface water moving cross-slope. Water volume and velocity increase as trail length and gradient increases; as volume and velocity increase, the power to erode increases. The fundamental concept of water control is to disperse this concentrated runoff before it develops the volume and velocity to erode. This means diverting water off the trail—effectively and frequently.

Waterbreaks are necessary to divert concentrated runoff from the trail because the berms normally developed by OHV traffic keep runoff concentrated in the tread, making simple out-sloping ineffective in most cases. As used in the form, the term waterbreak includes any and all structures, devices, design elements, and techniques that divert water from the trail tread. This includes, but is not limited to, breaks in grade, openings in outside berms, rolling dips, OHV rolling dips, waterbars, open-tops, and insloped treads with cross ditches or culverts.

A functional waterbreak diverts runoff before it has the volume and velocity to erode. This is a function of design, spacing, and to some extent traffic. Indicators of non-functional waterbreaks are rill or gully erosion in the tread; sediment-filled waterbreaks; water running through breaches in waterbreaks, or around waterbreaks; sediment accumulation or erosion at waterbreak outlets; water ponded by berms at reverse-grade low points; and plugged cross-drain inlets where inside ditches are present.

2 Erosion Off-Trail

Look for evidence of off-trail erosion at waterbreak outlets, on sidecast and fillslopes, and anywhere else concentrated water leaves the trail. Where off-trail erosion is observed, determine how far the sediment moved before it was deposited or filtered out by litter and vegetation. This can be determined by observing sediment plumes and other evidence of concentrated flow such as gullies, rills, realignment of surface litter, matted down vegetation, and sediment or litter caught on woody vegetation.

G2 Green *Conditions: No accelerated erosion off-trail. Runoff at waterbreak outlets and on slopes adjacent to the trail is dispersed effectively. All sediment is filtered by vegetation or litter.*

Y2 Yellow *Conditions: Rill erosion and/or sediment deposition occurs at waterbreak outlets and/or on slopes adjacent to the trail. All sediment is filtered or deposited before it reaches a watercourse with a scoured channel.*

R2 Red *Conditions: Gully erosion occurs at waterbreak outlets or on slopes adjacent to the trail and/or sediment is transported to an intermittent or perennial watercourse.*

3 Sediment Traps

Sediment traps, where present, capture soil eroded from the tread so the soil can be recycled back into the rolling dip or tread during maintenance. A functional sediment trap

collects runoff diverted by a waterbreak (usually a rolling dip) and ponds the runoff long enough for sediment to settle out. A properly located sediment trap is constructed close enough to the trail to allow trapped sediment to be retrieved with a small excavator or by back-blading with a trail tractor. The condition of sediment traps and the amount of sediment accumulated in them can also be used as indicators of water control effectiveness.

G3 Green *Conditions: Sediment traps, where present, are all functional and have adequate capacity for at least one season of use. Trapped sediment can be retrieved during normal maintenance.*

Y3 Yellow *Conditions: Where present, most sediment traps are full or nearly full, but still functional. Most trapped sediment can be retrieved during normal maintenance.*

R3 Red *Conditions: Where present, sediment traps have been breached and have a plume of sediment and/or a gully below the breach. Most sediment cannot be retrieved.*

4 Tread Wear

Tread wear can be caused by other processes in addition to water erosion. Heavy traffic on steep slopes may cause tread loss by mechanical erosion. Mechanical erosion is often the main reason for tread loss on very ashy soils and pumice because these soils absorb runoff rapidly. Fine-textured soils, and soils high in volcanic ash, can lose tread by dusting. Dusting occurs when tread is loosened by traffic and kicked up as dust that drifts or is blown off the trail. The dust may be deposited some distance from the trail, making it difficult to retrieve. OHV traffic may also cause "whoops" or "stutterbumps" to develop, especially in loose, sandy soils on gentle slopes. This tread wear may not result in tread loss, but can cause trail widening.

Trails on bedrock—especially 4WD trails—may have what appears to be excessive tread wear, but actually are stable. Some of these trails may appear to be causing resource damage, and may appear "ugly" to the untrained eye. A critical and analytical evaluation of water control, stability over time, and the other condition factors listed on the form should be used to determine condition, not overall appearance. Refer to the history of these types of trail before rating trail sections yellow or red.

G4 Green *Conditions: Tread wear is minimal. Tread is generally incised less than 6 inches. Tread wear is generally evident on less than 1/3 of the distance between waterbreaks or on less than 1/3 of the tread width.*

Y4 Yellow *Conditions: Tread wear is evident. Tread is generally incised 6 to 12 inches and tread wear is generally evident on more than 1/3 the distance between waterbreaks and on more than 1/3 of the tread width. If present, "whoops" or "stutterbumps" and high berms are well-developed.*

R4 Red *Conditions: Tread wear is severe. Tread incision is generally greater than 12 inches deep and tread wear is generally evident on the entire distance between waterbreaks. If present, deep "whoops" and "stutterbumps" force traffic off the trail.*

Discussion Berms on either side of the tread develop naturally as OHV trails are used. Berm development is most pronounced on single-track motorcycle trails, and to some extent on ATV trails. Berms also develop naturally on turns, especially on the outside edge of turns. These berms are desirable because they help direct traffic flow. They also

provide a measure of safety by keeping vehicles on the trail. Berms on turns are not considered incision as described in G4, Y4, and R4.

Incision on straight trail sections is not measured from the top of the berm to the tread; it is measured in reference to the natural slope the tread is located on. As shown in Figure 1, the guidelines for depth of incision are based on measurements or estimates of "A" not "B."

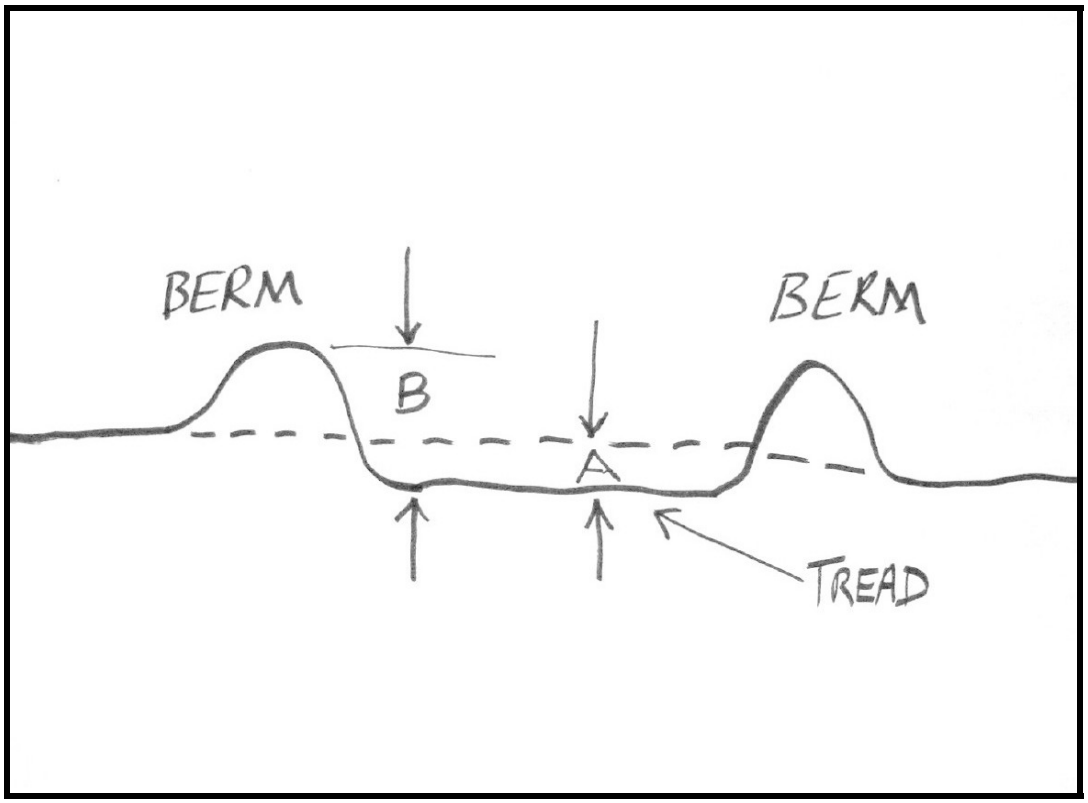

Figure 1. Sketch of berm and tread (vertical scale exaggerated).

When evaluating tread wear, note that where trails are located on native soil (in contrast to an old road or skidtrail), loss of the surface soil is normal, and even desirable. The surface soil is typically high in organic matter and does not compact well. The upper part of the subsoil has less organic matter and often more clay. This soil compacts much better to a running surface. Some soil volume is lost in the compaction process, but this should not be counted as part of trail incision. Loss of a few inches of the surface soil should not be counted as part of incision either. For these reasons incision of up to 6 inches is considered acceptable for the G4 condition class.

5 Tread Width

Tread width is evaluated in the context of design width. Refer to the history, origin, and design of the trail to make this evaluation. As guidelines, use the design widths in Table 1. Tread widths are given for the running surface, which is not the same as clearing width.

Designated Use	Tread Width (Inches)	Tread Width (Feet)
Motorcycle, most difficult	12 – 24	1 – 2
Motorcycle, easiest	18 – 30	1.5 – 2.5
ATV, most difficult	58 – 70	4.8 – 5.8
ATV, easiest	74 – 86	6.2 – 7.2
4WD, most difficult	84	7
4WD, easiest	120	10

Table 1. Design Widths for Designated OHV Uses

G5 Green *Conditions: Tread width is generally no greater than 1.5 times the design width for the designated use.*

Y5 Yellow *Conditions: Tread width is generally greater than 2 times the design width for the designated use and appears to be increasing.*

R5 Red *Conditions: Tread width is generally greater than 3 times the design width for the designated use and has caused or is causing severe resource damage.*

6 Unauthorized User-created[1] Trails

Where use is restricted to designated trails there should be no off-trail traffic. User-created trails are by definition a red condition class and should be closed and rehabilitated. The G6, Y6, and R6 condition codes are included to evaluate the impact of the rated trail segment as a *source* of user-created trails. It is not the unauthorized user-created trails that are being rated. These condition codes for user-created trails are generally used to identify situations where unauthorized off-trail use can be controlled by management, barriers, or by closure of the trail segment being rated.

G6 Green *Conditions: Unauthorized user-created trails are limited to single tracks or single passes generally less than 300 feet long. Tracks are not eroded and have little effect on water control.*

Y6 Yellow *Conditions: Unauthorized user-created trails are common, well-defined, and generally greater than 300 feet long. Water control is inadequate. Areas with resource damage can be revegetated/restored with ordinary effort.*

R6 Red *Conditions: Unauthorized user-created trails have caused severe resource damage such as gully erosion, eroded hillclimbs, or extensive damage to vegetation and/or sensitive habitat. Restoration will usually require a major effort (e.g., large equipment, topsoil replacement, etc.).*

Discussion Occasional single passes off-trail are still considered a green condition. However, where occasional passes have caused resource damage to sensitive areas, management codes M5, M6, or M7 can be used in combination with a G6 condition code to draw management to the problem before it becomes more serious.

[1] The term "unauthorized" is used because some system trails now in the designated system may have originated as user-created trails or were built by volunteers.

7 Approach to Watercourse Crossing

Rate crossings on all watercourses that are perennial or intermittent. Each approach begins at the last cut-off waterbreak before the channel. This is the last place runoff water flowing down the trail is diverted from the trail before the trail crosses the watercourse. Rate each approach as a trail section on a separate line.

Measure or estimate the length of the approach; measure or estimate the trail gradient; and observe tread width and condition. Using the criteria below and Table 2 as a guideline, enter a G7, Y7, or R7 condition code in column 3. If the approach is rated Y7 or R7, enter any cause codes that apply. Repeat for the other crossing approach. An evaluation of tread condition and width can be used for exceptions to the guidelines in Table 2. For example, a hardened surface may justify a green condition rating even though the table suggests a yellow rating. If the approach is very wide, or if a gully is present, this may justify a red condition rating.

Record the condition of all watercourse approaches even if the rating is a G7. This serves as documentation that the approach was observed.

G7 Green *Conditions: Approach to watercourse crossing is short and has a gentle gradient. Tread is stable, shows little evidence of erosion, and is at design width. No damage to riparian vegetation outside the tread.*

Y7 Yellow *Conditions: Approach to watercourse crossing is short and steep or long and gentle. Tread may show some evidence of erosion and may show evidence of widening. Minimal damage to riparian vegetation.*

R7 Red *Conditions: Approach to watercourse crossing is both steep and long and/or tread is unstable and shows evidence of accelerated erosion. Approach may be widening and damaging riparian vegetation.*

	Approach Length (from last cut-off waterbreak to channel)		
Trail Gradient	< 30 feet	30 – 150 feet	> 150 feet
0 – 8 %	G7	G7	Y7
8 – 20%	G7 or Y7	Y7 or R7	R7
> 20%	Y7 or R7	R7	R7

Table 2. Guidelines for Rating Approaches to Watercourse Crossings

Discussion An adequate assessment of the impacts of OHV trails on water quality and aquatic resources at watercourse crossings is time-consuming and usually requires the expertise of a specialist. However, by considering a few basic concepts, non-experts can at least identify the crossings most likely to impact water quality.

The concept of sediment delivery is key. Where runoff water from a trail is drained onto a natural slope a long distance from a watercourse, most sediment is filtered out before it can reach a watercourse. Where runoff is drained onto deep forest duff and litter, the probability of sediment delivery approaches zero. However, where a trail is close to a watercourse, and especially where a trail crosses a watercourse, the probability of

sediment delivery is high. At watercourse crossings, sediment delivery is essentially 100% for the section of trail from the last cut-off waterbreak to the watercourse.

With these basic concepts in mind—all other things being equal—the amount of sediment delivered to a watercourse at a crossing is a function of the length and gradient of the trail section from the last cut-off waterbreak to the watercourse. These two factors alone will sort most OHV crossings into green, yellow, and red condition classes. This initial sort can be further refined by considering tread condition and width.

This method of evaluating crossings is intended primarily for OHV trails with low-water crossings, hardened crossings, arches, or bridges. More detailed road crossing standards and agency standards should be used for road crossings with large fills and culverts, inside ditches, etc. Crossings with culverts and large fills require the use of more detailed criteria to evaluate crossing condition.

8 Other

This space (G8, Y8, R8) is provided for other condition classes that may need to be field tested for use in making GYR condition ratings. To provide consistency across the Region, new GYR condition classes should be used sparingly, and only with approval.

The G8, Y8, and R8 codes should be removed for the final version of the rating form. To provide consistency, all users of the GYR trail condition rating form should be using the same condition codes and criteria.

Coding the Sheet When No Problems Exist

If there are no problems with the trail segment (i.e., the entire trail segment is in green condition classes), there are no watercourse crossings, and there are no situations that require a management code, enter a "G1" on the first line in Column 3, take a photograph of a representative section of the trail segment, and enter a overall recommended rating of "G" in the header in RATING (GYR).

Column 4. - Cause Codes

Cause codes provide a shorthand method for recording why a section of trail is in a yellow or red condition. Enter a cause code (C1, C2, …C14) for each trail section where a condition code was entered in Column 3. Enter the cause code that best describes the problem. If listing more than one cause code, list them in order of importance.

Most trail condition problems have multiple causes. Generally one to three cause codes will be enough to describe the problem. A cause code combined with a GYR condition code will usually both describe the problem and identify a treatment. Some cause codes have wider application than others.

C1 Waterbreaks not constructed to design standards

Enter this cause code where waterbreak construction is the cause of the problem. This requires some knowledge of the construction standards for waterbreaks. For example, rolling dip construction standards include such items as a proper cross-drain angle; adequate height and cross-drain gradient to divert water from the trail; a well-compacted

core; an open cross-drain; and energy dissipation and sediment filtration (or a sediment trap) at the outlet.

C2 Waterbreak spacing is too wide for conditions

Enter this cause code where waterbreaks are spaced too far apart to effectively divert runoff from the trail. Indicators that spacing is too wide include rill or gully erosion between waterbreaks; filled waterbreaks or sediment traps; failed waterbreaks; erosion at waterbreak outlets; and excessive sediment deposition at outlets. To use these indicators requires knowledge about when the trail was last maintained, how heavily the trail is used, and moisture conditions at the time of use.

C3 Cascading runoff from a trail or road upslope

Excessive rill or gully erosion or failed waterbreaks on a trail that appears to have an adequate number of waterbreaks often indicates that runoff from another trail or road upslope is the real cause of the problem. Look carefully for evidence of overland flow onto the trail. Overland flow across natural, undisturbed slopes is rare. Indicators of overland flow are small rills, orientation of surface litter, matted down vegetation, or sediment or litter caught on woody vegetation. Any evidence of overland flow across the cut slope or on the uphill side of the trail should be traced to its source. The potential for this problem is high near trail junctions that occur on steep sideslopes.

C4 Cascading runoff from an impervious surface upslope

See discussion above. Use this cause code when the source of the concentrated flow is an impervious surface other than a trail or road. Some examples of impervious surfaces are staging areas, areas with very shallow soils or rock outcrop, old logging landings, and construction sites.

C5 Wet area caused by a seep or spring

Self-evident. For example, this cause code could be used with Y4, R4, Y5, and R5.

C6 Excess soil moisture at time of use

This cause code does not imply that the trail was not effectively closed when soil moisture was excessive, although this is one possibility. Early or late in the season many trails have short sections that remain too wet even though most of the trail has suitable moisture conditions. Unpredicted rainfall during special events can also be a cause of excess moisture.

C7 Trail section is poorly located (describe)

Self-evident. There are many reasons for poorly located trails. When using this code, describe the reasons the location is poor.

C8 Trail gradient is too steep for the type and/or amount of use occurring

Self-evident. Measure gradient and describe type and amount of use.

C9 Segment was not designed for the type or amount of use occurring

Some knowledge of the history of the trail is needed to use this cause code. For example, a logging skid trail may have been an appropriate location for very light OHV use, but cannot hold up under heavy use. Another example would be where a trail designed for light motorcycle use is now heavily used by ATVs.

C10 Brush or log is blocking trail

Self-evident.

C11 Rocks or roots exposed in tread

Can be used with Y5 and R5. Exposed rocks and roots by themselves do not necessarily indicate a problem condition, although they may be a cause of trail widening. Exposed rocks and roots may provide a challenge to riders. Many trails with exposed rock are stable.

C12 Barriers (natural or constructed) to control traffic are lacking

Self-evident. Typically used with condition codes Y5, R5, Y6, and R6.

C13 Mechanical erosion makes maintenance ineffective

This code is typically used for steeper trails subjected to heavy traffic, for trails on very ashy soils or on pumice, and for soils susceptible to dusting.

C14 Storm intensity unusual or unique for the area (not for use in deserts)

Note that this cause code should not be used in desert areas where intense storms and flash floods are typical. Also, this code should be used sparingly in the high Sierra Nevada and on the east side of the Sierra Nevada where heavy summer thunderstorms are a natural component of the climate.

Column 5. - Trail Gradient

Enter the gradient of the tread surface for the section evaluated as a percent (%) as measured with a clinometer or similar device. If the gradient varies within the section, enter the range in slope followed by the gradient most typical for the section in parentheses. For example, 3 – 25% (6%). If the trail gradient is not measured with a clinometer, estimate the gradient and enter "gentle", "moderate", or "steep." (G, M, and S may be used). Guidelines for visual estimates of trail gradient are: gentle < 8%, moderate 8 – 20%, steep > 20%.

Column 6. - Crossing Approach

Enter a checkmark (√ or X) in the L column if the rating is for the left bank approach, or in the R column if for the right bank approach. Face downstream to determine which bank is the left and which is the right. Rate each crossing approach as described under Column 3, G7, Y7, R7 Approach to Watercourse Crossing.

Column 7. - Management Codes and Comments

As appropriate, enter a management code (M1, M2, …M14) plus any comments about trail management or suggestions for maintenance or repair. Inexperienced raters may not be able to recommend specific maintenance and repair. The following management codes are provided for some of the more common management issues.

M1 Segment is overgrown with brush

Use this code where clearing is needed.

M2 Signing is inadequate to control use and protect resources

If used, explain what is inadequate about the signs, and describe the type of resource damage that has resulted.

M3 Barriers (natural or constructed) are inadequate or lacking

Explain the effects of inadequate barriers.

M4 Trail is not designated for type of use occurring

Explain what the designated use is, how the trail is designated (maps, signs), what type of unauthorized use is occurring.

M5 Rutting or vegetation damage in meadow, spring, or wet area

Use this code where off-trail damage would be rated as G6 or Y6.

M6 Damage to sensitive plant habitat or other sensitive area

Other sensitive areas might be wildlife habitat. Archaeological sites may or may not be recorded depending on local preferences for disclosure of these locations.

M7 Unauthorized traffic in dry washes

This may be of local importance, particularly in desert areas, because of potential impacts on wildlife habitat.

M8 Vandalism (e.g. shooting signs, destroying barriers, etc.)

Describe the type of damage.

M9 Users lack an awareness of need for resource protection

This is subjective. If used explain the reason and evidence for using it.

M10 Land management agency presence is lacking

This is subjective. If used explain the reason and evidence for using it.

M11 – M14 Other (describe):

M11 to M14 are available to use for recording observations of local importance or to gather information not directly related to trail conditions, but important to resource

management. For example, the botanist may want observations on the location of noxious weeds noted. These codes can also make more efficient use of field personnel by collecting other information while evaluating trail condition.

Column 8. - Photograph Number(s)

Enter the identification number(s) for photographs taken of the evaluated section. As a minimum, one photo should be taken for each section given a red condition code. If the entire trail segment has been rated green, take at least one photograph of a representative section of the trail segment.

OHV SOIL LOSS MONITORING

Date:		**Evaluator:**	
Grant Number:	**OR-**	**Grantee/Agency:**	
7.5 Min. Quad:		**Trail/Area Name/Number:**	
Segment Length:		**Type of Use:**	
Weather Cond:		**Notes (use, event, other):**	

Rate OHV trails, trail segment, or area as Green (acceptable), Yellow (needs maintenance), or Red (needs major maintenance or repair). Show color, symbol, and number of each segment on a map (use G, Y, & R symbols for Green, Yellow, and Red on map and define in the legend). Briefly explain yes items in comments. Yellow or Red ratings should trigger further review. Begin by consulting a journey-level soil scientist. Document consultation, recommendations, and actions approved by District Ranger. Take photos before and after repairs. Include all in annual report.

1. **GREEN (satisfactory)** – all of the following are "no" and all category Yellow and Red are "no". If any of the Green indicators are "yes" the segment must be rated Yellow or Red.

	YES	NO
a. Drains and water transportation/dispersal systems needs work (to prevent accelerated or unnatural erosion).		
b. Trail tread surface inadequate and needs working.		
c. Resource damage occurring outside designated trails or open areas.		
d. Short cutting across switchbacks.		
e. Signing, barriers, or other traffic control structures inadequate for resource protection/user direction.		
f. Segment NOT designed for use pattern occurring.		
g. Vegetation cover is inadequate to prevent accelerated erosion.		
h. Significant erosion features occurring on the segment.		
i. Impacted area cannot be readily revegetated/restored.		

2. **YELLOW (needs maintenance within 1 year)** – one or more "yes", and all category Red are "no".

	YES	NO
a. Trail segment is overgrown with brush. Brushing required (clearing width 1.5 to 3 feet - greater clearing removes trail containment value).		
b. Drains or water dispersal systems need opening or reshaping.		
c. Tread surface needs working.		
d. Signing, barriers, or other traffic control structures are minimally adequate, but lack of signing may lead to problems such as those described in red.		
e. Evidence of unauthorized use off a designated route.		
f. Impacted area cannot be revegetated/restored with ordinary effort.		

3. **RED (needs major maintenance or repair within 6 months) – one or more "yes"**.

	YES	NO
a. Requires major maintenance, repair, re-route, or reconstruction.		
b. Needs additional drainage construction or hard surfacing.		
c. Drains or water dispersal systems require reconstruction.		
d. Evidence of off-site damage (sediment, dust, excess runoff).		
e. Needs major tread surface work.		
f. Evidence of severe unauthorized use off a designated route.		
g. Signing, barriers, or other traffic control structures inadequate for resource protection - problems apparent.		
h. Route NOT designated for all uses being made of it.		
i. Segment does not meet current construction guidelines and problems are apparent.		
j. Revegetation of impacted area requires major effort (such as returning topsoil to site).		

Cause Evaluation: In evaluator's opinion, identify the potential cause(s) for trails rated YELLOW or RED.

a. Users are not aware of need for resource protection.		
b. Barriers (natural or constructed) lacking.		
c. Trail constructed without adequate natural drainage, rolling dips, or permanent water dispersal systems.		
d. Excess soil moisture at time of use (needs wet weather closure or hardened surfacing).		
e. Land management agency presence is lacking (patrols).		
f. Grade too steep in relation to type and amount of use, soil type, or runoff concentration.		
g. Intensity of storms unusual or unique (e.g., flash flood event).		
h. Segment not designed for the major type of use or amount of use occurring.		
i. Location of segment is poor (e.g., riparian, dead end trail, unstable soil, etc.).		
j. Mechanical erosion makes maintenance ineffective.		
k. Not enough signing, barriers, or other traffic control structures for resource protection.		
l. Vandalism (shooting signs, tread damage, damage to vegetation).		
m. Heritage resource site could be damaged		
n. Forest Plan allows cross-country (off trail) use.		

Comments:

_____

STANISLAUS NATIONAL FOREST (DRAFT)

RYG Monitoring Form (Rev. 6/26/03) **Route:_____** **Usage:_____** **Date: _____** **Monitoring Team: _____**

Begin	End	R,Y, or G	RYG Code	Cause Code	% Grade	Problem/Remedy

	Green Conditions		Yellow Conditions		Red Conditions
G1	Water control is adequate; Small rills* occurring on less than 1/3 of distance between water breaks; Fines are not leaving trail corridor.	Y1	Water control is marginal; Small rills occurring on more than 1/3 distance between water breaks. Fines can be retrieved during normal maintenance	R1	Water control is inadequate; Gully* is present or large rills occurring on more than 1/3 of distance between water breaks.
G2	Less than 4 inches of mechanical tread loss occurring on less than 1/3 of distance between water breaks; Loss occurring on about 1/3 of trail width.	Y2	Tread surface needs reworking; 4 to 6 inches of mechanical tread loss occurring on more than 1/3 of distance between water breaks; Loss occurring on about 1/3 of trail width; Fines can be retrieved during normal maintenance; (See note on bedrock trails**)	R2	Needs major tread work or hard-surfacing to control down wearing; More than 6 inches of mechanical tread loss is occurring on more than 1/3 of distance between water breaks; (See note on bedrock trails).
G3	Blocked, signed closed user created trail.	Y3	Unblocked, un-signed user created trail; recommend closure	R3	User created trail causing damage; recommend closure & restoration
G4	Trail is at design width or is recovering on its own.	Y4	Evidence of increasing trail width.	R4	Trail is wider than designated use.
G5	Signing is adequate.	Y5	Signing is minimally adequate, but lack of sign may lead to problems.	R5	Signing inadequate for resource protection or safety.
G6	No accelerated erosion off trail. Waterbreaks are dispersing runoff safely.	Y6	Some rill* erosion occurring off trail. Deposition occurs within 50 feet.	R6	Gully* erosion occurring off trail or rilling extends further than 50 feet.
G7	No measurable increase in downstream pool tail fines.	Y7	Some sediment reaches channel, approach is stable; less than 20% increase in fines in downstream pool tails.	R7	Significant sediment reaches channel; More than 20% increase in fines in downstream pool tails.
G8	Other; Explain in problem/remedy.	Y8	Other; Explain in problem/remedy.	R8	Other; Explain in problem/remedy.

***Definitions**: A gully is deeper than 6 inches and longer than 20 feet; A rill is less than 6 inches deep, and is typically one or two inches in depth.

**Some bedrock trails show significant loss of tread, but are stable (not actively eroding), and do not pose further erosion hazard. If no other concerns are present these trails may be rated green.

RYG Conditions: There will always be trail conditions that fit between the red, yellow, and green conditions described on the form. Best judgment or fit is required.

Cause Codes

C1	Needs additional drainage
C2	Water breaks are non-functional
C3	Water breaks or sediment traps need maintenance
C4	Awareness of resource protection off-highway vehicle users lacking.
C5	Barriers (natural or constructed) lacking.
C6	Constructed without adequate natural drains, water bars, or water dispersal systems.
C7	Excess soil moisture at time of use (needs wet weather closure or hard surfacing).
C8	Land management agency presence is lacking (eg.foot or vehicle patrols).
C9	Grade too steep in relation to type and amount of use, soil type, or runoff concentration.
C10	Intensity of storms unusual or unique - not typical.
C11	Segment not designed for the major type of use or amount of use occurring.
C12	Location segment is poor (eg. located in riparian, dead-end trail, located on unstable side slope, near sensitive plants)
C13	Mechanical erosion makes maintenance ineffective.
C14	Not enough signing for resource protection.
C15	Vandalism (eg. shooting signs, damage to vegetation). Notify manager/law enforcement ASAP
C16	Brush or log is blocking trail.
C17	Rutting in meadow, spring, or other sensitive area, i.e., sensitive plant habitat. Notify manager

Appendix 5.5

Team Members and Reviewers

Jeff Applegate*	Mendocino National Forest
Kit Custis*	CA Parks & Recreation, OHMVR Division
Todd Ellsworth*	Inyo National Forest
Rich Farrington	USFS Pacific SW Region
Dan Ford	Cleveland National Forest
Greg Hoffman	Mountain Top RD, San Bernardino National Forest
Chuck James	Mi Wok RD, Stanislaus National Forest
Alex Janicki*	Stanislaus National Forest
Joe Johnson*	South Zone Soil Scientist, San Bernardino NF
Jim Keeler	Bureau of Land Management
Cam Lockwood	Trails Unlimited
Bruce Lund*	CA Parks & Recreation, OHMVR Division
Kathy Mick*	USFS Pacific SW Region
Chuck Mitchell	Eldorado National Forest
Carolyn Napper	San Dimas Technology and Development Center
Roger Poff**	R. J. Poff & Associates, Nevada City
Brent Roath*	USFS Pacific SW Region
Susan Southard*	Natural Resources Conservation Service
Jeff TenPas*	North Zone Soil Scientist, Stanislaus NF
Don Trammell	Trails Unlimited
James Weigand*	Bureau of Land Management

* core team member
** team leader

Appendix 5.6

Sites Visited in the Field

Miami OHV Area, Sierra National Forest

Mt. Pinos Ranger District, Los Padres National Forest

Hungry Valley SVRA

Rowher Flat OHV Area, Angeles National Forest

Lake Arrowhead Area, San Bernardino National Forest

Dove Springs OHV Area, Ridgecrest Area, Bureau of Land Management

Jawbone Canyon OHV Area, Ridgecrest Area, Bureau of Land Management

Mammoth Bar SVRA