

Forest Agreement

**related to the
Hoh River, Kalaloch Creek and Nolan Creek Drainages**

The Hoh Tribe

and

**The Washington State Department of
Natural Resources**



Signed
May 11, 1993



WASHINGTON STATE DEPARTMENT OF
Natural Resources

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding is entered into between the Hoh Indian Tribe, referred to as the "Tribe", and the State of Washington, Department of Natural Resources, referred to as the "Department."

WHEREAS, The Tribe and the Department share the belief that it is in their mutual self interest to cooperate in their respective management responsibilities in the Hoh River basin; and,

WHEREAS, The open sharing of information allows the Tribe and the Department to make better decisions in managing resources in the Hoh River basin; and,

WHEREAS, A need exists to clarify the role of each party in the following areas of resource management:

1. Timber harvest from Trust lands
2. Road and slope stabilization on Trust lands
3. Fish habitat enhancement and fish productivity improvement on Trust lands

BOTH PARTIES agree to the following:

1. Maintain active membership in the Pro-Fish committee as a place for ongoing communication and cooperation with its membership.
2. Meet together yearly in October or as often as necessary to share plans for land management and fishery resource management activities for the next year and to review the previous years' accomplishments.
3. Actively pursue and propose budget authority to fully implement this MOU.
4. Develop a monitoring plan to measure and evaluate the assumptions used to qualify timber sales using the SIAP Hazard and Risk Assessment process.
5. Accept that this MOU will not be superseded by the Old Growth Commission recommendations or by other Department administrative decisions unless it is terminated.

THE TRIBE agrees to the following:

1. Participate in the Sensitive Issue Action Plan (SIAP) Hazard and Risk Assessment process as described in attachment A for proposed timber sales within the areas of the Hoh Basin shown on attachment B.
2. Recognize that timber sales that have qualified through the Hazard and Risk Assessment system are supported by scientific evaluation of basin risk features as identified by the SIAP team and the Hazard and Risk Assessment.
3. If the Tribe believes that additional, substantive concerns remain, other than those addressed in the Hazard Risk procedure, and after further consultation with the Department District Manager, and after discussion with the Department's Olympic Region Manager, the Tribe still objects to a specific timber sale resulting from the above process, the Tribe will appeal the sale to the Supervisor of the Department.
4. Provide to the Department data and results from stream monitoring on Trust lands, scheduling monitoring efforts to facilitate the SIAP process.
5. Provide the Department with information about potential enhancement projects in the Hoh Basin, including tribal priorities and supporting data.
6. Support the Department by providing consultation and any relevant data concerning Tribe projects to assess the condition of salmonid habitats in selected tributaries of the Hoh River.
7. Provide the Pro-Fish committee with an assessment of whether the number of escaping spawners is sufficient to fully occupy the habitat available in the Hoh Basin.
8. During the October meeting of each year, consult with the Department on slope stability and road stability plans and projects. Provide Tribe priorities, data, and other pertinent information at the annual planning meeting or during the operation as need arises.

THE DEPARTMENT agrees to the following:

1. Plan and propose timber sales using the Sensitive Issue Action Plan (SIAP) Hazard and Risk Assessment process as described in attachment A within the areas of the Hoh Basin shown on attachment B.
2. During the October meeting of each year or at other appropriate times, the Department will propose only those timber sales that have qualified (either green or yellow areas) through the Hazard and Risk Assessment procedure within specified areas of the Hoh Basin shown on attachment B and provide updated information about road and slope stability plans and projects.
3. If, after timber sales have qualified under the Hazard and Risk Assessment procedure, and after further consultation with the Department District Manager, and after discussion with the Department's Olympic region Manager, the Tribe still objects to a specific timber sale resulting from the above process, the Supervisor of the Department will hear an appeal to the sale.
4. Provide to the Tribe GIS analytical assistance on stream monitoring data on Trust lands as needed to facilitate the SIAP process.
5. Support the Tribe by providing consultation and any relevant data concerning Department projects to assess the condition of salmonid habitats in selected tributaries of the Hoh River.
6. Allow installation of and access to stream monitoring stations and devices. Information so gathered will be shared with the SIAP and Pro-fish groups for analysis.
7. During the October meeting of each year, consult with the Tribe on slope stability and road stability plans and projects. The Department will consult with the Tribe on priorities, and provide data, and other pertinent information at the annual planning meeting or during the operation as need arises.
8. Actively continue the road stability program as outlined in the Department's Road Stability Program five-year plan.
9. Continue active participation in stream enhancement and fish productivity improvement projects developed by the Pro-Fish committee and the Department's CoHoh program.


10. Provide the Pro-Fish committee all data and analytical support for "Red" sites discovered by the Hazard and Risk Assessment process to aid their evaluation and priority of future projects.
11. Increase aerial photo reconnaissance within the Tribe U&A to reach a goal of flight reoccurrence of three years to aid in Hoh Basin monitoring.

THIS AGREEMENT shall remain in force and binding to both parties until it is mutually agreed that it be terminated, or by thirty days notice by either party. Both parties agree to implement this agreement to the extent allowed by budget authority. Terms of this agreement not controlled by budget authority will remain in effect as described above. Nothing in this agreement shall be construed to support or detract from any treaty rights, or legal argument surrounding those rights. Nothing in this agreement shall be construed to relieve the Department of any future liabilities regarding natural resource management in the Hoh Basin for which it would otherwise be legally responsible.

IN WITNESS WHEREOF, the parties hereto have entered into this Memorandum of Understanding dated this 11th day of May, 1993.

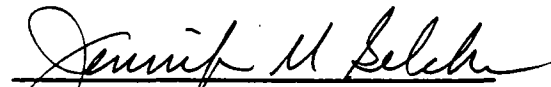
Hoh Indian Tribe

Department of Natural Resources



Vivian Lee

Hoh Chairwoman

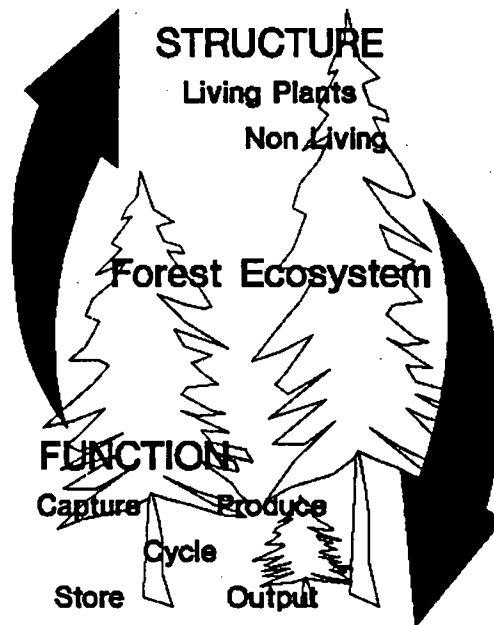


Jennifer M. Belcher

Commissioner of Public Lands

Hoh Basin - Special Issue Action Plan

Measuring Cumulative Effects for Proposed Timber Sales Using a Hazard & Risk Assessment System



Regional Guideline:

Each timber sale proposal within the Hoh River Basin will be subjected to this Hazard and Risk Assessment System.

This guideline to cumulative effects analysis is presented in two parts.

- PART 1** A brief background description of what and why the Department of Natural Resources plans management changes in the Hoh River Basin.
- PART 2** A procedural approach to the Hazard and Risk Assessment system.

PART 1: Background

The Olympic Experimental State Forest (OESF) plan commits to landscape planning based on growing multiple forest structures across management landscapes through time. The OESF goal is to achieve biological diversity that perpetuates a healthy forest ecosystem and provides economically viable commodity production.

The Hoh River basin spans a large geographic area, encompassing numerous management landscapes. Issues of slope instability, fish habitat and water quality in parts of the Hoh basin require both local-site and drainage-basin levels of analysis. Forest-structure based planning alone is unable to fully address concerns in the Hoh basin.

Parts of the Hoh basin have steep side-channel tributary drainages and unstable mid-slope geology. (see: Huelsdonk Ridge/Hoh River Slope Stability Task Force Report) Because of this, forest management activities must be analyzed even more closely, down to the sub-drainage and sometimes the sub-sub-drainage level.

To address smaller geographic levels of planning, a hazard and risk assessment system (HRA, attached) has been devised. This system is composed of two basic elements, 1) computer analysis of sub-basin level hazard potentials and 2) field work to analyze local site potentials and protection needs. These elements combined identify and rate, by threshold determinations, ground slope instability hazards, hydrologic cumulative effects and site-specific biological risks to stream and fish habitat.

Hoh basin timber sales proposals must qualify using this system. Computer analysis using geologic and hydrologic features combined with threshold limitations allows proposed timbers sales to qualify for field work action plans. Qualified sites become an "action plan" that will steer the field pre-sales work. During the field work stages, on-site specific evaluations of biological health will test for local site stream and fish habitat health.

Models and Thresholds

The Hazard and Risk Assessment system uses computer based mapping systems and predictive ecosystem models. The Department's Geographic Information System (DNRGIS) and complementary Personal Computer (PC) based programs perform together to plan, predict and record land use proposals and environmental results.

Computer model results used in the HRA system are compared to "threshold values". Threshold values are standards that have been adopted to represent the potential for impacts to a chosen environmental system. For the HRA, threshold values are converted into relative symbols indicated by different colors of hazard; Green, Yellow and Red. The "colors" are representative of project activity risk and operational constraints. Looking at the color hazard coding in summary:

- Green -** indicates "relative hazard/risk is low" (OK to proceed)
- Yellow -** indicates "relative hazard/risk is medium" (Caution, lets look closer, mitigation and special design may be needed)
- Red -** indicates "relative hazards/risk is high" (Stop & evaluate project in detail or dismiss project)

(See "Threshold criteria" attached.)

HRA procedure diagram

Finally, a diagram has been developed to assist in the evaluation procedure. (attached) It is the core of the HRA system approach and is the guide flowchart for the operational guidelines to follow.

Part II:

Hazard & Risk Assessment Procedures

The following timber sale guidelines use the HRA system, step by step, to qualify timber sales proposals at the sub-basin level and outlines additional field operations that qualify timber parcels to sell in the Hoh basin.

STEP 1: Choose a sub-drainage for a timber sale.

Go to Step 2A

STEP 2A: Level 1 Hazard Zone Analysis
(Sub-basin slope stability)

Ask for the following GIS map products:

Base map - Contains sub-drainage delineations, forty (40) foot topographic contours, existing roads, stream location and forest practice stream types, section lines. Recommended scale for this and all listed GIS products is 1:12000 (1" = 1000'). (Paper medium)

Age class map - Contains stand origin dates for all forest stands in the selected sub-drainage. Special shading of commercial age timber will highlight the timber sale opportunities. Included are section lines.

Slope failure history map - Contains slope failures of the following classes: 1) natural channel-related, 2) natural failures re-initiated by past harvest, 3) channel-related following harvest, 4) road-related failures and 5) mid-slope failures following harvest. This layer is 1:12000 aerial photo interpreted and stored in GIS.

Slope morphology map - Contains a GIS produced hybrid "land form" map combining slope gradient and slope form characteristics. Specifically, 1) degree or percent of slope gradient and 2) land form components differing by 3 shapes; convexity, concavity and

planarity are analyzed to produce a slope stability "hazard zonation" map. Zones are subdivided by colors green, yellow and red.

Geomorphology map - Contains depictions of the relationship between soil depth and tree rooting depth. This layer, another hybrid, is interpreted by field evaluation and aerial photos. The interpretations are stored on the GIS. Using threshold criteria (see thresholds) for root/soil retention, various areas are assigned value colors of green, yellow and red.

(Value of the overlay maps: they jointly predict slope stability. By using slope stability information, timber sale location, wetland buffers, partial cuts, various leave tree aggregations and harvest systems can be fashioned to avoid or mitigate impacts near predicted unstable slopes. This is a sub-basin harvest planning tool, all timber sale designs will require field checks later in the biological risk analysis stage)

Using the above maps, study the following overlay combinations in the design of a sale proposal:

Overlay 1: Base / Age Class / Failure History - Consider the past and current slide activity in the basin. Road impacts and natural slide activity are factors in sale design and location.

Overlay 2: Base / Age Class / Failure History / Slope Morphology - Consider past slide activity and predicted hazard areas. Locate your proposal in areas on the Age Class map following the Green and Yellow colors as location guides. Try to minimize activities in red areas and areas of past slide activity. Buffer red areas or develop selective cutting prescriptions. Red areas indicate instability and need for protection. Examine opportunities for partial cutting in yellow areas, these too may exhibit instability and will need sale design attention.

Overlay 3: Base / Age Class / Geomorphology - Compare sale design and location to the geomorphology map. Is there need for sale location changes? Are additional hazard areas evident on this layer? Are the hazard areas the same or in different places? Use this layer to verify, check and change your original sale location plans. Continue cross checking and redesigning your sale area plans using the overlays. Following this procedure, a timber sale proposal is to be designed and located with much of the hazard of slides reduced or "green".

If most of the sale area is in green and yellow.....

**Go to Step 3A:
"Level 1 Hydrology
Analysis"**

**If the best plan you can make still has most of the sale
existing in yellow and red.....**

**Go to Step 2B:
"Level II Slope
Failure Analysis"**

**STEP 2B: Level 2 Slope Failure Analysis
(Slope Failure Model)**

Model to be named at a later date.

If analysis is positive.....

Go to Step 3A.

If analysis is negative.....

Go to Step 8.

**STEP 3A: Level 1 Hydrology Analysis
(Annual Water Yield Model)**

Ask for the following GIS map or report products:

Drainage size - A report of total acres in the sub-drainage selected for your proposed timber sale.

Slope, Aspect & Elevation of sub-drainage - This information is taken from the "Base map" product already produced in Step 2A.

Age Class & Timber type - An age class and timber type report. It lists a breakdown in ten (10) year age class increments with primary tree species. The age class increments are: 0-9 years, 10-19 years, 20-29 years, 30-39 years and 40+ years.

Slope morphology & Geomorphology - This information is taken from the "morphology" maps already produced in Step 2A.

The information provided above is used to fill out a "data input" worksheet (sample attached) to use in the H20RAIN hydrology model. H20RAIN is an interactive PC model that predicts impacts of proposed harvest in a drainage on water yield and stream flow. (The program was developed for rain dominated hydrologic systems by the US Forest Service, Ryan and Morison; for more information on H20RAIN see Software users guide, H20RAIN - a water yield and stream flow model, 4/19/91)

Run the model and develop three model outputs:

- 1) Sub-basin flows based on undisturbed forest conditions,
- 2) Sub-basin flows based on current forest conditions and
- 3) Sub-basin flows based on proposed timber sale action.

The outputs will be graphs that show average flow duration. Use the GIS to find the area under each curve. (We hope to simplify this step with program enhancements in H20RAIN that do the area calculations with out need to use GIS) GIS will calculate andcompare the area under each curve and give back to you a report indexing the stream flow on the undisturbed sub-drainage and the percent change (%x) from natural conditions inherent of current conditions and the proposed action. Again, threshold values have been assigned (see "threshold criteria") to the %x calculations.

0 - 5% = green, 6 - 15% = yellow and 16% = red

If the hydrological analysis in green.....

Go to step 4, "Action Plan".

If the hydrological analysis is yellow or red.....

Go to step 3B, "Level II Peak Flow Hydrological Analy

STEP 3B: Level II Channel Condition Assessment

Channel condition assessment elements include

- 1) peak flow computer modeling,
- 2) sediment mobility computer modeling and
- 3) evaluations of fish habitat using stream temperature sampling, sediment measurements and ambient monitoring data.

If analysis is green.....

Go to Step 3C.

If analysis is yellow:

1. pass on related data and maps.....to....
2. and.....

.....Step 8.

Go to Step 6.

If analysis is red.....

Go to Step 8.

Choose another
sub-basin for a
sale candidate.

STEP 3C: Has Biological Risk Analysis been performed?

Yes.....

Go to Step 7.

No.....

Go to Step 4.

STEP 4: Hoh Basin Action Plan

Go to Step 5.

The Action Plan is basically a list of all slope stability and hydrologically qualified timber sale proposals. It is used to communicate timber sales intentions and schedule pre-sales field work. Use it to schedule field consultations with other resource specialists in the "Biological conditions and risk analysis" stages of the HRA system for the Hoh Basin.

STEP 5: Level 1 Physical and Biological Channel Conditions Analysis

This phase is field work intensive and site specific. Involve the department staff specialists: soils and geology specialist, wildlife specialist, engineering and field foresters.

The DNR will have stream sediment routing, fish habitat potential and Hoh Tribe fish distribution data on GIS. This information will be consulted for timber sale site specific conditions. A stream-channel condition assessment (physical and biological conditions) will be used to judge and rate the current physical and biological conditions of the major stream reaches within the sub-basin. (Original Jones/Stokes analysis prepared for Weyerhaeuser Environmental Forestry Division by Jones and Stokes Associates. Feb. 10, 1992.)

If Revised Jones/Stokes analysis assigns green.....

If Revised Jones/Stokes analysis assigns yellow or red.....

Go to Step 7.

Go to Step 3B.

STEP 6: Special harvest and protection systems

DNR designs special harvest & environmental protection systems to address special physical and/or biological concern(s)

Go to Step 7.

STEP 7: Forest Practices application and TFW process

Submit the proposed sale to normal TFW and FP application processes.

Hoh basin Special Issues are satisfied.

STEP 8: Evaluation by "Co-Hoh" or "PRO-FISH"

Refer drainage and transfer associated maps, analysis and data to "CO-HOH" or "PRO-FISH" planning groups to evaluate conditions for mitigation, enhancement or restoration of fish habitat and water quality.

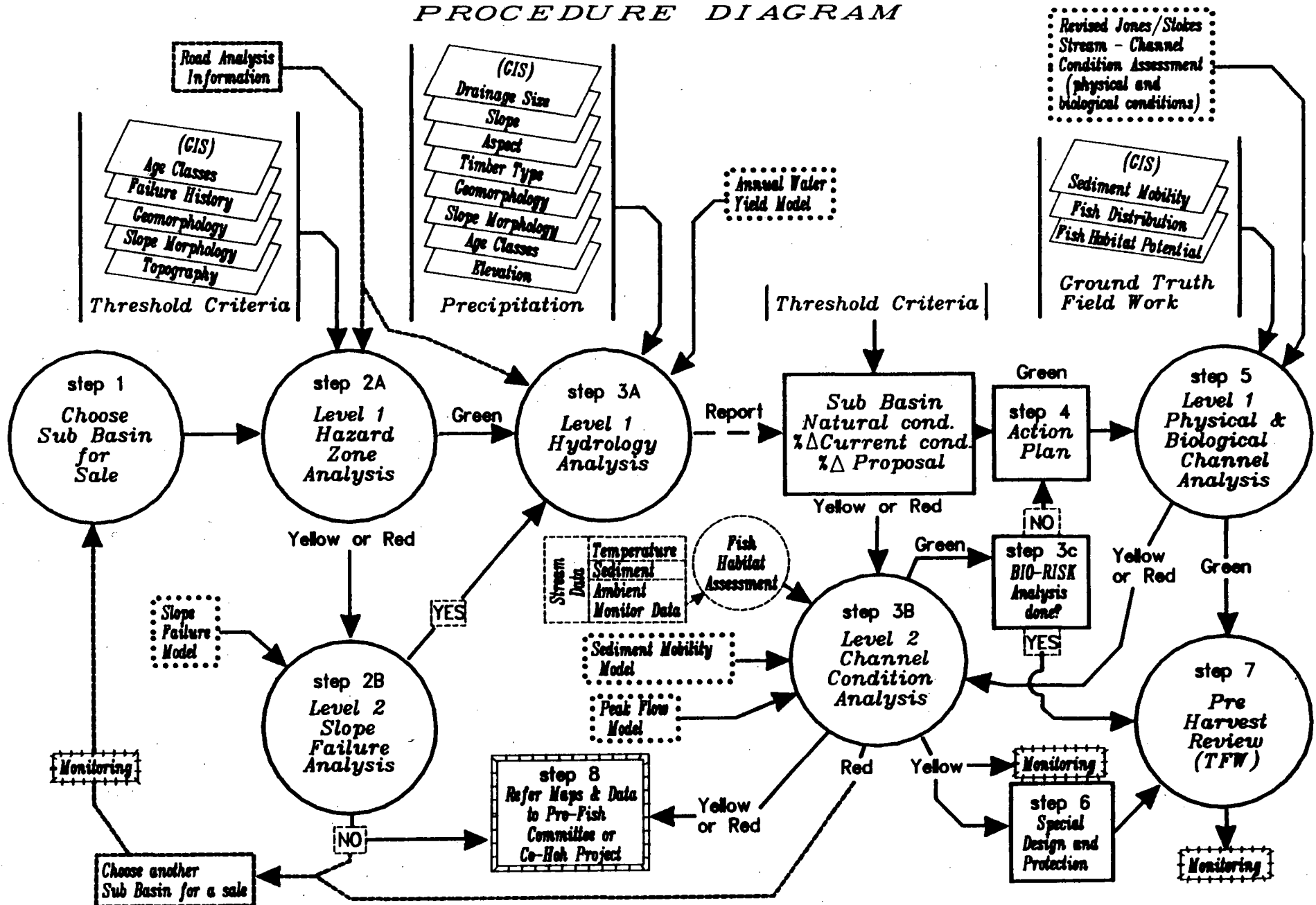
Either this is no longer a timber sale candidate area, or the timber sale proposal is subject to special protection design.

Attachments:

Hazard and Risk Assessment (HRA) diagram
Threshold criteria
Sample H20RAIN worksheet
Sample Jones/Stokes summary worksheet

SITE HAZARD / RISK ASSESSMENT

PROCEDURE DIAGRAM



THRESHOLD CRITERIA Rev. 10/1/92
Hillslope Hazard and Risk Assessment

<u>Parameter</u>	<u>Threshold</u>	<u>Index</u>
(1) Slope Morphology slope gradient slope form	Green Yellow Red	= convex form, 0-35 deg. (0-70%) slope = planar form, 0-25 deg. (0-47%) slope = convex form, 35+ deg. (71+%) slope = concave form, 0-25 deg. (0-47%) slope = planar form, 25-35 deg. (48-70%) slope = concave form, 25+ deg. (48+%) slope = planar form, 35+ deg. (71+%) slope
(2) Geomorphology soil depth-to-bedrock root reinforcement slope form	Green: Yellow: Red:	soil depth = 0-0.5 ft. <u>OR</u> any depth if soil and root depth are equal and undisturbed soil depth = 0.5-3 ft. on convex/planar slopes <u>OR</u> on concave slopes if soil and root depth are equal and disturbed soil depth = 3+ ft. if soil depth exceeds root depth; any slope form; <u>OR</u> soil depth = 0.5-3 ft. on concave slopes if soil depth exceeds root depth; <u>OR</u> undercut streambanks
(3) History of Failures	Green Yellow Red	= no previous failures = natural, isolated, small failures = large failures or man-caused failures
(4) Slope Hydrology	Green Yellow Red	= 0-5% increased water production = 6-15% increased water production = 16+ % increased water production

THRESHOLD CRITERIA **Risk Analysis / Biological Conditions**

<u>Parameter</u>	<u>Threshold</u>	<u>Index</u>
(1) Stream Temperature	Green	= maximum temp. 16.3°C, <u>AND</u> temp. increases from forest management 2.8°C
		= 10% exceedance of max. daily high measurements' exceed 16.3°C or a 2.8°C increase due to management
	Yellow	= 10% <x% < 25% of max. daily high measurements exceed 16.3°C or a 2.8°C increase due to forest management
	Red	= 25% of max. daily high measurements exceed 16.3°C or a 2.8°C increase due to forest management

* To be consistent with DOE 305b assessment procedures, two or more measurements must exceed the criterion.

(2) Substrate Composition (% fine sediments in spawning gravels)	Green	= 11% of the substrate particles are <0.85 mm
	Yellow	= 11% <x% < 17% of substrate particles are <0.85 mm
	Red	= 17% of the substrate particles are <0.85 mm

(3) Other Bio-indicator Parameters*

- large organic debris
- pool/riffle ratio
- channel bank/bed stability
- cobble embeddedness
- macroinvertebrates

* Criteria for these parameters have yet to be developed.
Methods will follow those being designed by TFW ambient-monitoring/watershed-analysis programs, and for DNR Forest Practices regulatory guidelines and state water-quality regulations.

THRESHOLD CRITERIA
Risk Analysis / Biological Conditions

(4) Stream Shade*

* Criteria for this parameter are being developed.

Methods will follow the RAPID (Riparian Aerial Photographic Inventory of Disturbance) technique and DNR Forest Practices Watershed Analysis Manual (Appendix D: Riparian Function Module).

[For RAPID technique, see: Grant, G., 1988, The RAPID technique: A new method for evaluating downstream effects of forest practices on riparian zones. Gen. Tech. Rep. PNW-GTR-220; Portland, OR., U.S. Dept. of Agric. Forest Service Pac. NW Research Station, 36 p.]

(5) Stream Channel Physical Conditions*

* Criteria for this parameter are being developed.

Methods will follow Stream channel conditions assessment: A methodology to evaluate channel damage related to increased peak flow (Jones & Stokes Assoc., 1992; prepared for Weyerhaeuser Environ. Forestry Div.), with modifications.

H2ORAIN WORKSHEET

Forest Land Management Division
Department of Natural Resources

Timber Sale Information

Timber Sale Name: _____

Region: _____ County: _____

Site Description

Sale Size: _____ acres Elevation: _____ feet

Average annual rainfall: _____ inches

Soils

	Texture	Rooting Depth	Area
Soil #1	_____	_____	_____
Soil #2	_____	_____	_____
Soil #3	_____	_____	_____
Soil #4	_____	_____	_____
Soil #5	_____	_____	_____

Type of Harvest System

Clearcut: _____ or Partial Cut: _____

If partial cut - residual basal area _____ Ft²

Drainage Information

Drainage Size: _____ acres General Aspect: _____

Timber habitat zone: Hemlock: _____ Douglas-fir: _____

Timber Age Class Distribution

	Age Class	Percent of Area
0-9 years	_____	_____
10-19 years	_____	_____
20-29 years	_____	_____
30-39 years	_____	_____
40+ years	_____	_____

Number of stations of existing road within drainage: _____

Percent of drainage in permanently open areas: _____

Number of station of new read construction: _____

**EVALUATION OF STREAM CHANNEL CONDITIONS
SCORE SHEET**

Using the Field Assessment forms, score each item below: 1 = applicable to the surveyed reach; 0 = does not apply.
Record the score in the column indicated.

"Red Flag Conditions"	Existing	Potential
I. <u>Response Category Type</u> = A, B, or C		_____
II. <u>Channel Banks</u>		
A. Channel Capacity = b, c, d, or e (for either 1. or 2.)	_____	_____
B. Bank Cutting		
1. (1. Length) > 30% and (2. Location) = c	_____	
2. (1. Length) > 50%	_____	
C. Degree of Bank Protection		
1. (2. Vegetation Density) = c, d, or e and banks are not predominantly resistant bedrock		_____
D. Resistance of Bank Material		
1. (1. Rock content) = d or e and (2. Cohesion) = d, e, g, h, or i		_____
2. (1. Rock content) = b or c and (2. Cohesion) = g or h		_____
E. Flow Deflection = c		_____
III. <u>Channel Bottom</u>		
A. Deposition		
1. (1. Extent) = c and (2. Size) = d	_____	
2. (1. Extent) = d or e	_____	
B. Recent Bed Mobility = c or d	_____	
C. Armoring		
"yes" for either wetted channel or bars	_____	
D. Particle Size Distribution = c	_____	
E. Particle Size = e, f, or g		_____
F. Particle Angularity and Packing = d, e, f, g, or h		_____
G. Manmade Channel Controls = c, d, or e		_____
IV. <u>Other Indicators</u>		
A. Woody Debris		
location = e, h, or i	_____	
location = f or g		_____
B. Surface Flow Inputs = a, b, or c		
TOTAL SCORE	_____	_____

Interpretation - "Existing" Columns

- | | | |
|-----|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | green | Channel conditions indicate little or no existing damage related to increased peak flows |
| 2-3 | yellow | Channel conditions indicate a moderate degree of existing damage; further investigation is necessary to determine the specific cause of items scored above |
| 4 | red | Channel conditions indicate significant channel damage has occurred |

Interpretation - "Potential" Columns

- | | | |
|-----|--------|----------------------------------------------------------------------------------------------------|
| 1 | green | Channel conditions indicate the channel has a low potential for damage if peak flows increase |
| 2-3 | yellow | Channel conditions indicate the channel has a moderate potential for damage if peak flows increase |
| 4 | red | Channel conditions indicate the channel has a high potential for damage if peak flows increase |

[Note: This evaluation method is modified from: Jones and Stokes Associates (JoAnn Metzler), 1992, Stream channel conditions assessment: A methodology to evaluate channel damage related to increased peak flow. Prepared for Weyerhaeuser Environmental Forestry Division, Tacoma, WA.]

Attachment B - Hoh Tribe U&A Boundary Excluding Olympic National Park

