Alaska State Parks

Trail Management Handbook

May 2015

Section 1: Trail Management Objectives (TMOs)

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Introduction

Complementary to the Alaska State Parks Trail Management Policy, (Appendix F) the Division of Parks and Outdoor Recreation has developed a reference guide that incorporates the necessary detail for implementation. This handbook will be an iterative publication that will start with the basics of pertinent trail guidelines and will grow over time with regular updates or as necessary. The Handbook is intended to be used as a practical, hands-on tool to help improve the consistency of trail management throughout the State. It is the intent of the Division to adapt this to a field-size guide in the future.

Section 1: Trail Management Objectives (TMOs)

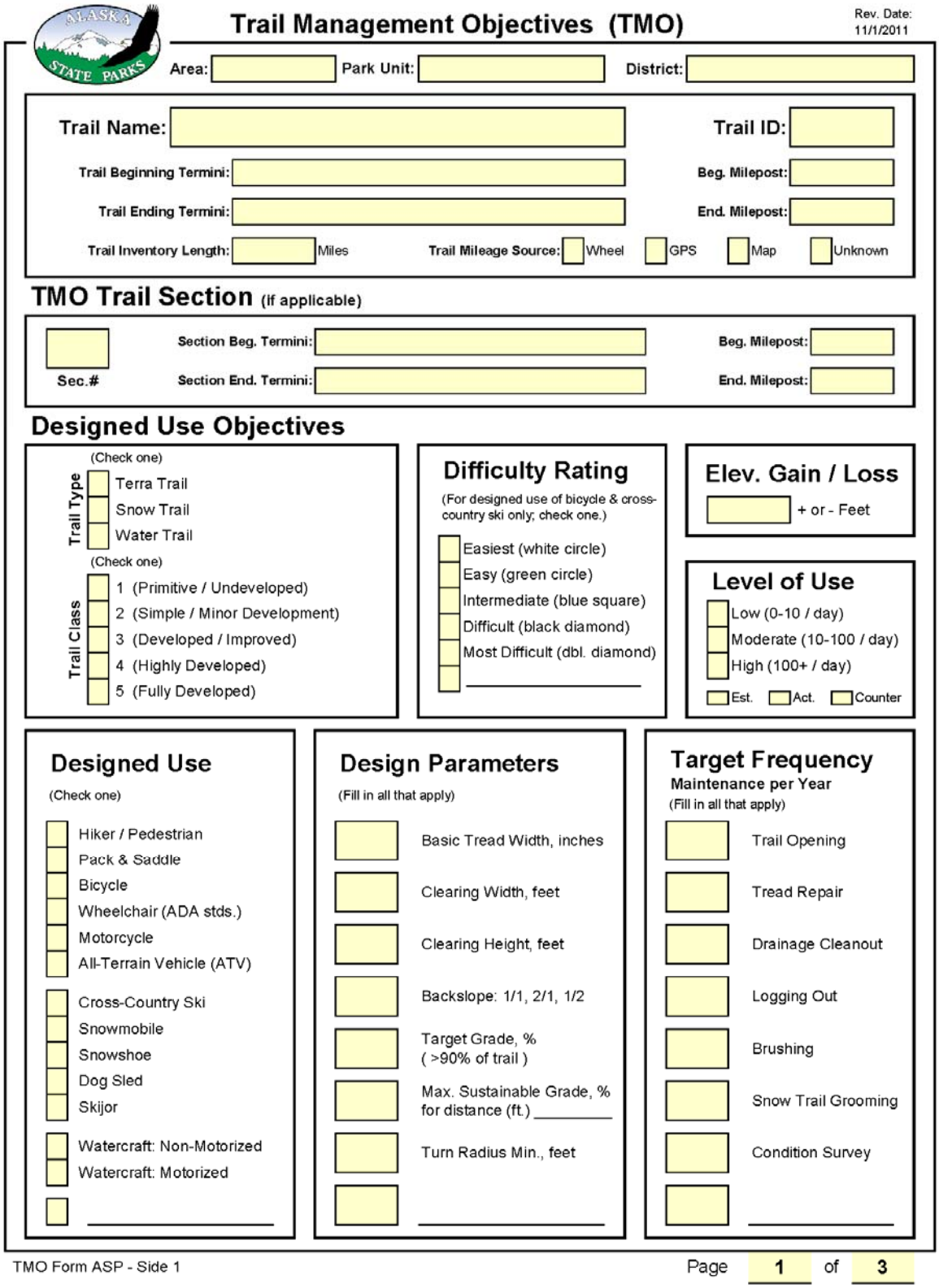
Trail Management Objectives (***TMOs***) that Alaska State Parks uses are a close adaptation of the National Trail Classification System that has been formally adopted by the United States Forest Service (USFS), and can be referenced in USFS Trail Assessment and Condition Surveys (TRACS) course material.

Trail Management Objectives are the most important tools that can be utilized in the management of a trail system for determining how individual trails will be developed, used, and maintained. A properly written TMO can be used to identify the types of use that will occur on a trail, how much use it is expected to receive, and how much maintenance will be required once it is built. Specifically, TMOs document ***Designed Use***, ***Managed Use***, and ***Design Parameters*** for both planned *and* existing trails. For existing trails, TMOs can be an effective tool to determine if a trail is being properly managed or if it is meeting intended standards or objectives.

As identified in the Alaska State Parks, Trail Management Policy (Appendix. F), *all* Alaska State Parks' managed trails will have TMOs developed based on management plan direction and a trail's specified Designed Use. Absent of a trail management plan, TMOs should be developed with consideration given to how individual TMOs accommodate public need, protect resources, and are sustained in the future.

The following pages include a blank TMO document to be used by field and management staff. Instructions and a sample TMO have also been provided. It is important that all finalized documents have been approved by the Park Area Manager. Once approved, a copy of the TMO should be filed with the State Trails Program Office.

1.1 Trail Management Objectives Form



Trail Management Objectives (TMO)

Rev. Date: 11/1/2011

Area: | Park Unit: | District:

Trail Name: | Trail ID:

Trail Beginning Termini: | Beg. Milepost:

Trail Ending Termini: | End. Milepost:

Trail Inventory Length: ____ Miles | Trail Mileage Source: ☐ Wheel ☐ GPS ☐ Map ☐ Unknown

TMO Trail Section (if applicable)

Sec.# | Section Beg. Termini: | Beg. Milepost:

Section End. Termini: | End. Milepost:

Designed Use Objectives

Trail Type (Check one)
- ☐ Terra Trail
- ☐ Snow Trail
- ☐ Water Trail

Trail Class (Check one)
- ☐ 1 (Primitive / Undeveloped)
- ☐ 2 (Simple / Minor Development)
- ☐ 3 (Developed / Improved)
- ☐ 4 (Highly Developed)
- ☐ 5 (Fully Developed)

Difficulty Rating

(For designed use of bicycle & cross-country ski only; check one.)
- ☐ Easiest (white circle)
- ☐ Easy (green circle)
- ☐ Intermediate (blue square)
- ☐ Difficult (black diamond)
- ☐ Most Difficult (dbl. diamond)
- ☐ _____

Elev. Gain / Loss

____ + or - Feet

Level of Use
- ☐ Low (0-10 / day)
- ☐ Moderate (10-100 / day)
- ☐ High (100+ / day)

☐ Est. ☐ Act. ☐ Counter

Designed Use

(Check one)
- ☐ Hiker / Pedestrian
- ☐ Pack & Saddle
- ☐ Bicycle
- ☐ Wheelchair (ADA stds.)
- ☐ Motorcycle
- ☐ All-Terrain Vehicle (ATV)
- ☐ Cross-Country Ski
- ☐ Snowmobile
- ☐ Snowshoe
- ☐ Dog Sled
- ☐ Skijor
- ☐ Watercraft: Non-Motorized
- ☐ Watercraft: Motorized
- ☐ _____

Design Parameters

(Fill in all that apply)
- ____ Basic Tread Width, inches
- ____ Clearing Width, feet
- ____ Clearing Height, feet
- ____ Backslope: 1/1, 2/1, 1/2
- ____ Target Grade, % (>90% of trail)
- ____ Max. Sustainable Grade, % for distance (ft.) _____
- ____ Turn Radius Min., feet
- ____ _____

Target Frequency

Maintenance per Year

(Fill in all that apply)
- ____ Trail Opening
- ____ Tread Repair
- ____ Drainage Cleanout
- ____ Logging Out
- ____ Brushing
- ____ Snow Trail Grooming
- ____ Condition Survey
- ____ _____

TMO Form ASP - Side 1

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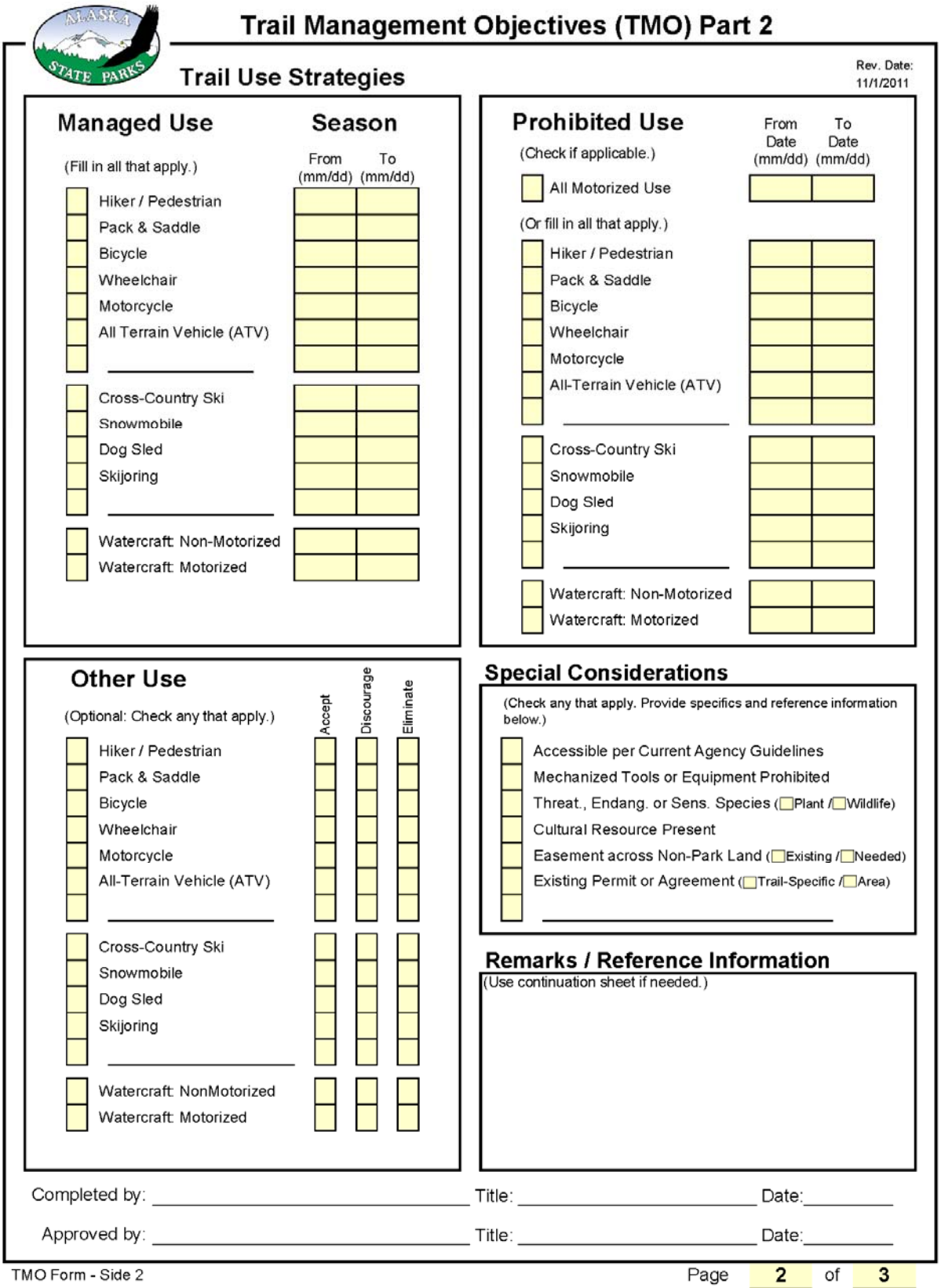
Figure 1.1 – Trail Management Objectives Form



Trail Management Objectives (TMO) Part 2

Trail Use Strategies

Rev. Date: 11/1/2011

Managed Use — Season (From (mm/dd) / To (mm/dd))

(Fill in all that apply.)

- Hiker / Pedestrian
- Pack & Saddle
- Bicycle
- Wheelchair
- Motorcycle
- All Terrain Vehicle (ATV)
- _____
- Cross-Country Ski
- Snowmobile
- Dog Sled
- Skijoring
- _____
- Watercraft: Non-Motorized
- Watercraft: Motorized

Prohibited Use — From Date (mm/dd) / To Date (mm/dd)

(Check if applicable.)

- All Motorized Use

(Or fill in all that apply.)

- Hiker / Pedestrian
- Pack & Saddle
- Bicycle
- Wheelchair
- Motorcycle
- All-Terrain Vehicle (ATV)
- _____
- Cross-Country Ski
- Snowmobile
- Dog Sled
- Skijoring
- _____
- Watercraft: Non-Motorized
- Watercraft: Motorized

Other Use

(Optional: Check any that apply.) — Accept / Discourage / Eliminate

- Hiker / Pedestrian
- Pack & Saddle
- Bicycle
- Wheelchair
- Motorcycle
- All-Terrain Vehicle (ATV)
- _____
- Cross-Country Ski
- Snowmobile
- Dog Sled
- Skijoring
- _____
- Watercraft: NonMotorized
- Watercraft: Motorized

Special Considerations

(Check any that apply. Provide specifics and reference information below.)

- Accessible per Current Agency Guidelines
- Mechanized Tools or Equipment Prohibited
- Threat., Endang. or Sens. Species (☐Plant /☐Wildlife)
- Cultural Resource Present
- Easement across Non-Park Land (☐Existing /☐Needed)
- Existing Permit or Agreement (☐Trail-Specific /☐Area)
- _____

Remarks / Reference Information

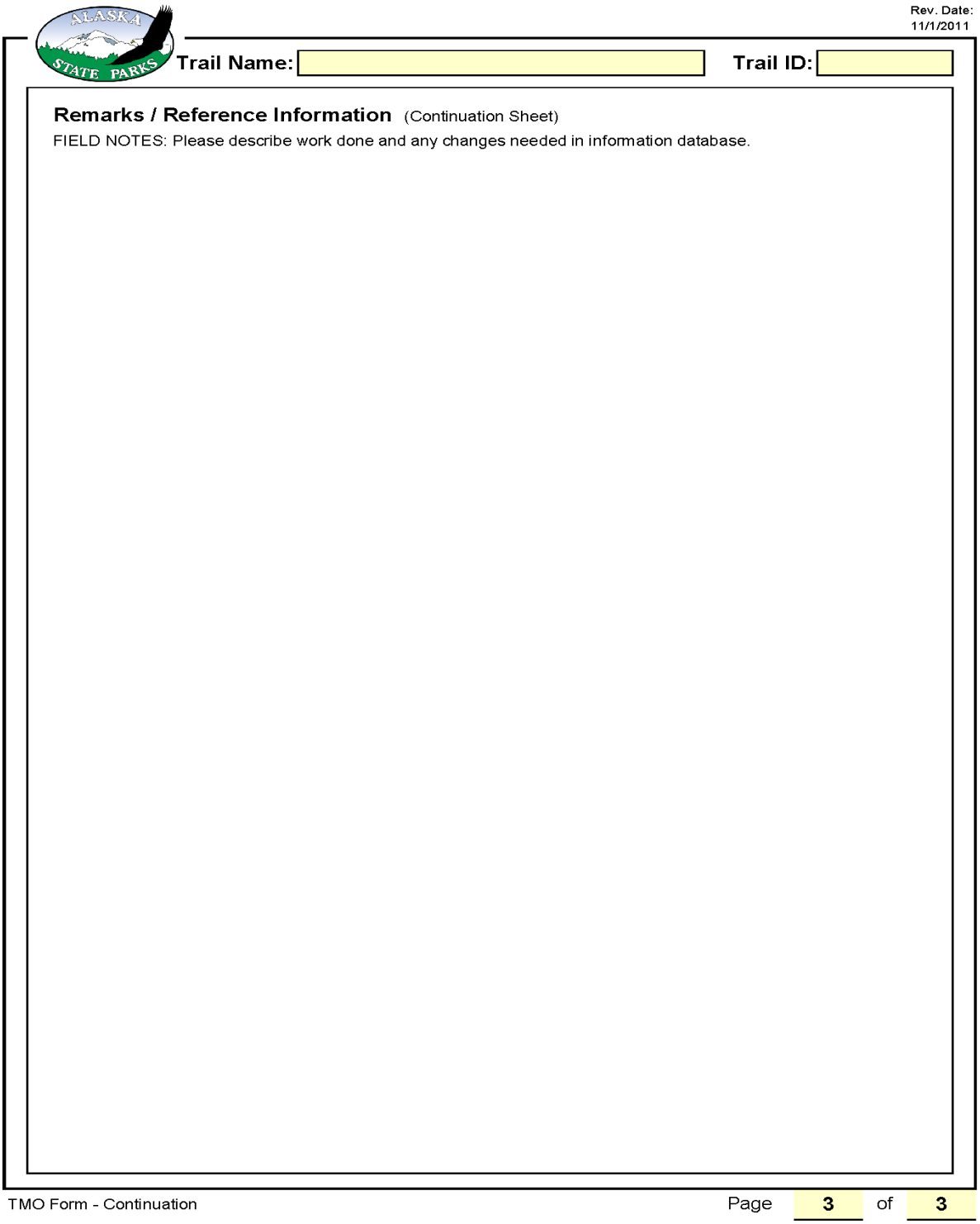
(Use continuation sheet if needed.)

Completed by: _____ Title: _____ Date: _____

Approved by: _____ Title: _____ Date: _____

TMO Form - Side 2 Page 2 of 3

1.2 Trail Management Objective Form Instructions



Rev. Date:
11/1/2011

Trail Name: Trail ID:

Remarks / Reference Information (Continuation Sheet)

FIELD NOTES: Please describe work done and any changes needed in information database.

TMO Form - Continuation Page 3 of 3

Area / Park Unit / District: Enter the *area* name, *park unit* name, and *district* name.

Trail Name and Trail ID: Enter the official *trail name* and *trail ID* number (if used).

Trail Beginning and Trail Ending Termini: Enter a brief narrative description identifying the location of *the trail beginning and trail ending termini*.

Beginning and Ending Mileposts: Enter the *beginning milepost* (or measure point) and the *ending milepost* for the trail.

Trail Inventory Length: Mileage accuracy should correspond to the method of collection (trail mileage source):

- If the actual length is unknown, or determined by vehicle, use no more than one decimal place of accuracy = 3.6.
- If the length was collected by GPS, use two decimal places = 3.64.
- If the length was wheeled with a cyclometer (mile-wheel), use one decimal places = 3.6.

Trail Mileage Source: Check the box that corresponds to the source of the mileage above.

1.2.1 TMO Trail Section:

A trail may have different TMOs for sections of the trail that are, or will be, managed differently. Normally this occurs when a TMO variable changes along distinct portions of the trail, like between junctions or destinations. Examples can include changes in *trail class*, *design parameters*, or *prohibited uses*.

If applicable, use the TMO Trail Section block to identify individual TMOs by trail section. If not applicable, leave this section blank.

Section #: Enter a number or letter to sequentially identify the trail section and corresponding TMO (i.e. Segment #: 1, 2, 3, etc.).

Section Beginning and Ending Termini: Enter a brief narrative description identifying the location of the *section beginning and ending termini* for this trail segment.

Section Beginning and Ending Milepost: Enter the *section beginning and ending milepost* (or measure point) for this trail segment.

1.2.2 Designed Use Objectives

Trail Type: A fundamental trail category that indicates the predominant trail surface or trail foundation, and the general mode of travel the trail accommodates.

The *trail type* differentiates between the three basic types of trails: ***terra*** (standard), ***snow***, or water.

- Assign one *trail type* for the trail.

Trail Class: The prescribed scale of trail development, representing the intended design and management standards of the trail.

- Assign the most appropriate *trail class* for the trail or trail segment. If more than one *trail class* is assigned to the trail, identify each *trail class* by individual trail segment (see *TMO trail section* above). Only one *trail class* may be applied to any trail or trail segment.

1.2.3 Difficulty Rating

The *difficulty rating* is the degree of challenge a trail presents to an average user's physical ability and skill, based on trail condition and route location factors such as alignment, steepness of grades, gain and loss of elevation, and amount and kind of natural barriers that must be crossed.

Assign a *difficulty rating* only for trails with a *designed use* of biking or cross-country skiing. Assign only one rating of the trail based on the criteria identified as follows:

a. ***Easiest***: Requiring little skill and challenge to traverse. Symbol: White circle with black outline.

b. ***Easy***: Requiring little skill and challenge to traverse. Symbol: Green circle.

c. ***Intermediate***: Requiring little skill and involving limited challenge to traverse. Symbol: Blue square.

d. ***Difficult***: Requiring some skill and involving some challenge to traverse. Symbol: Black diamond.

e. ***Most Difficult***: Requiring a high degree of skill and involving a high degree of challenge to traverse. Black double-diamond.

1.2.4 Elevation Gain/Loss

Enter the overall elevation changed along the trail or trail segment. If there is net gain in elevation, use the **+** (positive) symbol, if net loss in elevation, use the **–** (minus) symbol. Use the following formula:

- Highest Elevation Point (feet) – Lowest Elevation Point (feet) = Total Elevation Change

1.2.5 Level of Use

The *level of use* is an indicator of the levels of use on a trail or trail segment, to help establish and review scheduling for maintenance, patrols, and assessments. It can also help identify whether a trail is properly designed to accommodate target use levels.

- Enter use based on numbers of visitors per day. Also indicate the source of values, whether the numbers are estimated counts (*Est.*), actual counts (*Act.*), or some type of mechanical counter (*Counter*).

1.2.6 Designed Use

The *designed use* is the intended use that controls the desired design of the trail, and determines the subsequent maintenance parameters for the trail.

The *designed use* must be identified for each trail or trail segment. It identifies the single use or limiting factor that drives technical design parameters for the trail (i.e. tread width, grade, turning radius, etc.). The *designed use* is necessary to establish the trail's geometric design standards from which the trail is designed, constructed, operated, and maintained, While several *managed uses* may occur on the trail, there is only one *designed use* for any given trail or trail segment.

- Select only one *designed use* per trail or trail segment.

1.2.7 Design Parameters

Design Parameters are technical specifications for trail construction and maintenance, based on the *designed use* and *trail class*.

Design parameters identify the technical specifics that drive trail design, construction, maintenance, and subsequent reconstruction. Choose these carefully. Other criteria (backslope angle for example) are also important but are generally site-specific and require sound engineering judgment to fulfill the objectives.

- Assign a specific value for each of the *design parameter* variables listed. This is not intended to be an all-encompassing list of specifications, but a list of only the dominant criteria that most defines the geometric shape of the trail. If a range of values is listed on the *design parameters*, select a specific value that reflects the prescription for the trail.
- Add any additional fields and values that are deemed important to this specific segment of trail and are necessary for achieving the trail objectives.

1.2.8 Target Frequency

For routine maintenance tasks, each trail requires a recurring maintenance interval in order to keep it functional, stable, and useable. For example, brush grows at a certain rate and to keep a trail operational, the brush must be cut at regular intervals. These intervals are generally site or area-specific, and require local experience to define.

- For the applicable tasks, define the maintenance interval that best reflects the frequency necessary to keep this trail or trail segment to standard. Any period within that interval should be considered "to standard".

- The interval is expressed in years.

Examples:

Table 1.1 - Target Frequency

Task:	Frequency:	Recorded As:
Trail Opening	once every year	1.0
Brushing	once every 3 years	0.33
Logging Out	two times per year	2.0

1.2.9 Trail Use Strategies

Trail Use Strategies are very important to consider and are routinely overlooked. Establishing *trail use strategies* for each trail helps the manager balance the needs of conflicting uses, guides the manager on operational tradeoffs, and assists maintenance crews to efficiently target maintenance efforts to only necessary tasks.

Managed Use: The modes of travel that are actively managed and appropriate, considering the design and management of the trail.

Managed use indicates a management decision or intent to accommodate and/or encourage a specified type of trail use. Accommodating the *managed use* frequently results in user-specific trail maintenance and/or signing needs and costs. This if different from *designed use*, since a trail can have many *managed uses*. However, just because a trail can accommodate a particular type of use, does not mean this use should be checked – only those uses that are actively managed should be identified. For example, a winter trail may be passable by a hiker in the summer, but is not actively managed for that use since it would require very different development standards to make it sustainable during the summer season.

- Record any use that is actively managed on the trail or trail segment.
- There may be more than one *managed use* per trail or trail segment.

Season: The *managed use season* specifically defines the period of the time that the trail is available and managed in a safe condition for the defined user. It is intended to bracket the times that the park is responsible for providing that opportunity.

Examples:

- One obvious example would be when the trail is covered by snow and outside of the *managed use season*. During this time, the park does not intend to provide an accessible tread as this would require snow removal and is not part of the managed trail opportunity. Conversely, during the defined *managed use season*, the park intends to maintain the accessible tread in a safe and functional condition.

- A less obvious example would be if the trail has a "*hiker/pedestrian*" *managed use* defined with a *managed use season* of use from March 1 to November 15. In this case, the park would be responsible for providing stream crossings during high water in June (i.e. trail bridges). Changing the *managed use season* of use for the same example to June 30 to November 15, thus bypassing the June run-off, would alleviate this conflict and clearly define management expectations.

Prohibited Use: Mode of travel prohibited by official legal order.

- Record any use that is prohibited by an official prohibition or closure order.
- Document the dates during which the use is prohibited.
- Footnote and cite the specific statute, regulation, or director's order under *remarks / reference information*.
- If the dates are condition-specific (such as snowfall dependent), enter "typical" dates and footnote that in the *remarks / reference information* section below

Other Use: This section is provided to document additional trail-specific information as needed.

- Check whether the use is *accepted* (allowed, while not actively managed for), *discouraged*, or *eliminated*.

1.2.10 Special Considerations

Use this area to identify any additional considerations that trail managers, design, construction, or maintenance personnel should be aware of.

- Check any special considerations for the trail or trail segment; mark an appropriate clarifier within parentheses if applicable.

1.2.11 Remarks / Reference Information

Use this area to provide additional information or clarification, or to cite reference decisions and materials related to information documented earlier in the TMO. When clarifying information documented in previous sections of the TMO, it is recommended that a footnote be added next to the TMO entry, followed by a footnoted explanation in the *remarks / reference* section.

Example:

Footnoted Items in TMO Sections

Design Parameters

Basic Tread Width, inches	24"[1]

Maintenance Frequency

Trail Opening	1[2]

Special Considerations

Threatened, Endangered, or Sensitive Species Present	X[3]

Footnote Explanations in Remarks:

Remarks / Reference Information

[1] Tread width exceptions allowed at existing wood trail structures.
[2] Complete annual trail opening by 6/15.
[3] Orange Hawkweed, invasive plant located in first mile of trail; refer to 3/15/2006 for Smith Ridge Trail for mitigation purposes.

Figure 1.2 – Footnotes / Remarks

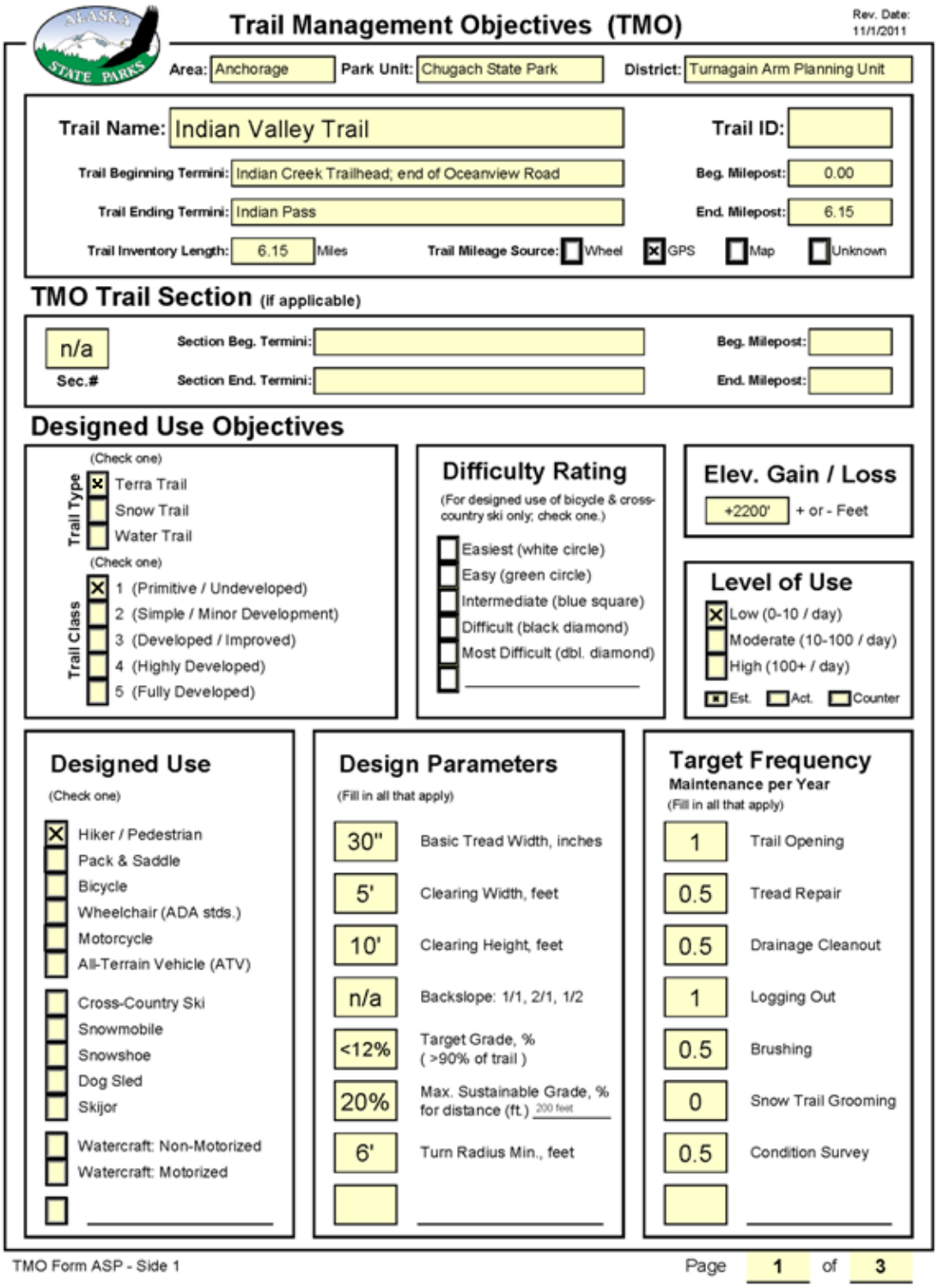
1.2.12 Manager Approval

Having the area manager approve the *trail management objectives* is essential. A properly completed TMO form documents and clarifies management direction across all levels and expectations for a trail. An approved TMO provides the trail manager and the trail maintenance crews with the key tool they need to confidently work on the trail without having to second-guess operational and maintenance choices.

The TMO establishes the base standards against which trail condition surveys and prescriptions are measured and completed. It also ensures a management framework of continuity and consistency over time and through personnel changes.

An example of a completed TMO is given on the following pages.

1.3 Trail Management Objectives Form: Example



Trail Management Objectives (TMO)

Rev. Date: 11/1/2011

Area: Anchorage | Park Unit: Chugach State Park | District: Turnagain Arm Planning Unit

Trail Name: Indian Valley Trail | Trail ID:

Trail Beginning Termini: Indian Creek Trailhead; end of Oceanview Road | Beg. Milepost: 0.00

Trail Ending Termini: Indian Pass | End. Milepost: 6.15

Trail Inventory Length: 6.15 Miles | Trail Mileage Source: ☐ Wheel ☒ GPS ☐ Map ☐ Unknown

TMO Trail Section (if applicable)

n/a (Sec.#) | Section Beg. Termini: | Beg. Milepost:

Section End. Termini: | End. Milepost:

Designed Use Objectives

Trail Type (Check one)
- ☒ Terra Trail
- ☐ Snow Trail
- ☐ Water Trail

Trail Class (Check one)
- ☒ 1 (Primitive / Undeveloped)
- ☐ 2 (Simple / Minor Development)
- ☐ 3 (Developed / Improved)
- ☐ 4 (Highly Developed)
- ☐ 5 (Fully Developed)

Difficulty Rating

(For designed use of bicycle & cross-country ski only; check one.)
- ☐ Easiest (white circle)
- ☐ Easy (green circle)
- ☐ Intermediate (blue square)
- ☐ Difficult (black diamond)
- ☐ Most Difficult (dbl. diamond)
- ☐ _____

Elev. Gain / Loss

+2200' + or - Feet

Level of Use
- ☒ Low (0-10 / day)
- ☐ Moderate (10-100 / day)
- ☐ High (100+ / day)

☒ Est. ☐ Act. ☐ Counter

Designed Use (Check one)
- ☒ Hiker / Pedestrian
- ☐ Pack & Saddle
- ☐ Bicycle
- ☐ Wheelchair (ADA stds.)
- ☐ Motorcycle
- ☐ All-Terrain Vehicle (ATV)
- ☐ Cross-Country Ski
- ☐ Snowmobile
- ☐ Snowshoe
- ☐ Dog Sled
- ☐ Skijor
- ☐ Watercraft: Non-Motorized
- ☐ Watercraft: Motorized
- ☐ _____

Design Parameters (Fill in all that apply)

30"	Basic Tread Width, inches
5'	Clearing Width, feet
10'	Clearing Height, feet
n/a	Backslope: 1/1, 2/1, 1/2
<12%	Target Grade, % (>90% of trail)
20%	Max. Sustainable Grade, % for distance (ft.) 200 feet
6'	Turn Radius Min., feet

Target Frequency
Maintenance per Year (Fill in all that apply)

1	Trail Opening
0.5	Tread Repair
0.5	Drainage Cleanout
1	Logging Out
0.5	Brushing
0	Snow Trail Grooming
0.5	Condition Survey

TMO Form ASP - Side 1 Page 1 of 3

Figure 1.3 - Trail Management Objectives Form: Example

Trail Management Objectives (TMO) Part 2

Trail Use Strategies

Rev. Date: 11/1/2011

Managed Use

(Fill in all that apply.)	Season From (mm/dd)	Season To (mm/dd)
☒ Hiker / Pedestrian	05/01	09/30
☒ Pack & Saddle	05/01	09/30
☐ Bicycle		
☐ Wheelchair		
☐ Motorcycle		
☐ All Terrain Vehicle (ATV)		
☐ _____		
☒ Cross-Country Ski	09/30	05/01
☐ Snowmobile		
☐ Dog Sled		
☐ Skijoring		
☐ _____		
☐ Watercraft: Non-Motorized		
☐ Watercraft: Motorized		

Prohibited Use

(Check if applicable.)	From Date (mm/dd)	To Date (mm/dd)
☒ All Motorized Use		
(Or fill in all that apply.)		
☐ Hiker / Pedestrian		
☐ Pack & Saddle		
☒ Bicycle		
☒ Wheelchair		
☒ Motorcycle		
☒ All-Terrain Vehicle (ATV)		
☐ _____		
☐ Cross-Country Ski		
☒ Snowmobile		
☐ Dog Sled		
☐ Skijoring		
☐ _____		
☐ Watercraft: Non-Motorized		
☐ Watercraft: Motorized		

Other Use

(Optional: Check any that apply.)	Accept	Discourage	Eliminate
☒ Hiker / Pedestrian	☒	☐	☐
☒ Pack & Saddle	☒	☐	☐
☐ Bicycle	☐	☐	☐
☐ Wheelchair	☐	☐	☐
☐ Motorcycle	☐	☐	☐
☐ All-Terrain Vehicle (ATV)	☐	☐	☐
☐ _____	☐	☐	☐
☒ Cross-Country Ski	☒	☐	☐
☐ Snowmobile	☐	☐	☐
☐ Dog Sled	☐	☐	☐
☐ Skijoring	☐	☐	☐
☐ _____	☐	☐	☐
☐ Watercraft: NonMotorized	☐	☐	☐
☐ Watercraft: Motorized	☐	☐	☐

Special Considerations

(Check any that apply. Provide specifics and reference information below.)

- ☐ Accessible per Current Agency Guidelines
- ☐ Mechanized Tools or Equipment Prohibited
- ☐ Threat., Endang. or Sens. Species (☐Plant /☐Wildlife)
- ☒ Cultural Resource Present
- ☐ Easement across Non-Park Land (☐Existing /☐Needed)
- ☐ Existing Permit or Agreement (☐Trail-Specific /☐Area)
- ☐ _____

Remarks / Reference Information

(Use continuation sheet if needed.)

Cultural resources under review. Access heavily used during the fall moose hunt in Ship Creek Valley. Trail needs to be built to allow horse crossing of the five streams so they do not use the bridges. Current trail location in unsustainable beyond the first bridge. New alignment will move trail up on west slope of valley bottom. Area has high level of spruce bark beetle kill. Used in winter for Arctic to Indian traverse.

Completed by: T. Crocket Title: Park Ranger I Date: 11/1/11

Approved by: M. Wedeking Title: Chief Ranger Date: 11/1/11

TMO Form - Side 2 Page 2 of 3

Rev. Date:
11/1/2011

Trail Name: Indian Valley Trail **Trail ID:**

Remarks / Reference Information (Continuation Sheet)

FIELD NOTES: Please describe work done and any changes needed in information database.

Trail Crew Work Notes:

2008 Season
-CSP crew 2 weeks
-SAGA crew 25 days
-Turnpike built
-First bridge replacement
-Four loads of gravel

2009 Season
-SAGA crew 10 days
-Two loads of gravel

TMO Form - Continuation Page 3 of 3