Aquatic Conservation Strategy:

Conserve and Restore Management Themes

Introduction

The Clearwater and Nez Perce National Forests are proposing aquatic conservation areas as the basis for development of strategic direction within the revised Nez Perce and Clearwater National Forest Land and Resource Management Plans. Conservation biology and landscape ecology theory supports the concept of conservation areas in land use planning for maintaining biological diversity and sustainable ecosystems (Rieman *et al*. 2000, Jensen *et al.* 1996, Rieman *et al.* 2006). Moreover, Forest Service direction mandates maintenance of sustainable ecosystems while providing for resource uses and enjoyment. As one of the four major conservation areas in the United States that contribute substantially to biological diversity (Shaffer 1987), National Forest lands provide the best remaining habitat for many aquatic species at risk.

This document describes two proposed aquatic conservation management themes: Conserve and Restore - a naming scheme that provides an intuitive sense of the condition of the biophysical environment. A conserve or restore designation and priority (high, moderate or low) was assigned to each subwatershed within the Clearwater and Nez Perce National Forests. Conserve or restore designation and priority were based on the current watershed condition and the current fish species status, ecosystem risks, and restoration opportunities. The purpose is to provide the decision maker and public with a

clear intent of the watershed and aquatic resources management emphasis and priority when considering land use alternatives[1].

Clearwater and Nez Perce National Forest hydrologists, biologists, and ecologists relied on a variety of information (subbasin, watershed, and project assessments) to gain an understanding of existing conditions in order to complete conservation area strategies. Conservation area strategies for the Clearwater and Nez Perce National Forest considered biotic diversity, physical processes, and land uses at the watershed and subwatershed scales. Physical processes considered include "landform", which reflects underlying geology, slope, dominant vegetation, and the stream drainage network. Biotic diversity considerations include the number of aquatic animal species and overall abundance, sensitive and threatened fish species, and the potential of the habitat upon which these species depend. Land uses focused on road density as a predictor of change from historic condition (Rieman *et al*. 2000). Forest road density is an indicator for a variety of lands uses that negatively influence hydrologic condition in regards to water flow amount, duration, and quality. Stream crossing density provides an indication of stream connectivity for stream dwellers and water quality. The resulting aquatic conservation area designations recognize the linkages between the uplands and aquatic environments and the variety of resource uses and activities.

Aquatic conservation themes display the integrated and prioritized Forest Plan desired conditions, the basis for development of goals, objectives, standards and monitoring

[1] See November 2002 MOU with FS, BLM, USFWS, EPA, and NOAA that implements "***The Interior Columbia Basin Strategy***" that guides the revision of forest resource management plans.

strategy. Given limited time and monetary resources, it is important that land management strategies prioritize the most effective and cost efficient conservation and restoration opportunities, not just the most convenient. Management also recognizes that some watersheds or subwatersheds will not be restored to their physical or biological potential within the planning period timeframe of ten to twenty years because of the cumulative effects outside the basin and Forest planning area and legacy effects of past land management.

Conserve Area Designation

Conserve subwatersheds display stream channel, riparian and upland vegetation conditions and patterns that reflect a historic range of watershed disturbance processes. Sediment amounts and stream flow regimes are within an expected historic range of frequency, duration and intensity based upon the landscape setting and disturbance processes. Water quality supports designated or existing beneficial uses, including current and future public drinking water supplies. Land uses and human activities do not strongly influence landscape pattern or hydrologic processes, as indicated by low road density and few stream crossings. Examples of conservation areas include wilderness and many of the roadless subwatersheds across both Forests.

Management strategies emphasize allowing natural disturbance such as fire, flood and disease. However, active management is sometimes required to conserve these physical and biological processes and patterns. For example, vegetation composition and structure that trend outside the historic range of variability because of fire suppression may pose

risk to some fish populations from high intensity fire events. Fish often re-colonize streams following a local extinction caused by intense fires once conditions stabilize. Re-colonization following a local extinction event may not occur because of isolated and depressed fish populations. Mitigating fire intensity through active management may be impractical at the watershed scale; however, it may be critically important to manage smaller key habitats to reduce the risk of local extinctions. Another example of active management activities to conserve hydrologic and biological processes is maintenance of existing roads and trails to minimize erosion and resulting sediment additions to nearby streams and water bodies. These may be very high management priorities to maintain the function and critical instream and upland habitat elements. However, as a general rule minimal investment over time is needed to maintain function and critical instream and upland habitat elements in these conservation-designated watersheds.

Restore Area Designation

Restore subwatersheds are where the cumulative effects of past land uses combined with natural disturbances have interrupted expected water flow regimes and physical processing of sediment. These disturbances are a result of past activities such as extensive roads and trail network, timber harvest near stream channels, stream channel changes caused by mining, and riparian damage due to unmanaged livestock grazing. The common effect of these disturbances are long-term (decades) increase of sediment deposition in streams, loss of large woody debris recruitment to stream channels, abnormal hydrologic patterns (water flows), and elevated water temperatures. Cumulative impacts from human caused disturbances and periodic natural events such as

large fires, landslides, and floods exacerbate abnormal watershed and biological conditions.

Active management is required to restore the physical and biological function to their natural range of frequency, duration, and intensity. Identification and assessment of the significant adverse impacts to habitat will allow managers to focus restoration efforts in the most cost effective manner to achieve hydrologic and biological recovery. This implies that 1) there is a range of treatment intensities and desired landscape responses, and 2) not all impacts need be treated to achieve goals.

Priority Designations

Priority ranking (high, moderate, and low) for each subwatershed was based on status, risks, and opportunities (USDA Forest Service and USDI Bureau of Land Management 1999). Primary issues considered in ranking status and risks were water quality, riparian habitat, existing aquatic species diversity, and potential fisheries habitats productivity. Opportunities considered the expected cost and response time to effect measurable changes toward achieving goals.

High Priority Criteria – Conserve Area Designation

1. Fish species assemblages contribute to high biological diversity. Habitats support productive or unique populations and key salmonids species exhibit full range of life history diversity. The assumption is that the aquatic community is largely

intact, and is a potential source of individuals to nearby recovering populations AND;

2. Water quality supports designated and existing beneficial uses; OR
3. Municipal (public) water supplies.

Moderate Priority Criteria – Conserve Area Designation

1. Fish species assemblages represent moderate biological diversity AND;
2. Water quality supports designated and existing beneficial uses.

High Priority Criteria – Restore Area Designation

1. Habitat potential for highly productive or unique fish communities with restoration efforts. Loss of connected populations, competition or genetic introgression with non-native species has caused the loss of diversity of some unique populations such as key salmonids species. The assumption is that the aquatic community is largely intact, but not resilient to landscape disturbance events, nor provides a source of individuals to nearby recovering populations AND;
2. Water quality may not support all designated and existing beneficial uses OR:
3. Municipal (public) water supply.

Moderate Priority Criteria – Restore Area Designation

1. Potential for moderately productive fish habitat with restoration efforts. Long-term loss of connected populations, competition or genetic introgression with

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non-native species has caused the loss of diversity of some unique populations such as key salmonids species. The assumption is that the aquatic community is largely intact, but not resilient to landscape disturbance events, nor provides a source of individuals to nearby recovering populations AND;

2. Water quality may not support all designated and existing beneficial uses OR:
3. Municipal (public) water use a future possibility.

Low Priority Criteria – Restore Area Designation

1. There is a minor amount of fish habitat. Long-term loss of connected populations, competition or genetic introgression with non-native species has caused the loss of diversity of key salmonids species. The assumption is that the aquatic community is not intact, and not highly resilient to natural events, nor provides a source of individuals to nearby recovering populations AND;
2. Water quality may not support all designated and existing beneficial uses AND:
3. Municipal (public) water is not considered as a future use.

Management Strategies[2]

Protection

Preserve riparian areas that are ecologically intact and fully functional. Human activities that significantly influence aquatic and riparian ecological functions are restricted. The strategy strives to protect aquatic and riparian ecosystems that are currently in good condition so that naturally regenerative processes can continue to operate. Conserve designations that typically include the wilderness and roadless watersheds generally would fall within this management strategy. However, high

[2] **From Pete Bisson 2000 Draft Subbasin Assessment Template**

priority restoration projects do exist within portions of some conserve-designated watersheds.

Passive Restore

Prevent further loss of aquatic and riparian ecosystem integrity. To the extent possible, remove anthropogenic disturbances from altered aquatic and riparian ecosystems in order to allow natural processes to be the primary agents of recovery. Allow the natural disturbance regime to dictate the speed of recovery in areas that have a high probability of returning to a fully functional state without human intervention. This management strategy applies to many of the low and moderate priority restore designated subwatersheds. Speed of recovery may be several decades once anthropogenic disturbances are removed or mitigated.

Active Restore

Return functionally impaired aquatic-riparian ecosystems to a state that would occur naturally at the site by actively managing certain aspects of habitat recovery. Combine elements of natural recovery with management activities directed at accelerating development of self-sustaining, ecologically healthy riparian ecosystems. This management strategy applies to the high and some moderate restore priority watersheds. Many watershed and riparian restoration projects fall into this category, including vegetation treatments, stream crossings removal or improvement, reducing road densities, and improving road condition. Speed of recovery may be one to two decades once human caused disturbances are removed or mitigated.

Rehabilitation

Re-establish naturally self-sustaining riparian ecosystems to the extent possible, while acknowledging that irreversible changes such as dams, permanent channel changes due to urbanization and streamside roads, stream channel incision, and floodplain development, permit only partial restoration of ecological functions. Combine natural and active management approaches where ecological self-sufficiency cannot occur.

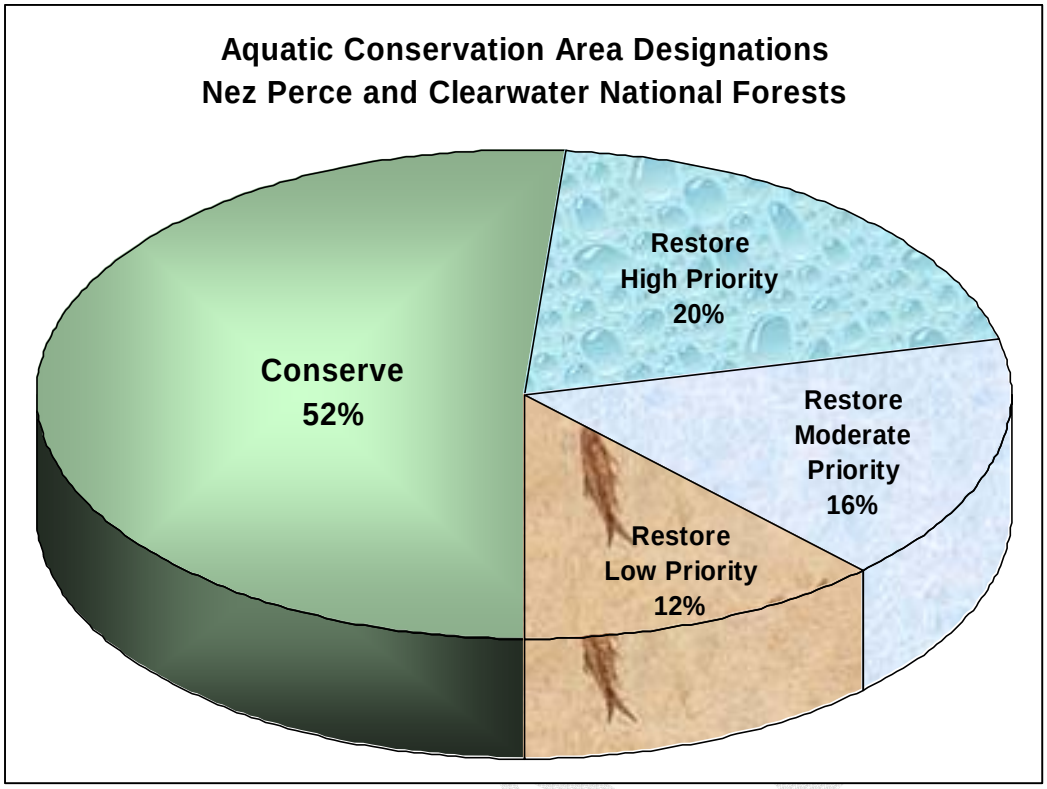

Figure 1. Distribution of conservation area designation and priority subwatersheds within the Nez Perce and Clearwater National Forests.

Table 1. Distribution of conservation area designation and priority of 228 subwatersheds within the Nez Perce and Clearwater National Forests.

Conservation Theme and Priority	Number of Subwatersheds	Percent of Total
Conserve – High Priority	89	40%
Conserve – Moderate Priority	26	12%
Restore – High Priority	47	20%
Restore – Moderate Priority	40	16%
Restore – Low Priority	28	12%

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Figure 2. Distribution of conservation area designation and priority subwatersheds within the Nez Perce and Clearwater National Forests.

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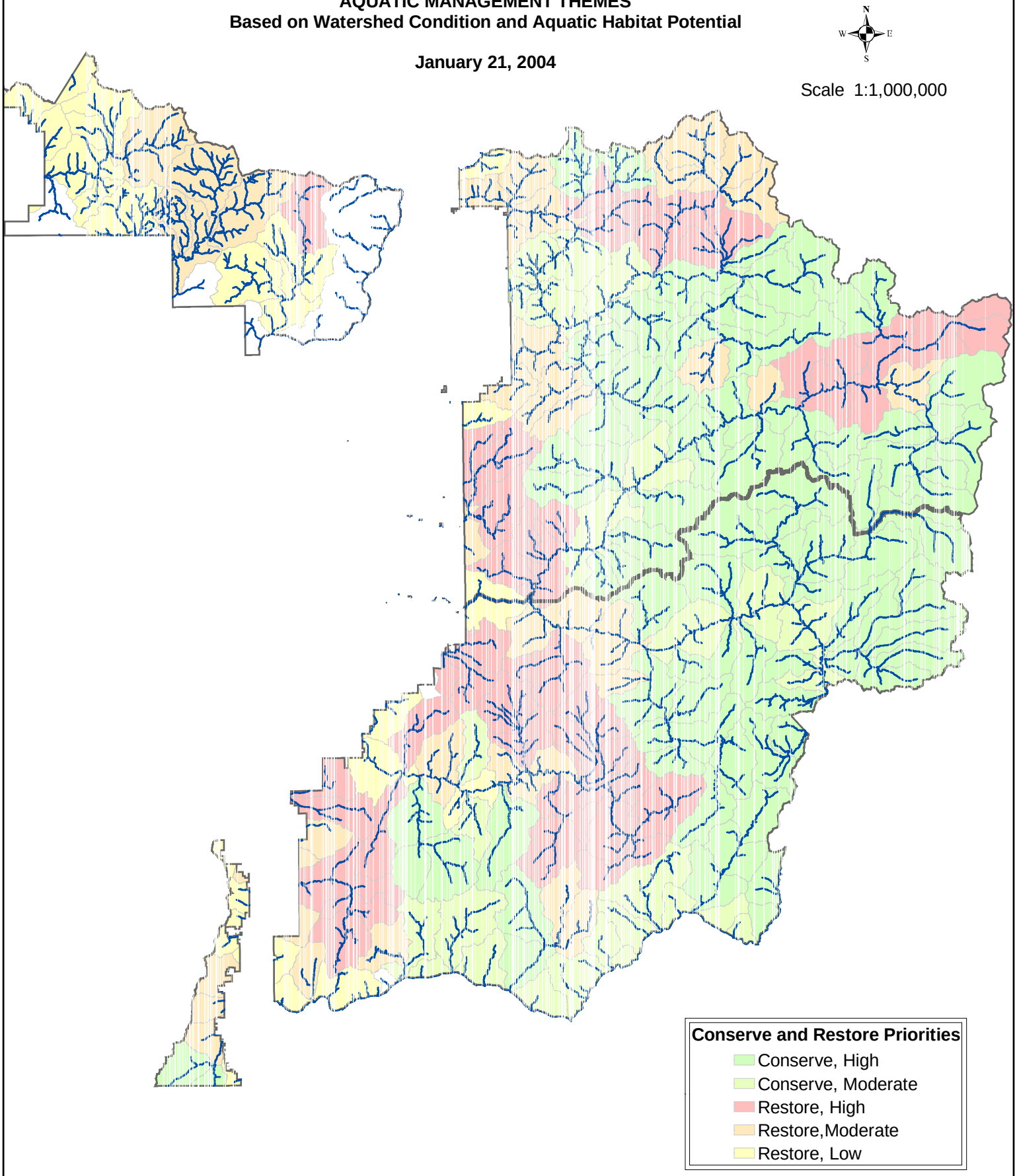
CLEARWATER AND NEZ PERCE NATIONAL FORESTS
AQUATIC MANAGEMENT THEMES
Based on Watershed Condition and Aquatic Habitat Potential

January 21, 2004

Scale 1:1,000,000



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