



# PART TWO

## Applying the Building Blocks in the Field





*More and more girls and women are enjoying OHV recreation.*



# Chapter Eleven

## Conducting Assessments

Observe, Record, Report

The fourth E in the all-important 4Es is Evaluation, which is an assessment, appraisal, or review. If managers don't know the current conditions, they won't know how to plan, act, or react.

Assessments, which can be either routine or formal, are part of a continual process used in every component of the Great Trail Continuum:

### THE GREAT TRAIL CONTINUUM



- **Planning:** What could or should be out there? This is used to develop the vision, trail concept plan, and draft trail management objectives (TMOs).
- **Design:** Does the location and design of the trails match the vision, the concept plan, and draft TMOs? Are the desired experiences and opportunities being provided?
- **Implementation:** Do the trails conform to the TMOs, design guidelines, and sign plan? Is the vision being realized on the ground?
- **Maintenance:** Are the trails being maintained in accordance with the TMOs? Is the frequency and level of maintenance adequate? Are there signs of non-sustainability?
- **Management:** Is there a high level of customer satisfaction? Are use types or use levels changing? Is the team successfully managing the use? Are resources being protected?

### Routine Assessments

Routine assessments are daily or regularly scheduled inspections of the trail or trail system. The motto “Observe, Record, Report” forms the basis for these inspections. Every person in the field should be performing monitoring for obvious safety or maintenance issues. These should be recorded on an informal daily monitoring form and be accompanied by pictures, GPS coordinates, or other documentation as necessary. This report is then given to management so action can be scheduled. It is important to note that the project file should also have documentation of what is working and going well. This information can be used in preparing reports to upper management or in developing grant applications.

Field personnel who perform routine inspections need to have a basic knowledge of engineering and the physical forces covered in Chapter 4, comprehension of trail durability versus trail



Blowdown is a common occurrence on most forested trails. Routine and timely inspections are essential to get these trees cut out before braiding and other impacts can occur.

degradation, an understanding of structure function and maintenance, and the ability to recognize routine problem indicators. Personnel need to detect the difference between what is there versus what should be there. The goal of routine inspections is to detect symptoms before they become problems. Field personnel don't necessarily have to know how to fix the issue, just observe it, record it, and report it.

## Formal Assessments

Formal assessments are more comprehensive, detailed, and often look at the bigger picture that includes not just sites on the ground, but how those sites affect the overall effectiveness of the program. Rather than being proactive, a formal assessment is often requested as a reaction to an issue that is no longer a symptom, but a problem. A formal assessment answers the questions: What could be there? What is there? What should be there? How do I get to where I should be? The final report usually has three parts: observations, where the site is examined and evaluated to answer the first two questions (above); commendations, what is good or going well; and recommendations, actions to correct what isn't good and answer the last two questions (above). Often, these reports are precursors to a management action, used as a project basis (Purpose and Need), and incorporated into NEPA documents or management plans.

There are three main types of formal assessments: feasibility or site assessment, safety assessment, and condition survey or assessment.

**Feasibility or Site Assessments.** What activities could or should occur on a given site? What are the opportunities and what are the obvious constraints? A feasibility assessment is usually conducted at the project initiation phase, which could be at the beginning of a new project or the expansion of an existing project.

The assessor should understand:

- The vehicle types that use the trails
- Desired rider experiences
- Climate
- Vegetation
- Soil types
- Site hydrology
- Resource concerns, issues, and constraints
- Transportation planning
- Facility design
- Trail design
- Engineering and the physical forces
- GPS, data collection, and mapping software

**Safety Assessments.** A safety assessment examines agency risk and the risk to public safety. Perhaps there has been a tort claim, an increase in the number or severity of accidents, increased search and rescue incidents, customer complaints, or just an uneasy feeling or question by management. For objectivity, it is highly recommended that the assessor be unfamiliar with the site.

The assessor should understand:

- Transportation planning. Is there effective access and movement of people to and through the site?



- Facility design
- Trail design, including grade, alignment, consistent difficulty, conformance with TMOs, and a thorough understanding of challenge versus risk
- Use types and levels of use
- Rider demographics and ethics
- Seasonality and day use versus night use
- Soils
- Climate
- Effective signing, including guidelines for shapes, colors, sizes, symbols, reflectivity, messages, and placement
- Effective mapping
- Engineering, including guidelines for stopping distance, sight distance, junction design and spacing, road crossings, structure placement and approaches
- The physical forces
- Emergency communications and emergency plan
- Accident history
- Enforcement issues
- Actual liability versus perceived liability (it is helpful to have expert witness experience)
- The effective application of the 4Es

**Condition Survey or Assessment.** A condition assessment usually focuses on the physical condition of the trail and related facilities, but it can also look at the bigger picture and address safety and risk issues. It answers questions like: How often does this occur? Why does this occur? What else is occurring? Is the trail condition consistent with design and maintenance guidelines in the TMO? Does the trail provide the desired experience? Is the trail sustainable or is it degrading due to poor location and design or changes in use levels, use types, or maintenance? Are the structures sound and functional? Do the facilities provide good customer information and service? Are resources being protected? Is there compliance with the rules and regulations? Is off-trail use occurring? Is the trail providing a high-quality recreation experience and customer satisfaction? Does the site appear professionally managed and maintained?

Using the 4Es, the condition assessment examines trail issues (drainage, erosion, tread degradation) and recommends solutions (maintenance, reconstruction, structures, hardening, or relocation). Recommendations can also include staffing, training, or equipment needs. As with safety assessments, a condition survey is best done with someone who is knowledgeable, but not routinely familiar with the site.

The assessor should understand:

- Facility design and construction
- Trail design and construction, including grade, alignment, consistent difficulty, and conformance with TMOs
- Trail maintenance techniques and equipment
- Use types and levels of use
- Maintenance or reconstruction frequency
- Previous condition surveys
- Soils
- Climate
- Hydrology of the site
- Effective signing, including guidelines for shapes, colors, sizes, symbols, reflectivity, messages, and placement
- Engineering, including guidelines for stopping distance, sight distance, junction design and spacing, and intersections
- Structures, including placement and approaches and trail hardening techniques.
- Equipment needs and capabilities

### Tip, Trick or Trap?

**Tip:** A qualified engineer must inspect structures that have been engineered such as bridges and retaining walls on a regular basis. Unless qualified, an assessor can only note the indicators of structure degradation and recommend further inspection by an engineer.

- The physical forces
- The effective application of the 4Es
- Costs for recommended actions
- GPS, data collection, and mapping software

## How Do I Know If I Have a Problem?

Safety and condition assessments examine issues, but often managers may not recognize an issue or the indicators of an impending issue. Inexperienced personnel or familiarity with a site can blur the team members' vision, which is why a fresh set of eyes is best for conducting these assessments. Listed below are some of the issues or indicators that an assessment could highlight.



**Issue:** Ineffective drainage due to riders by-passing log and belted waterbars

**Concerns:** Trail widening, erosion, resource impacts

**Action(s):** A) Replace log with belted waterbar and install barriers to force riders over waterbars; B) Replace waterbars with rolling dips; C) Relocate trail off old roadbed to create grade reversals



**Issue:** Creek draining into trail

**Concerns:** Erosion, lack of drainage. If the creek wants to be where the trail is, then the trail is in the wrong place

**Action:** A) Install culvert; excavate creek channel so it is lower than the trail elevation and runs through the culvert. B) Relocate the trail (preferred).



**Issue:** Deadfall tree hung up above trail

**Concerns:** Rider safety, agency risk, lack of inspection frequency

**Action:** Increase trail inspection and maintenance frequency



**Issue:** Fall line trail is now the drainage line

**Concerns:** Rider safety, erosion, sedimentation, poor trail location

**Action:** A) Relocate the trail (preferred). B) Drain the trail at the top of the hill (yellow arrow), line the ditch with cobble rock to dissipate the water energy and reduce sedimentation (blue arrow), ensure that water drains off the trail at red arrow, harden the trail if necessary.



**Issue:** Ineffective drainage

**Concerns:** Rider safety, saturated trail tread, resource impacts

**Action:** A) Increase size of sump, harden trail tread, or B) relocate the trail



**Issue:** Trail marker not clearly visible. Marker does not meet placement or recognition guidelines

**Concerns:** Rider safety and orientation, lack of trained personnel, poor maintenance practices

**Action:** Increase personnel awareness and training, replace or reinstall marker with proper placement on right-hand side of trail



**Issues:** Regulatory message does not meet sign shape, color, and placement guidelines. Poor quality workmanship

**Concerns:** Rider safety; ineffective signing; untrained, unskilled, or complacent personnel

**Action:** Increase personnel awareness and training, install proper regulatory signs



**Issue:** Trail washout due to under-sized culvert

**Concerns:** Rider safety, erosion, sedimentation

**Actions:** A) Conduct watershed analysis and install properly sized culverts; B) Install a ford or bridge if that option is allowed

### Tip, Trick or Trap?

**Tip:** Never close a trail by simply putting a fence across it. The result will be failure.



**Issue:** Metal fence posts protruding into trail corridor

**Concerns:** Rider safety, agency risk, livestock retention, lack of maintenance personnel awareness

**Action:** Replace fencing, train maintenance personnel



**Issue:** Gate with no warning signs or object markers and it cannot be locked in the open position

**Concerns:** Rider safety, agency risk, compliance

**Action:** Install temporary markers for visibility. Educate management on proper signing and gate management techniques



**Issue:** Lack of toilet maintenance

**Concerns:** Poor customer service, public health, poor agency image

**Action:** Clean and stock toilet. Increase facility inspection and maintenance frequency. Determine how often this situation occurs and discuss with management if appropriate.



**Issue:** Good sign, but there is no gate

**Concerns:** Lack of pasture management and stock control. Potential range and recreation conflict

**Action:** Install temporary gate if stock is present. Notify range and recreation management to get permanent gate installed. Remove sign if no longer required.





**Issue:** Sign has been vandalized

**Concerns:** Leaving this sign can send the message these activities are acceptable.

**Action:** Install new sign, determine how often and where this activity is occurring



**Issue:** Ineffective cattle guard due to lack of maintenance

**Concerns:** Lack of pasture management and stock control, potential range vs. recreation vs. permittee conflict

**Action:** A) Increase inspection and maintenance frequency. Schedule clean out. Educate maintenance personnel on proper equipment and grooming operation at cattle guards. B) Replace with an arched cattle guard.



**Issue:** Confusing signing

**Concerns:** Rider education, rider control, management control

**Action:** Educate management on proper signing techniques, reconfigure this installation



**Issue:** Renegade trail developing (ahead)

**Concerns:** Rider control, resource impacts, lack of inspection or management action

**Action:** Install reassurance marker with left arrow at entrance to renegade trail, install barrier or debris at entrance behind marker, drag in debris to block trail, rake out tracks. Increase inspection frequency and awareness of off-trail use and impacts.



**Issue:** Inconsistent decal placement

**Concerns:** Lack of decal spacing decreases marker legibility, lack of personnel training, lack of decal placement protocols, personnel complacency, lost riders

**Action:** Train personnel in decal application and the need for consistency, establish decal placement protocols if none exist



**Issue:** Poorly maintained trailhead kiosk

**Concerns:** Lack of rider education, potential lack of rider control, sends the wrong message to the public, poor agency image, complacent personnel

**Action:** Clean and refinish kiosk, install new posters and education materials, cover with polycarbonate sheet if this is a recurring issue



**Issue:** Pavers are moving due to lack of proper bedding and containment

**Concerns:** Rider safety, failure of the installation

**Action:** Reconstruct the installation with proper bedding and containment



**Issue:** One broken concrete plank in ford structure. Two others have shifted position

**Concerns:** Rider safety, movement or failure of ford bedding, additional breakage, structure failure, lack of regular inspection or awareness of the issue

**Action:** Have structure inspected by qualified personnel, perform recommended reinforcement or reconstruction, ensure that regular inspection occurs, educate inspection personnel



**Issue:** Tread inconsistent with TMO, tread degraded due to lack of drainage and loss of fine soils

**Concerns:** Rider safety, erosion, lack of effective or timely maintenance, failure of drainage structures (if there are any), poor trail location

**Actions:** Increase drainage awareness of inspection and maintenance personnel. A) Relocate trail if feasible. B) Reconstruct trail and install rolling dips if feasible. C) Change TMO and leave trail as is if resource impacts are acceptable.



**Issue:** Loss of cover material has resulted in direct tire contact and partial failure of geoweb structure

**Concerns:** Rider safety, continued structure failure, lack of maintenance, lack of regular inspection or awareness of the issue

**Action:** Reconstruct installation using grass pavers or other trail hardening technique, increase maintenance frequency, educate inspection and maintenance personnel



**Issue:** Missing rub rail, uneven, loose or broken decking material, loss of structure integrity

**Concerns:** Rider safety, moss could indicate stringer rot, lack of bridge inspection, lack of structure maintenance

**Action:** Have bridge inspected by an engineer, sign as closed if structurally unsound, repair or replace structure, ensure that regular bridge inspections occur, increase awareness of inspection or maintenance personnel.



**Issue:** Inadequate hardening of bridge approaches, bridge elevation too low

**Concerns:** Resource impacts, trail widening, rider safety, lack of trail drainage, lack of inspection and maintenance

**Action:** Drain water off trail before the bridge, extend bridge approach hardening, educate trail personnel on proper inspection and maintenance techniques



**Issue:** Failure of trail hardening and drainage structure.

**Concerns:** Rider safety, agency risk, trail braiding, resource impacts, improper hardening technique, inadequate drainage structure design, poor trail location, lack of skilled trail personnel, lack of hazard warning signs.

**Action:** A) Install warning signs. B) Explore relocation options. C) Examine agency constraints for fish and water. D) Remove tires and culvert if possible. E) If relocation is not an option, raise grade of approaches and construct a ford. F) Conduct training for trail personnel.



**Issue:** Confusing sign message, poor visibility, lack of conformance with sign shape, color, and reflectivity guidelines

**Concerns:** Resource impacts, lack of sign plan, lack of knowledge of effective signing methods

**Action:** Determine existence of sign plan, if none, develop one; educate personnel on effective signing; revise message and install proper regulatory sign



**Issue:** Rill indicates water is running too long due to lack of drainage

**Concerns:** Erosion, resource impacts, tread degradation, lack of awareness of problem indicators, lack of inspection and maintenance

**Action:** Educate trail personnel on problem indicators and proper maintenance techniques, determine water source, install drainage, or relocate the trail



**Issue:** Inadequate and unsafe trail maintenance. Log on left protrudes into trailway. Log on right is on immediate trail shoulder and could be hit by an inattentive rider.

**Concerns:** Rider safety, agency risk, lack of risk awareness by inspection and maintenance personnel, inadequate training of maintenance personnel

**Action:** Cut logs back out of trailway, educate trail personnel on risk awareness and proper logout techniques



**Issue:** Log obstacles to slow down riders are becoming obscured by vegetation

**Concerns:** Rider safety, agency risk, lack of risk awareness by inspection or maintenance personnel, complacency of personnel

**Action:** Educate trail personnel on risk awareness and proper maintenance techniques, trim or remove vegetation in roadway, monitor trail to ensure vegetation does not cover obstacles



**Issue:** Due to compaction and displacement, trail tread is lower than surrounding ground resulting in flooding during the wet season

**Concerns:** Rider safety, water quality, saturated trail tread, poor recreation experience

**Action:** Construct lead-off ditches and sumps to drain water away from trail, use excavated material to help construct turn-pike, apply gravel to harden tread



**Issue:** Damage to plastic culvert due to loss of cover material

**Concerns:** Collapse of the structure, maintaining water flow, lack of maintenance, lack of awareness of inspection and maintenance personnel

**Action:** Inspect the interior of the culvert for efficient water flow, inspect integrity of the pipe wall, if still useable, cover with a dirt and gravel mix that will bind together. If not useable, replace culvert and add adequate cover. Educate inspection and maintenance personnel.



**Issue:** Rocks are blocking culvert outlet

**Concerns:** Culvert blockage and washout of culvert and trail, poor risk awareness of inspection and maintenance personnel, poorly constructed culvert headwall

**Action:** Remove rocks, clean out culvert, rebuild headwall, educate inspection and maintenance personnel



**Issue:** Decals degrading due to exposure to weather and UV rays. Fiberglass marker is fading and starting to “bloom”, improper decal placement.

**Concerns:** Reduced legibility, short-term durability, rider compliance, lack of a sign plan or sign protocols. Markers placed on back of sign are in wrong location and may not be seen by riders.

**Action:** Ensure there are trail marker protocols that include covering decals with clear overlaminatate tape. Educate trail personnel on effective signing techniques. Replace markers as needed



**Issue:** Breached trail closure

**Concerns:** Ineffective closure techniques: sign placement, no ripping or disguising of trail, no education. Management failure has resulted in lack of rider compliance.

**Action:** Repair fence, install temporary closure signs at nearest trail junction, install closure notice on map at trailhead, educate management on proper closure techniques



**Issue:** Improper trail maintenance

**Concerns:** Rider safety, agency risk, lack of maintenance personnel training and awareness

**Action:** Cut log back entirely out of trailway. Educate maintenance personnel on proper logout techniques and risk management

### Tip, Trick or Trap?

**Tip:** Challenge is an expectation, risk is a surprise



**Issue:** Water running down trail, trenched trail tread

**Concerns:** Erosion, resource impacts, degraded trail tread, trail widening, lack of or poor maintenance of drainage structures

**Action:** A) Educate trail personnel on problem indicators and effective maintenance techniques. B) Determine source of water, add rolling dips or other drainage. C) Relocate the trail.



**Issue:** Bridge abutment footing is eroding

**Concerns:** Rider safety, inadequate structure inspection, lack of immediate action, impending structure failure

**Action:** Order an immediate bridge inspection to determine footing integrity, close trail and bridge if warranted, check inspection frequency and records, educate personnel on risk awareness, determine repair actions



**Issue:** Sediment deposit indicates excessive water volume and velocity

**Concerns:** Erosion, resource impacts, tread degradation, lack of awareness of problem indicators, lack of inspection and maintenance

**Action:** Educate trail personnel on problem indicators and proper maintenance techniques, determine water source, install drainage



**Issue:** OHV accident on the trail

**Concerns:** Rider safety, agency risk, cause of accident, lack of rider education and safety awareness

**Action:** Visit accident site and determine cause if possible (alignment, clearing width, obstacle, signing, rider error, etc). Take pictures, talk to witnesses, document incident, and inform management. Examine frequency and locations of other accidents to determine any commonality or trends.

### Tip, Trick or Trap?

**Tip:** Every known accident should have some level of investigation to determine cause and agency risk

Problem indicators can be obvious or subtle, but they are all precursors of future management or maintenance issues. Many of these issues appear to be maintenance related, but they could also indicate issues with trail location, construction techniques, budget, priorities, available personnel, skilled personnel, complacent personnel, material availability, equipment availability, a lack of an assessment, or extended intervals between assessments.

Some problem indicators that often show up in assessments include the following:

- Increased frequency and cost of maintenance
- Large deposits of sediment after weather events
- The appearance of sediment deposits on bridges
- The development of ruts on grades or the creation of muddy sections on flatter areas
- Trail braiding or widening to get around pot holes, ruts, rocks, etc.
- The development of rock gardens because all of the soil fines have washed off the surface
- The intended difficulty level has increased, at least in portions of the trail
- User-created trails are developing to avoid or short-cut the nasty areas

Too often, trail managers choose to pour time, money, and materials into fixing a poorly located trail when the remedy of relocation would be less expensive and far more sustainable in the long run. Assessments can help managers identify the source of problems and make the right decisions to correct them.

## Need more? Learn more here...

*Designing Sustainable Off-Highway Vehicle Trails*, Kevin G. Meyer, USDA Forest Service, Technology & Development Program, November 2013

*Trail Planning, Design, and Development Guidelines*, Minnesota Department of Natural Resources, 2006

## A Look Back...

Here are some of the elements discussed in this chapter:

- Assessment, or evaluation, is a constant process that managers should use throughout the Great Trail Continuum
- The motto “Observe, Record, Report” is the backbone of assessments
- Field personnel should conduct daily routine assessments or inspections
- Field personnel need to be trained in what to observe and how to protect the trail infrastructure
- The goal of routine assessments is to detect symptoms before they become problems
- Formal assessments answer: What could be there? What is there? What should be there? How do I get to where I should be?
- There are three main types of formal assessments: Feasibility, Safety, and Condition
- Feasibility assessments examine site potential and the activities that could or should occur on that site
- Safety assessments examine risk potential to the public and the agency and recommend actions to reduce that risk
- Condition assessments focus on the physical condition of the trails and facilities to determine conformance to the TMO, level of customer service, quality of the recreation experience, level of sustainability, maintenance or reconstruction needs, and corrective actions
- Assessments should be timely and should be proactive rather than reactive
- Problem indicators can be obvious or quite subtle, but if ignored there could be dramatic resource impacts and management issues