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INTERNATIONAL FOREST PRODUCTS LTD.

BCV40468

SLOPE STABILITY REVIEW  
FOR TFL 45 MANAGEMENT PLAN  
TABLES AND NOTES  
TO ACCOMPANY MAPS



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FOR TFL 45 MANAGEMENT PLAN  
TABLES AND NOTES  
TO ACCOMPANY MAPS**

*Prepared for:*

**INTERNATIONAL FOREST PRODUCTS LTD.**

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Project Number BCV40468

Heidi Kalmakoff, RPF  
INTERNATIONAL FOREST PRODUCTS LTD.  
#311 - 1180 Ironwood Road  
Campbell River, B.C. V9W 5P7

Dear Ms. Kalmakoff:

**RE: SLOPE STABILITY REVIEW FOR TFL 45 MANAGEMENT PLAN:  
TABLES AND NOTES TO ACCOMPANY MAPS**

## **INTRODUCTION**

### **General**

As requested by International Forest Products Ltd. (Interfor), Jacques Whitford and Associates (JWA) has completed a review of slope stability mapping previously completed for Tree Farm Licence 45 (TFL 45). In general, the slope stability review was completed as discussed in our letter "*Proposed Study Techniques for Slope Stability Review for TFL45 Management Plan*", dated October 31, 2000. However, some modifications were required, as it became apparent that the available mapping was not always in the anticipated format, and as the project requirements became better defined. This letter report describes the study methods and results, and provides tables and explanatory notes to accompany the revised slope stability maps.

TFL 45 is held by Interfor, and is located mostly on the mainland of British Columbia, north of Campbell River. Lewis (1994) notes that the TFL

"... encompasses approximately 240,000 hectares in six discrete areas on West Thurlow Island, at Frederick and Phillips Arms, and along and at the head of Knight Inlet. Only 22% of this land base is forested; 78% consists of alpine tundra, mountain hemlock parkland, snow avalanche tracks, glaciers and icefields, and essentially bare rock".



TFL 45 extends onto 36 different TRIM map sheets. Ten of these sheets include only very small portions of the TFL, and these areas generally either are not forested or are considered inoperable for timber harvesting purposes due to inaccessibility or other constraints. Slope stability mapping on the remaining 26 map sheets is the basis of this project.

As noted above, TFL 45 consists of several discrete areas or compartments, which have been designated as follows:

1. West Thurlow Island
2. Frederick Arm
3. Phillips Arm (Fanny Bay Camp)
4. Kwalate/Sallie Creeks
5. Millerd Creek
6. Glacier Bay
7. Hill Creek
8. Sim/Galley/McMyn Creeks
9. Northern Knight Inlet (Klinaklini and Franklin Rivers)

### **Previous Work**

Terrence Lewis, Ph.D., P.Ag., P.Geo. completed Environmentally Sensitive Area (ESA) mapping for TFL 45 in 1994. He used a two-step process to generate a set of polygons showing unstable (Es1) and potentially unstable (Es2) areas:

1. a system of 5 numerical stability classes (1 to 5) was used to map the stability of the study area. Note that these stability classes are not the same as the Ministry of Forests (MoF) five-class system (Classes I to V) more commonly used today, but an approximate correlation was provided in the report accompanying the maps. Note also that only terrain polygons containing a component of slope stability classes 3, 4 or 5 (MoF Classes IV and V) were mapped.
2. Es units were derived by applying an Es1 designation to all units of stability classes 4 and 5 (approximately equivalent to MoF V), and an Es2 designation to units of stability class 3 (approximately equivalent to MoF IV) and to units consisting mainly of classes 1 and 2 but with a minor component of classes 3, 4 or 5.

He then split the TFL into Northern and Southern areas, and recommended Annual Allowable Cut (AAC) net-downs as follows:

Southern Area:	Es2 – 20 percent	Es1 – 95 percent	
Northern Area:	Es2 – 5 percent	Es1 – 95 percent	Es1a – 85 percent



For the purposes of these recommended net-downs, the Southern Area was defined as compartments 1, 2, and 3 as listed above, as well as the lower Sallie Creek valley in compartment 4, and the Northern Area consisted of the remainder of the TFL.

## **Current Study**

The current slope stability review is part of a Timber Supply Analysis (TSA) that is currently underway as part of Management Plan 4 for TFL 45. We understand that for the current TSA, Interfor has decided to use a net-down of 100 percent for the Es1 units throughout the TFL, meaning that the model will assume no harvesting in these areas. We also understand that the current TSA model is to be spatially tied to the landscape, so that it was now necessary to determine exactly where the previously estimated 5 to 20 percent of non-harvestable terrain within the mapped Es2 units is located. This has been accomplished both by designating some entire Es2 units as harvestable or not harvestable, and by splitting some of the existing units into smaller polygons that can be so designated. The ESA mapping has also been extended into some areas not covered in the original study, and some of the polygon boundaries on the maps provided to us have been adjusted for various reasons that are discussed below.

## **STUDY METHODS**

### **Reference Materials**

To enable us to complete this project, Interfor provided the following to JWA:

- a report entitled “Slope Stability Sensitivity Areas, TFL 45, Explanatory Notes to Accompany Maps”, prepared for Interfor by Terrence Lewis, Ph.D., P.Ag., P.Geo., dated July 1994;
- a set of 1:20,000 scale maps prepared by Timberline Forest Industry Consultants entitled “Slope Stability Sensitive Areas, Tree Farm Licence 45”, dated September 1993. These maps show the Es1 and Es2 areas and provide the equivalent stability class (Lewis System), and are believed to be true copies of the original ESA maps that accompanied the above-referenced report. These maps are on an old (NAD27-based) planimetric base, and do not cover the West Thurlow Island and Millerd Creek compartments of the TFL;
- Colour laser copies of a set of colour air photos from 1996 and 1997 (Series SRS 5667, 5673, and 5816), covering the entire TFL except some inaccessible areas on the extreme perimeter;
- Several recent series of 1:20,000 scale 5-year Forest Development Plan (FDP) maps for TFL 45 (on the NAD83-based TRIM topographic base);



- 1:20,000 scale slope maps, showing the average slope of the terrain in 15 percent increments, for the entire TFL (TRIM base); and
- 1:20,000 scale "Soil ESA Rating" maps (TRIM base) showing the mapped Es1 and Es2 areas, and providing forest cover information. This set of maps was generated on November 14, 2000, and was used as the base for this mapping review project.
- Part of a GIS database of the TFL. This was used late in the project to enter the results of our review, and the modified files were then forwarded to Interfor for further processing.

In addition to the above, JWA has project files from several years of studies (mainly Terrain Stability Field Assessments) in some parts of the TFL. In particular the writer is very familiar with the Northern Knight Inlet and Frederick Arm compartments, and has limited familiarity with the Fanny Bay, West Thurlow Island and Glacier Bay areas. JWA has no internal field data for the other parts of the TFL.

### **Limitations of Existing Mapping**

The 1993 ESA mapping does not quite cover all forested areas within the TFL. Some of the areas not covered are considered inoperable for timber harvesting purposes, according to operability maps provided by Interfor (we understand that these maps are currently being updated, but that the operability limits of the TFL are unlikely to change substantially). However, some of the unmapped areas, particularly in parts of the Northern Knight Inlet compartment, could be within the operability limits, and we have therefore extended the mapping further up the following valleys:

- Franklin River, and its tributaries Smythe, Stanton, Crevice and Fissure Creeks;
- along the west side of the lower part of the Klinaklini Glacier; and
- Hoodoo and Dorothy Creeks, on the east side of Klinaklini River.

A second limitation of the existing mapping arises from the differences between the NAD27 and TRIM (NAD83) bases. The 1993 mapping was done on a set of NAD27-based planimetric maps, and has subsequently been transferred onto the TRIM map sheets. However, this has introduced significant distortion on some of the sheets, with the result that many of the Es1 and Es2 polygons no longer coincide with the features such as major gullies or unstable slopes that they were intended to delineate. Therefore, we have adjusted the polygons where judged appropriate.

Finally, a few differences have been found between the polygon labels on the original ESA maps and those on the more recent TRIM map sheets. Where these differences were encountered, we



have assumed that the 1993 maps are correct, and that the differences are due to errors made when the information was transferred onto the TRIM sheets. Therefore, after carefully examining the affected polygons on the air photos, we have changed the labels to match the 1993 mapping where appropriate.

## Study Methods

The main part of this project entailed completing detailed air photo interpretations of all areas shown as Es2 on the most recent TRIM maps, after the mapping had been extended or adjusted as discussed above. As discussed in our letter of October 31, 2000, the intent was to use these interpretations, combined with the slope maps and our own knowledge of some parts of the TFL, to determine whether each Es2 polygon could be safely harvested or not. Alternatively, the Es2 polygons could be split into smaller units that could be designated harvestable or not harvestable. Based on discussions with Gerry Sommers of Interfor, it was decided that all information would be provided in hard copy form, by drawing directly on the TRIM base maps provided. Therefore, each Es2 polygon on each sheet has been assigned a unique number, which is cross-referenced to the tables attached to this report. The polygon numbers were later entered into the GIS database provided by Interfor.

During the review of the airphotos and maps, it quickly became apparent that there could be several reasons why an Es2 polygon might be considered not harvestable, including:

- unstable or potentially unstable terrain;
- area already harvested; and,
- immature timber or non-productive forest cover.

Therefore, to give Interfor maximum flexibility in interpreting our findings, we have indicated in the tables both the terrain stability (based on our interpretations) and the status of the forest cover (based on the maps provided) for each polygon. For practical purposes, only those polygons which are indicated as both “stable” and “mature” can be considered harvestable in the short term, although polygons rated “stable” and either “immature” or “logged” could likely be harvested at some point in the future (for this project, we have arbitrarily defined “mature” as age class 8 or 9; i.e. timber greater than 140 years old). Polygons rated as “unstable” should be considered not harvestable regardless of forest cover, and polygons rated as “NP” are unlikely to ever be commercially harvestable, regardless of stability. Note that the term “unstable” as used in these tables does not necessarily imply that a slope failure will occur or is imminent. The term implies a high potential for slope failure to occur following timber harvesting. We have entered the stability information into the GIS files provided by Interfor, but have not entered the forest cover status. We understand that this information already resides elsewhere in the GIS.



The tables attached to this report also indicate the approximately equivalent terrain stability classification for each Es2 polygon, using both the Lewis System (Classes 1 – 5) and the MoF system (Classes I – V). In almost all cases, the Es2 polygons are equivalent to Lewis Class 3 and MoF Class IV. The Es1 polygons shown on the original mapping are Lewis Class 4 or 5, and MoF Class V. In most cases, Es1 polygons in the areas where we have extended the mapping have been designated Class 5 under the Lewis system in the GIS, although some can be considered Class 4. In both cases, this can be considered equivalent to MoF Class V.

Where existing polygon boundaries have been adjusted for the reasons discussed above, we have drawn the recommended revised polygon boundaries on the hard copy maps in red. Where the mapping has been extended into areas not covered by the original mapping, the polygon boundaries have been drawn in pencil, and we have used shading that approximates the colours used on the maps provided. Where polygons have been subdivided, the internal boundaries are marked in pencil, and the individual portions of the polygons are labeled accordingly. Also, all polygon boundaries have now been updated in the GIS.

It should be noted that, where we have extended the terrain mapping, the work is based entirely on interpretation of the air photos and available maps, with no field checking. Therefore, this work is considered Terrain Survey Intensity Level (TSIL) E according to the definitions in the Forest Practices Code “Mapping and Assessing Terrain Stability” Guidebook. This is appropriate for the overall planning purposes for which this project was commissioned, but the mapping should not be relied upon for detailed decisions such as locating roads and cutblocks. Also, because the Es2 areas are approximately equivalent to MoF Stability Class IV, any proposal to develop a road or cutblock in one of these polygons would normally trigger a TSFA. The TSFA may find that certain portions of the proposed block should not be harvested. Therefore, although an Es2 polygon may be mapped as harvestable as a result of this study, the actual area that can be safely harvested may be less. However, the reverse can also be true: some portions of areas mapped as Es1 may turn out to be harvestable when a detailed TSFA is completed, due to the difficulty in accurately locating ESA polygon boundaries on 1:20,000 scale maps in TSIL E mapping, especially in heavily forested areas.

## DISCUSSION

This section of the report provides a brief map-sheet-by-map-sheet description of each of the nine compartments in TFL 45. Particular reference is paid to areas where the polygons shown on the TRIM maps had to be adjusted or extended, or where significant changes have occurred since the





#### *Map Sheet 92K054*

This sheet covers the northern portion of the Frederick Arm compartment, and includes 11 Es2 polygons. Only one of the Es2 polygons is considered unstable, and 5 of the 11 have been at least partially logged. JWA has completed TSFA's for several roads and cutblocks that are proposed or have been developed here since 1993 – in general, these blocks avoid the mapped Es1 and Es2 terrain. Several of the Es2 and Es1 polygons on this sheet had to be shifted to better match the 1993 mapping.

#### **Phillips Arm (Fanny Bay)**

#### *Map Sheet 92K044*

This sheet only covers the extreme southeast corner of the Fanny Bay compartment, and there are no mapped Es2 polygons in this area. One Es1 polygon had to be shifted to better match the 1993 mapping.

#### *Map Sheet 92K053*

This sheet covers the majority of the Fanny Bay compartment, and includes 29 Es2 polygons. As noted by Lewis, most of this area had been logged by 1993, and, as a result, most of the Es2 and Es1 polygons have been at least partially logged. There does not appear to have been any logging in this area since 1993, however JWA has recently completed TSFA's for two proposed blocks, both of which avoid the Es1 and Es2 terrain. Only one portion of one of the 29 Es2 polygons is judged unstable. A few Es1 and Es2 polygons in the northwestern part of the map sheet had to be shifted to better match the 1993 mapping.

#### *Map Sheet 92K054*

This sheet covers the eastern edge of the Fanny Bay compartment, and includes 7 Es2 polygons and several Es1 polygons, virtually all of which have been at least partially logged or contain some immature timber. At least one cutblock has been developed in this area since 1993, but it avoids the mapped Es1 and Es2 terrain. JWA has also recently completed fieldwork for a few other blocks and roads that also generally avoid the Es1 and Es2 terrain. One entire Es2 polygon, and part of a second one, are judged unstable, and all others are considered stable. Only one Es1 polygon on this map sheet had to be shifted to better match the 1993 mapping.

## **Sallie/Kwalate Creeks**

### *Map Sheet 92K071*

This sheet covers the extreme western edge of the Sallie Creek watershed, and contains only one Es2 polygon and two large Es1 polygons. There has been no previous timber harvesting in this area, and the one Es2 polygon is judged to be stable. The polygon locations appear correct relative to the 1993 ESA mapping, but we have extended the mapping slightly to the west, to the boundary of the TFL.

### *Map Sheet 92K072*

This sheet covers most of the Sallie Creek watershed and the lower (eastern) portion of the Kwalate Creek watershed. The area includes 28 Es2 polygons, roughly half of which have been at least partially logged. At least four blocks have been harvested in this area since 1993: three of these avoid the mapped Es1 and Es2 terrain except on their extreme perimeters, but one helicopter block contains roughly one-third Es1 terrain, one-third (stable) Es2 terrain, and one-third non-Environmentally Sensitive terrain. Only portions of four of the remaining Es2 polygons are considered unstable. Some polygons on the east side of Sallie Creek had to be shifted to better match the 1993 mapping.

### *Map Sheet 92K081*

This sheet covers the extreme western edge of the Kwalate Creek watershed. No Es2 polygons and two large rectangular Es1 polygons are shown on this sheet, but the 1993 mapping that we have reviewed does not extend onto this sheet. Although it is probably true that much of the terrain on this sheet could be considered Es1, the original mapping does not support the polygons depicted on the recent maps. For the purposes of the current TSA model, we recommend that Interfor delete the two Es1 polygons and consider this sheet as not having being mapped for slope stability. JWA could complete ESA mapping for this sheet if required, although the area may be beyond the operability limits of the TFL.

### *Map Sheet 92K082*

This sheet covers most of the Kwalate Creek watershed, and includes 12 Es2 polygons on the 1993 mapping, plus another two that we have added near the western edge of the sheet. All of



the Es2 polygons are considered stable, with the exception of part of one polygon. A few of the polygons had to be shifted to better match the 1993 mapping, and we have also extended the original mapping slightly. There has not been any previous logging on this sheet.

### **Millerd Creek**

The Millerd Creek compartment of TFL 45 is not described in the 1994 report by Lewis, and we understand that Interfor has not located any of the 1993 ESA maps showing this watershed. Nevertheless, the two TRIM-based maps that cover this compartment do show several Es1 and Es2 polygons. The compartment consists solely of the watershed of Millerd Creek, a west-flowing creek that flows into Knight Inlet approximately 30 km south of the head of the inlet. There has not been any previous logging in this watershed.

#### *Map Sheet 92K073*

This sheet covers the southern half of the compartment, and includes 7 Es2 polygons. Portions of two of these are considered unstable, and the rest are considered stable. Although the 1993 ESA mapping for this area has not been located, the polygon boundaries depicted on the current maps appear reasonable with respect to the locations of gullies, steep slopes, etc., and no adjustments were deemed necessary.

#### *Map Sheet 92K083*

This sheet covers the northern half of the compartment, and includes 5 Es2 polygons. Portions of three of these are considered unstable, and the rest are considered stable. Although the 1993 ESA mapping for this area has not been located, the polygon boundaries depicted on the current maps appear reasonable with respect to the locations of gullies, steep slopes, etc., and no adjustments were deemed necessary.

### **Glacier Bay**

#### *Map Sheet 92K083*

This sheet covers the southern three-quarters of the Glacier Bay compartment, and includes 5 small Es2 polygons and one large Es1 polygon around the rim of the adjoining drainage basins that form the compartment. All of the Es2 polygons are considered stable, and all have been



fully or partly logged. The polygon locations appear correct relative to the 1993 ESA mapping, and no adjustments have been made.

A very large natural rock avalanche occurred in this area in September 1999, and its approximate location has been indicated on the map. This slide initiated on very steep Es1 terrain well above the forested and logged areas, and extended all the way to Knight Inlet, severing several old roads.

#### *Map Sheet 92K093*

This sheet covers the northern end of the Glacier Bay compartment, and includes three large Es2 polygons plus some Es1 terrain. Two of the three Es2 polygons have been partially logged, and all are considered stable. The polygon locations appear correct relative to the 1993 ESA mapping, and no adjustments have been made.

### **Hill Creek**

#### *Map Sheet 92K092*

This sheet covers the western part of the Hill Creek compartment, and includes one large Es1 polygon around the perimeter of the watershed and 10 small Es2 polygons, eight of which are considered stable. All of the polygons have been shifted to better match the 1993 mapping. There has not been any previous logging in this area.

#### *Map Sheet 92K093*

This sheet covers the lower or eastern part of the Hill Creek compartment, and includes three Es2 polygons and some Es1 terrain. All of the Es2 polygons are considered stable. Some polygons have been shifted to better match the 1993 mapping. According to the forest cover information on the base map there has not been any previous logging in this area, but there are several areas of immature forest cover.

## **Sim/Galley/McMyn Creeks**

### *Map Sheet 92K092*

This sheet mostly covers the Hill Creek area (discussed above), but also includes the upper reaches of one tributary of Sim Creek. The ESA mapping does not extend into this part of the Sim Creek watershed.

### *Map Sheet 92N001*

This sheet covers the upper (western) portion of the McMyn Creek watershed, but the ESA mapping does not extend into this area. Because the area is outside the operability limits for the TFL according to draft operability maps provided by Interfor, we have not extended the ESA mapping onto this sheet.

### *Map Sheet 92N002*

This sheet covers the eastern (lower) portions of the Sim and McMyn Creek watersheds, and includes 23 Es2 polygons and a significant amount of Es1 terrain on the valley sides. None of the Es2 polygons are mapped as logged, although some contain immature forest. About 40 percent of the Es2 polygons contain at least some unstable terrain. Roughly half of the Es2 polygons, plus adjacent Es1 terrain, have been shifted to better match the 1993 mapping.

### *Map Sheet 92N003*

This sheet mostly covers the Northern Knight Inlet area (discussed below), but also includes the area in the vicinity of the mouth of Sim Creek. Of the 3 Es2 polygons in this area, two are judged stable and one contains both stable and unstable sections. All Es2 and Es1 polygons in this area have been shifted to better match the 1993 mapping.

### *Map Sheet 92N012*

This sheet covers the upper (northern) part of the Sim Creek catchment, except the extreme upper reaches of the watershed, and also covers the lower part of the Galley Creek area. There are three Es2 polygons in this area, of which two are stable and one is partly stable. All polygons in this area have been shifted to better match the 1993 mapping.



## Northern Knight Inlet

### *Map Sheet 92N002*

This sheet mostly covers the Sim/Galley/McMyn compartment (discussed above), but also includes one Es2 polygon in the Northern Knight Inlet compartment. This polygon includes both stable and unstable sections. The polygon location appears correct relative to the 1993 ESA mapping and has not been adjusted, but some Es1 terrain shown on the 1993 mapping has been added to the current map sheet.

### *Map Sheet 92N003*

This sheet shows the area in the vicinity of the Knight Inlet dry land sort, the mouth of Franklin River, and parts of the Stanton Creek and Smythe Creek catchments. The 1993 mapping was confined to the northwestern portion of this map sheet, and extended up Smythe and Stanton Creeks to about 4.5 km upstream of their confluence. We have extended the mapping up both of these creeks essentially to the eastern edge of the map. The original mapping included 23 Es2 polygons, of which all but two are judged to be stable. The locations of these polygons on the current mapping appear correct relative to the 1993 mapping, and no adjustments have been made. We have added another 17 Es2 polygons, all of which are stable. One of the originally mapped Es2 polygons has been logged in the past.

The valleys occupied by Smythe and Stanton Creeks have similar morphologies. These are glacially modified valleys, consisting of relatively gentle to flat bottoms, moderately steep lower slopes, moderate to steep mid slopes, and very steep, untreed upper slopes. The newly mapped Es2 terrain tends to be located on the moderately steep lower slopes, between the major gullies, while the Es1 terrain consists of most of the mid and upper slopes, as well as gullied sections of the lower slopes.

### *Map Sheet 92N004*

This map sheet covers the upper part of the Stanton Creek watershed as well as the extreme upper limits of the Smythe Creek watershed. There is no previous ESA mapping for this sheet. The Smythe Creek area is considered inoperable according to the most recent operability maps, but part of the Stanton Creek area is operable, and contains at least two projected Small Business Forest Enterprise Program (SBFEP) blocks. We have extended the ESA mapping up Stanton



Creek as part of this project, adding 10 Es2 polygons and a large amount of Es1 terrain. All of the Es2 polygons are considered stable except a small portion of one polygon.

#### *Map Sheet 92N012*

This map sheet includes 12 Es2 polygons on the western side of the lower part of the Klinaklini River valley and another 4 in the valleys of two small creeks that flow into the head of Knight Inlet just west of the mouth of Klinaklini River. Six of these 16 Es2 polygons contain areas that are judged to be unstable, and the rest are stable. Portions of 4 of the Es2 polygons have been logged or contain immature timber. The locations of the polygons on the current mapping appear correct relative to the 1993 mapping, and no adjustments have been made.

#### *Map Sheet 92N013*

This is by far the most complex of the 26 map sheets assessed during this project. It covers the eastern side of the lower part of the Klinaklini River valley, most of the Franklin River valley, and parts of three major Franklin River tributaries: Stanton, Crevice and Fissure Creeks. The 1993 mapping covered approximately the western half of this sheet, and included 60 Es2 polygons. The locations of most of these on the recent mapping appear correct relative to the 1993 mapping, but we have adjusted the boundaries of a few in the south-central part of the sheet to better match the 1993 mapping. We have also added one polygon that was not transferred from the 1993 mapping, and have reclassified some terrain in the north-central part of the sheet, at the extreme limit of the previous mapping. The mapping has been extended east up the three tributary drainages mentioned above, adding another 34 Es2 polygons and a significant amount of new Es1 terrain. The morphology of these valleys and the general locations of the Es1 and Es2 terrain are similar to the valleys of Stanton and Smythe Creeks on Sheet 92N003 described above. About 45 percent of the 94 Es2 polygons are judged to contain at least some unstable terrain, and 19 of them, mostly in the western part of the sheet, have been at least partly logged.

#### *Map Sheet 92N014*

This map sheet mostly covers alpine areas, but includes a small part of the Stanton Creek watershed in the southwest corner. There is no previous ESA mapping on this sheet, but the Stanton Creek portion is considered operable according to the most recent operability maps. We have extended the ESA mapping in the Stanton Creek watershed as part of this project, adding 6

Es2 polygons and a large amount of Es1 terrain. All of the Es2 polygons are considered stable except a small portion of one polygon.

#### *Map Sheet 92N021*

This sheet covers mostly alpine areas and other inoperable terrain on the western edge of the Klinaklini watershed. ESA mapping is confined to the extreme northeast corner of the sheet, near the Klinaklini glacier, and only one small Es1 polygon and one small Es2 polygon are shown. The terrain within the Es2 polygon is judged to be stable. The locations of the polygons on the current mapping appear correct relative to the 1993 mapping, and no adjustments have been made.

#### *Map Sheet 92N022*

This sheet is centred on the lower reaches of Klinaklini River, and includes the confluence with West Klinaklini River and the lower reaches of that tributary. The area includes 56 Es2 polygons, about half of which contain some terrain that is judged to be unstable. Twelve of the Es2 polygons have been fully or partly logged in the past. Most of the polygon locations on the current mapping appear correct relative to the 1993 mapping, but a few have been shifted to better match the 1993 mapping.

#### *Map Sheet 92N023*

This sheet covers the eastern edge of the lower Klinaklini valley, as well as the upper reaches of Franklin River. The original ESA mapping included 24 Es2 polygons, mostly in the Klinaklini drainage. We have extended the mapping up the Franklin River to just above the downstream end of the Franklin Glacier, adding 3 new Es2 polygons and greatly enlarging a fourth one. Only portions of three of the 27 Es2 polygons are judged to be unstable. Eleven of the Es2 polygons have been fully or partly logged in the past. One Es1 polygon has been shifted to better match the 1993 mapping, and part of another one near the limit of the original mapping has been reclassified from Es1 to Es2.

#### *Map Sheet 92N031*

This map sheet mostly covers alpine and inaccessible terrain on the west side of the Klinaklini Glacier, as well as part of the lower reaches of the glacier itself. The 1993 ESA mapping was



confined to the eastern side of the glacier, where only one Es1 polygon and no Es2 polygons have been mapped. Operability maps indicate that part of the lower slopes above the west side of the glacier is considered operable terrain, so we have extended the mapping into this area, adding 14 Es2 polygons and a significant amount of Es1 terrain. All but one of the Es2 polygons are judged to be stable. There has been no previous logging in the area shown on this map sheet.

#### *Map Sheet 92N032*

This sheet is centred on Klinaklini River from just above the confluence with West Klinaklini River to just below Dorothy Creek, and also shows the slopes on the east side of the Klinaklini Glacier. Nineteen of the 50 Es2 polygons that have been mapped on this sheet are judged to contain at least some unstable terrain. Only four of the Es2 polygons have been partly logged: two on the east side of Klinaklini River south of Hoodoo Creek, and two on the south side of Hoodoo Creek itself. JWA has also completed TSFA's for several blocks in this area, mainly on the west side of Klinaklini River, in the past few years. These blocks all avoid the mapped Es1 and Es2 terrain. All of the Es1 and Es2 polygons on the east side of the Klinaklini Glacier, as well as numerous others scattered throughout the rest of the map sheet, have been adjusted to better match the 1993 mapping.

#### *Map Sheet 92N033*

This map sheet mostly covers alpine and inaccessible terrain near the northeastern corner of the TFL. The 1993 ESA mapping was confined to the southwest corner of the sheet, in the area of the middle reaches of Hoodoo Creek and a tributary of Hoodoo Creek, as well as part of the Dorothy Creek drainage in the northwest corner of the sheet. Eight Es2 polygons were identified in 1993, and all except a portion of one of these are judged to be stable. We have extended the mapping east or southeast along the three creeks mentioned above, into areas that are shown as operable on the most recent operability maps, adding 23 Es2 polygons and a significant amount of Es1 terrain. All of the new Es2 polygons are judged to be stable. The locations of the eight original Es2 polygons on the current mapping appear correct relative to the 1993 mapping, and no adjustments have been made. There has been no previous logging in the area shown on this map sheet.



### *Map Sheet 92N042*

This sheet covers the extreme north-central part of TFL 45, centred on the confluence of Klinaklini River and Dorothy Creek. The 1993 ESA mapping shows 6 Es2 polygons and a similar amount of Es1 terrain in the vicinity of this confluence, plus one large Es1 polygon and one large Es2 polygon on the east side of the Klinaklini Glacier. Most of the area shown on this sheet lies north of the TFL boundary, and therefore has not been mapped for slope stability. Four of the seven Es2 polygons contain some terrain that is judged to be unstable. A few of the polygons have been shifted to better match the 1993 mapping.

### *Map Sheet 92N043*

This sheet covers the middle reaches of Dorothy Creek, in the extreme northern end of TFL 45. Most of the area shown on this sheet lies north of the TFL boundary, and therefore has not been mapped for slope stability, but 7 Es2 polygons and a similar amount of Es1 terrain are identified on the 1993 maps. We have also extended the mapping along Dorothy Creek to the southern edge of the sheet, where the valley continues onto Sheet 92N033 (discussed above). Five additional Es2 polygons have been identified, along with some additional Es1 terrain. All 12 of the Es2 polygons on this map sheet are judged to be stable. Several of the polygons from the original mapping, which was based on relatively small scale air photos (Lewis, 1994) have been modified based on our assessments.

## **CONCLUSIONS**

Es2 polygons on 26 TRIM map sheets covering most of TFL 45 have been assigned unique numbers and classified according to both stability and forest cover in the tables included in this report. Many of the map sheets have required adjustments to the polygon boundaries, either to better match the 1993 mapping (on the old NAD27 base), or to extend the mapping into areas not previously included. The revised Es2 and Es1 polygon boundaries have been entered into the GIS files provided by Interfor and returned to Interfor for further processing.

The tables attached to this report provide information on both forest cover and slope stability for every Es2 polygon on each map sheet. The stability information only has been entered into the database tables in the GIS and returned to Interfor for use in current TSA.

## CLOSURE

This report has been prepared for use by International Forest Products Ltd. which includes distribution as required for purposes for which this assessment was commissioned. The assessment has been carried out in accordance with generally accepted engineering practice. Engineering judgment has been applied in developing the recommendations in this report. No other warranty is made, either expressed or implied.

We trust that this report and the accompanying tables and maps and the edited GIS files satisfy your requirements. If there are any questions pertaining to this report, please do not hesitate to contact the undersigned at your convenience.

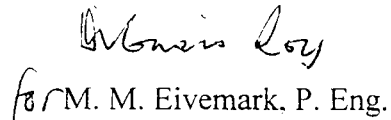
Yours truly,

**JACQUES WHITFORD AND ASSOCIATES LTD.**

Reviewed by:



Bruce R. Dagg, P. Eng.  
Senior Geotechnical Engineer



for M. M. Eivemark, P. Eng.  
Principal

c.c. Gerry Sommers – International Forest Products Ltd., Vancouver Office

## APPENDIX A

### STABILITY AND FOREST COVER TABLES FOR Es2 POLYGONS ON MAP SHEETS

92K033

92K043

92K044

92K053

92K054

92K071

92K072

92K073

92K082

92K083

92K092

92K093



MAPSHEET # 92K033

[illegible]

**MAPSHEET # 92K043**

[illegible]

MAPSHEET # 92K044

[illegible]

MAPSHEET # 92K053

Polygon	Lewis	MoF	Stability		Status			
			stable	unstable	mature	immature	NP	logged
1a	3	IV	X					X
1	3	IV	X		X			
2a	3	IV	X			X		
2	3	IV	X		X			
3	3	IV	X					X
4a	3	IV	X					X
4	3	IV	X		X			
5	3	IV	X			X		
6	3	IV	X			X		
7a	3	IV	X					X
7	3	IV	X		X			
8	3	IV	X					X
9	3	IV	X					X
10	2//3	IV	X			X		X
11	3	IV	X					X
12	3	IV	X					X
13	2//3 northern, 3 southern	IV	X					X
14	3	IV	X					X
15	3	IV	X					X
16	3	IV	X					X
17a	3	IV		X		X		
17	3	IV	X		X			
18	3	IV	X					X
19	3	IV	X					X
20a	3	IV	X					X
20	3	IV	X		X			
21a	3	IV	X					X
21	3	IV	X		X			
22a	3 and some 2//4	IV	X			X		X
22	3	IV	X		X			
23a	3	IV	X			X		X
23b	3	IV	X			X		X
23	3	IV	X		X			



MAPSHEET # 92K053, Continued

[illegible]

**MAPSHEET # 92K054**

[illegible]

MAPSHEET # 92K071

[illegible]

# MAPSHEET # 92K072

Polygon	Lewis	MoF	Stability		Status			
			stable	unstable	mature	immature	NP	logged
1a	3	IV	X				X	
1	3	IV	X		X			
2	3	IV	X		X			
3a	3	IV	X			X		
3	3	IV	X		X			
4	3	IV	X		X			
5	3	IV	X		X			
6a	3	IV	X			X		
6	3	IV	X		X			
7a	5	V		X			X	
7b	3	IV		X	X			
7c	3	IV	X				X	
7	3	IV	X		X			
8	3	IV	X		X			
9	3	IV	X		X			
10a	3	IV	X					X
10	3	IV	X		X			
11a	3 (WEST) 3/4 (EAST)	IV	X					X
11	3 (WEST) 3/4 (EAST)	IV	X		X			
12	3	IV	X					X
13a	3	IV	X				X	
13	3	IV	X		X			
14	3	IV	X		X			
15a	3	IV	X					X
15	3	IV	X		X			
16	3	IV	X		X			
17a	3	IV	X					X
17	3	IV	X		X			
18a	3	IV	X					X
18b	3	IV		X			X	
18	3	IV	X		X			
19	3	IV	X		X			
20a	2/13	IV	X					X

**MAPSHEET # 92K072, Continued**

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
20b	4	V		X			X	
20c	3//4	IV		X	X			
20	3//4	IV	X		X			
21a	3	IV	X					X
21b	3	IV	X					X
21	3	IV	X		X			
22a	3	IV	X			X		X
22	3	IV	X		X			
23a	3	IV	X					X
23	3	IV	X		X			
24a	3	IV	X					X
24	2//3 (MOSTLY) 3 (UPPER)	IV	X		X			
25a	3	IV	X					X
25	3	IV	X		X			
26a	3	IV		X	X			
26	3	IV	X		X			
27a	3	IV	X			X		
27	3	IV	X		X			
28a	3	IV	X					X
28	3	IV	X		X			

MAPSHEET # 92K082

[illegible]

MAPSHEET # 92K083

[illegible]

**MAPSHEET # 92N003**

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
1	2/3	IV		X		X	X	
2	3	IV	X		X			
3	3	IV	X		X			
4a	3	IV	X			X		
4	3	IV	X		X			
5	3	IV	X			X		
6	3	IV	X		X			
7	3	IV	X		X			
8	3	IV	X		X			
9	3	IV	X			X		
10a	3	IV	X					X
10	3	IV	X		X			
11	3	IV	X		X			
12	3	IV		X		X		
13	3	IV	X		X			
14	3	IV	X		X			
15	3	IV	X		X			
16	3	IV	X		X			
17	3	IV	X		X			
18	3	IV		X	X			
19	3	IV	X		X			
20	3	IV	X		X			
21	3	IV	X			X	X	
22	3	IV	X		X			
23	3	IV	X		X			
24	3	IV	X			X		
25a	3	IV		X		X	X	
25	3	IV	X		X			
26a	3	IV	X				X	
26	3	IV	X		X			
27a	3	IV	X			X		
27b	3	IV	X				X	
27	3	IV	X		X			



MAPSHEET # 92K092

[illegible]

MAPSHEET # 92K093

[illegible]

## APPENDIX B

### STABILITY AND FOREST COVER TABLES FOR Es2 POLYGONS ON MAP SHEETS

92N002

92N003

92N004

92N012

92N013

92N014

92N021

92N022

92N023

92N031

92N032

92N033

92N042

92N043

MAPSHEET # 92N002

[illegible]

MAPSHEET # 92N003

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
1	2/3	IV		X		X	X	
2	3	IV	X		X			
3	3	IV	X		X			
4a	3	IV	X			X		
4	3	IV	X		X			
5	3	IV	X			X		
6	3	IV	X		X			
7	3	IV	X		X			
8	3	IV	X		X			
9	3	IV	X			X		
10a	3	IV	X					X
10	3	IV	X		X			
11	3	IV	X		X			
12	3	IV		X		X		
13	3	IV	X		X			
14	3	IV	X		X			
15	3	IV	X		X			
16	3	IV	X		X			
17	3	IV	X		X			
18	3	IV		X	X			
19	3	IV	X		X			
20	3	IV	X		X			
21	3	IV	X			X	X	
22	3	IV	X		X			
23	3	IV	X		X			
24	3	IV	X			X		
25a	3	IV		X		X	X	
25	3	IV	X		X			
26a	3	IV	X				X	
26	3	IV	X		X			
27a	3	IV	X			X		
27b	3	IV	X				X	
27	3	IV	X		X			

**MAPSHEET # 92N003, Continued**

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
28	3	IV	X		X			
29a	3	IV	X				X	
29	3	IV	X		X			
30	3	IV	X		X			
31	3	IV	X		X			
32	3	IV	X		X			
33	3	IV	X		X			
34	3	IV	X		X			
35	3	IV	X		X			
36	3	IV	X		X			
37a	3	IV	X			X		
37	3	IV	X		X			
38a	3	IV	X			X		
38	3	IV	X		X			
39	3	IV	X		X			
40	3	IV	X		X			
41	3	IV	X		X			
42	3	IV	X		X			
43	3	IV	X		X			

MAPSHEET # 92N004

[illegible]

MAPSHEET # 92N012

[illegible]



**MAPSHEET # 92N013**

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
1a	3	IV	X					X
1b	3	IV		X		X		
1c	3	IV	X		X			
1	3	IV	X		X			
2	3	IV		X	X			
3a	3	IV		X				X
3b	3	IV		X				X
3c	3	IV		X	X			
3	3	IV	X		X			
4	3	IV	X					X
5a	3	IV		X	X			
5b	3	IV	X				X	
5c	3	IV	X					X
5	3	IV	X		X			
6a	3	IV	X					X
6	3	IV	X		X			
7	3	IV	X		X		X	
8	3	IV	X					X
9a	3	IV	X					X
9b	3	IV		X	X			
9	3	IV	X		X			
10	3	IV	X		X			
11a	3	IV	X			X		
11	3	IV	X		X			
12a	3	IV		X			X	
12	3	IV	X		X			
13a	3	IV	X					X
13b	3	IV		X	X			
13c	3	IV	X				X	
13	3	IV	X		X			
14	3	IV	X					X
15	3	IV	X					X
16	3	IV		X	X			

**MAPSHEET # 92N013, Continued**

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
17	3	IV	X					X
18a	3	IV		X				X
18b	3	IV		X	X			
18	3	IV	X		X			
19a	3	IV		X				X
19	3	IV		X	X			
20a	3	IV		X			X	
20b	3	IV		X				X
20c	3	IV		X			X	
20d	3	IV	X			X		
20	3	IV		X	X			
21a	3	IV	X		X			
21b	3	IV	X					X
21	3	IV	X		X			
22	3	IV	X					X
23a	3	IV		X				X
23b	3	IV	X				X	
23c	3	IV	X		X			
23	3	IV	X		X			
24	3	IV		X	X			
25a	3	IV	X					X
25	3	IV	X		X			
26	3	IV	X					X
27a	3	IV	X		X			
27	3	IV	X		X			
28	3	IV	X		X			
29	3	IV		X	X			
30a	3	IV	X			X		
30	3	IV	X		X			
31	3	IV	X			X		
32	3	IV		X	X			
33	3	IV		X				
34a	3	IV		X			X	
34b	3	IV		X			X	

**MAPSHEET # 92N013, Continued**

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
34c	3	IV		X		X		
34	3	IV	X		X			
35a	3	IV		X			X	
35	3	IV	X		X			
36a	3	IV	X				X	
36	3	IV	X		X			
37a	3	IV	X			X		
37b	3	IV		X			X	
37c	3	IV		X		X		
37d	3	IV	X			X		
37	3	IV	X		X			
38a	3	IV		X				
38b	3	IV	X					
38c	3	IV		X		X		
38	3	IV	X		X			
39a	3	IV		X			X	
39b	3	IV		X	X			
39	3	IV	X		X			
40a	3	IV		X		X		
40	3	IV	X		X			
41a	3	IV	X				X	
41	3	IV	X		X			
42	3	IV	X		X			
43	3	IV	X		X			
44	3	IV	X		X			
45	3	IV	X		X			
46a	3	IV	X			X		
46b	3	IV		X	X			
46	3	IV	X		X			
47	3	IV	X		X			
48	3	IV		X	X			
49	3	IV	X		X			
50	3/4	IV/V	X		X			

**MAPSHEET # 92N013, Continued**

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
51a	3	IV	X				X	
51b	3	IV		X		X		
51	3	IV	X		X			
52	3	IV	X					
53	3	IV	X					
54	3	IV	X		X			
55	3	IV		X	X			
56	3	IV		X	X		X	
57	3	IV	X					
58a	3	IV		X	X			
58	3	IV	X		X			
59	3	IV	X		X			
60a	3/4	IV	X			X		
60	3	IV	X		X			
61	3	IV		X			X	
62a	3	IV		X	X			
62b	3	IV	X		X			
62c	3	IV		X		X		
62d	3	IV	X		X			
62	3	IV	X		X			
63	3	IV	X		X			
64a	3	IV		X	X			
64b	3	IV	X		X			
64c	3	IV		X		X		
64d	3	IV	X		X			
64	3	IV	X		X			
65	3	IV	X		X			
66	3	IV	X		X			
67	3	IV		X		X		
68	3	IV	X				X	
69	3	IV	X		X			
70a	3	IV	X			X		
70b	3	IV	X		X			
70c	3	IV	X				X	

**MAPSHEET # 92N013, Continued**

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
70d	3	IV	X		X			
70	3	IV	X		X			
71	3	IV	X		X			
72	3	IV	X		X			
73	3	IV	X		X			
74a	3	IV	X				X	
74	3	IV	X		X			
75a	3	IV	X				X	
75	3	IV	X		X			
76a	3	IV	X				X	
76	3	IV	X		X			
77a	3	IV		X	X			
77	3	IV	X		X			
78a	3	IV	X			X	X	
78b	3	IV	X			X	X	
78	3	IV	X		X			
79a	3	IV	X				X	
79b	3	IV		X			X	
79	3	IV	X		X			
80a	3	IV		X			X	
80b	3	IV	X				X	
80	3	IV	X		X			
81	3	IV	X		X			
82a	3	IV		X			X	
82b	3	IV	X				X	
82c	3	IV	X				X	
82d	3	IV	X				X	
82e	3	IV		X	X			
82	3	IV	X		X			
83a	3	IV		X			X	
83b	3	IV	X				X	
83c	3	IV	X				X	
83	3	IV	X		X			

MAPSHEET # 92N013, Continued

[illegible]

MAPSHEET # 92N014

[illegible]

MAPSHEET # 92N021

[illegible]



**MAPSHEET # 92N022**

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
1	3	IV		X	X			
2a	3	IV	X				X	
2b	3	IV		X			X	
2	3	IV	X		X			
3	3	IV	X		X			
4	3	IV		X			X	
5a	3	IV		X	X		X	
5	3	IV	X		X			
6	3	IV	X		X			
7	3	IV		X	X			
8	3	IV	X			X	X	
9a	3	IV	X				X	
9	3	IV	X		X			
10	3	IV	X		X			
11	3	IV	X					X
12	3	IV	X		X			
13	3	IV	X		X			
14a	3	IV	X			X	X	
14	3	IV	X		X			
15	3	IV	X		X			
16	3	IV	X		X			
17	3	IV	X		X			
18	3	IV	X		X			
19a	3	IV	X					X
19	3	IV	X		X			
20a	3	IV		X	X			
20	3	IV	X		X			
21a	3	IV		X	X		X	
21	3	IV	X		X			
22a	3	IV		X				X
22	3	IV		X	X			
23	3	IV	X					X
24	3	IV	X		X			
25a	3	IV	X					X

**MAPSHEET # 92N022, Continued**

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
25	3	IV	X		X			
26a	3	IV		X	X			
26	3	IV	X		X			
27a	3	IV	X			X	X	
27	3	IV	X		X			
28	3	IV		X	X			X
29	3	IV		X	X			
30a	3	IV	X					X
30	3	IV	X		X			
31	3	IV		X			X	
32a	3	IV		X	X			
32	3	IV	X		X			
33	3	IV		X	X		X	
34	3	IV	X		X			
35	3	IV	X		X			
36a	3	IV		X	X			
36	3	IV	X		X			
37	3	IV		X	X			
38a	3	IV	X					X
38	3	IV	X		X			
39	3	IV		X		X		
40a	3	IV	X					X
40	3	IV	X		X			
41a	3	IV		X				X
41	3	IV	X		X			
42a	3	IV	X					X
42	3	IV	X		X			
43a	3	IV		X	X		X	
43	3	IV	X		X			
44a	3	IV		X	X			
44	3	IV	X		X			
45	3	IV		X	X			
46	3	IV		X	X			

MAPSHEET # 92N022, Continued

[illegible]

# MAPSHEET # 92N023

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
1a	3	IV	X				X	
1	3	IV	X		X			
2	3	IV	X		X			
3	3	IV	X		X			
4	3	IV	X		X			
5	3	IV	X		X			
6	3	IV	X		X			
7a	3	IV	X				X	
7	3	IV	X		X			
8a	3	IV	X					X
8b	3	IV		X	X			
8	3	IV	X		X			
9a	3	IV	X					X
9b	3	IV	X				X	
9	3	IV	X		X			
10	3	IV	X		X			
11a	3	IV	X					X
11	3	IV	X		X			
12a	3	IV	X					X
12	3	IV	X		X			
13	3	IV	X		X			
14a	3	IV	X					X
14b	3	IV		X	X			
14	3	IV	X		X			
15a	3	IV	X					X
15	3	IV	X		X			
16a	3	IV	X					X
16	3	IV	X		X			
17a	3	IV	X				X	
17	3	IV	X		X			
18	3	IV	X					X
19	3	IV	X					X
20	3	IV	X					X

MAPSHEET # 92N023, Continued

[illegible]

MAPSHEET # 92N031

[illegible]

# MAPSHEET # 92N032

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
1a	3	IV	X				X	
1	3	IV	X		X			
2a	3	IV	X				X	
2	3	IV	X		X			
3a	3	IV		X		X	X	
3	3	IV	X		X			
4a	3	IV	X				X	
4b	3	IV		X			X	
4	3	IV	X		X			
5a	3	IV	X				X	
5b	3	IV		X	X			
5	3	IV	X		X			
6a	5	V		X	X		X	
6b	3	IV	X				X	
6	3	IV	X		X			
7a	3	IV	X			X	X	
7b	3	IV		X	X		X	
7	3	IV	X		X			
8a	3	IV		X	X			
8	3	IV	X		X			
9	3	IV	X		X			
10	3	IV	X		X			
11	3	IV		X	X			
12a	3	IV		X	X			
12	3	IV	X		X			
13a	3	IV	X				X	
13	3	IV	X		X			
14a	3	IV	X				X	
14	3	IV	X		X			
15	3	IV	X		X			
16	3	IV	X		X			
17a	3	IV	X				X	X
17	3	IV	X		X			

**MAPSHEET # 92N032, Continued**

Polygon	Lewis	MoF	Stability		Status			
			<i>stable</i>	<i>unstable</i>	<i>mature</i>	<i>immature</i>	<i>NP</i>	<i>logged</i>
18	3	IV	X		X			
19	3	IV	X		X			
20	3	IV	X		X			
21a	3	IV	X			X	X	
21	3	IV	X		X			
22	3	IV	X		X			
23a	3	IV	X			X	X	X
23	3	IV	X		X			
24a	3	IV	X					X
24b	3	IV		X	X		X	
24	3	IV	X		X			
25a	3	IV	X					X
25b	3	IV		X	X			
25	3	IV	X		X			
26a	3	IV	X					X
26b	3	IV		X		X	X	
26	3	IV	X		X			
27a	3	IV		X			X	
27b	3	IV		X	X			
27	3	IV	X		X			
28	3	IV	X		X			
29	3	IV	X		X			
30	3	IV	X		X			
31	3	IV		X	X			
32	3	IV		X	X			
33a	3	IV		X	X			
33	3	IV	X		X			
34a	3	IV		X			X	
34	3	IV	X		X			
35	3	IV	X		X			
36a	3	IV	X		X			
36	3	IV	X		X			
37a	3	IV		X	X			
37	3	IV	X		X			



MAPSHEET # 92N033, Continued

[illegible]

**MAPSHEET # 92N042**

[illegible]

MAPSHEET # 92N043

[illegible]