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February 21, 2006

Re: Review of Environmental Impact Report for the Comprehensive Update to the Jackson Demonstration State Forest Draft Management Plan, December 2005

Dear Mr. Gentry,

Below you will find my comments on the *Environmental Impact Report* (EIR) for the *Comprehensive Update to the Jackson Demonstration State Forest Draft Management Plan*, December 2005. The following incorporates by reference all points made in my letter of comments (Higgins, 2004) on the previous release of the *Jackson Demonstration State Forest Management Plan* (CDF, 2004) and the associated *Environmental Impact Statement* (EIS). I am a consulting fisheries biologist with extensive knowledge of the watersheds surrounding Jackson Demonstration State Forest (JDSF), having completed projects on the Noyo, Big and Ten Mile rivers for the California Department of Forestry (CDF). These CD and Internet (www.krisweb.com) compendiums of information, known as KRIS projects, have been filed into the record as compact disks with my past submissions.

While the new EIS is sometimes encyclopedic, it does not specifically recognize the reliance of endangered coho salmon (*Oncorhynchus kisutch*) on JDSF and potential regional consequences of mismanagement of the State forest at this critical time. Although CDF FRAP included more information on cumulative effects, sediment yield, roads, water temperature, riparian conditions, sensitive amphibians, restoration, and timber harvest, there is still a fundamental failure to deal with these subjects in a scientific, meaningful and quantitative way. There is no clear monitoring program for tracking effects of management as required by CEQA nor do the *Draft Plan* and *EIS* meet that law's requirement to "emphasize feasible mitigation measures." Reliance on the "functionally equivalent" JDSF Management Plan measures and Forest Practice Rules (FPRs) does not meet CEQA standards and the FPRs have been shown to be insufficient to prevent cumulative effects (Dunne et al., 2001) and the decline of Pacific salmon species (Ligon et al, 1999; Collison et al., 2003).

Overall Organization and Flaws of EIS Approach

The *JDSF EIS* (CDF, in press) is 1449 pages in length and is exhaustive in its coverage of issues and the range of literature that it sites. It is, however, scientifically vacuous and completely insufficient in its understanding and explanation of cumulative watershed effects. There are no clear means of minimizing risk of these effects or any quantifiable and well defined monitoring program that would guarantee positive trends in aquatic health or fish populations in concert with the suggested management approaches. Although high levels of impacts are explicitly acknowledged, most are ascribed to old logging not more recent widespread clear cutting. CDF fails to prove that planned actions will not cause incremental additions of pollution in already critically stressed aquatic ecosystems within and adjacent to JDSF. It seems that there has been a great deal of effort put into invoking literature and giving lip service to issues raised in previous comments (Higgins, 2004), but no point made in portions of the document adjacent that explain the significance of citations or references (see Restoration below).

Specifically there are basic problems with scientific assessment and selective use of data that undermine the credibility of the *JDSF Plan* and *EIR* (see Temperature). Despite a substantial increase in discussion of coho salmon and a more frank characterization of their imperiled status, there are no specific steps in the preferred options of the *EIS* and *JDSF Management Plan* that I would expect to lead to their recovery. CDF Fire and Resource Protection (FRAP) generated maps for the *EIR* (Appendices 1-14) that are very attractive, but very unenlightening and in some cases colors are used that are actually misleading.

Summary Response to Range of Alternatives

Alternative B is to continue with business as usual under the outmoded 1984 *JDSF Management Plan*, although this option has been defeated in court and is not a viable management strategy. The *EIS* preferred alternative is C1, which relies mostly on protections under the California Forest Practices Rules (FPRs) for maintaining aquatic health and allowing ecosystem recovery. Numerous studies, such as Ligon et al. (1999), Dunne et al., (2001) and Collison et al. (2003), have explicitly pointed out that California FPRs have failed to protect Pacific salmon species. That CDF clings to the strategy that they can devolve management back to reliance on FPRs shows that the institution is in denial. *JDSF* management will continue to give rise to public opposition (and likely legal challenge) unless an Alternative other than C1 is selected. The “non-management” option Alternative A is not viable because ecological perturbations are so far advanced, and the ecosystem so far outside the normal range of variability, that return to good forest health through any unmanaged succession would be unlikely.

Alternatives C2-E would all be acceptable. Alternative E makes the most sense ecologically, since it would move upland conditions in the direction of their normal range of variability. Fish and key herpetofauna evolved in old growth conditions, with trees up to 20 feet in diameter that live for hundreds or sometimes thousands of years (Figure 1).



Figure 1. Early logging in the Fort Bragg area circa 1870 showing that the redwood forest before disturbance at JDSF likely had trees that were very large and hundreds of years old. Photo courtesy of the Held-Poage Historical Library and the Mendocino Historical Society. From KRIS Ten Mile.

Scientific Problems

CDF FRAP is misrepresenting or cherry picking data to minimize problems of cumulative effects or to make points that are not supported by wider data sets.

Water Temperature: JDSF owns and commonly deploys a number of automated temperature sensors that allow data to be downloaded within minutes for a whole season. CDF FRAP only used temperature data that spanned from 1996-2001, a period ending more than five years ago. CDF is claiming that there is no temperature problem on JDSF, except on James and Chamberlain Creek, when in fact my last comment letter (Higgins, 2004) and data from the KRIS Noyo system (IFR, 1999) shows quite clearly that both Parlin Creek and the SF Noyo at the lower JDSF boundary were over the range that supports coho in 1997 (Figure 2). Automated temperature probes were undoubtedly deployed in JDSF in the five years since 2001. This raises questions as to whether CDF omitted these data because they didn't support the hypothesis that there were no existing temperature problem related cumulative effects. Collison et al. (2003) point out that in order for management decisions to be trustable, that raw data supporting management conclusions must be provided. JDSF and CDF FRAP need to provide analysis of temperature data from 2001-2005 for the Noyo and Big Rivers as part of the revised *EIS* and post raw water temperature on the Internet for use by scientists and the general public.

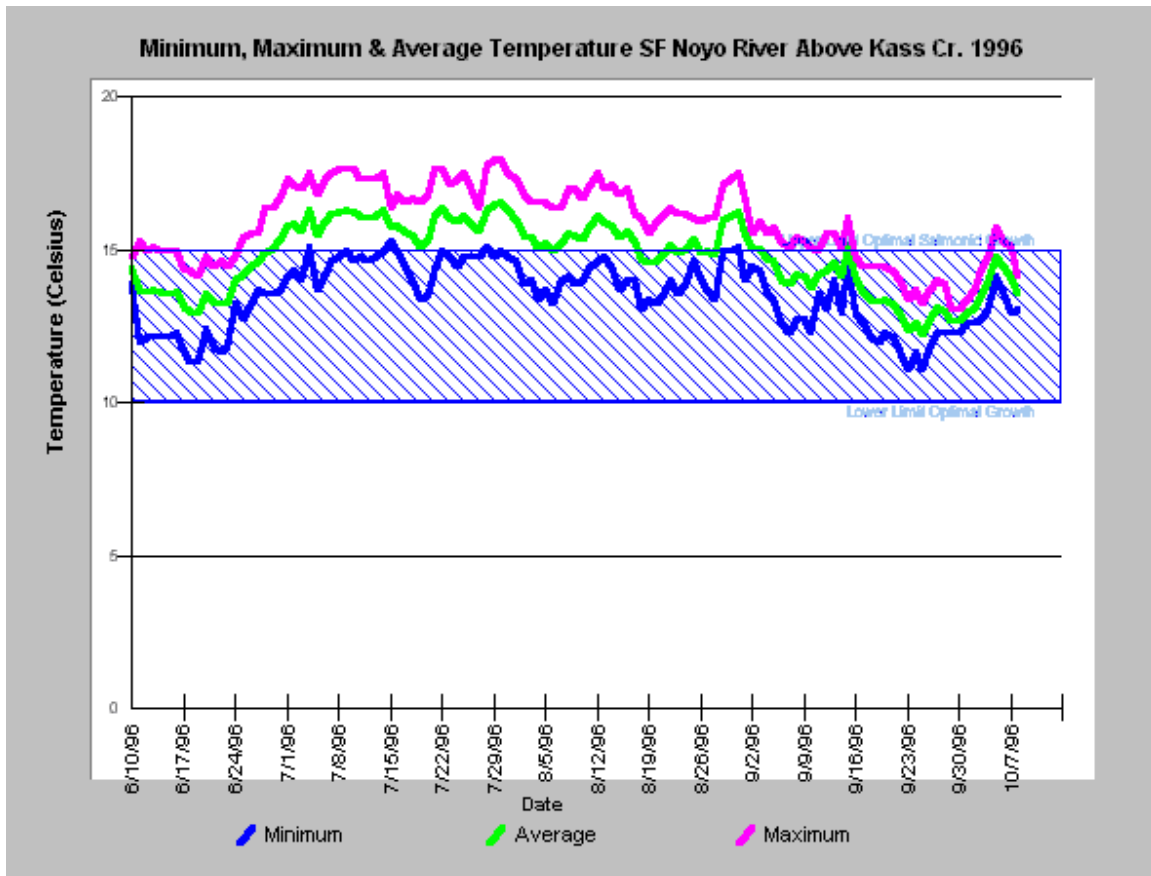


Figure 2. The minimum water temperature of the SF Noyo at the lower JDSF boundary was over optimal on some days in 1997, while maximums exceeded levels stressful to coho salmon (McCullough, 1999; Welsh et al., 2001). From KRIS Noyo.

Sediment Data: CDF makes many charts from sediment data, particularly from Casper Creek, but the latter is likely not representative of JDSF as a whole. The CDF analysis of turbidity uses invalid thresholds. Sigler et al., (1984) showed clearly that levels over 25 nephelometric turbidity units (ntu) inhibit juvenile steelhead growth. CDF chose 40 ntu as the level of impact on salmonids and did not report exceedence of the more relevant 25 ntu level. As CDF FRAP revises this *EIS*, they need to use 25 ntu as the point of concern and raw data must be made available to the scientific community and the public.

CDF FRAP needs to collect data similar to Caspar Creek on turbidity in streams like Parlin Creek, which was logged intensively from 1994-1998 (Higgins, 2004). Methods should follow those of Lewis and Eads (2001) and JDSF samples should be compared with the same watersheds as studies by Klein (2003). Klein (2003) found relationships between disturbance related to logging and the maximum and duration of turbidity. Levels of timber harvest over 2% of a watershed per year (2% POI) lead to substantial increases in turbidity. Rates in sub-basins like Parlin far exceed this level between 1994-1998 causing sediment pollution (Figure 3) and elevated turbidity. Turbidity in Parlin and the Noyo exceed the maximum 20% increase over background allowed by the North Coast Regional Water Quality Control Board *Basin Plan* (2003).



Figure 3. This photo shows Parlin Creek in 1999 on JDSF where large wood has been added to the stream for restoration purposes. Not also, however, the turbidity of the water and fine sediment stored at right. This deposit is indicative of recent surface erosion and transport related to logging. Photo from JDSF and CDFG. KRIS Noyo.

CDF FRAP failed to recognize the significance of Knopp's (1993) north coast study of streams that showed strong relationships between the volume of sediment in pools and upland disturbance related to logging. JDSF streams were part of Knopp's (1993) universe of samples of sediment in pools (Figure 4) that covered over 60 northwestern California locations. The volume of sediment in pools relative to the volume of water and sediment is the V-Star (V^*) score (Hilton and Lisle, 1993). The U.S. Environmental Protection Agency (1998; 2001) has set a target of 0.21 for V^* in the Noyo and Big River basins as part of the TMDL (U.S. EPA, 1998, 2002). Data from Knopp (1993) show that JDSF streams were already sediment rich according to this metric as of 1992 (Figure 5), including Parlin Creek pools that had roughly 30% ($0.31 V^*$) of their volume filled with sediment. Data have been released for Caspar Creek that show a wave of sediment moving through the North Fork (Figure 6) in the mid-1990's immediately after widespread clear cutting in that watershed (Figure 7). It is obvious that this cost-effective tool, which requires only one day per stream per year for inventory, should be used strategically as an adaptive management tool. CDF uses sediment data like the Casper Creek model to show trends, but doesn't acknowledge logging related sediment waves.

Habitat typing data cited by CDF and shown in EMDS model outputs are classic examples of existing cumulative watershed effects, yet the authors of the EIS fail to recognize their significance. Figure 8 shows habitat typing data for the North Fork Big River and its tributaries, including some on JDSF. Murphy et al. (1984) found that undisturbed old growth streams had pool frequencies by length of 39-67%. Pudding Creek surveys in the 1960's found 90% pools while post logging CDFG surveys found nearer 30% (IFR, 1999).

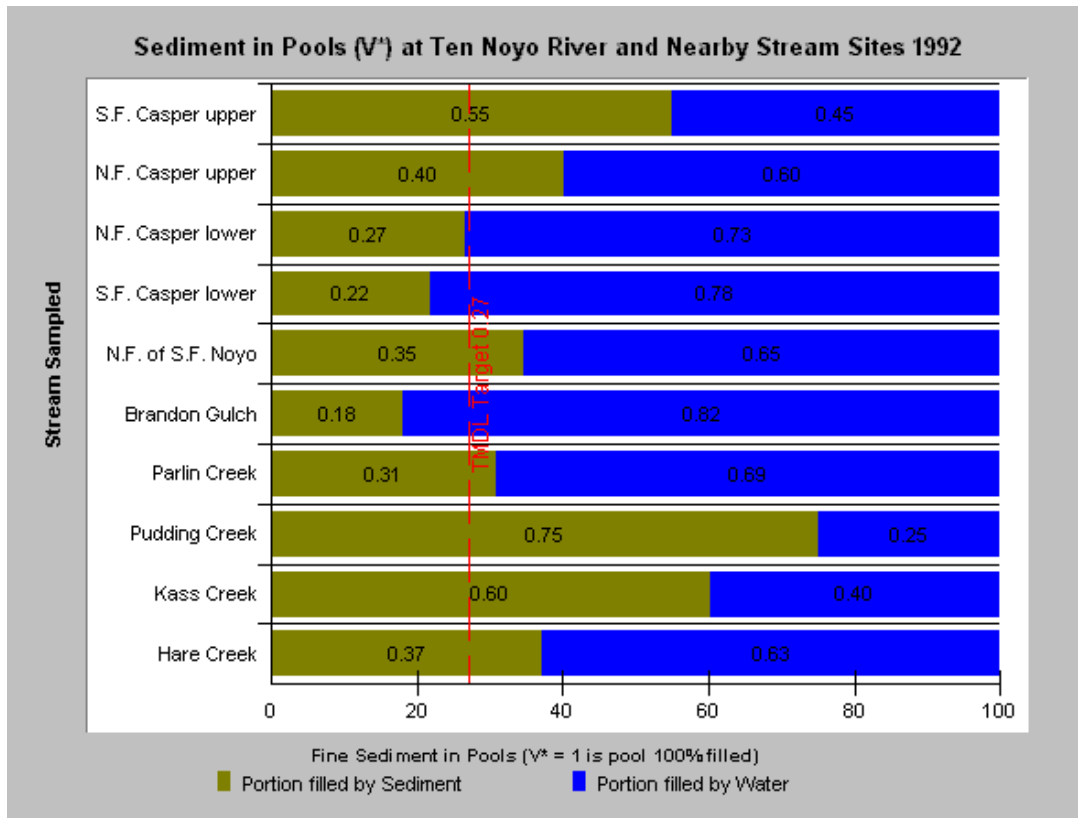


Figure 4. The volume of fine sediment in pools for JDSF locations in the Noyo River and nearby streams show very high V* in extensively logged watersheds like Pudding Creek.

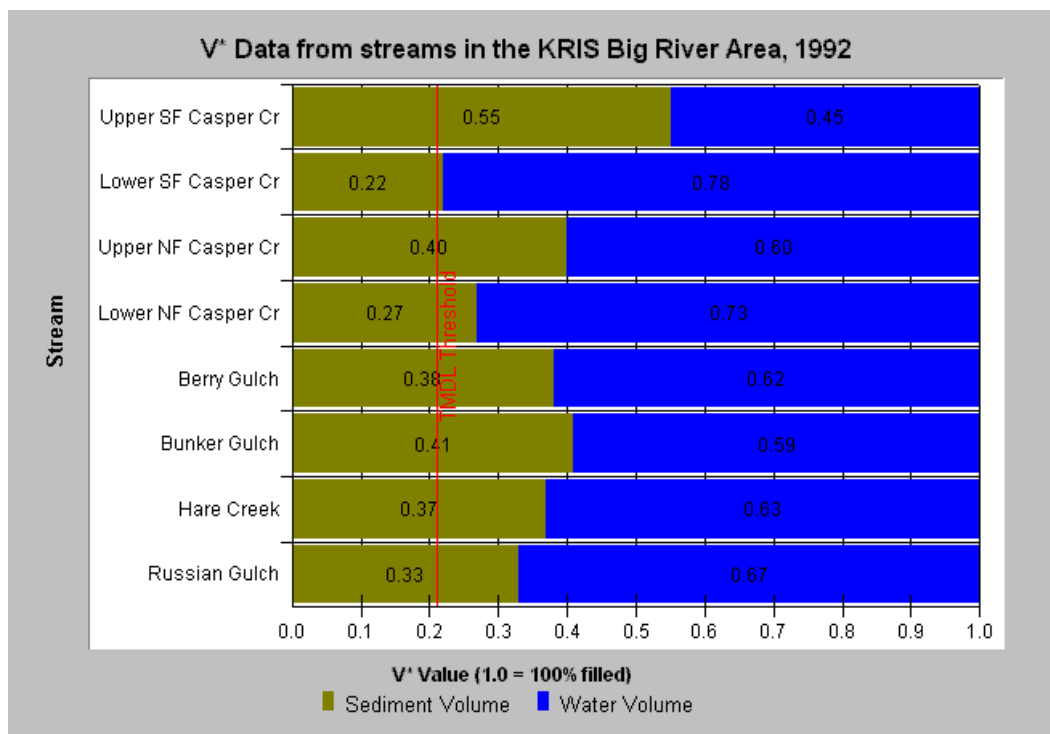


Figure 5. V-Star chart from KRIS Big River showing sediment impairment.

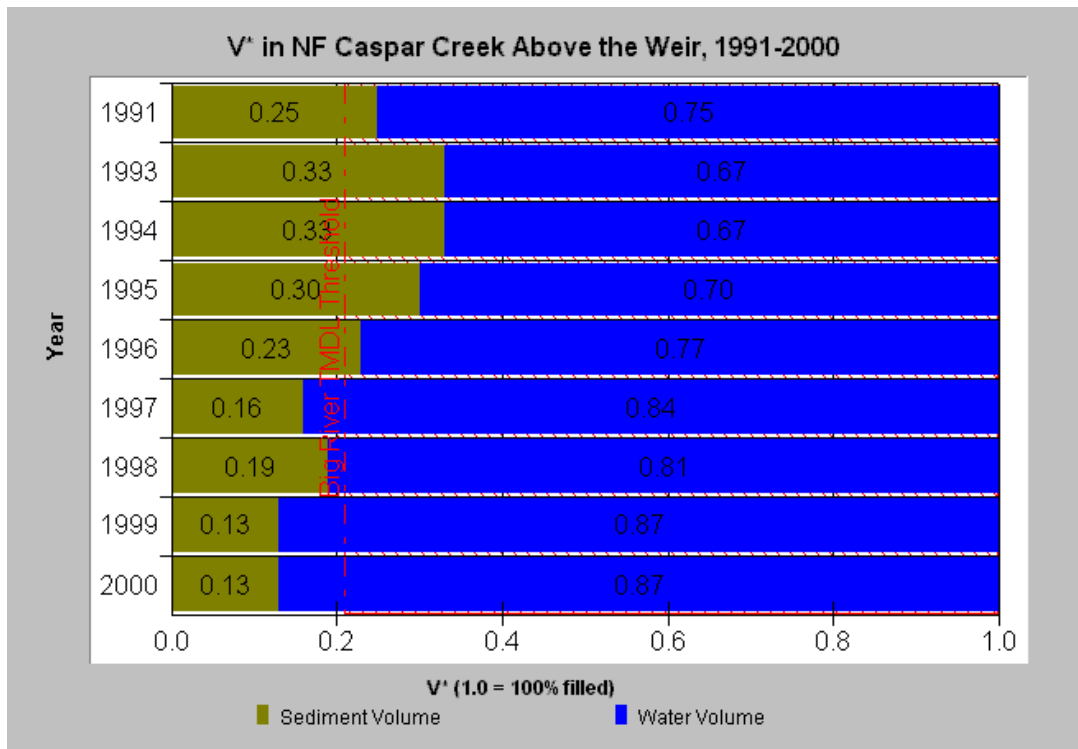


Figure 6. V-Star scores for successive years in the NF Caspar Creek show a wave of sediment being transported immediately after widespread clear-cutting. KRIS Big River.



Figure 7. Photo shows uplands of JDSF in the NF Caspar Creek in 1995 with widespread patch clear cuts in early recovery. Photo by Pat Higgins from KRIS Big River.

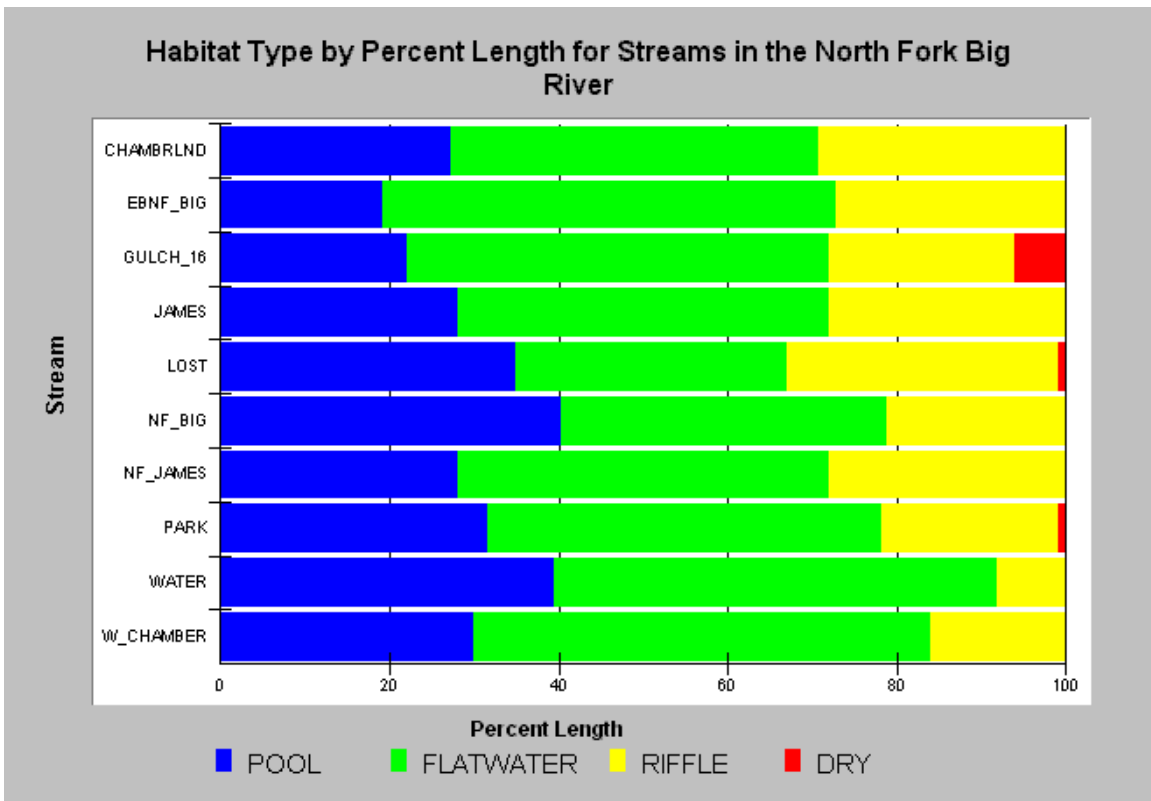


Figure 8. California Dept. of Fish and Game habitat typing surveys of the NF Big River show that only the mainstem North Fork and Water Creek attain 40% pool frequency. Compromised pool frequency and depth is a manifestation of sediment over-supply. KRIS Big River.

Cumulative Watershed Effects

Timber Harvest Data: CDF does not use timber harvest data to quantify impacts, but rather indulges in the fantasy that all impacts are fully mitigated. Reeves et al. (1993) showed that coastal Oregon watersheds logged in over 25% of their watershed area in less than 30 years experienced major declines in salmonid diversity and abundance. Matthews and Associates (1999) showed a major increase in logging beginning in the mid-1980's and continuing to the late 1990's (Figure 9). CDF FRAP fails to discuss the significance of the impact of the increased rate of harvest. JDSF is over 50% harvested since 1986, the Noyo 75% and the Big River 62%. Some sub-basins in the region have been re-entered and harvested at levels as high as 122% since 1986! The extent of cut on adjacent private lands and the previous intensive management on JDSF suggest that only thinning from below, full cable suspension selective logging and light touch forestry are appropriate for JDSF for at least the next 20 years. Timber harvest maps in the EIS show colors for management that are difficult to distinguish between short and long harvest rotations, which makes it challenging to see where they are applied to sensitive ground (Figure 10).

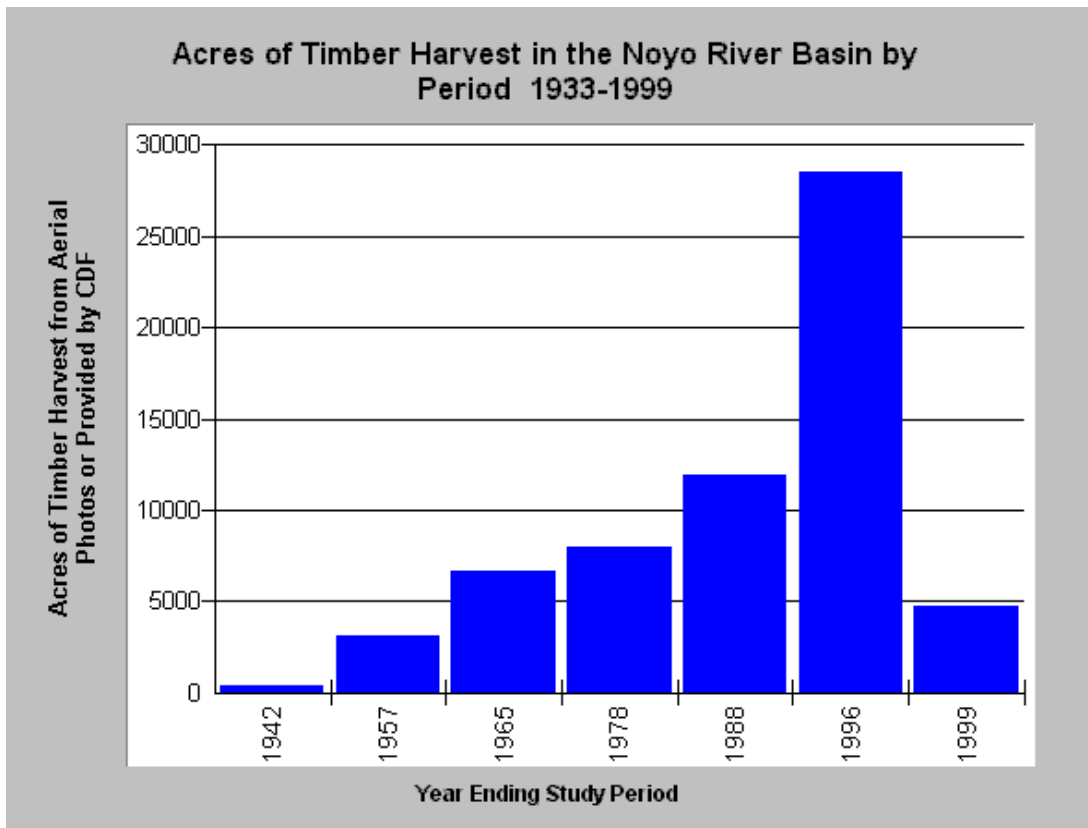


Figure 9. Timber harvest by decade from aerial photos and CDF records show a major wave of logging in the Noyo River from 1988-1996 but the *EIS* doesn't acknowledge logging impacts such as sediment and temperature increases. KRIS Big River.

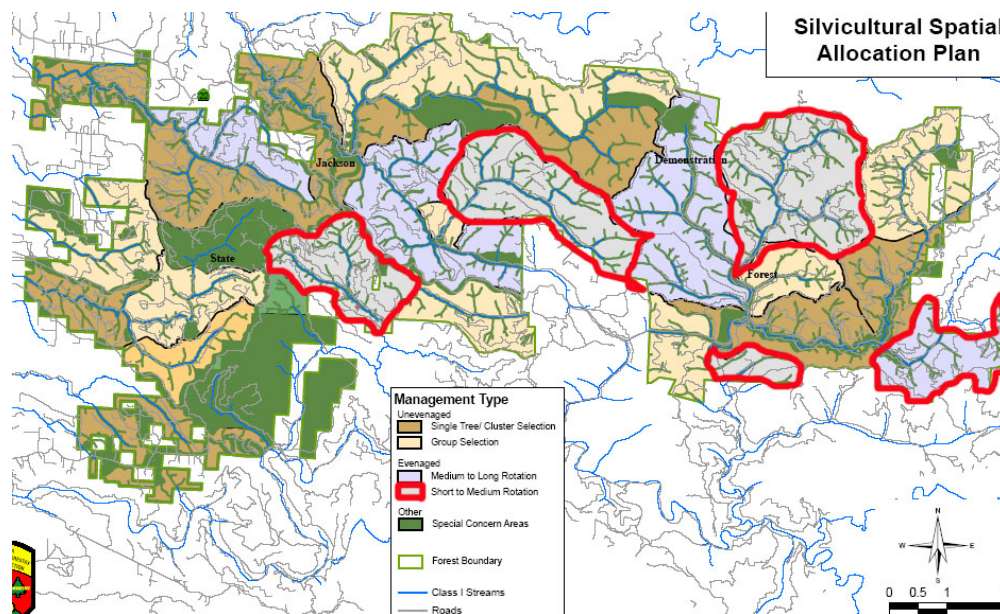


Figure 10. Figure from *EIS*. Note that short rotation is recommended in Brandon Gulch even in high risk landslide zones. Outlines in red provided by Pat Higgins.

Roads: CDF FRAP does not have a meaningful discussion on roads and their effects on flow and sediment yield. Matthews and Associates (1999) found that sediment yield related to roads in the Noyo River basin greatly increased with the most recent waves of logging (Figure 11). Despite the listing of the Noyo and Big Rivers as sediment impaired and their current pending status under Total Maximum Daily Load requirements, CDF does not deal quantitatively or substantively with roads and sediment.

Gucinski et al. (2001) found that “Even a well-designed road system inevitably creates a set of changes to the local landscape, and some values are lost as others are gained; for example, road density and fish populations correlate negatively over a large area in the interior Columbia basin.” Bull trout disappeared in Interior Columbia River Basin watersheds that had road densities of over 1.7 miles per square miles of watershed area (mi./sq mi.) (Quigley at al., 1997). The National Marine Fisheries Service (1996) suggested guidelines of 2.5 mi/sq mi and no stream side or valley bottom roads. JDSF needs to commit to lower road densities beginning immediately, not study for 5 years and then act, and there should be an explicit goal of removal of almost all streamside roads.

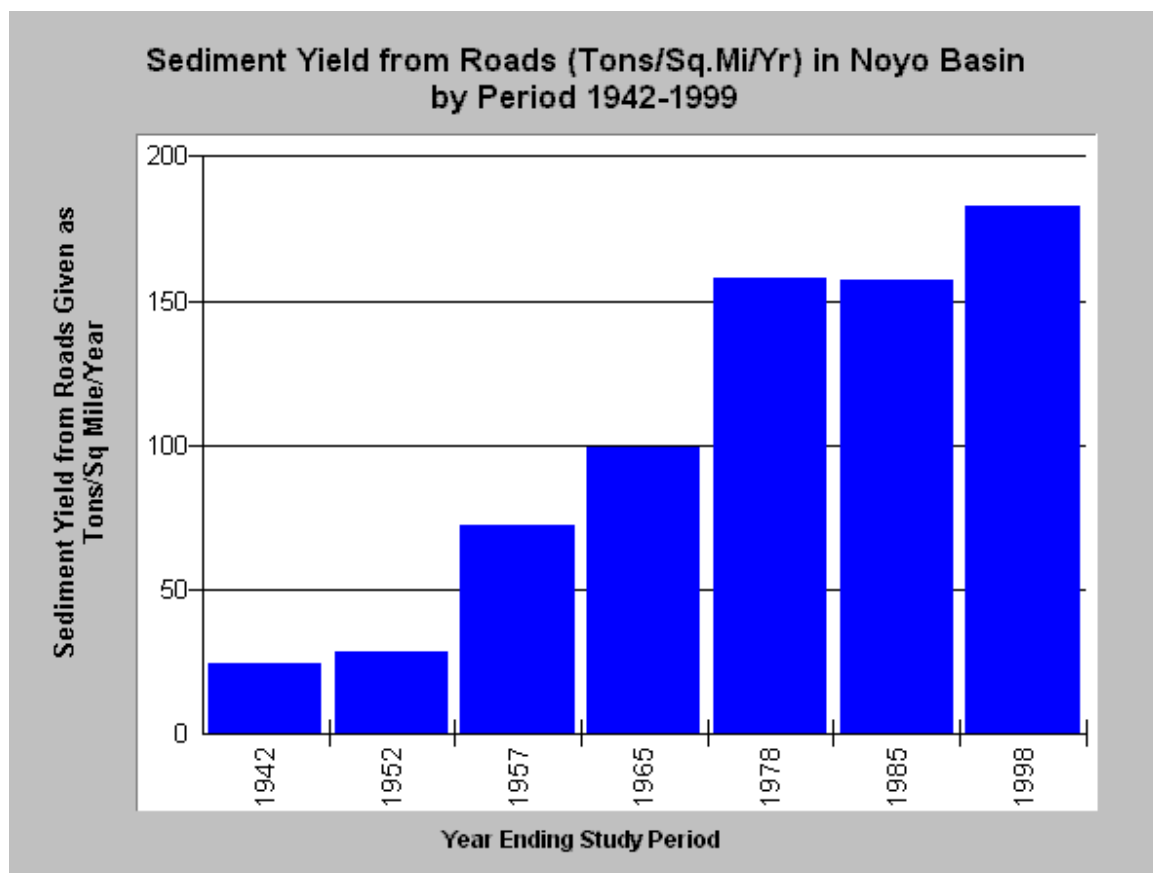


Figure 11. Estimated sediment yield from roads by decade showing a continuous increase in the Noyo River watershed associated with the recent wave of logging and road building. From KRIS Noyo.

Disturbance Indices Using Landsat: Welsh et al. (2005), in a paper on the Mattole River watershed found, that conversion of uplands to early seral conditions was likely altering ground water temperatures and leading to water temperatures in exceedence of thresholds required by coho salmon and tailed frogs. CDF FRAP participates in vegetation mapping using Landsat in cooperation with the U.S. Forest Service (Warbington et al., 1998). In the revised *EIS*, CDF needs to quantify seral stages and projected recovery and succession. CDF FRAP needs to dust off the data from Keithley (1999) on riparian zones quantified by tree diameter and show quantitative charts of conditions on and off JDSF for the revised *EIS*.

CDF and the USFS Spatial Analysis Lab in Sacramento also have Landsat “change scene detection” that shows landscape vegetation changes by comparing two years worth of scenes (Fischer, 2003). Data for 1994-1998 for change scene are available for JDSF and CDF FRAP should run queries on how much changed in JDSF in that period and provide bar charts by Calwater Planning Watershed. Another query that CDF FRAP should run in revising the *EIS* is the overlap of changes according to Landsat with functional riparian zones that would extend be at least 200-240 feet given local site potential tree height (Spence et al., 1996), including Class II and III water courses.

CWE Temperature/Sediment/Riparian Interactions: The *EIS* completely ignores the relationships between the sediment problems related to logging, riparian canopy removal and increased water temperature. Chamberlain and James Creeks are hot because they have a previous history of logging and large wood removal from which they have not yet recovered. Sedimentation caused by previous waves of logging has changed the width to depth ratio to shallow and wider, which facilitates stream warming (Poole and Berman, 2001). The low pool frequency, shallow maximum pool depths and high embeddedness suggest watersheds in early recovery from past logging, not candidates for a new wave of clear cutting. Past logging and large wood removal projects on JDSF have starved streams of large wood, which in turn can reduce downwelling that can moderate stream temperature through connection with the cooler hyporheic zone (Poole and Berman, 2001).

In addition, CDF FRAP needs to look at temperature problems and riparian conditions and more honestly explore relationships. The excellent work by Keithley (1999) regarding restoration potential of the Big and Noyo River basins is invoked in the *EIS*, but the significance of its conclusions is overlooked. JDSF has the last contiguous riparian zones in the coastal redwood belt of Mendocino County suitable for coho salmon restoration. CDF ignores effects of industrial timber harvest of riparian trees in the rest of the Noyo and Big River watersheds, although their map of the pattern of temperature suitability shows widespread *CWE* (Figure 9). Large tree diameters in JDSF shown by Keithley (1999) are correlated to the cold stream temperatures. Restoration of coho in streams that are currently too warm to support them today are decades away from any recovery potential.

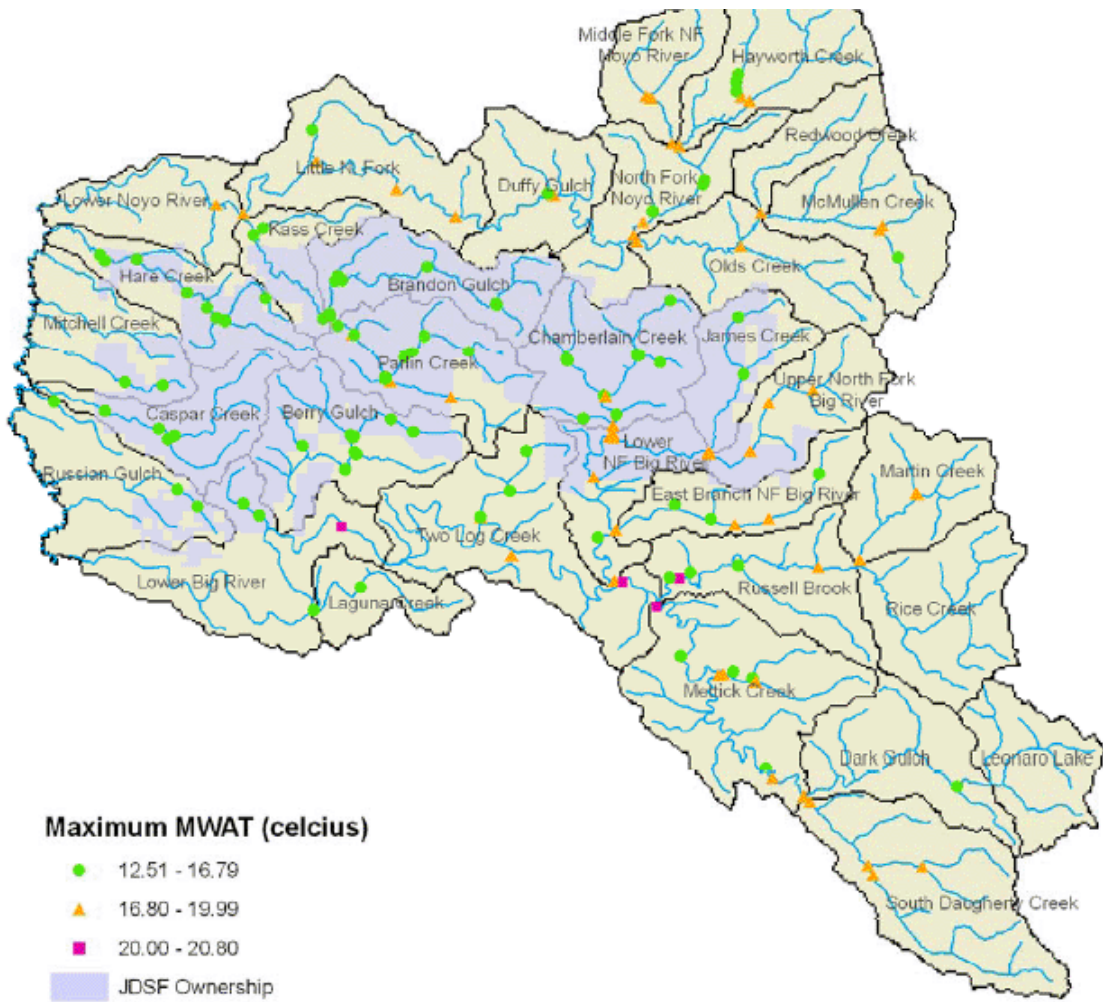


Figure 12. Map from JDSF EIS showing maximum floating weekly average water temperatures for the Noyo and Big Rivers. Only green sites would support coho salmon (<16.8 C) and there are many sites off JDSF no longer capable of doing so.

Shallow Landslide Stability Model: The Shallow landslide stability model (Dietrich and Montgomery, 1998) or SHALSTAB can be used to detect unstable headwater and inner gorge areas. IFR (1999) created SHALSTAB coverages for JDSF and the Noyo River basin that CDF should use quantitatively to show the overlap of unstable areas and management options proposed, including road building. The *EIS* points out that:

“JDSF has a higher percentage of its area in potential inner gorge than does the area outside of the Forest. This situation is of concern because these potentially unstable areas tend to be directly connected to watercourses and have a high likelihood of delivering sediment to watercourses, if they release material due to either natural causes or anthropogenic disturbance.”

The JDSF inner gorges are extremely fragile and prone to mass wasting, but logging would be allowed under Alternatives B and C1. Mapping areas with high risk and sharing

the data with the public is useful, although SHALSATB is only a screening tool and does not take the place of a registered geologist.

Tailed Frogs: Welsh et al. (2005) found that early seral stages conditions in riparian zones were not compatible with maintaining water and air temperatures suitable for supporting tailed frogs. In addition to the coho salmon, the tailed frog should be the aquatic keystone species for JDSF. The condition of Noyo River tailed frog populations are likely similar to those of the Mattole Basin characterized by Welsh et al. (2005):

“The few small populations of these species now appear to be sufficiently isolated from one another by distance that they are likely nearing extinction in this watershed. These fragmented distributions are the legacy of the large-scale anthropogenic alteration of much of the watershed.”



Because tailed frog larvae live for up to four years in streams adhering to rocks with a sucking disc, they are extremely susceptible to being dislodged by sediment transport. High sand supply may also scour algae from rocks, thus reducing food supply for this sensitive indicator species. Widespread timber harvest has eliminated tailed frogs from many Noyo and Big River tributaries outside JDSF.

Fish

There is more discussion about the dire condition of north coast coho populations than in the previous *Draft EIS*, but still no real recognition to how important JDSF is to regional recovery. Brown et al. (1994) recognized the South Fork Noyo River as one of the last adult coho populations in the hundreds from Marin County to Oregon. CDFG data on adult trends, downstream migrant trapping and standing crops of juveniles in the Noyo and other nearby tribs show poor recruitment of juveniles to adults, but that fact is never stated in the *EIR*. Steelhead show poor survival and from young of the year (0+) to yearling (1+) or two year olds (2+), which indicates poor freshwater habitat. Again CDF FRAP shows examples of data, but avoids the associated conclusion.

There is exhaustive discussion of life history requirements of juvenile salmonids, but no discussion of how poor JDSF habitat affects them! Fore example, coho salmon are acknowledged as needing pools in the *EIS*, but there is no discussion of the diminished frequency or volume of pools as indicated by V* and habitat typing data.

While CDF invoked CDFG data on coho presence and absence, they failed to use spatial data to show that the distribution has greatly diminished (Figure 13). JDSF streams have a higher consistent presence than streams on private land, although some year classes are weak. The EIR map of the present range of coho and steelhead masks the fact that they were much more widespread. We need to see where coho once ran and what temperature conditions are in these various locations and correlative riparian. The *Draft Plan* and *EIR* are not frank about the diminishment of range of coho and the causal mechanisms.

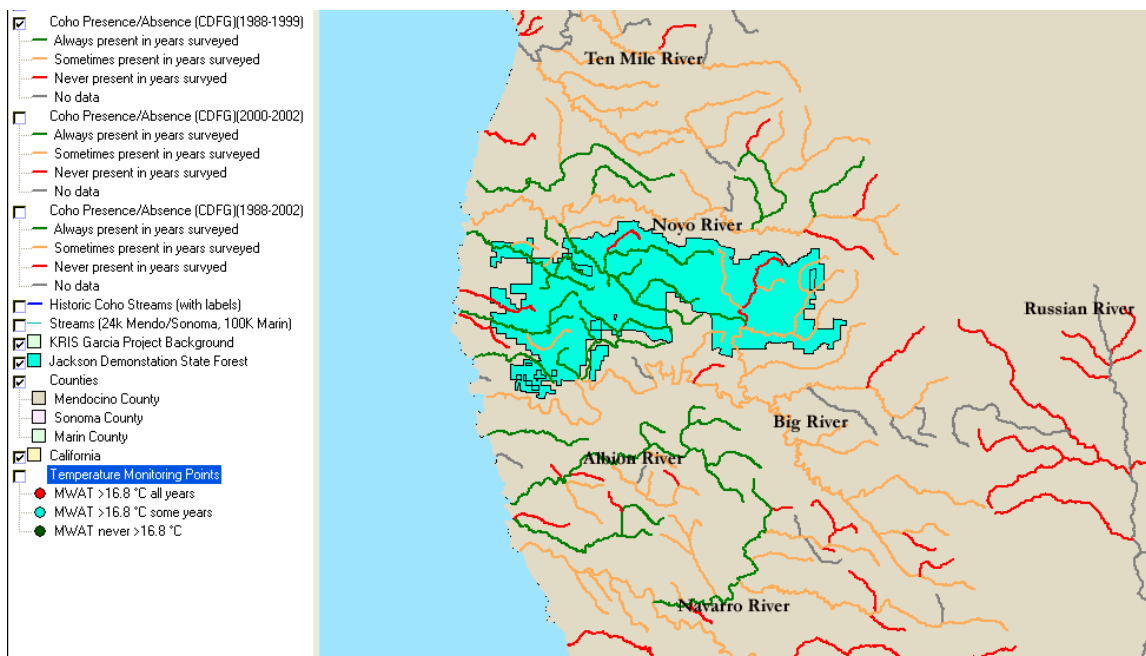


Figure 13. This map shows where coho were present each year between 2000 and 2002 on the Mendocino coast. JDSF has more consistent coho presence than most other areas indicating its importance as a regional refugia and seat of recovery for the species. From KRIS Garcia.

Fires before European contact would have fragmented the landscape, but would have caused nothing to mimic the last 50 years of industrial logging. JDSF should be a leader in showing how thinning from below can lead to stand release and how ecological forestry can produce commodities and truly accelerate development late seral conditions and healthy streams supporting a diverse assemblage of salmonids..

Monitoring

There is no commitment to measurement of tried and true water quality indicators in Monitoring section of the *Draft JDSF Plan* or in *EIS*. The documents acknowledge condition of habitat as impaired but set no time table or trajectory for recovery. The next version of the *EIR* needs to define specific monitoring parameters that are scientifically valid, cost effective and strategic. Sediment monitoring should conform to standard techniques such as McNeil (McNeil and Ahnell, 1964) or shovel samples (McHenry et al., 1994) and reference progress toward TMDL targets of <14% less than 0.85 mm and

<30% fine gravel and sand less than 6.4 mm. As mentioned above, V* should be used to measure trends toward recovery with a target for all of JDSF of less than 0.21. Automated temperature sensors should be arrayed in riparian zones of different streams with different seral stage conditions and recovery of stream temperature projected with models, similar to the Elk River Watershed Analysis (Siskiyou NF, 1996).

The Project Impacts section (10.9 *ADEIR*, Chapter 8) says: “Hydrologic and water quality impacts are considered significant if they exceed targets set by federal, state, or local guidelines.” If JDSF is not strategically monitoring trends and showing appropriate protection, they are not meeting NCRWQCB or Porter Cologne requirements. There should be equivalent targets for TMDL in the *JDSF Plan* and *EIR* and an explicit time table for their being met. Such monitoring would support adaptive management and meet TMDL and ESA requirements as well as those of the NCRWQCB with regard to new THP waste-discharge requirements.

Recovery

There is no scientific foundation for recovery planning in the *JDSF Plan or EIS* (i.e. Bradbury et al., 1996). The *Plan* and *EIS* make the claim that JDSF has “improved in most of the resource categories” since being acquired in 1948, but provide absolutely no data to support that contention in so far as it applies to aquatic resources. Instead of recognizing a hierarchy of recovery with expected time frames (i.e. physical channel attributes followed by biological response), CDF makes statements like “Recovery of a more natural stream geometry from these substantial historic impacts will take a long time.”

Bradbury et al. (1996) make the point that salmonid populations that are thriving and the areas of best habitat must be protected as a priority, if Pacific salmon populations are to be recovered. The *JDSF EIR* references Keithley (1999), but none of his findings are brought forward. Instead his conclusions are stood on their head:

“Most of the planning watersheds composed primarily of JDSF lands received ratings that indicate good or moderate habitat conditions with low or moderate disturbance ratings. This outcome suggests that in the context of the assessment area, these planning watersheds may represent a lower relative priority for restoration. In addition, the expected recovery time for these healthier planning watersheds is less than for the more heavily impacted planning watersheds.”

The patterns shown by Keithley (1999), where JDSF is the obvious center of recovery potential for salmon, is also paralleled by the Marble Murrelet Recovery maps. They both indicate that if these species are to be saved that JDSF must be managed to their benefit.

I hope that JDSF will change its management to:

- Increasing basal diameter of riparian zones/cool microclimate over streams,
- Accelerating growth of large trees to support terrestrial species like murrelets,
- Returning watersheds to more normal ranges of flows,

- Managing restoration and production of wood products secondarily,
- Inviting the community to participate in studies,
- Making JDSF a recreational Mecca for Ft Bragg residents and tourists.

Sincerely,

Patrick Higgins

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