Chapter 7 - Monitoring and Adaptive Management

Three topics are suggested for a monitoring and adaptive management effort in the Indian/Deadwood watershed. All three offer opportunities to improve our knowledge of how to manage forest ecosystems to promote improved aquatic habitats and old-growth structure. The proposed methods could be adopted by the Mapleton Ranger District to illustrate some adaptive management designs at a watershed scale, or the methods could be adopted as part of a larger scale monitoring effort, e.g., at the river basin or province scale. The proposed topics are expected to meet some of the monitoring requirements identified in the Northwest Forest Plan.

1. PUBLIC PARTICIPATION

BACKGROUND:

During the watershed analysis, team members had several contacts with residents of the watershed, including open meetings and a workshop. One outcome of the meetings was our increased awareness of the residents' desires to improve habitat along streams crossing their property and a better understanding of their efforts to initiate cooperation and secure funds to do stream enhancement on their own property. Such efforts are occurring as a group in the Deadwood community. Since the beginning of the watershed analysis, the fish biologist and hydrologists have been working with residents on stream enhancement projects and sharing information about aquatic conditions.

GOAL:

Our objective for public participation revolves around the mutual concern we have with residents in the watershed about declining fish populations, particularly salmon. Our goal is to increase aquatic and riparian diversity by promoting land use practices along streams on private and public land that are compatible with healthy stream ecosystems. Good communication and cooperative agreements with the residents in these watershed are key to addressing this mutual concern.

WHAT do we want to learn?

Over the next several years, the following questions could be monitored:

1.) Does increased Forest Service involvement with residents in the Indian and Deadwood watersheds affect landowners' use of and attitudes about land in riparian areas?
2.) How do residents in the watershed view restoration?

WHO will be responsible for conducting the work?

Monitoring should be a combined effort of state agencies, conservation districts and the federal land management agencies, i.e., Forest Service and Bureau of Land Management. It would be necessary to provide information to interested residents, continue to provide residents with assistance (consultation) on project design, and assist with stream structure placement on private land.

HOW will we measure our results?

Over the next several years, the watershed restoration efforts will be considered successful if there have been positive changes in:

1). Stream temperatures (i.e., reduced temperatures due to increased shade in riparian zone).
2.) Number of riparian and in-stream restoration projects (i.e., a predetermined number of projects per year and target number for a given year that we would like to increase in each watershed on private land).
3.) Reduced stream bank erosion due to fewer cattle in the stream (e.g., increased linear feet of fencing in and along the creeks such that placement of fences allow cattle to only enter the creek for watering at specific locations).
4.) Increased successful plantings of large riparian vegetation (i.e., numbers of willows, alder, conifer) on private land within 10 feet of the creek.
5.) Increased numbers of telephone and personal contacts per year between district and residents discussing stream diversity and habitat.
6.) Is there more dialogue among residents?
7.) Challenge cost share agreements--not just private land, e.g., being able to get funds from GWEB, watershed council involvement).
8.) Have we been involved enough to get these projects off the ground? Do we still interact with people on projects? Are they still inviting us to their meetings?
9.) Send out a written survey every five years asking how the residents perceive what the Forest Service is doing.

WHEN will activities and measurement occur?

Year 1: Assist with fish projects in Deadwood Watershed.

Determine response to the watershed analysis and develop rapport with Indian and Deadwood community.

Determine extent of interest by individuals to put up fences, install fish projects, do riparian planting on private land.

Year 2-3: Continue assisting residents and actively making contacts.

Year 5: Survey elements listed under "HOW" with cooperation.

Year 10: Survey elements listed under HOW to determine lasting effects of our efforts.

2. THINNING PLANTATIONS TO DEVELOP OLD-GROWTH STRUCTURE ON LARGE SCALE IN BLOCK H (30,000 ACRE BLOCK)

BACKGROUND:

Block H (see Landscape Management Design) is a large, fairly contiguous block (30,000 acres) in which most of the federal land (and 50% of the total acres) is in plantations 10-40 years old, which we want to keep in similar seral condition because it offers an opportunity to study changes in seral condition over a large scale. We want to maintain it as large patch so we can monitor wildlife and wildlife habitat for species that require large patches. There are many unanswered questions about the development of old-growth structure and forest succession. Within this large block a special opportunity exists because there is variation with regard to species composition and structure, due to the Plant Association Groups (PAGs). This setting will allow us to compare successional stage development simultaneously in three PAGs on one large block.

Block H has unique value to monitoring because it is primarily in federal ownership, and is a contiguous large block of plantations. This would allow us to examine silvicultural treatments on a large scale which provides opportunity for wildlife monitoring. In addition, the large block provides for many replicates of each treatment in several stands.

GOAL:

The goal is to examine silvicultural treatments used to develop old-growth structure in relation to environmental differences in the planning area, by testing the vegetation and wildlife response to three or four treatments and a control within large blocks among three environments (wet, moist and dry as represented by the plant association groups). Because of the size of Block H, treatment block sizes could be as large as 5000 acres and treatments would cover large areas so that each environment type would receive 4 or 5 treatments, and trends could be monitored across the environments (as mapped by PAGs). The treatments would be similar to thinning prescriptions frequently implemented over the past two years on thinning projects, although many of the acres would be untreated because they are mature stands or steep ground, unsuitable for cutting.

WHAT do we want to learn?

We would like verification of the generalized successional pathways of PAGs (i.e., species composition at various stand ages) as outlined in Chapter 4 (Generalized Successional Pathways). These are assumptions we recommend guide our treatment of plantations. However, they should be tested through monitoring and adaptive management.

1.) What is the structural development (size of trees, understory, rate of succession/development) of stands in the three different environments to 4 or 5 different thinning regimes?
2.) What is the habitat change (long term--over 50 years) due to these treatments for guild species that require large patches?
3.) What is the response (decay rate and function) of coarse woody debris under the microclimates (thinning densities) as stands develop?
4.) What is the economic cost and benefit of each of these thinning regimes at each entry?

WHO will be responsible for completing the work?

The district could implement this by guiding project ID Teams toward it with a proposed action and encouraging ID Teams to develop this as an alternative. In identifying significant issues, design alternatives to address these monitoring goals. Include an economic analysis and schedule logging systems and road treatments to meet the goals. For the greatest learning to occur, the ID Team must document the vegetative response they anticipate for each environment to the treatment prescriptions. This will clarify the rationale for the treatments and be easier to monitor over the next several decades by those attempting to follow our tracks. Design prescriptions to meet the objectives including a prescription that is a control (i.e. no thinning of a substantial number of fully stocked plantation acres) so it can be determined if changes are due to the treatment or would have occurred anyway. As in North Fork Thin or Big Blue Thin on Waldport, other treatments might be a light thinning, a heavy thinning and underplanting, or some type of random marking to ensure non-evenly spaced trees. To ensure implementation of the design, it will be necessary to loosely schedule all of Block H for treatment and designated controls over the next 30 years of entries.

HOW will we measure our results?

Over the next several years, we will measure and consider implementation successful if we do a variety of treatments across the PAGs by treatment blocks and maintain a database of results. A possible scenario for treatment would be:

1.) For each of the four or five treatments across subwatersheds (approximately 5000 acres per treatment), measure tree size, CWD by decay class, understory development (if underplanting is one of the prescriptions) and other appropriate structural components.
2.) Measure the response of similar treatments applied over large blocks across PAGs.
3.) Measure the same components on control units to determine if the changes are due to treatments or if they would have occurred anyway. (To be able to make that distinction with any certainty, untreated blocks the same size as treatments must be maintained).
4.) Track the cost of treatments and compare economic viability (timber revenue) of treatments for the large area.

WHEN will activities and measurement occur?

Year 1: First project planned and EA written that includes one or more adaptive management scenarios as alternatives in the EA. At this time the entire block should be mapped out and plantations scheduled for treatment.
Year 2-3: Layout sale and logging of first set of treatments (timbersale). Take post-treatment measurements immediately after logging so subsequent growth can be compared. Small permanent plots or low-level flights could be used. May want to digitize and put in GIS.
Year 15: Differences in structural development or differences in succession may be evident. Measurements of structure and composition.
Year 30: Additional entries may be part of the prescription.

3. RIPARIAN THINNING FOR IMPROVED ECOLOGICAL RIPARIAN FUNCTION IN BLOCK H (30,000 ACRES).

BACKGROUND:

Block H is a large, contiguous block of plantations 10-40 years old which have young conifer and alder along the streams because few riparian buffers were implemented as part of past logging plans in the area. This large length of stream provides an opportunity to monitor the response of riparian vegetation in conjunction with thinning the adjacent plantations. It is a unique opportunity to monitor vegetation response along the stream continuum at a landscape scale.

The long term strategy of this block is to develop stream conditions and riparian vegetation capable of prime fish (salmon) habitat. Over the past two years current riparian treatments (to meet the Aquatic Conservation Strategy) have recommended thinning existing vegetation to increase the size of conifers, and (along short stream reaches) to create openings in the riparian canopy and plant conifers (usually red cedar or hemlock) for long term future CWD input into the streams and riparian zones. There is a concern (short term) that our efforts to develop large conifers in riparian areas creates some risk to aquatic species by removing shade and increasing summer stream temperatures. However, we don't know how great a risk these treatments may be creating.

GOAL:

The goal is to determine the actual risk (short term concern) of thinning trees adjacent to streams by monitoring the effects of various thinning treatments on stream conditions and riparian vegetation. We would achieve this by measuring differences in stream temperature associated with the three thinning treatments and control described in Question 2. These results could then be compared to the conifer growth so the benefits and risks could be weighed.

WHAT do we want to learn?

Over the next several years, the following questions could be monitored:

1.) What is the short-term risk of removing vegetation (shade) at various densities to develop large conifers trees in riparian area? What level can we thin to for large tree development before we limit our options for CWD (after blowdown and after regeneration mortality and natural mortality from bank channel cutting)?

2.) Our analysis assumes that Douglas-fir regenerate more densely and grow more successfully on toeslopes than on gentle or flat lower slopes because conditions are drier and Douglas fir are more able to compete with alder than they do on wetter sites (non toeslopes). This assumption is based on the information that stocking levels in riparian zone (RUSP PAG) are low. Modeling of PAGs suggests toeslopes have a more narrow band of RUSP than gentle slopes. We would like these assumptions to be tested

3.) Do we see differences in temperature.

4.) Do stands of given treatments remove most of the in-stream structure during high flow? For example, does removal of alder result in unacceptable loss of streamside vegetation? What is the effect of removal on brush competition?

5.) Cumulative effects. We may need to compare to industrial forest land.

6.) Costs/benefits of treatment (even if benefits are hard to measure, an accounting of costs would be enlightening).

WHO will be responsible for completing the work?

This could be accomplished by guiding ID Teams in an environmental analysis that proposes development of this as an alternative, and by giving the presale team direction to implement these priorities as part of their job. Prescriptions would be written similar to the previous monitoring design.

HOW will we measure our results?

1.) Stream temperatures correlated with the range of stand treatments including the control.
2.) Stream roughness.

WHEN (When will activities and measurement occur?):

Years 1-3: Project planning, layout, timber sale and logging.
Year 2: Stream temperatures should be taken before logging (pre-treatment data is vital to being able to compare post treatment effects) and immediately after treatment.
Year 3-10: To make this economically viable, stream temperatures should be taken in conjunction with plantation monitoring.

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ACRONYMS

ALRU	red alder
ATM	Access and Travel Management
BLM	Bureau of Land Management
CWD	Coarse woody debris
FS	Forest Service
FWS	US Fish and Wildlife Service
GASH	Salal
GWEB	Governor's Watershed Enhancement Board
HABSCAPES	Habitat suitability model
LSR	Late-Successional Reserve
LTA	Landtype association
LWD	Large woody debris
NMFS	National Marine Fisheries Service
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
PA	Plant association
PAG	Plant Association Group
POMU	swordfern
PSME	Douglas-fir
RHMA	rhododendron
RUSP	salmonberry
THPL	western redcedar
TSHE	western hemlock