

PROJECT MANAGEMENT PLAN

Unstable Slope Criteria Project:

Object-Based Mapping with High Resolution Topography

Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform

Empirical Evaluation of Shallow Landslide Runout

03/08/2022

PROJECT MANAGEMENT PLAN OVERVIEW

The Project Management Plan breaks down project work into logical steps to help provide a framework to efficiently allocate resources, reliably estimate project costs, and help guide schedule, budget development and project scope. Previously in the CMER Protocols and Standards manual (PSM), this document was titled an implementation plan. The Project Management Plan documents and tracks the progress of a CMER project through its various stages. The contents of the Project Management Plan will vary depending on the type and complexity of the project. The Project Team is the primary audience for the Project Management Plan; however, UPSAG/CMER members are encouraged to provide feedback on the plan.

OVERSITE COMMITTEE: Upland ~~Process~~Processes Science Advisory Group (UPSAG)

PROJECT TEAM MEMBERS

Name, Title, Affiliation, Contact Info	Roles and Responsibilities
Greg Stewart, CMER (NWIFC) gstewart@nwifc.org	Principal Investigator
Dan Miller (M ² Environ.) dan@m2environmentalservices.com	Principal Investigator
Lori Clark, DNR Lori.clark@dnr.wa.gov	Project Manager
Ted Turner (Weyerhaeuser) ted.turner@weyerhaeuser.com	Scientific Advisor
Julie Dieu julie.dieu@rayonier.com	Scientific Advisor

BACKGROUND

The Unstable Slope Criteria Project is part of the Cooperative Monitoring, Evaluation, and Research (CMER) Committee's Mass Wasting Effectiveness Monitoring Program. The Unstable Slopes Criteria Project consists of five distinct phases that were outlined within the CMER and Policy approved scoping document "Unstable Slope Criteria Project – Research Alternatives". This implementation plan addresses **only** phase 2 "Object-based Landform Mapping" and is in coordination with the CMER and ISPR approved study design "Unstable Slope Criteria Project: Study Design for Object-based Mapping with High-Resolution Topography^[TT1]". **In addition, it addresses phase 3 "Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform" and phase 4 "Empirical Evaluation of Shallow Landslide Runout." As of the current date of this PMP, a study design is being drafted for each of phase 3 and phase 4.**

Washington Administrative Code (WAC) Section 222-16-050(1)(d)(i) lists the five rule-identified landforms (RIL) and directs the reader to Section 16 of the board manual where the RIL and their criteria are described in detail. The 2015 CMER Work Plan states that the Unstable Slope Criteria Project will evaluate the degree to which the landforms described in the unstable slopes rules and board manual identify potentially unstable areas with a high probability of impacting public resources and public safety.

Current RIL definitions and criteria are based on landforms and processes that are inferred to yield relatively high landslide densities, are influenced by forest practices, and have the highest likelihood for sediment delivery and probable significant adverse impact. They were developed from field observations, regional research, and watershed analysis data collected from various sources and methods. Observations of storm-induced landslides that have occurred since the current rules were implemented have shown that a sizable proportion [JFM2] of delivering hillslope landslides may originate from terrain that does not meet RIL criteria. Likewise, ~~as highlighted by the SR 530 landslide [JFM3] which occurred on March 22, 2014 while models have been built that predict maximum runout potential,~~ there are no explicit criteria for assessing delivery to public resources or risk to public safety. [TT4]

This project will evaluate the degree to which the landforms described in the unstable slopes rules identify potentially unstable areas with a high probability of impacting public resources and safety. The project will be designed to evaluate the original Forests & Fish Report Schedule L-1 research topic: "Test the accuracy and lack of bias of the criteria for identifying unstable landforms in predicting areas with a high risk of instability". The project replaces the Testing the Accuracy of Unstable Landform Identification Project, based on feedback from Policy at the November 2010 meeting. At that meeting, UPSAG presented two interpretations of the original Forests & Fish Report Schedule L-1 topic and asked for direction as to how to proceed and prioritize efforts. UPSAG understood Policy's direction was to evaluate the landslide susceptibility of different slopes/landforms in the interest of evaluating current rule-identified landforms and identifying/characterizing additional potentially unstable landforms.

The TWIG developed a study design alternatives document to provide the scientific design options for this CMER project. At a minimum it provides the project purpose, objectives, alternative technical approach/experimental designs, general methods, schedule, and budget.

The Unstable Slopes Criteria Project consists of five distinct studies approved by Policy in April 2017:

1. Compare/Contrast Landslide Hazard Zonation (LHZ) Mass Wasting Map Units with RIL (this project will be incorporated into subsequent projects per ISPR review comments).
2. Object-Based Landform Mapping with High-Resolution Topography
3. Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform
4. Empirical Evaluation of Shallow Landslide Runout
5. Models to Identify Landscapes/Landslides Most Susceptible to Management

The Project Team is currently working on Project 2, Object-Based Landform Mapping with High-Resolution Topography Study, implementation. Study Designs for Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform (Project 3) and the Empirical Evaluation of Shallow Landslide Runout (Project 4) are being developed using information learned in the Object-Based Landform Mapping with High-Resolution Topography Study.

PROJECT MILESTONES AND TASKS

Project Milestones	Dates by Fiscal Year (Actual* or Estimated)			
	2021	2022	2023	2024
Update Charter		Dec 2021 – March 2022		
Project Management Plan		March - April 2022[JFM5]		
Draft Object-Based Landform Mapping with High-Resolution Topography Report		May 2022		
Object-Based Landform Mapping with High-Resolution Topography Report Editing and Revision		May - June 2022		
<u>Draft Study Designs for the Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform (Project #3) and Empirical Evaluation of Shallow Landslide Runout (Project #4).</u>		May-June 2022[JD6]		
Concurrent UPSAG/CMER review of Draft Study Design for the Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform (Project #3) and Empirical Evaluation of Shallow Landslide Runout (Project #4).		June-July 2022		
Object-Based Landform Mapping with High-Resolution Topography Report Finalization and Approval (UPSAG)		May – July 2022		
Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform and Frequency by Landform (Project #3) and Empirical Evaluation of Shallow Landslide Runout (Project #4) Study Design Finalization and Approval (<u>UPSAG/CMER</u>)			July-August 2022	
Object-Based Landform Mapping with High-Resolution Topography Report Presentation and Approval (<u>CMER/SAGUPSAG/CMER</u>)			June-July 2022	

ISPR of CMER Approved Object-Based Landform Mapping with High-Resolution Topography Report			July-September 2022	
ISPR of CMER Approved Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform and Frequency by Landform (Project #3) and Empirical Evaluation of Shallow Landslide Runout (Project #4) Study Design			August-November 2022	
ISPR Approved Object-Based Landform Mapping with High-Resolution Topography Report Presentation and Approval (CMER)			September/October 2022	
Object-Based Landform Mapping with High-Resolution Topography Report 6 Q Development & Review (PT/UPSAG)			November-December 2022	
ISPR Approved Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform (Project #3) and Empirical Evaluation of Shallow Landslide Runout (Project #4) Presentation and Approval (CMER)			November/December 2022	
Object-Based Landform Mapping with High-Resolution Topography Report 6Q CMER Revisions & Approval			Jan-Feb 2023	
CMER and ISPR Approved Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform (Project #3) and Empirical Evaluation of Shallow Landslide Runout (Project #4) Study Design Presentation and Approval (Policy)			March 2023	
Object-Based Landform Mapping with High-Resolution Topography Report 6Q and Findings Report to Policy			March 2023	
Implementation of Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform (Project #3) and			July 2023-June 2024	

Empirical Evaluation of Shallow Landslide Runout (Project #4)				
Models to Identify Landscapes/Landslides Most Susceptible to Management Study Design				Dec 2023-Feb 2024
UPSAG review of Models to Identify Landscapes/Landslides Most Susceptible to Management Study Design				Feb-March 2024
CMER review of Models to Identify Landscapes/Landslides Most Susceptible to Management Study Design				April-May 2024
Models to Identify Landscapes/Landslides Most Susceptible to Management Study Design Finalization and Approval				June 2024

PROJECT DELIVERABLES

Task/Deliverable	Responsible Team Member	Estimated Completion Date
Update Charter	Clark	March 2022
Project Management Plan	Clark	April 2022
Object-Based Landform Mapping with High-Resolution Topography Final Report (UPSAG, CMER, and ISPR approved)	Stewart	September/October 2022
Draft Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform (Project #3) and Empirical Evaluation of Shallow Landslide Runout (Project #4) Study Design	Miller	April 2022
Final Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform (Project #3) and Empirical Evaluation of Shallow Landslide Runout (Project #4) Study Design	Miller	July 2022
Object-Based Landform Mapping with High-Resolution Topography Report 6 Questions Document	Stewart, Miller & Project Team	Dec 2022 – Jan 2023
Object-Based Landform Mapping with High-Resolution Topography	Stewart, Miller & AMPA	March 2023

Findings Report and Final Report Presentation to TFW Policy		
Models to Identify Landscapes/Landslides Most Susceptible to Management Study Design	Miller	November 2023
Quarterly Progress reports	Stewart & Miller	September 31 st , December 31 st , March 31 st , and June 30 th .

PROJECT TEAM MEMBERS

Name, Title, Affiliation, Contact Info	Roles and Responsibilities ^[JD7]
Lori Clark, Project Manager, DNR	<ul style="list-style-type: none"> • Monitors project activities and the performance of the Project Team. • Communicates progress, problems, and problem resolution to the Adaptive Management Program Administrator (AMPA), CMER, and UPSAG. • Works with UPSAG/CMER, and Project Team to manage Project Charter and other managing documents, and keeps them updated. • Works with the AMPA, UPSAG/CMER, and Project Team to monitor contract performance, and provide input on budgeting, schedule, scope changes, and contract amendments. • Works with UPSAG, CMER, and Project Team to resolve problems and build consensus • Works with PI and Project Team to develop interim and final draft reports. • Ensures communication between team members is clear, concise, and consistent. • Coordinates technical reviews and responses in a timely fashion. • Facilitates archiving of data and documents. • Ensures that contract provisions are followed. • Provides direction and support to the Project Team to achieve clear and specific scopes of work, schedules, and budgets within approved contracts. • Maintains sole responsibility for all aspects of project management even if other individuals are completing or helping complete parts of the project.
Greg Stewart, CMER Scientist/Principal Investigator	<ul style="list-style-type: none"> • Executes the technical and scientific components of the project. • Provides materials needed by the PM. • Prepares quarterly summary and progress reports of project status. • Conducts field data collection, hires staff and purchases supplies and equipment to support data collection. • Develops summaries and conducts statistical analyses to inform Final Report development. • Leads in the development and writing of the Final Report and Six Questions for Policy. • Presents study progress and/or findings to UPSAG, CMER, and Policy. • Communicates project status and issues to the PM and Project Team. • Coordinates project meetings as needed.
Dan Miller, Principal Investigator	<ul style="list-style-type: none"> • Principle investigator for the Empirical Evaluation of Shallow Landslide Susceptibility and Frequency by Landform <u>and Empirical Evaluation of Shallow Landslide Runout study designs.</u>Study Design.
Project Team Members:	<ul style="list-style-type: none"> • <u>Assist with finding solutions to technical issues that arise during scoping, study design development and project implementation.</u>

<p>Julie Dieu Ted Turner</p>	<ul style="list-style-type: none">• <u>Provide expertise needed for successful completion of scoping, study design and implementation.</u>• <u>Assist with writing technical documents such as: project charter, communication plan, scoping document, study design, prospective 6 questions document, project management plan, and interim and/or final findings reports.</u>• <u>Provide constructive and timely feedback on project documents.</u>• <u>Assist as needed with communicating project information to UPSAG and CMER.</u>• <u>Participate in project meetings and conference calls as needed.</u> <p><u>Assist as needed with implementation tasks at the direction of the Principle Investigator.</u> Supports the technical and scientific components of the project.</p> <ul style="list-style-type: none">• Provides technical expertise for successful implementation of project components.• Assists with review of Final Report and Six Questions for Policy [TT8][JFM9].• Participate in project meetings and conference calls.
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PROJECT CONSTRAINTS AND ASSUMPTIONS

Project constraints are limiting factors (internal or external) that affect the initiation, planning, execution, monitoring & control, and close-out of a project. Constraints restrict or dictate the actions of the project team. There are four specific constraint types that will be considered herein: schedule constraints, budget constraints, human resource constraints, and resource constraints. Assumptions on the other hand are factors in the planning process that are considered to be true, real, or certain, without proof or demonstration and are outside the total control of the project team.

Schedule constraints:

There are no specific schedule constraints at this time.

Budget constraints:

There are no specific budget constraints at this time.

Human resource constraints:

- The implementation of this project will primarily be executed internally, with the majority of the study tasks being completed by a CMER Scientist. Limited contracting will occur to provide technical assistance to the CMER Scientist in study design, project execution, data analysis and report review and revision.

Resource constraints:

There are no specific resource constraints at this time.

Project assumptions:

The following are key assumptions for implementation of this project:

- The core members of the Project Team stay on the team throughout the majority of the project.
 - If a core member were unavailable, time could be lost in replacing them.
 - Loss of certain expertise could limit or slow the ability to execute some portions of the study design.
- Funding for the project remains stable.

A separate Risk Management Plan will not be developed unless one of these constraints or assumptions occurs or if one is deemed necessary. The process for developing a detailed Risk Management Plan is outlined in section 7.11 of the CMER Protocols and Standards Manual (PSM). A Risk Management Plan identifies potential actions to avoid, reduce, and/or mitigate impacts to a project.

DECISION-MAKING AUTHORITY

The Forest Practice Board (Board) has approval authority over proposed CMER projects, annual work plans, and expenditures. The Board manages the Timber, Fish and Wildlife Policy Committee (Policy), the Cooperative Monitoring, Evaluation, and Research (CMER) Committee, and the Adaptive Management

Program Administrator (AMPA) to assist with the Board’s directives. Policy assists the Board by providing guidance to CMER and recommendations on adaptive management issues. CMER is responsible for understanding available scientific information that is applicable to the questions at hand, selecting the best and most relevant information and synthesizing it into reports for Policy and the Board. The AMPA coordinates the flow of information between Policy and CMER according to the Board’s directives. Decision-making authority described in this section needs to be consistent with CMER process and ground rules per the Board Manual section 22.

Decisions related to science and/or technical items is the responsibility of the PIs and the Project Team. If needed, decisions for scientific and/or technical items could be expanded to include UPSAG and CMER^[TT10][JFM11]. Final documents will be prepared by the ~~project~~ Project team Team and then reviewed and approved by UPSAG, CMER, Independent Scientific Peer Review (ISPR), and Policy. ^[TT12]Although the PM will assist in the facilitation of the discussion and decision making process, the PM will not be directly involved in decisions related to science and/or technical items.

Decisions related to contractual (scope of work, RFQQ, contract process, contractor interaction, etc.) and budgetary items is the responsibility of the PM along with input from the Project Team. Requests for additional funding will be approved by the PM and Project Team and sent to UPSAG and CMER for formal approval. Minor budgetary or contractual items will be handled directly by the PM with notification provided to the Project Team. Major budgetary or contractual items will be decided between the PM, Project Team, and AMPA. If needed, decision making for budgetary items may require CMER and/or Policy input and/or approval.

PROJECT RESOURCE NEEDS

Project Resource	Quantity
Computer/laptop	1
LIDAR	TBD

PROJECT BUDGET

Breakdown by Project	FY 22 Budget	FY 23 Budget	FY 24 Budget	FY 25 Budget	FY 26 Budget	FY 27 Budget	Total Budget
Object-based Based landform mapping <u>Landform</u> mapping <u>Mapping</u>	\$4,840						\$4,840
<u>Shallow landslide</u> susceptibility <u>Landslide</u> susceptibility <u>Susceptibility</u>	\$50,000	\$100,000	<u>\$10,000</u> \$78,960	<u>\$10,000</u> \$25,000	-	-	<u>\$170,000</u> \$203,960

Shallow landslide <u>Landslide</u> Runout		\$50,000	\$10,000 \$100,000	\$10,000 \$25,000	-	-	\$70,000 \$175,000	Total
Mgt Susceptibility M modeling			\$25,000 \$25,000	\$25,000 \$100,000	\$75,000 \$75,000	\$25,000 \$25,000	\$150,000 \$225,000	
Total Budget	\$54,840	\$150,000	\$45,000 \$203,960	\$45,000 \$150,000	\$75,000 \$75,000	\$25,000 \$25,000	\$394,840 \$658,800	

Project Budget (FY22-27): \$658,800

PROJECT SITES

The automated mapping methodology will first be developed and applied for a limited pilot area, using high-quality MWMU mapping for the North Fork Calawah WAU. The Mass Wasting Reanalysis performed for this WAU provides detailed landform maps that have been well vetted through extensive field transects (see Figure 2; Dieu, 2015). Ability of the developed techniques to accurately reproduce these maps will provide a good test of the applicability of automated landform mapping for hazard assessment.

~~After landform mapping rules and methods are developed for the pilot study area, the project team will apply and evaluate them in three additional LHZ areas with high quality LiDAR data and MWMU maps^[TT13]. The project team will seek to select training and testing areas in significantly different soil, hydro and eco-geomorphic conditions, although the range of environments that can be included will be constrained by the location of available LHZ and LiDAR data. If they find the model does not adequately represent landforms in the LHZ areas, the project team will adjust model parameters as needed.~~

~~Project sites for phases 3 and 4 will be determined as those study designs are developed.~~^{[JFM14][JD15]}

COMPANION CMER DOCUMENTS

Document	Completion Date (Actual* or Estimated)
Unstable Slope Criteria Project – Research Alternatives	Feb 27, 2017
Unstable Slope Criteria Project: Study Design for Object-Based Mapping with High-Resolution Topography	Sept 26, 2019
Unstable Slope Criteria Project Charter	May 2022

*Use asterisk to distinguish actual dates.

PROJECT COMMUNICATION OVERVIEW

Transparent and accurate communication between the different adaptive management parties (Project Team/UPSAG/CMER/AMPA/TFW Policy) is critical for the AMP to guide and oversee the work of the Project Team. This section provides a framework to manage and coordinate the communications needed for all phases of a project. If a separate Communication Plan is needed for a project, see section 7.6 of the PSM for detailed guidelines. Two primary pathways exist for project communication to occur when working on CMER

projects - 1) between the Project Team and project oversight committees (i.e., SAGs/CMER/TFW Policy), and 2) communication within the Project Team.

PROJECT OVERSIGHT COMMITTEE COMMUNICATION

This section covers communication between the Project Team and the project oversight committees (i.e., UPSAG/CMER/TFW Policy). Project oversight communication includes three categories of documents/communication: 1) Project management documents that enable oversight committees to understand how projects will be managed, 2) Project tracking and communication to enable the oversight committee(s) to track project progress and provide guidance and approvals to move projects forward, and 3) communication with contractors.

1. Project management documents

The PM is the lead author for the Project Charter, Project Management Plan, and other project management documents. If the Principal Investigator (PI) has been identified at the time of project launch, the PM will work with the PI to draft the Project Charter and Project Management Plan, in consultation with the oversight committee.

Project Management Documents*	Primary Author	Collaborators	Final Approval	Primary Audience
Project Charter	PM	Project Team	CMER and TFW Policy	Project Team, UPSAG, CMER, and TFW Policy
Project Management Plan (including communication and risk sections)	PM	Project Team	CMER	Project Team, UPSAG, and CMER
Document Management and closure plan	PM	PI	N/A	Project Team, UPSAG, and CMER

*For details regarding these documents, see PSM Section 7.6

2. Project tracking and guidance documents

The PM is responsible for ensuring that all reporting tasks are complete and provided on schedule. When preparing progress reports, the PI is responsible for providing detailed and comprehensive costs, schedule, and project updates, in writing, to the PM consistent with prior written agreement. The PM, in turn, is responsible for summarizing project update information into progress reports, and presenting these progress reports to UPSAG and CMER per the project schedule or as requested by UPSAG or CMER. The PM may delegate preparation or presentation of progress reports to the PI or other Project Team members, with their consent.

Project Tracking/Guidance Documents*	Primary Author	Collaborators	Final Approval	Primary Audience
Project updates	PM	PI	N/A	Project Team, UPSAG, CMER, and TFW Policy

CMER quarterly and annual project progress reports	PM	PI	N/A	UPSAG and CMER
CMER Requests	PM	Project Team	CMER	CMER
TFW Policy Requests/Check-ins	AMPA	Project Team	CMER	TFW Policy
Public Presentations	PI/PM	Project Team	N/A	Public

*For details regarding these documents, see PSM Section 7.6

3. Contractor Communications

In all cases, the PM is primarily responsible for facilitating open and transparent communication between contractor(s) and project oversight committee(s) members. Committee members should generally not directly communicate with the contractor(s) about substantive project elements outside of formally organized meetings, conference calls, or PM-facilitated group e-mail discussions, unless specifically authorized in pre-established contract terms, or approved in advance to do so by the PM. The PM may verbally grant authorization, and the rest of the Project Team and oversight committee members should be informed when this occurs. The PM is responsible for informing the contractor(s) of this policy as well.

INTRA-PROJECT TEAM COMMUNICATION

The PM provides assistance to Project Team members by coordinating communication (e.g., one-on-one and group meetings, conference calls, etc.) when needed as well as maintaining the e-mail distribution list for the Project Team. The PM also ensures that any communication resulting in a formal decision about the project occurs in a transparent and inclusive way.

The PI is responsible for preparing and writing technical reports for CMER. How the PI communicates and works with other Project Team members to produce these documents will vary based on the nature of the project and dynamics of the Project Team. The PI works together with the PM to coordinate communication with other team members as needed.

Communication by individual team members includes participation at meetings and conference calls, providing feedback on draft documents, researching specific topics/issues, taking the lead on writing report sections, and/or acting as co-author(s) of CMER documents. The expectation is that Project Team members, including PMs and PIs, who communicate outside of normal project meetings, conference calls, and other venues will share substantive, project-related conversations they have with the rest of the Project Team. For additional details regarding project team communication see PSM section 7.6.3.

COMMUNICATION STRUCTURE



