



MEMORANDUM

March 31, 2016

TO: Adrian Miller, TFW Policy Co-Chair

FROM: Hans Berge, Adaptive Management Program Administrator

SUBJECT: Recommendations for Implementing the Unstable Slopes Proposal Initiation

On 10 February 2016, the Forest Practices Board accepted a Proposal Initiation (PI) from the Department of Natural Resources to address issues raised by the Conservation Caucus (CC) in written material and testimony at the 10 November 2015 meeting. The ensuing motion from the meeting is captured as follows:

“Carmen Smith moved, the Forest Practices Board forward the Proposal Initiation for Unstable Slopes to the Adaptive Management Program Administrator to initiate Adaptive Management Program review. She further moved, the Board direct TFW Policy Committee to provide to the Board at their May 2016 meeting an Adaptive Management Program work plan and timeline for review of the items in the Proposal Initiation and completion of recommendations for further actions to the Board.”

The specific components of the PI are focused on concerns raised from the CC regarding the development of Board Manual Section 16, “Guidelines for Evaluating Potentially Unstable Slopes and Landforms.” Pursuant to Board Manual Section 22, the proposal contained all of the information required for consideration in the Adaptive Management Program (AMP), including recommended tasks that appeared to be necessary to address the PI components.

The first step in the AMP evaluation of the PI is to determine the applicability to the AMP by assessing management and resource implications. Following the criteria set forth on page 8 of Board Manual Section 22, it is clear that this proposal fits the criteria and will inform rules, guidance, and/or a DNR product; in this case Board Manual Section 16.

In Board Manual Section 22, the process for the AMP specifically identifies two tracks for proposal development: scientific or policy (Board Manual M22-9 and 10). From the Board Manual, the following direction is given:

*“The **science track** evaluates currently available science, collects new information through research and monitoring, and synthesizes the best available information into a technical summary for Policy consideration.”*

*“Proposals seeking to change or clarify policies or change the way existing science is implemented in the rules are directed toward the **policy track**.”*

After reviewing the proposal, it is clear that a two part approach will be necessary to appropriately address all six elements of the PI. Within almost every component there are both “policy” and “science” tasks that are necessary. I have summarized my recommendations in the same format as the PI to address each component and subsequent task and included proposed timelines to complete each task.

Component 1: *Non-glacial deep-seated landslides, concerns are contained in Attachment 4, memo authored by David Montgomery, dated November 9, 2015, to the Board outlining requested “Revisions to Guidelines for Evaluating Potentially Unstable Slopes”*

Task: Address the following questions.

Track: Science

1. Should all deep-seated landslides be added as rule-identified landforms found in WAC 222-16-050(1)(d)(A) – (E), Class IV-special?

Approach: This question should be brought to UPSAG first. UPSAG should recommend whether or not a study is warranted or if the work can be accomplished through a thorough literature review. UPSAG would then bring a proposal to Policy.

Timeline: It depends upon the task identified by UPSAG. As little as two months for a literature review or up to nine months for a study.

2. A. Is further guidance needed for evaluating and assessing reactivation potential for all dormant or relict deep-seated landslides and any associated groundwater? If yes, should an assessment be required?

B. Do non-glacial deep- seated landslides have associated groundwater recharge areas? If yes, should an assessment for influence on the deep-seated landslide from the groundwater recharge area be required?

Approach: Both parts of question 2 should be brought to UPSAG and a recommendation should be brought to Policy.

Timeline: It depends upon the approach UPSAG takes, but it should take no more than six months.

Component 2: *Deep-seated Landslide Reactivation (Reactivation), letter Attachment 4, memo authored by David Montgomery, dated November 9, 2015, to the Board outlining requested “Revisions to Guidelines for Evaluating Potentially Unstable Slopes”*

Task: Address the following questions.

Track: Policy

1. Should a method to assess the degree of risk to public safety for glacial deep-seated landslides (low, moderate, high or uncertain) be developed? If yes, should the assessment be required in rule? Or provided as guidance in the manual?

Approach: This question is focused around a relative risk to public safety being added to the Board Manual and/or rule and is clearly a Policy issue. If Policy answers yes, then a technical group needs to be convened to establish thresholds and methods used to conduct such an assessment.

Timeline: Four to five months.

Track: Science

2. Is there existing science available to assess the reactivation potential for dormant bedrock and glacial deep-seated landslides? If yes, should an assessment to determine the potential for further movement of dormant bedrock and glacial deep-seated landslides be developed and required?

Approach: This question needs to be considered by UPSAG, and resources need to be made available for a thorough literature review to evaluate the science around all activity levels surrounding deep-seated landslides. UPSAG is currently working on a literature review of glacial deep-seated landslides that would provide a useful starting point.

Timeline: Six months.

3. Should the reactivation potential of *relict* slides be included in all bullets in sub-part 6.2?

Approach: This question needs to be considered by UPSAG, in the context of definitions of dormant/distinct vs. relict slides and how section 6.2 in Board Manual Section 16 addresses uses those definitions.

Timeline: One meeting

Component 3: *Dr. Ann Weekes Landslide Screening Tool, title of document proposed for inclusion Complex or composite rotational deep-seated landslide assessment*

Task: Address the following questions.

Track: Policy

1. Is there a need for a *precautionary screening technique* to identify landslides and other potentially unstable landforms that may not appear on contemporary landslide maps?

Approach: This question needs to be discussed at Policy to decide whether or not it should be added to the Board Manual. If the decision is ‘yes’, then Policy would need to work with a technical group to define what is needed.

Timeline: Between one meeting and up to six months.

Track: Science

2. A. What is the likelihood of an increase in the frequency of composite failures in rotational deep-seated slides due to projections of a rise in the magnitude and duration of

precipitation caused by atmospheric rivers and diminished mid-elevation snow transitioning into rain during the winter months?

B. What effect would an increase in atmospheric precipitation have on overland flow, stream capture and groundwater? What would this increased water have on the unconsolidated hummocky topography characteristics of large rotational slides?

Approach: These two questions need to be considered by UPSAG, and resources need to be made available for a thorough literature review to evaluate the science around these complex covariates.

Timeline: Six months.

3. Should a TWIG be formed to develop a study to identify those characteristics of large landslides that may predispose them to failure modes that include long rapid runout? And to develop methods to improve the ability to predict if the topographical signature of a rotational slide indicates a landform that is likely to fail as a composite slide?

Approach: This question needs to be considered by UPSAG to better understand current methods, and determine if additional work is necessary. Resources will be needed to do this work.

4. **Timeline:** Six months to one year.

Component 4: *Coarse Screen, title of document proposed for inclusion Shallow-rapid landslide coarse screen*

Task: Address the following questions.

Track: Policy

1. A. Is there a need to include a shallow- rapid landslide coarse screen for general practitioners or Qualified Experts?
2. B. If yes, how prescriptive is the proposed shallow- rapid coarse screen based on the Tolt Watershed? Is it appropriate for guidance? For rule?

Approach: This question needs to be discussed at Policy to decide whether or not it should be added to the Board Manual. If the decision is 'yes', then Policy would likely need to consult a group of experts (UPSAG or Qualified Experts working on Board Manual Section 16) to better understand the application of various models that could work.

Timeline: Between three to six months

Track: Science

3. Should a TWIG be formed to develop a study to determine what runout distances should be used in a shallow- rapid landslide coarse screen flow chart designed for application in all geographic and geomorphic areas to be used statewide?

Approach: This question needs to be discussed at UPSAG and consider the emphasis on statewide application and whether or not a TWIG is needed. If a study is determined to be warranted, additional resources will be needed.

Timeline: Two months to discuss the need for a study and to recommend an approach for Policy approval.

Track: Science and Policy

4. If a shallow-rapid landslide coarse screen is developed, should the Board consider establishing an acceptable level of risk? If yes, could it potentially result in over- or underestimations resulting in inappropriately over- or underutilizing expert analysis? On the latter point, Paul Kennard has scoped a possible study design, a “runout-risk evaluation tool” that may be suitable for Adaptive Management Program study. See Paul Kennard Declaration, pages 9-11.

Approach: This question needs to be discussed at UPSAG along with Policy to discuss the pros and cons of assigning probability associated with risk. If ‘yes’, then UPSAG will need to develop a study to develop and/or refine such a tool.

Timeline: Two months for UPSAG to develop the pros and cons and meet with Policy to discuss a path forward. If Policy decides to move forward, consultation with UPSAG in study design and approaches would be needed.

Component 5: *Run-Out Path Analysis, title of document proposed for inclusion Methods for Deep-seated Landslide Runout Assessment*

Task: Address the following questions.

Track: Policy

1. Given the level of review and the required analyses and protection criteria listed in the rules, where public safety may be impacted is there a need to develop an additional precautionary runout principle, including a more conservative (further) runout distance, for deep-seated landslides?

Approach: This question needs to be discussed at Policy and is a fundamental issue to resolve. Policy may seek input from UPSAG to better understand how avoidance and the precautionary principle work in concert.

Timeline: Two months for Policy to discuss and fully understand the issue and perspective.

Track: Science

2. Do scientifically-derived methods exist for predicting the potential for deep-seated landslide failure?

- a. If yes, is it appropriate to incorporate additional guidance in the manual? What guidance and for whom – the general practitioner, the qualified expert, or both?
- b. If no, is it appropriate to incorporate any additional guidance in the manual? What guidance and for whom – the general practitioner, the qualified expert, or both?

Approach: For either part a or b, a thorough literature review is necessary. Much of that literature will be included in the current work that UPSAG is doing, but an additional review will be necessary to address the non-glacial deep-seated failures. Part b would include a conversation between Policy and the Board Manual Section 16 technical group to see the benefits of adding any additional guidance.

Timeline: Four months for the literature review, and two months for Policy to fully understand the issue and perspective.

Component 6: *Landslide Risk Flow Chart, title of document proposed for inclusion Landslide Risk Decision Pathway*

Task: Address the following questions.

Track: Policy

1. Do the existing forest practices rules, forest practices application review process flow charts (Attachment B), and Board Manual Section 16 provide a landslide hazard risk decision pathway? Based on the previous review, is there a need for a landslide hazard risk decision pathway? If the decision is to develop a landslide hazard risk decision pathway should a precautionary risk management principle be added to the decision pathway?

Approach: Policy should consider this question and make a recommendation on whether or not it is necessary for inclusion in Board Manual Section 16. I would recommend a subgroup of Policy representatives work together between meetings to address this question.

Timeline: Two to three months for the literature review, and two months for Policy to fully understand the issue and perspective.

2. Should the definition of Rule Identified Landforms be amended to include a certainty rating based on the likelihood that a failure of the feature would threaten public safety? Or a certainty rating based on threats to public resources or public safety? If yes, how would the threat potential and the levels of certainty be defined?

Approach: Policy should consider this question regarding public safety and/or public resources. There will need to be discussions around uncertainty and risk and how to capture these differences in a rating system.

Timeline: Three to five months for a subgroup of Policy to meet and discuss options and return a proposal to the larger group to consider.