

## **SECTION IV**

### **SWANTON PACIFIC RANCH NTMP**

### **CUMULATIVE IMPACTS ANALYSIS**

#### **Board of Forestry Technical Rule Addendum No. 2**

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## **I. PROJECT ALTERNATIVES ANALYSIS**

The following analysis, guided by the California Environmental Quality Act (CEQA), discusses alternatives to the proposed project other than a selective harvest of commercial conifers. The analysis of alternatives will, "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." The analysis will further evaluate the comparative merits of the alternatives.

No significant environmental effects have been identified as a potential result of implementation of the project as proposed. Nonetheless, alternatives to the project as proposed have been evaluated to determine if there are any favored alternative that would achieve the essence of the project while reducing any perceived negative impacts. The RPF has used CEQA's EIR-related guidelines as well as CDF's guidance for addressing alternatives in the plan preparation process.

The RPF has considered six alternatives for discussion in this NTMP: 1) Purpose/Need and Project as Proposed, 2) The No Project Alternative, 3) Public or Private Purchase of the Timber/Timberland, 4) Purchase of the Timber/Timberland as a Conservation Easement, 5) Delaying the Timing of the Project, or Alternative Project Locations on the Ownership, 6) Alternative Land Uses (including a discussion of the Project as Proposed), 7) Alternative Silvicultural Methods, and 8) Alternative Harvesting Practices. The following is an analysis of each in terms of its impact on the ownership, surrounding watershed, and the ability of the alternative to meet the stated project objectives.

### **Purpose/Need and Project As Proposed**

The Swanton Pacific Ranch is a research and demonstration property for California Polytechnic State University, San Luis Obispo, and in this capacity, serves to provide students, faculty, staff and the general public with a unique interdisciplinary learning opportunity.

The commercial timberland is managed specifically for research, demonstration, and growing and harvesting timber in order to achieve an economic return on the property to continue to facilitate the research and educational goals. This land is zoned for Timber Production (TPZ), excluding parcel 057-251-08, 057-251-09 which are currently proposed for rezoning with the county, and as such is specifically used for growing and harvesting trees. Faculty members regularly utilize the ranch for course fieldtrips with the premise that the ranch is actively managed. Graduate students conduct research on the Ranch as it applies to managed timberland in the Santa Cruz Mountains. Studies focus on how to achieve long-term sustained yield of high quality forest products while maintaining species diversity, wildlife habitat, water quality, recreational opportunities, teaching opportunities and social harmony. In addition to research, the proposed harvest contributes to a base of sustainable resources in support of the local economy. Accomplishment of the landowner's goals is largely dependent on the ability of this portion of the ownership to economically support land management activities and produce a financial return that can be reinvested in various management activities including timber stand improvement to enhance forest health and vigor, and road upgrade and maintenance. These management activities are designed to maintain and enhance the beneficial uses of water, while conserving

archaeological and historical resources, terrestrial habitats, and biodiversity. In addition, the forest management strategies selected by the timberland owner will provide for the long term sustained yield of high quality timber products, enhance regional and local employment and markets, and will improve overall forest health. These goals demonstrate the need for this proposed project.

The project as proposed presents the preferred alternative after considering the potential for other alternatives to meet the project objectives, and the potential for cumulative significant adverse impacts on the environment to result from other alternatives. Feasible alternatives must be technically operational, must meet regulatory and legal requirements, and must satisfy social considerations. This project proposes single-tree and group selection silviculture on a total of approximately 701 acres over the life of the NTMP. The re-entry interval in each area is approximately 10-20 years. Following harvesting each area shall meet stocking as outlined in 14 CCR 913.8(a) or 14 CCR 913.8(b), and 14 CCR 926.5. All harvest activity shall be in compliance with the Sustainability Analysis as provided in NTMP Section III, including management objectives. The project is located in two distinct planning watersheds, namely Little Creek (Calwater V2.2 #3304.110202), and Big Creek (Calwater V2.2 #3304.110201).

With this proposed project the landowner will attain Maximum Sustained Production (MSP) of high quality timber product as provided in 14 CCR 913.11(c) which states:

14 CCR 913.11 Maximum Sustained Production of High Quality Timber Products

The goal of this section is to achieve Maximum Sustained Production of High Quality Timber Products (MSP). MSP is achieved by meeting the requirements of either (a) or (b) or (c) in a THP, SYP or NTMP, or as otherwise provided in Article 6.8, Subchapter 7.

c) In a THP, or NTMP, MSP is achieved by:

2) For unevenaged management, meeting the minimum stand age standards of 14 CCR 913.1(c)(1)(A), meeting minimum stocking and basal area standards for the selected silviculture method as contained in the rules only with Group A species, and protecting soil, air, fish and wildlife, water resources and other public trust resource through the application of these rules.

Yarding methods identified within the proposed project give consideration to geology (slope stability and erosion potential), access, slope, water quality, maintenance of leave stands, wildlife habitat and presence of archaeological or cultural sites. The proposed yarding methods identified include cable systems, helicopter yarding, and ground based operations within various portions of the proposed project area. Ground-based yarding operations shall be limited to skid trails designated by the RPF, or her/his supervised designee. Ground-based yarding operations shall include end/long lining with rubber tired skidders and tractors. Helicopter and/ or cable yarding operations have been designated in areas where ground-based access is not suitable. Cable and/or helicopter operations were designated within portions of the proposed project area that lack adequate access, in addition to areas of steeper slopes. Utilizing a cable and/or helicopter system within hard to reach portions of the property will allow operations to take place without the construction of extensive new road systems with additional watercourse crossings.

Water quality considerations include protection of aquatic habitat from chemicals associated with timber harvesting, sediment, thermal increases, peak flows or inputs of unnatural levels of organic material. Mitigations pertaining to protection of the beneficial uses of water are outlined in NTMP Section II, Item 26.

Terrestrial habitat types and associated wildlife and plant species were considered during project development. A comprehensive list of species was evaluated for potential impacts from the proposed project. Mitigations for protection of the terrestrial species are included in NTMP Section II, Item 32; while the evaluation of species and their habitat is supplied in NTMP Section III (Plan Addendum to Item 32) and Section IV (Cumulative Impacts Assessment).

A Road Maintenance Program has been included within NTMP Section II. The landowner shall comply within this program to confirm that roads under their control within the proposed project boundaries are inspected and inventoried during the winter period. This program will ensure that the road system is a properly functioning component of the watershed that will allow access for management purposes including road inventory and water quality monitoring as well as research, education, and recreational needs. This program will also reduce erosion potential from associated roads, landings, and watercourse crossings by implementing routine handwork and an inventory program that addresses and prioritizes all identified significant maintenance issues.

In addition to a Register Professional Forester, the plan submitter retained the services of a consulting professional Geologist, Botanist, and Wildlife Biologist to aid in the development of this project. Recommendations from these Professionals are located throughout NTMP Section II, while associated reports drafted specifically for this proposed project are located within NTMP Section V.

The project as proposed, having satisfied the goals of the timberland owner, has been selected as the preferred alternative.

### **No Project Alternative**

Under this alternative, the land and timber resource would be left in its current condition with no active harvesting of the timber resource occurring. The land use would be primarily rural residential in combination with cattle operations and recreational activities such as running, hiking, bicycling and horse-back riding. Timber management activities would be limited to firewood harvest by the residents as well as fuels reduction around the various residences, outbuildings and roads.

Under this alternative, the vision of benefactor of the Ranch, Al Smith, would not be realized. Students, faculty and staff who teach and conduct research at Swanton Pacific Ranch would lose access to a property managed for sustainable natural resource production. Research goals would go unfulfilled and a land base dedicated to research in a redwood forest in the Santa Cruz Mountains would be unavailable. The comprehensive database of inventory developed over a decade of research would be terminated and thus unfulfilled.

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The costs of maintaining ownership of the land, both legally and operationally, would have to be funded through some other mechanism. It is unlikely that the scale of cattle operations on the property would provide for the payment of property taxes and land maintenance expenses. Investments into silviculture, roads, buildings, and research would degrade with no financial return. Road upgrades to occur in conjunction with the proposed harvesting operations would not take place. Roads would deteriorate and water control structures would fail with no maintenance activities.

While this alternative would satisfy those who would oppose timber harvesting on this ownership, it does little to improve upon the legacy of land use. Much of the property is zoned "Timber Production" and as such should be utilized to protect and enhance the long-term viability of sustainable forest products. Land capable of producing a quality resource in perpetuity would be unutilized for the benefit of the local, state and national economy. Local demand for redwood products that would otherwise be provided by local sources would be exported to some other location—in all likelihood, a location comparatively deficient in the stringency of forest practice rules.

### **Open Space Acquisition/Conservation Easement Alternative**

Under this alternative, the entire ownership or portions of it would be sold to a land trust organization or a state or local government for creation of a park, or placed under a conservation easement. This action would not necessarily preclude harvesting, though timber harvests would likely be limited in terms of interval and intensity.

The open space/park acquisition alternative assumes that the landowner is willing to sell and that Santa Cruz County, the State, or the local land trust has the financial and/or political wherewithal to both purchase the ownership (or a portion of it) and provide for its continued maintenance. Indeed, the potential for this to be a viable alternative lies in the fervor of the constituency of Santa Cruz County and their willingness to contribute tax or bond money to potential land acquisition. The current budgetary outlook for the County of Santa Cruz suggests that the financial means to consider this land purchase will not present itself in the near future. Furthermore, the management of this property is not jeopardizing public trust resources or threatening development and therefore, is not a high priority for purchase.

Local open space purchases in recent years have been premised on land use for recreational purposes. Mountain bicycling, hiking, equestrian activities and other forms of outdoor recreation seem to be acceptable uses of large tracts of forest as far as the local public is concerned. As illustrated in the purchase of the Gray Whale Ranch in Santa Cruz County, recreation enthusiasts can be tapped to help pay for the purchase. Following a purchase, at a minimum, roads improvements planned for implementation under this NTMP would need to be carried out, and at the maximum, campgrounds, water supplies and toilets would need to be constructed to accommodate a specified number of users. The effect of intense recreation on a land resource is not benign, however, and must be considered as well.

Many conservation trust organizations use periodic, light harvests as a means of obtaining revenue for future acquisitions and operating costs. Likewise, the terms of conservation easements can be somewhat flexible in scheme. In the interest of creating a more "park-like" or

"old growth" appearance, or for the purpose of fuels reduction, trust organizations might use periodic, light harvests to emphasize the increased growth of larger trees. Similarly, the terms of a conservation easement might be written to allow for a light harvest, whether for fuels reduction, aesthetics or revenue. However, the open space/park acquisition alternative does not provide for active forest management as a research forest.

Conservation easements can be a useful tool for deriving some level of economic return on portions of timbered ownerships. The tax breaks associated with easements and the potential perks, such as having the ability to participate in the carbon trading market could be considerable incentives to some landowners. The structure of the easement is very important as some easements are set up to preclude active management of the timber resource while others are aimed at limiting the development potential. This alternative certainly has merit, but is an unlikely and unnecessary choice given the management goals and of Swanton Pacific Ranch.

The property was given to the University as a research and demonstration venue for students to "learn by doing" forever. Under this direction, the College of Agriculture, Food and Environmental Sciences was entrusted to manage the property and seek to manage the timberland wood production using exemplary forest stewardship. The land serves as an educational tool and demonstration of what active timber management can accomplish on the landscape as well as providing an opportunity to conduct research in a managed redwood forest of the Santa Cruz Mountains. These management objectives rule out park acquisition, as that would halt active management of the timber resource. Under the direction of the current ownership, the property has the potential to flourish under an active management scheme in which stewardship of the land is the central and demonstrated theme.

### **Alternative Land Use:**

Portions of the property could be developed for agricultural purposes such as orchard, vineyard, hay, or row crop production. Areas where slopes are not prohibitive to this land use conversion would require large-scale clearing of vegetation and excavation of tree stumps with subsequent planting of trees, grapes, or other crops.

The land could be utilized for horse boarding or recreational camping facilities, which would require considerable infrastructure development. The area could be considered for higher scale cattle operations; however, this would not be ideal due to the topography and limited grass available for forage. Provided the application to remove the property from Timber Production Zoning (TPZ) was approved, rural estate subdivision and custom home building might be proposed as well. However, most of the property is on forested slopes best suited for growing timber and, as such the highest and best use for the property lies in maintenance of the forested landscape.

Planned research projects that seek to study actively managed timberland, would not meet their objectives if the land use shifted to discontinue selective harvesting. Faculty, staff, and students would not have the education and demonstration setting available to them that was intended for their use.

Any other intensive land use and particularly those associated with constructed development would result in conversion of this forested landscape to some degree and would undoubtedly result in some level of unmitigated impacts to the entire resource.

### **Alternative Site on the Ownership**

This alternative would shift the harvest area to another forested portion of the same ownership, assuming there is other forested area available for harvest. The area included in the proposed harvest boundary for the NTMP encompasses the timberland most suited for management purposes that is available for harvest. Proper forest management strategies have been developed with many parameters in mind. In the initial planning stages, the ownership as a whole was examined for potential harvesting activity. The acres identified by the RPF to be included in the NTMP display a combination of the parameters that make harvesting the optimal management strategy to increase long term stand productivity. Other acres on the property, not included in the NTMP, would not respond to single tree selection harvesting activity due to current stocking levels. Portions of the additional acres have dense stands of hardwoods or consist of brush fields. Market conditions and the lack of fiber processors do not support intensive hardwood management. The presence of pitch canker in Monterey pine stands on the property eliminates the option of transporting pine logs.

The Valencia Creek property owned by the Cal Poly Foundation already has an approved NTMP 1-01NTMP-018 SCR.

At the time of submittal, three parcels owned by the Ranch with timber, on the upper slopes above the west side of Scotts Creek, are not available for harvest due to ordinance restrictions put in place by the Coastal Commission. This area, approximately 80 acres of harvest area will potentially be amended onto the NTMP in the future if the zoning prohibitions can be resolved. All timberland owned by the Cal Poly Foundation was evaluated for management as an alternative to this project. Other timberland located within the ownership is either isolated, poorly stocked, or not feasibly accessible and was therefore excluded from the proposed project at this time.

Conducting a timber harvest on an alternative site would forgo the opportunity to actively manage stands with a periodic harvest cycle. Pressure on the rest of the ownership by utilizing an alternative site would be more intensive, as a fixed land base has limited resources.

Other areas requiring some silvicultural manipulation could be addressed at this time, rather than foregoing the opportunity, however those units have less pressing management needs than the proposed harvest area. Road work and bridge installation planned in conjunction with the proposed harvest would not occur if the harvesting were to shift to another site. Planned research projects that seek to study actively managed timberland, would not meet their objectives where they occur in the proposed harvest area.

Financial returns from timber revenue would still be available. Opportunities as a field classroom would still be available.

### **Alternative Timing of Operations**

This alternative would result in the delay of the proposed project until such time as other projects within the watershed are completed. The premise is that perceived risks to watershed attributes could be mitigated through effectively scheduling various projects so as not to have an overlap in the timing of operations. This assumes that all of the landowners within the watershed could be contacted and persuaded to schedule activities regardless of market conditions or personal necessity. Implementation of this alternative would require some level of bureaucracy, existing or constructed, to coordinate between the various landowners and land uses.

The concept here could be considered somewhat “novel”, though land use policy practitioners as far back as John Wesley Powell have been advocating watershed level coordination for land use and resource consumption (particularly water) since the late nineteenth century in the United States. The problem now as in Powell’s time is that this alternative does not fit well with capitalism and the belief in the individual’s right to prosper. Further, it is complicated by the 5-year life span of a THP and the volatility of the lumber market. It also presumes that all of the landowners in the watershed are willing to work together with a minimum of conflict towards the same end. If there’s anything to match the fervor of the capitalist it is surely the intensity of those who consistently prefer conflict and obstructionism. Coordinated Resource Management Planning (CRMP) groups serve as a great illustration as to what can be accomplished in terms of watershed level planning by working together through an adaptive resource management process.

### **NTMP as Proposed Alternative**

The parcels of the Ranch included in this NTMP are zoned Timber Production Zone (TPZ) indicating recognition that the resource may be utilized to that end to protect and enhance the long-term viability of a sustainable forest products industry. The property has been harvested in the past and the landowner desires to continue to manage the property as such. This alternative accounts for the protection of water quality, wildlife, soils, and various aesthetic concerns while promoting sustainable forestry and the provision of local wood products for local markets.

The mission of the Swanton Pacific Ranch for research and demonstration would be realized in part by the proposed harvest. The ongoing active management of the forested areas provides an evolving classroom setting for faculty, staff, and students to see, firsthand, the implementation of sound forest management.

This is the only alternative desirable to the landowner and is the reason for the composition of this NTMP.

### **Alternative Silviculture or Yarding**

The optimal silviculture and yarding prescription tailored to the property and available in the Santa Cruz Mountains is proposed in the Swanton Pacific Ranch NTMP.

One silvicultural alternative would be not to harvest - this would not meet the needs of the landowner. Another silvicultural alternative would be to clearcut the harvest area – this is not



legal pursuant to the special harvesting methods of the southern subdistrict as stated in 14CCR 913.8. The silvicultural prescription is written to increase regeneration, reduce defect, and allow redwood to maintain site occupancy while considering other beneficial uses.

The yarding method proposed for this harvest is tractor logging and cable logging. Most of the harvest area can be accessed by traversing existing skid trails and utilizing long-lining to retrieve logs from some areas. Other yarding methods available could include helicopter, balloon, cable, or animal logging. All of these options are more expensive and would increase the costs beyond an acceptable level for the landowners. Furthermore, many portions of the harvest area are not appropriate for the other yarding methods.

Helicopter yarding is most often used on steeper slopes, where cable yarding is not a feasible alternative due to the topography. Adequate yarder settings and cable profiles do not provide access for all of the harvest area. In some areas, slopes and slope deflection are not sufficient to facilitate skyline yarding. The terrain is too steep for effective horse or oxen yarding without the use of large teams. Balloon technology leaves much to be desired.

### **Analysis of Alternatives**

The NTMP as proposed alternative is the only alternative that thoroughly satisfies the goals of Swanton Pacific Ranch to provide a working ranch and forest for educational purposes. The faculty, staff, and students of Cal Poly San Luis Obispo rely on the Ranch as an outdoor classroom and demonstration tool for active land management. The “no project”, conservation easement or acquisition alternatives would not serve the purpose of the Ranch in exposing future land managers to responsible forest management.

This property is part of the base of sustainable resources that support the local economy. The highest and best use of the land remains in the production of timber. The proposed silvicultural method, selection, ensures that the resource will not be squandered and will be available for sustainable harvests in the future. The timing and location of this harvest entry are planned to clean up a stand that was partially harvested at last entry. The proposed harvest will bring the forest closer to the target un-even age structure. The proposed harvesting and yarding methods are the preferred techniques based on many years of logging experience with a strong desire to protect floral and faunal habitats, aesthetic values, and recreational opportunities. No other alternative would satisfy the landowners wish to practice good forest stewardship.

## **II. CUMULATIVE IMPACTS ASSESSMENT CHECKLIST**

### **Watershed Study Area**

The Watershed Study Area is made up of the planning watersheds of two major tributaries to lower Scotts Creek; the Little Creek Planning Watershed, #3304.110202, and the Big Creek Planning Watershed, #3304.110201. Together these watersheds comprise 11,676 acres. The watershed areas are shown on the Watershed Map at the end of Section IV.

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The project area is primarily located in the Little Creek planning watershed. The area for the Little Creek watershed depicted by Calwater encompasses a total of 4,470 acres, approximately 1,552 acres of which, located on the Range, drain directly to the Pacific Ocean. The remainder of the watershed, approximately 2,918 acres, contains smaller subwatersheds which drain directly to Scotts Creek, from north to south they are: Little Creek – 1,315 acres, Winter Creek – 149 acres, Archibald Creek – 421 acres, and Queseria Creek – 478 acres. The NTMP covers approximately 667 acres within the Little Creek planning watershed, located in the Little Creek, Winter Creek, and Archibald Creek tributary watersheds to lower Scotts Creek.

The northern tip of the project area is in the Big Creek planning watershed. Big Creek flows southwestward into Scotts Creek about three tenths of a mile north of the point where Little Creek flows into Scotts Creek. The NTMP area is located approximately 1.9 miles above the confluence of Big Creek with Scotts Creek on the headwaters of Berry Creek, which flows into Big Creek approximately .9 miles below the harvest area. The mainstem of Big Creek is accessible to migrating salmonids for approximately 2.5 miles from the confluence with Scotts Creek (Bulger, 1998). The Berry Creek tributary is a Class III watercourse at the top of the NTMP area, changing to a Class II watercourse near the downstream extent of the harvest boundary. Approximately 34 acres of the NTMP area are located in the 7,206 acre Big Creek planning watershed.

This area was chosen for analysis of potential cumulative impacts resulting from this proposed NTMP because it includes the entire area draining into and out of the NTMP area to downstream watercourses. It encompasses the entire length of the streams in close proximity to the harvest area and also the downstream drainage-ways all the way to the ocean. The study area also includes a stretch of rangeland along the coast that does not flow into Scotts Creek but flows toward the ocean. In addition to the NTMP area, the Watershed Assessment Area includes, among other watercourses: the headwaters of the North Fork of Little Creek, the South Fork of Little Creek, the headwaters of Winter Creek, Archibald Creek, Queseria Creek, and the mainstem of Scotts Creek from its confluence with Big Creek to the brackish lagoon that is the outlet to the Pacific Ocean.

**Does the watershed study area contain any past, present, or reasonably foreseeable probable future projects?**

Yes. The watershed has a rich history of human activity. Notable projects that have had an impact on the beneficial uses of water include past timber harvesting, livestock grazing, agriculture, road building and residential development.

Outside of the forested extent of the watershed, a small portion of the lowlands of the watershed are currently used for agriculture and are tilled and planted in row crops. Rangeland with seasonal cattle grazing covers approximately 1,600 acres of the watershed. Ownership in the watershed is primarily made up of large landowners including Big Creek Lumber, CEMEX, MPK Farms, and Cal Poly Corporation (Swanton Pacific Ranch). The predominant land use in the watershed is timber production with simultaneous management for wildlife and watershed values. There is minimal residential development and rural development is primarily in the valley bottom with a few structures in the surrounding hills.

Much of the watershed was logged by the San Vicente Lumber Company between 1908 and 1922. A Shay engine railroad followed the Little Creek drainage to the headwaters of the North Fork, where it branched and continued, north to Big Creek, and south to the headwaters of San Vicente Creek. Several miles of railroad grade, including a trestle across Little Creek are part of the Little Creek watershed area. Several logging camps along the rail line were constructed and used over the course of the logging operation. The logging technique at that time was clearcut and burn, leaving the ground relatively unvegetated. It is estimated that approximately 2000 acres were harvested during this time period between the Little Creek and Big Creek watersheds. The wood was in high demand to rebuild San Francisco following the 1906 earthquake. In 1922 the railroad was dismantled and many of the ties were removed and sold as scrap.

The watershed has been harvested selectively on a small scale by landowners and residents for split products since the late 1800's. In 1955, the lower portion of the watershed around Winter Creek, Archibald Creek, Queseria Creek, and the west side of Scotts Creek were selectively logged using narrow, track-laying tractors. Redwood removed during that harvest was used for split products and the Douglas-fir was sold to a box factory in west Santa Cruz.

In the last ten years, five timber harvest plans have been completed within the watershed study area. These plans encompass 597 acres in the watershed, approximately 6% of the watershed area. In the last 15 years, nine timber harvest plans have been completed within the watershed study area. These plans encompass 1,517 acres in the watershed, approximately 13% of the watershed area. The following list includes all THPs in the Watershed Assessment Area in the past 15 years, which are also shown on the Past CDF Projects Map at the end of Section IV.

<b>THP#</b>	<b>Acres</b>	<b>Location</b>	<b>Status</b>
1-94-055 SCR	62	T10S, R3W, San Vicente Rancho	Completed 6/26/97
1-94-071 SCR	200	T10S, R3W, Sec 8,9,17 and San Vicente Rancho	Completed 1/31/97
1-94-601 SCR	581	T10S, R3W, San Vicente Rancho	Completed 6/19/01
1-96-542 SCR	44	T10S, R3W, Sec 15,22,23 and San Vicente Rancho	Completed 5/19/99
1-98-96 SCR	74	T10S, R3W, San Vicente Rancho	Completed 5/24/02
1-00-136 SCR	80	T10S, R3W, San Vicente Rancho	N/A
1-01-011 SCR	130	T10S, R3W, San Vicente Rancho	N/A
1-04-115 SCR	222	T10S, R3W, San Vicente Rancho	N/A
1-04-053 SCR	91	T10S, R3W, Sec 8, 17 and Agua Puerca y las Trancas Rancho	N/A

THP # 1-89-539 SCR covered 59 acres in the South Fork of Little Creek on Cal Poly property. This plan was yarded with cable yarders and ground-based equipment, tractors and skidders. A violation of 14 CCR 1035.3 was issued for a Licensed Timber Operator violation. Another adjacent THP# 1-91-088 SCR covered 20 acres of the South Fork of Little Creek.

THP # 1-94-055 SCR covered approximately 200 acres in the North Fork of Little Creek on Cal Poly property and utilized tractor and cable yarding methods. An adjacent THP #1-94-071 SCR with 140 acres in the South Fork Little Creek watershed also utilized tractor and cable yarding methods. No violations were issued for either of these plans.

Outside of the forested extent of the watershed, agriculture and livestock grazing have played an important role in landuse since the late 1800's. The lowlands around Scotts Creek and the "panhandle" of the watershed that extends along the coast had up to 5 dairy establishments prior to 1950. Crops including strawberries, flowers, and brussel sprouts were cultivated and irrigated using a water diversion on Scotts Creek, below Mill Creek. Water was pumped from the stream at this location and stored in concrete tanks on the ridge then gravity fed to irrigate crops. This water intake was operational up until the early 1990's. Only a small portion of the lowlands of the watershed are currently used for agriculture and are tilled and planted in row crops. Rangeland with seasonal cattle grazing covers approximately 1600 acres of the watershed.

In 1938 the stretch of Highway 1 that bridges Scotts Creek near the outlet to the Pacific Ocean was constructed. The lower portions of Scotts Creek and Queseria Creek were channeled straight through agricultural fields and all riparian vegetation was removed for this effort. Since that time, up until 1982, the Army Corps of Engineers routinely dredged and maintained the levees that confine Scotts Creek and Queseria Creek. Restoration work on lower Queseria Creek in 2003-2004 modified the channel morphology and replaced an old culvert. A water diversion for agricultural uses was located in the lower reach of Scotts Creek until 1998.

Several crossing upgrades approved in the 2004 Lower Little Creek THP for the property have not yet been competed and are scheduled to be completed in conjunction with the first operation under this NTMP in summer 2008. THP #1-04-094 SCR has been extended and the 1600 agreement will still be valid. The crossings are 1) the fallen down bridge over Little Creek, X6 under the past THP, now referred to as R6 in the NTMP; and 2) the shotgunned culvert at the failed rock wall, X5 under the past THP and R7 in this NTMP. Language from the Lower Little Creek THP is carried over into the NTMP, including the Focused Engineering Geologic Report, in regards to CEQA compliance issues so that these crossing may be operated on in conjunction with NTMP operations.

Ownership in the watershed is primarily made up of large landowners including Big Creek Lumber, CEMEX, and Cal Poly Corporation (Swanton Pacific Ranch). The predominant land use in the watershed is timber production with simultaneous management for wildlife and watershed values. Selective timber harvests will likely be proposed on a sustainable cycle on forestlands within the watershed. A selective harvesting operation utilizing tractor and cable yarding is scheduled to take place on the North Fork of Little Creek in 2008, covering approximately 191 acres, 3% of the watershed.

There is minimal residential development and rural development is primarily in the valley bottom with a few structures in the surrounding hills. An infrastructure of paved and unpaved access roads receives varying levels of maintenance from the landowners. Other possible future projects could include home construction, permitted through the county planning department. No major developments are expected due to the parcel size and zoning.

**Are there any continuing significant adverse impacts from past land use activities that may add to the impacts of the proposed project?**

Yes. A number of legacy roads exist in the watershed from previous logging activities. Legacy roads may contribute sediment to watercourses as they are generally not maintained and they disrupt the natural drainage of a hillside. These roads have generally healed over through re-vegetation and cut-bank sloughing.

Residential land use and maintenance of related access roads will likely continue to be problematic within the watershed. Many stream crossings in the watershed modify channel morphology and continued road maintenance and construction in the watershed have the potential to impact the beneficial uses of water. The Highway 1 bridge and abutments will continue to restrict flow near the mouth of Scotts Creek.

This NTMP includes plans to reduce the potential for deleterious amounts of sediment to enter Little Creek at crossing R6. At this location, a flat-car bridge has fallen into the channel from one bank. The bridge is currently a partial obstruction to stream flow, not affecting fish passage at this time. It could cause a debris jam, which would lead to channel scouring when the debris jam broke or it could direct water toward the stream bank which would weaken bank stability. The proposed mitigation will reduce the potential for the bridge site to have significant adverse impacts on the watershed in the future.

**Will the proposed project, as presented, in combination with past, present, and reasonably foreseeable probable future projects identified in Parts B and C above, have a reasonable potential to cause or add to significant cumulative impacts in any of the following resource subjects?**

	Yes after mitigation (a)	No after mitigation (b)	No reasonable potential significant effects (c)
1. Watershed	[ ]	[X]	[ ]
2. Soil Productivity	[ ]	[X]	[ ]
3. Biological	[ ]	[X]	[ ]
4. Recreation	[ ]	[X]	[ ]
5. Visual	[ ]	[X]	[ ]
6. Traffic	[ ]	[X]	[ ]
7. Noise	[ ]	[X]	[ ]
8. Air Quality	[ ]	[X]	[ ]
9. Fire Hazard	[ ]	[X]	[ ]
10. Chemicals	[ ]	[X]	[ ]

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PART OF PLAN

- (a) "Yes after mitigation" means that potential significant adverse impacts are left after application of the forest practice rules and mitigation or alternatives proposed by the plan submitter.
- (b) "No after mitigation" means that any potential for the proposed timber operation to cause significant adverse impacts has been substantially reduced or avoided by mitigation measures or alternatives proposed in the THP and/or application of the forest practice rules.
- (c) "No reasonable potential significant effects" means that the operations proposed in the THP do not have a reasonable potential to join with the impacts of any other project to cause significant cumulative adverse effects.

**If column (a) is checked above, describe why the expected impacts cannot be feasibly mitigated or avoided and what mitigation measures or alternatives were considered to reach this determination.**

**If column (b) is checked above, describe what mitigation measures have been selected which will substantially reduce or avoid reasonable potential significant cumulative impacts except for those mitigation measures or alternatives mandated by application of the rules of the Board of Forestry.**

The Forest Practice Rules for the Southern Subdistrict of the Coast Forest District including the Santa Cruz County Rules shall be adhered to in the mitigation of potential impacts. The specific rule-related mitigations are described in the NTMP. A description of the assessment areas used for each resource subject is contained in the analysis of each resource that follows.

The following individuals, organizations, and records were consulted in the assessment of potential cumulative impacts.

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### **III. CUMULATIVE WATERSHED IMPACTS ASSESSMENT**

#### **Watershed Impacts Assessment Area**

The NTMP lies primarily in the Little Creek planning watershed (Calwater version 2.2 identification #3304.110202), although a small area in the northernmost part of the North Fork Unit drains to the Big Creek planning watershed (Calwater version 2.2 identification #3304.110201). These two watersheds were chosen as the Watershed Impacts Assessment Area where potential cumulative impacts resulting from this proposed NTMP shall be assessed. Big Creek and Little Creek are both major tributaries to Scotts Creek and the Calwater planning watersheds bearing their names also include the smaller subwatersheds of Berry Creek, which flows to Big Creek, and Winter Creek, Archibald Creek, and Queseria Creek, which flow directly to Scotts Creek. The Big Creek planning watershed is 7,206 acres, 30 acres of which, at the headwaters of Berry Creek, are part of this NTMP. The Little Creek planning watershed is 4,470 acres, approximately 644 acres of which are part of this NTMP. The harvest area covers portions of three subwatersheds within the Little Creek planning watershed. Little Creek is 1,315 acres, with 671 acres of harvest area, divided between the various sub-watersheds. No harvest area is located in the Queseria Creek subwatershed at this time. The Little Creek planning watershed also includes 1,552 acres of Range, located on the west side of Swanton Road, which predominantly drains directly to the Pacific Ocean. The Watershed Assessment Area and the upstream extent of the Scotts Creek watershed are depicted on the Watershed Map at the end of Section IV.

In addition to the NTMP area, the study area includes, among other watercourses: the headwaters of Big Creek and Deadman's Gulch and the headwaters of the North Fork of Little Creek, the South Fork of Little Creek, Archibald Creek, and Queseria Creek, as well as mainstem of Scotts Creek from its confluence with Big Creek to the brackish lagoon that is the outlet to the Pacific Ocean.

The Big Creek and Little Creek planning watersheds form the appropriate assessment area that can realistically be assessed for potential impacts related to the proposed harvest. It encompasses the entire length of the streams in close proximity to the harvest area and also the downstream drainage, all the way to the ocean. The study area also includes a stretch of rangeland along the coast that does not flow into Scotts Creek but flows toward the ocean.

#### **Beneficial Uses of Water within Assessment Area**

The known on-site and downstream beneficial uses of water that could be affected by the project are domestic use, agriculture, wildlife uses including fish and amphibian populations, ground water recharge, and recreation.

#### **Current Stream Channel Conditions**

**Are there any Class II or larger streams that flow through or adjacent to the project area that will receive runoff from areas disturbed by project activities?**



Yes. Little Creek is a Class I watercourse on the North Fork to the upstream property boundary and a Class I watercourse on the South Fork to approximately 400 feet above the confluence, above which point the South Fork is a Class II watercourse without likely fish habitat. The North Fork has several Class II tributaries and also includes several Class II wet areas. The headwaters of Berry Creek is Class III at the upstream extent of the harvest area, and transitions to Class II several hundred feet above the downstream extent of the harvest area. Portions of Winter Creek and Archibald Creek have Class II watercourse characteristics, while other sections are indicative of a Class III. Winter Creek is a Class III watercourse from the headwaters, below landing L3, to the in-stream pond, which provides Class II habitat. The watercourse remains a Class II to the road crossing at R3, below which point the watercourse normally goes subsurface and is designated Class III. Archibald Creek is a Class III watercourse upstream of the property boundary. It becomes a Class II watercourse from the property boundary to just below crossing R1, at which point it frequently goes subsurface, all the way to below Swanton Road. Both Winter Creek and Archibald Creek have a high component of native mudstone parent material in the streambed substrate. This creates the porosity and permeability that increases infiltration rates and promotes deep percolation. Several historic stock ponds near the NTMP area and many more of the east side of Scotts Creek have Class II habitat and are California red-legged frog breeding grounds.

The major watercourse in the NTMP area, Little Creek, has the following stream conditions:

Gravel Embeddedness: Small gravels are fairly embedded in the stream channel with mainly decomposed granite and Santa Cruz mudstone in the North Fork. The South Fork has a similar makeup of decomposed granite and mudstone. Granite boulders in the mainstem have worked their way down the stream channel from their origin in upstream granitic parent material. Several portions of the channel bottom are sandstone and shale bedrock along the length of Little Creek. In most tributaries to Little Creek, as well as other streams in the NTMP area, there are many 3-5 inch cobbles of mostly mudstone and some granite in the channel.

Pool Filling: A moderate amount of pool filling is occurring on Little Creek. Pools will aggrade and scour over a season a couple of times due to the high volume of gravels and fines moving through the system. For an event snap-shot of how much fine material moves through the Little Creek stream system, the Little Creek Watershed Study has measured approximately 3,168 cubic yards of sediment moving through the North Fork Little Creek flume during one 2" storm event under saturated soil conditions in a December/January event in 2005. The pools on Little Creek are generally not very large or very deep. The largest pool noted by the RPF is below the main stem flume and measures approximately 10 feet by 10 feet and three feet deep. There are a number of plunge/step pools that generally do not aggrade, most likely due to the steep gradient of the watercourse. The average pool depth during summer low flow is approximately 12 inches. A map of pool/riffle/glide habitat for Little Creek is included in Section V.

Aggrading: Aggrading is occurring behind rocks that trap logs perpendicular to the stream channel and debris jams. In general, Little Creek is downcutting over time through sediments deposited by large historic depositions.

Bank Cutting: Generally, bank cutting is low. Some bank cutting is present behind aggraded debris jams where fresh downcutting is occurring. The upper extents of the North Fork and South Fork, where the channel is narrower, are deeply incised with local steep streamside slopes on one or both sides. In some areas there is a high incidence of streamside bank cutting and undercut banks. In other areas, the stream channel is bedrock and significant downcutting is not occurring. In general, bank cutting is accelerated during larger storm events, under high flow conditions.

Bank Mass Wasting: Bank mass wasting is moderate to high along Little Creek. This is a function of the stream system having a lot of steep streamside topography. A higher level of mass wasting occurs after large storm events. Notable bank mass wasting episodes occurred in 1955 in the South Fork and in 1982 and 1997, throughout the watershed.

Significant mass wasting and bank erosion has been documented in the watershed following extreme flow conditions. A near-stream sediment source survey conducted in 2001 measured many smaller streamside landslides and streambank erosional features that were evident following high flow years in 1997-98 and in 1998-99. A subsequent survey following average and below-average flow years found far fewer active erosional features illustrating the episodic nature of these processes.

Downcutting: Downcutting is moderate on Little Creek. The stream channel is down-cutting through sediment deposited from historic storm events and also due to regional uplift. In several locations on both the North Fork and South Fork of Little Creek, stumps can be observed in or adjacent to the stream channel, with the top of the root crown at approximately the channel bank height. This suggests that the channel bottom has not downcut significantly in the last hundred years. Bedrock can also be observed on the channel bottom in several stream reaches of the North Fork, South Fork and mainstem, providing resistance to down-cutting.

Scouring: There is a variable amount of scouring that occurs annually on Little Creek, depending on the severity of the winter. Portions of the channel experiences localized scour during significant storm events when flows are high. Episodes of extreme scour are known to have occurred in 1940, 1955, 1982 and 1998, as described above.

Organic Debris: There is a moderate to high amount of Large Woody Debris (LWD) in the watercourse channel. The LWD is mostly comprised of redwood, a large portion from historic logging, and hardwoods including red alder and California bay. There are numerous debris jams made up of accumulations of LWD. Severe winter storms rearrange the channel causing landslides and bank erosion which results in many riparian and upland trees, primarily alders and redwoods, falling into or across the stream channel. Stream shading is somewhat reduced, but the added wood results in an increase in the number of pools and complexity within the pools.

Streamside Vegetation: Streamside vegetation has a large component of alder and big-leaf maple growing on the sediment sand bars deposited in historic flood events. The debris flow in 1940 scoured the North Fork and mainstem of Little Creek of riparian vegetation. The landslide in 1955 stripped the north bank of the South Fork and the downstream watercourse channel of vegetation. Much of the hardwood species regenerated in 1940 and 1955 is reaching maturity

and large limbs are beginning to break off or whole trees are becoming uprooted. The streamside vegetation generally forms a dense canopy with some openings over the watercourse channel. Bank understory vegetation is comprised of many hydrophilic plant species, including: elk clover, woodwardia, five-finger fern, trailing blackberry, horsetails, and oxalis.

**Recent Flooding:** Flooding events are relatively frequent in the watershed. Several historic events that have heavily impacted Little Creek are known to have occurred in 1940, 1982 and 1998. In 1940, a massive debris dam built up in the North Fork of Little Creek, creating a flood when it broke that scoured out the channel downstream. In 1955, a large landslide in the South Fork destroyed a large swath of riparian vegetation and severely scoured the stream channel in the South Fork and mainstem of Little Creek. Recent flooding events include the winters of 1982, 1983, 1996 and 1998. The 1998 event caused debris slides, mudflows, and bank failures on Little Creek, including the collapse of the Lower Little Creek bridge, and overtopping of drainage structures at haul road crossing R7 and R8.

**Are there any current stream channel conditions outside the project area, but within the watershed assessment area, that are contributing to a reduction in the beneficial uses of water?**

The effect of residential development (including roaded access) on the stream channel conditions is unknown. It can be speculated that some effect has occurred as a result of steep streamside road reconstruction and maintenance in the watershed. The Basin Plan developed by the Central Coast Regional Water Quality Control Board lists streets and rooftops as sources of pollutants, ranging from heavy metals to large pieces of trash. Most certainly, there has been an effect from the alteration of natural drainage patterns resulting from road construction (including legacy logging roads), road maintenance and residential development.

The construction of the Highway 1 bridge at the mouth of Scotts Creek has constrained the outflow from the brackish water lagoon. This modification has stopped the natural movement of the channel from year to year. The formation and subsequent breakdown of a sandbar on the ocean side of the bridge is a critical event for many species, allowing fresh and salt water mixing and opening the transportation corridor. For example, anadromous salmonids must wait for the berm to be broken to move between fresh and salt water habitats.

**Are there any known current stream channel conditions outside the assessment area that are contributing to a reduction in the beneficial uses of water?**

None known.

### **Past Projects**

Past projects within the assessment area include road construction, road maintenance, timber harvests, residential development, agriculture, water procurement, and recreation.

Based upon knowledge of watershed conditions on and off the project area, have past projects within the assessment area resulted in any of the following impacts?

**Increased sediment inputs that have embedded gravels, filled pools, or caused channel aggradation within any portion of the stream system?**

Legacy logging has undoubtedly contributed sediment to the stream system. A picture in Section III under Harvest History and also included in California Central Coast Railways (Hamman, 1980) shows a logging railroad trestle on Little Creek in 1918. The surrounding hills are devoid of vegetation and have been burned-over. With no ground cover to hold the soil in place, erosion likely moved sediment downhill until rapid succession revegetated the slopes.

A small amount of cattle grazing has taken place on the valley flats and foothill rangeland adjacent to Scotts Creek. Cattle use in the watershed is managed and has not significantly increased sediment inputs into the stream system.

Within the NTMP area, at crossing R6, a flat-car bridge dislodged from one abutment and fell to the floodplain during high flows in 1997. The bridge is currently only at minor risk for interfering with streamflow, but has potential to obstruct high flows. This increases the risk of forming a significant debris jam, which could lead to the release of excessive sediment delivery downstream and possibly channel scouring if streamflow were dammed and subsequently broke loose. A jam may also direct water toward the streambank, which may lead to bank caving. The removal of the bridge from R6 and installation at crossing R7 will fix this problem and is planned to coincide with the first operation in the North Fork Unit under this NTMP in 2008.

**Increased channel downcutting or bank erosion as a result of increased flows, sediment transport, or other channel modifications?**

Downcutting has occurred within the watershed as a result of natural processes and possibly to some unknown level associated with increased peakflows associated with legacy effects. Deposition of sediment from historic logging and failures from steep streamside slopes has left sediment accumulations that meandering stream flows erode and transport downstream. High flows accelerate bank erosion on certain stretches of the channel.

Channel modifications, such as road crossing can cause increased channel downcutting or bank erosion if improperly installed. Several such crossings are planned for replacement or installation of downspouts under this NTMP. The failed bridge at crossing R6 has the potential to cause bank erosion if plans to remove it from the stream channel as part of this NTMP are not carried out.

**Increased water temperatures resulting from canopy removal along stream channels?**

Historic clearcut logging in the watershed removed canopy from along stream channels. Channel construction in the Scotts Creek and Queseria Creek drainages removed riparian vegetation in the lower reaches of those streams. No projects in the recent past have resulted in a quantified increase in water temperature in the Assessment Area due to canopy removal.

**Increased inputs of unstable organic debris to streams or lakes?**

No known past projects have increased inputs of organic debris to streams in the watershed. Natural landslides within the watershed have added unstable organic debris during historic and recent flood events. Large events occurred in 1940, 1955, 1982 and 1998 that inundated the channel with sediment and debris. These events as well as many much smaller ones are natural processes in the Santa Cruz Mountains.

### **Removal of large organic debris leading to loss of pool habitat?**

Past harvest operations may have removed some naturally-occurring fallen trees from the Class I and II watercourses. A landslide in 1998, resulting from a heavy precipitation event under saturated soil conditions, deposited approximately 3 truck loads of logs in the Little Creek drainage. These logs were removed in a salvage logging operation in 1998 so as to not block the stream channel. No pool habitat was lost in this operation, rather, debris jams creating saturated and unstable bank conditions were averted.

No removal of naturally-occurring fallen debris is proposed from the Class I or II watercourses under normal conditions for this NTMP.

### **Chemical inputs to a stream or lake?**

Levels of chemical contamination likely are quite low. Industry is mostly absent from the basin, and commercial agriculture is currently limited to organically-grown row crops on small-scale farming operations near the mouth of Scotts Creek. Big Creek and other timber companies operating within the watershed do not use chemical fertilizers or pesticides in forestry operations.

### **Potential On-site Effects**

Based on conditions and knowledge of the impacts of similar past projects, what is the potential for the project to cause the following effects? Use High, Medium or Low.

#### **Channel or bank erosion?**

Low.

#### **Streamside or inner gorge mass wasting that could directly enter a stream channel?**

Low

#### **Debris flows or torrents that could move directly into the stream from side slopes, swales, small channels, roads, landings, or skid trails?**

Low

#### **Debris flows or torrents caused by debris jams?**

Low

**Side slope mass wasting that directs surface runoff into gullies, swales, or small channels connected to the stream system?**

Low

**Sheet, rill, or gully erosion that could be discharged into the stream from roads, landings, or skid trails (including all disturbed areas from the top of the cut to the bottom of the fill)?**

Low

**Sheet, rill, or gully erosion from harvesting or site preparation that could enter the stream system?**

Low

**Openings created by the project along streams that could result in substantially increased stream temperatures?**

Low

**Increased amounts of small organic debris in streams or lakes as a result of the project?**

Low

**Movement of roadway chemicals, machinery fuels, pesticides, nutrients released by burning, or other chemicals into streams or lakes as a result of the project?**

Low

**Increased peak flows as a result of vegetation removal, snow accumulation in new openings, or more efficient runoff routing created by the project?**

Low

**Inputs of large organic debris in streams or lakes as a result of the project?**

Low

**Extraction of large organic debris from streams or lakes as a result of the project?**

Low

**Loss of future organic debris as a result of streamside timber harvesting?**

Low

## **Future Projects**

Future projects within the assessment area will likely include timber harvests, continued repair and maintenance of roads, and continued urban interface development. Operations are scheduled to take place in the Watershed Assessment Area under this NTMP according to the schedule in Section III, approximately every 5-7 years. It is also likely that the neighboring commercial timberland owner, CEMEX, will continue to selectively harvest their timber in a sustainable way. Future timber harvest operations will be regulated by the California Department of Forestry and Fire Protection.

Maintenance of roads is an ongoing landowner priority in the watershed. Road work including construction of a short (<200 foot) spur road to landing L16 and reconstruction of approximately 300 feet of Winter Creek Road, including realigning several switchbacks to facilitate log truck passage, are proposed to make NTMP operations possible. Mitigation measures to minimize impacts from this road work are described in Section II under Item 25. The existing road system in the NTMP area is in good condition and is proposed for use where available. New construction to expand access is very limited and reconstruction is only proposed to improve the road condition. The minimalist approach to new road building in this NTMP, coupled with proactive road inventory and maintenance is intended to minimize the long term site occupancy of the road system. Upkeep of erosion control structures and upgrades to culverts will continue to take place on Swanton Pacific Ranch as well as other ownerships in the watershed.

Due to the large parcel size and zoning in the watershed, major residential development is unlikely; however, individual home construction, permitted through the county planning department may occur.

Based upon the knowledge of current watershed conditions, the effects of past projects, and accounting for currently proposed mitigation measures, are the identified future projects likely to result in:

### **Increased sediment inputs that will fill pools, embed stream gravels, or cause channel aggradation in some portion of the stream system?**

No. Residential development and road building that could cause sediment displacement is likely to proceed very slowly based on the large parcel sizes and zoning in the watershed. The proposed NTMP incorporates erosion control measures and upgrades to the road infrastructure that render increased sediment inputs insignificant. Future harvest plans utilizing selection silviculture and regulated by the California Department of Forestry and Fire Protection will not likely increase sediment inputs to streams in deleterious amounts.

### **2. Increased channel downcutting or bank erosion from increased flow, sediment transport, or other stream modifications?**

If development increases within the watershed and natural drainage patterns are modified or otherwise damaged, the velocity of flows could increase resulting in some degree of down

cutting and bank erosion. Future development is expected to be low in the watershed due to large parcel size.

**Additional openings along stream channels that could result in unacceptable increases in water temperature?**

Additional openings causing increases in water temperature are not likely to occur as a result of the proposed or future NTMP operations. The canopy retention standards set forth in the proposed NTMP include no removal of trees within the channel zone, retention of 85% canopy within the first 75 feet of the WLPZ and retention of 65% canopy for the remainder of the WLPZ. No increase in water temperature is expected to result following these rigorous standards.

**New inputs of organic debris to streams or lakes?**

No inputs are anticipated from proposed or future projects.

**Extraction of large organic debris from streams or lakes?**

No, given the awareness surrounding large woody material in streams, future extractions are unlikely.

**Chemical inputs to streams or lakes?**

An increase in such inputs is wholly dependent upon the potential increases in residential development within the watershed. Landowner's and resident's awareness of the effects of chemical inputs to the stream system is an important determining factor for what substances are used on the ground or introduced to septic systems in the watershed.

**Interactions**

Considering the combined impacts upon the beneficial uses of water described in the previous sections, what is the potential for developing adverse cumulative watershed effects in the assessment area as a result of: (Use High, Medium or Low)

**The proposed project combined with the ongoing effects of past projects, but without the expected impacts of future projects?**

Low

**The proposed project combined with the effect of past projects and the expected impacts of future projects listed in Part F?**

Low

If the answer to both questions is "Low", go to Part H and check the line labeled, "No (after mitigation)" or "No (no reasonable potential significant effects)" as appropriate.



## **Impacts Evaluation**

Will the proposed project, as presented, in combination with the impacts of past and future projects, as identified in Parts C through F and with the interactions rated in Part G above, have a reasonable potential to cause or add to significant cumulative impacts to watershed resources?

Yes (after mitigation)	[ ]
No (after mitigation)	[X]
No (no reasonable potential significant effects)	[ ]

If the answer is, "No" and either or both of the questions in Part G are rated "Medium," describe the reasons for reaching this conclusion. This section may also be used to describe situations in which the proposed project, as described and mitigated, will result in positive effects on watershed conditions and existing cumulative watershed impacts.

The roads and skid trails proposed for use in this NTMP are predominantly existing. The existing infrastructure will be improved by erosion control measures and mitigations implemented as part of this NTMP. Improvements made to drainage structures and road surfaces will result in positive effects on watershed conditions.

Roads proposed for use on the property will be upgraded with rolling dips and the surface will be rocked or seeded and straw mulched where necessary to reduce the transport of surface fines. The rolling dips will reduce sediment movement on roads by getting water off the road surface and onto stable vegetated surfaces. Skid trails will be waterbarred and slashed for added erosion control and landings will be positively drained.

Crossing improvements planned in conjunction with NTMP operations will reduce erosion and failure potential during high stream flows. Road crossings R7, R15 and R17/R18 are planned for improvements in road drainage for the first NTMP operations and are included in the accompanying 1600 Agreement, along with temporary crossings S1-S4. Also in conjunction with initial NTMP operations in the North Fork Unit, the bridge at failed Little Creek crossing R6 will be removed from its perched position and installed at crossing R7. Bridge removal permits and designs for new bridge installation are attached in Section V in the approved 1600 Agreement for the Lower Little Creek THP, #1-04-053. Bridge installation was delayed during the THP operations due to available funds and physical challenges encountered preparing to transport a new bridge to the site. At some time in the future, a new bridge may be installed at this location, at which time this NTMP will function as the CEQA compliance document and a 1600 Agreement will be negotiated.

The proposed mitigations in crossing construction and reconstruction are designed to have a net positive impact on the beneficial uses of water. Temporary crossings will leave the channel bed and bank as natural as possible and will employ erosion control measures to reduce erosion as specified in the NTMP.

This project in combination with the impacts of past and future projects, as identified in Parts C through F and with the interactions rated in Part G above, do not have a reasonable potential to cause or add to significant cumulative impacts to watershed resources.

#### **IV. CUMULATIVE SOIL PRODUCTIVITY IMPACT ASSESSMENT**

##### **Soil Productivity Impacts Assessment Area**

The Soil Productivity Impacts Assessment Area encompasses the entire proposed project area. It is reasonable to assume that potential soil impacts from operations are limited to the project area and no further.

##### **Soil Productivity Resources Assessment**

Site factors to be assessed for cumulative soil productivity impacts include organic matter loss, surface soil loss, soil compaction, and growing space loss. The potential impact of successive management activities must be assessed for each of those factors individually and in combination and the overall impact classed as significant when:

**The area disturbed by proposed timber operations will exceed that required by the silvicultural and harvest systems approved for use under the proposed NTMP, including unnecessary duplication of existing skid trails, roads, landings, yarding disturbance, and mechanical site preparation.**

The proposed silvicultural and harvest systems are planned to be as protective of the soil resource as possible. Existing infrastructure is proposed to be used wherever feasible and environmentally sound. New infrastructure is minimized and is designed to fit with the natural topography where proposed. Past harvest operations in 1910, 1989 and 1993 have established a nearly complete operational infrastructure. Improvements on the valuable resource of the roads are proposed in conjunction with NTMP operations to maintain their integrity and ensure future access for management as well as research, education and recreation. Existing landings and natural openings are proposed for use as landings and are shown on the Operations Map. To minimize yarding disturbance, the yarding method most suited to the available access and topography is proposed. In several locations in the NTMP areas, multiple yarding methods are proposed to allow flexibility for the most appropriate method at the time of operations. Minimal disturbance is proposed for timber operations and the selection silvicultural method retains living forest structure. Above ground structure from living trees drops leaves, needles, branches, and bark to litter the forest floor. Thriving root masses from coppice sprouting trees such as redwood, tanoak and madrone keep the soil healthy as a result of harvesting.

**The amount of organic matter loss and soil displacement with use of the proposed silvicultural and harvesting systems will substantially exceed that of other feasible systems.**

Organic matter loss and soil displacement will be minimal under the proposed silvicultural systems. Proposed single tree selection with possible small groups will leave canopy cover to provide fog interception and leaf litter following operations. Understory species composition

may benefit from the increased sunlight of the partial cut, yet the impact of selective tree removal will not alter the natural light regimes enough to change the microsite. Regeneration will occur naturally through coppice sprouting and natural seeding, and may be periodically supplemented with planting stock from the local seed zone. New growth will follow harvest, yielding more organic matter as a result of proposed operations.

The harvesting systems for the NTMP are also designed to minimize soil displacement. The most appropriate harvesting systems for available access and topography are proposed. Ground based equipment is proposed for use on suitably flat ground with existing access. Skid trails will be packed with tractor crushed slash, straw mulched and/or seeded, and waterbarred at the appropriate spacing. Cable operations are proposed where landing sites are available and good deflection is possible. Helicopter yarding is proposed where no other access is available, the site is sensitive, or the skidding distance is too long. The roads will be upgraded with functioning erosion control including rolling dips and waterbars with surfacing in key locations. Landings will be kept to a reasonable size and will be treated with soil stabilization measures following operations. Among other measures, these will help minimize the Soil Productivity impacts from operations.

**The amount of compaction and puddling with use of the proposed silvicultural and harvesting systems will substantially exceed that of other feasible systems under the soil moisture conditions expected at the time of the proposed operations.**

Operations shall occur according to a Winter Period Operating Plan, which sets forth conditions for operations to avoid negative impacts to soil productivity from compactions and puddling. Specific winter period protocol is under Item 23 in Section II. Tractor operations will only occur prior to the onset of the wet season. Harvesting will not cause excessive compaction since ground based yarding and skidding will not take place when conditions of saturated soil or low antecedent soil wetness are present. Roads and landings shall be shaped to drain to a positive configuration to avoid concentration of water and puddling.

**The combined loss of soil productivity from loss of growing space, organic matter loss, soil displacement and soil compaction from the proposed operations will substantially exceed that of other feasible combinations of silvicultural and harvesting systems.**

The selection silviculture system in combination with proposed yarding methods are suited for the project area and will work well to prevent soil loss. The erosion control methods employed on all skid trails and roads described in the proposed NTMP, in association with the silvicultural and harvesting methods, should significantly reduce the potential for loss of soil productivity, soil displacement, and soil compaction.

### **Impacts Evaluation**

Will the proposed project, as presented, alone or in combination with impacts of past and future have a reasonable potential to cause or add to significant cumulative soil productivity impacts as a result of:

	No after Mitigation	Yes after significant effects	No reasonable potential
1. Organic Matter Loss	[X]	[ ]	[ ]
2. Surface Soil Loss	[X]	[ ]	[ ]
3. Soil Compaction	[X]	[ ]	[ ]
4. Growing Space Loss	[ ]	[ ]	[X]
5. Combination of above	[X]	[ ]	[ ]

Cumulative soil productivity impacts have the potential to occur when impacts from a sequence of management activities produce a significant reduction in soil productivity. Impacts are present in some areas of the property to varying degrees as a result of past landuses. Management activities proposed in this NTMP are designed to be as protective of the soil resources as possible. Ground-based operations are planned to utilize existing infrastructure wherever feasible and environmentally sound. The most suitable yarding options for the access and topography are proposed. Soil stabilization measures are proposed to mitigate soil disturbance from equipment and ensure functioning erosion controls. Most roads in the WLPZ are proposed to be rocked as an example of proactive efforts to reduce surface soil loss in conjunction with NTMP operations. Skid trails are proposed to be mulched with slash from the operations, which is often tractor crushed on the trail surface, leading to faster decomposition and incorporation of organic matter into the topsoil. Proposed operations are limited to the dry period when soils are not saturated to reduce the risk of soil compaction. Proposed new infrastructure is minimized to prevent unnecessary growing space loss. In fact, the NTMP proposes some treatments to revitalize areas and regain the potential soil productivity by encouraging species diversity and healthy growing conditions. Overall, the NTMP will have a positive impact on soil productivity and will not produce a negative impact when combined with any residual impacts from past activities or anticipated future impacts.

## V. CUMULATIVE BIOLOGICAL IMPACTS ASSESSMENT

### **Biological Impacts Assessment Area**

The biological impacts assessment area for aquatic species such as fish and amphibians is the entire Watershed Assessment Area. The watershed study area chosen for analysis of potential cumulative impacts resulting from this proposed NTMP encompasses approximately 2,918 acres of the Little Creek planning watershed, and 7,206 acres of the Big Creek planning watershed. In addition to the NTMP area, the study area includes, among other watercourses: the headwaters of Big Creek and Berry Creek, the headwater of the North Fork and South Fork of Little Creek, Winter Creek, Archibald Creek, Queseria Creek, and the mainstem of Scotts Creek from its confluence with Big Creek to the brackish lagoon that is the outlet to the Pacific Ocean. Other watercourses flowing into Scotts Creek upstream of the Watershed Assessment Area include Mill Creek, Bettencourt Gulch, Calf Gulch and the headwaters of Scotts Creek to the top of Ben Lomond Mountain.

The Watershed Assessment Area is shown on both topographical and aerial photo maps in Section IV. The Little Creek Calwater watershed includes several subwatersheds that drain to Scotts Creek as well as an area on the Range the drains directly to the Pacific Ocean. The Big

Creek Calwater Watershed includes Big Creek and the watershed of Berry Creek, a tributary to Big Creek. The Watershed Assessment Area is an area which can be realistically assessed for potential impacts related to this proposed harvest. The study area is appropriate for assessment of aquatic species because it includes the entire length of all streams in and adjacent to the harvest area and also the entire downstream extent and the outlet to the Pacific Ocean.

For all other animal and plant species, the Assessment Area is the project area and the area within one mile of the project boundary. The scope of this assessment area is shown as the inner buffer on the CNDDDB query map, referenced below and included in Section V. This assessment area accounts for mobile species that may move in and out of the project area. Most plant and animal species found in the plan area will stay within the Assessment Area. Other animal species which have a larger home-range will move in and out of the assessment area. The inventory of species being discussed within this assessment was generated from scoping queries processed through the California Native Plant Society (CNPS), California Natural Diversity Database (CNDDDB), RareFind 3 and the California Wildlife Habitat Relationships Database (CWHR). The CNDDDB was queried for a five-mile radius around the project boundaries to identify the potential occurrence of species. The map and list of species generated by this query is included in Section V. The CNPS database was queried (nine quadrangle query) for the occurrence of flora that occurs within proximity to the proposed project, and therefore may be present within the boundary. The CNPS list is included in Section V. A professional botanist surveyed the project area and a report is supplied in NTMP Section V. The CWHR database utilizes specific elements that create a representative habitat type designed to mimic the habitat types present within the project. CWHR then reports the species that could occur within the project boundaries based on the habitat elements within the project boundaries. The CWHR report is also available in NTMP Section V. In addition, the Santa Cruz County General Plan plants and animals lists were reviewed and are included in Section V. All species with listing status and potential presence based on review of the above lists as well as perusal of field guides and discussions with biologists are addressed in Section III. Species with protection guidelines of particular importance to the Licensed Timber Operator are also discussed in Section II and accompanied by mitigation measures. All other non-listed species considered in analysis of potential NTMP impacts are under listed under #2 below.

### **Biological Resource Inventory**

**Identify any of the following categories of species known or suspected to occur in the biological assessment area for each: rare, threatened or endangered; species of special concern established by the BOF; sensitive species.**

This species inventory includes federally or state threatened or endangered species, plants on the CNPS 1B list, species of special concern established by the BOF, sensitive species, and other noteworthy or locally rare species. Detailed information and discussion on species known or suspected to occur in habitats available in the Biological Assessment Area is included in Section III, Technical Addendum. The resources used in habitat-type determinations, as well as individual species scoping is also included in Section III. For specific species habitat requirements and mitigation measures developed for protection of the species, refer to Section II,

Item #32. A list of the species discussed in Section III follows. Those species with additional discussion and mitigation measures described in Section II are shown in **bold**.

### **Fish**

**Coho Salmon (*Oncorhynchus kisutch*) Central California Evolutionary Significant Unit.**

**Steelhead (*Oncorhynchus mykiss irideus*) Central California Evolutionary Significant Unit**

Tidewater Goby (*Eucyclogobius newberryi*)

### **Amphibians**

**California Red-legged Frog (*Rana aurora draytoni*)**

California Tiger Salamander (*Ambystoma californiense*)

Santa Cruz Black Salamander (*Aneides flavipunctatus*)

Western Spadefoot (*Spea hammondi*)

Foothill Yellow-legged Frog (*Rana boylei*)

### **Insect**

Monarch Butterfly (*Danaus plexippus*)

### **Reptiles**

Western Pond Turtle (*Emys marmorata*)

Coast Horned Lizard (*Phrynosoma coronatum frontale*)

California Legless lizard (*Anniella pulchra*)

San Francisco Garter Snake (*Thamnophis sirtalis tetrataenia*)

Rubber Boa (*Charina bottae*)

### **Birds**

**Marbled Murrelet (*Brachyramphus marmoratus*)**

Double-crested Cormorant (*Phalacrocorax auritus*)

Great Blue Heron and Great Egret (*Ardea herodias* and *A. alba*)

California Black Rail (*Laterallus jamaicensis coturniculus*)

California Clapper Rail (*Rallus longirostris obsoletus*)

Black Swift (*Cypseloides niger*)

Vaux's Swift (*Chaetura vauxi*)

Red-breasted Sapsucker (*Sphyrapicus ruber*)

Olive-sided Flycatcher (*Contopus cooperi*)

Loggerhead Shrike (*Lanius ludovicianus*)

California horned lark (*Eremophila alpestris actia*)

Purple Martin (*Progne subis*)

Bank Swallow (*Riparia riparia*)

California Thrasher (*Toxostoma redivivum*)

Yellow Warbler (*Dendroica petechia brewsteri*)

Saltmarsh Common Yellowthroat (*Geothlypis trichas sinuosa*)

Yellow-breasted Chat (*Icteria virens*)

Lark Sparrow (*Chondestes grammacus*)

Bell's Sage Sparrow (*Amphispiza belli belli*)

Tricolored Blackbird (*Agelaius tricolor*)

Osprey (*Pandion haliaetus*)  
Bald Eagle (*Haliaeetus leucocephalus*)  
White-tailed Kite (*Elanus leucurus*)  
Northern Harrier (*Circus cyaneus*)  
Sharp-shinned Hawk (*Accipiter striatus*)  
Cooper's Hawk (*Accipiter cooperii*)  
Ferruginous Hawk (*Buteo regalis*)  
Golden Eagle (*Aquila chrysaetos*)  
Merlin (*Falco columbarius*)  
American Peregrine Falcon (*Falco peregrinus anatum*)  
Burrowing Owl (*Athene cunicularia*)  
Long-eared Owl (*Asio otus*)  
Short-eared Owl (*Asio flammeus*)  
Turkey Vulture (*Cathartes aura*)  
Red-shouldered Hawk (*Buteo lineatus*)  
Red-tailed Hawk (*Buteo jamaicensis*)  
American Kestrel (*Falco sparverius*)  
Barn Owl (*Tyto alba*)  
Great Horned Owl (*Bubo virginianus*)  
Western Screech Owl (*Otus kennicottii*)  
Northern Pygmy Owl (*Glaucidium gnoma*)  
Northern Saw Whet Owl (*Aegolius acadicus*)

### **Mammals**

Pallid bat (*Antrozous pallidus*)  
Townsend's big-eared bat (*Corynorhinus townsendii*)  
Long-eared myotis (*Myotis evotis*)  
Fringed myotis (*Myotis thysanodes*)  
Long-legged myotis (*Myotis volans*)  
Yuma myotis (*Myotis yumanensis*)  
American Badger (*Taxidea taxus*)  
San-Francisco Dusky-footed Woodrat (*Neotoma fuscipes annectens*)  
Ringtail (*Bassariscus astutus*)  
Monterey Ornate Shrew (*Sorex ornatus salaries*)

### **Terrestrial Natural Communities**

#### **Northern Maritime Chaparral**

#### **Monterey Pine Forest**

Northern Interior Cypress Forest  
Maritime Coast Range Ponderosa Pine Forest  
Coastal Brackish Marsh  
Northern Coastal Salt Marsh

### **Plants**

#### **Monterey Pine (*Pinus radiata*)**

Shreve oak (*Quercus parvula* var. *shrevei*)

**Elmer's fescue (*Festuca elmeri*)**

Santa Cruz Microseris (*Stebbinsoseris decipens*)  
White-rayed Pentachaeta (*Pentachaeta bellidiflora*)  
Santa Cruz Wallflower (*Erysimum teretifolium*)  
San Francisco Campion (*Silene verecunda* ssp. *verecunda*)  
Santa Cruz Manzanita (*Arctostaphylos andersonii*)  
Schreibers Manzanita (*Arctostaphylos glutinosa*)  
Pajaro Manzanita (*Arctostaphylos pajaroensis*)  
Bonny Doon Manzanita (*Arctostaphylos silvicola*)  
Kelloggs Hokelia (*Horkelia cuneata* ssp. *sericea*)  
Santa Cruz Clover (*Trifolium buckwestorium*)  
Ben Lomond Spineflower (*Chorizanthe pungens* var. *hartwegiana*)  
Santa Cruz Mountains Beardtongue (*Penstemon rattanii* var. *kleei*)  
Dudley's Lousewort (*Pedicularis dudleyi*)  
Santa Cruz Cypress (*Cupressus abramsiana*)  
Blasdales Bent Grass (*Agrostis blasdalei*)  
San Francisco Popcorn-Flower (*Plagiobothrys diffusus*)  
Awned bentgrass (*Agrostis aristiglumis*)  
Bent-flowered fiddleneck (*Amsinckia lunaris*)  
Slender silver-moss (*Anomobryum julaceum*)  
Coast rock cress (*Arabis blepharophylla*)  
Santa Cruz Mountains pussypaws (*Calyptridium parryi* var. *hesseae*)  
Franciscan thistle (*Cirsium andrewsii*)  
San Francisco Collinsia (*Collinsia multicolor*)  
California bottlebrush grass (*Elymus californicus*)  
Zayante buckwheat (*Eriogonum nudum decurrens*)  
Coast Wallflower (*Erysimum ammophilum*)  
Elmer's fescue (*Festuca elmeri*)  
Zayante everlasting (*Gnaphalium zayatense* (pro sp))  
Short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*)  
Redwood lily (*Lilium rubescens*)  
Arcuate bushmallow (*Malacothamnus arcuatus*)  
Gairdner's yampah (*Perideridia gairdneri* ssp. *gairdneri*)  
Michael's rein orchid (*Piperia michaelii*)  
Artist's popcornflower (*Plagiobothrys chorisianus* var. *chorisianus*)  
Straggly gooseberry (*Ribes divaricatum* var. *pubiflorum*)  
Hoffmann's sannicle (*Sanicula hoffmannii*)  
Mt Diablo cottonweed (*Micropus amphibolus*)

**Identify any other wildlife or fisheries resource concerns known or suspected to occur within the biological assessment area.**

The following is a list of species that has the potential to occur within the Biological Assessment Area but has no listing status or no habitat type conducive to use by that species within the NTMP area. This list is provided as an additional source so that future evaluations may consider



them. No resource concerns exist for these species, through the abundant mitigations provided, as a result of proposed NTMP operations.

Other aquatic fish species possibly present within the Biological Assessment Area include:

Coastrange sculpin (*Cottus aleuticus*)  
Riffle sculpin (*Cottus gulosus*)  
Prickly sculpin (*Cottus asper*)  
Pacific staghorn sculpin (*Leptocottus armatus*)  
Threespine stickleback (*Gasterosteus aculeatus*)  
California roach (*Hesperoleucus symmetricus*)  
Speckled dace (*Rhinichthys osculus*)

Other amphibian species possibly present within the Biological Assessment Area include:

Pacific giant salamander (*Dicamptodon ensatus*)  
Rough-skinned newt (*Taricha granulosa*)  
California newt (*Taricha torosa*)  
Ensatina (*Ensatina aschscholtzii*)  
Arboreal salamander (*Aneides lugubris*)  
Pacific tree frog (*Pseudacris regilla*)  
Western toad (*Bufo boreas*)  
Western Spadefoot (*Spea hammondi*) (formerly *Scaphiopus multiplicatus*)

Other insect species present within the Biological Assessment Area are too numerous to list.

Other reptile species possibly present within the Biological Assessment Area include:

Southwestern pond turtle (*Clemmys marmorata*)  
Bunchgrass lizard (*Sceloporus scalaris*)  
Western fence lizard (*Sceloporus occidentalis*)  
Northern alligator lizard (*Gerrhonotus coeruleus*)  
Western skink (*Eumeces skiltonianus*)  
Ringneck snake (*Diadophis punctatus*)  
Sharp-tailed snake (*Contia tenuis*)  
Racer (*Coluber constrictor*)  
Striped whipsnake (*Masticophis taeniatus*)  
Pacific gopher snake (*Pituophis melanoleucus catenifer*)  
Common king snake (*Lampropeltis getulus californiae*)  
California mountain king snake (*Lampropeltis zonata multifasciata*)  
California red-sided garter snake (*Thamnophis sirtalis inornatus*)  
Coast garter snake (*Thamnophis elegans terrestris*)  
Northern Pacific rattlesnake (*Crotalus viridis helleri*)

Other bird species possibly present within the Biological Assessment Area include (common names only):

American bittern	Snowy egret
Black-crowned night heron	Green-backed heron
Virginia rail	Sora

Killdeer  
 Black-shouldered kite  
 California quail  
 Rock dove  
 Common poorwill  
 Anna's hummingbird  
 Belted kingfisher  
 Acorn woodpecker  
 Hairy woodpecker  
 Tree swallow  
 Northern rough-winged swallow  
 Scrub jay  
 American crow  
 Brown Creeper  
 Bewick's wren  
 Western bluebird  
 Hermit thrush  
 Northern mockingbird  
 European starling  
 Orange-crowned warbler  
 Wilson's warbler  
 Black-headed grosbeak  
 Brown towhee  
 Song sparrow  
 Dark-eyed junco  
 Western meadowlark  
 Brewer's blackbird  
 Northern oriole  
 House sparrow  
 Lesser goldfinch

Common snipe  
 Band-tailed pigeon  
 Mountain quail  
 Morning dove  
 House finch  
 Allen's humminbird  
 Northern flicker  
 Downy woodpecker  
 Nuttall's woodpecker  
 Violet-green swallow  
 Barn swallow  
 Steller's jay  
 Bushtit  
 House wren  
 Marsh wren  
 Swainsons trush  
 American robin  
 Cedar waxwing  
 Warbling vireo  
 Yellow-rumped warbler  
 Common yellowthroat  
 Lazuli bunting  
 Savannah sparrow  
 Rufous-crowned sparrow  
 White-crowned sparrow  
 Red-winged blackbird  
 Brown-headed cowbird  
 Western tanager  
 Pine siskin

Other mammal species possibly present within the Biological Assessment Area include:

Virginia opossum (*Didelphis virginianus*)  
 Trowbridge shrew (*Sorex trowbridgei*)  
 California mole (*Sacpanus latimanus*)  
 Little brown myotis (*Myotis lucifugus*)  
 California myotis (*Myotis californicus*)  
 Western pipistrel (*Pipistrellus hesperus*)  
 Red bat (*Lasiurus borealis*)  
 Big brown bat (*Eptesicus fuscus*)  
 Hoary bat (*Lasiurus borealis*)  
 Mexican freetail bat (*Tadarida brasiliensis*)  
 Raccoon (*Procyon lotor*)  
 Longtail weasel (*Mustela frenata*)  
 Striped skunk (*Mephitis mephitis*)  
 Coyote (*Canis latrans*)

Grey fox (*Urocyon cinereoargenteus*)  
 Mountain lion (*Felis concolor*)  
 Bobcat (*Lynx rufus*)  
 California ground squirrel (*Spermophilus beecheyi*)  
 Merriam chipmunk (*Eutamias merriami*)  
 Western grey squirrel (*Sciurus griseus*)  
 Valley pocket gopher (*Thomomys bottae*)  
 California pocket mouse (*Perognathus californicus*)  
 Western harvest mouse (*Reithrodontomys megalotis*)  
 California mouse (*Peromyscus californicus*)  
 Deer mouse (*Peromyscus maniculatus*)  
 Brush mouse (*Peromyscus boylei*)  
 Pinon mouse (*Peromyscus truei*)  
 California vole (*Microtus californicus*)  
 Blacktail jackrabbit (*Lepus californicus*)  
 Desert cottontail (*Syvilagus auduboni*)  
 Brush rabbit (*Syvilagus bachmani*)  
 Wild boar (*Sus scrofa*)  
 Mule deer (*Odocoileus hemionus*)

**Describe the pre-project condition of the biological resources inventoried within the biological assessment area. Describe the anticipated post-project condition of those biological resources after completion of the proposed project.**

The pre-project condition of the biological assessment area is a function of the impact of past land-use activities on the natural environmental conditions. The forested areas were heavily logged between 1906 and 1922, leaving a seed bed and redwood stumps that have grown up into a dense redwood forest with many associate plant species including Douglas-fir, knobcone pine, tanoak, California bay, and nutmeg, to name a few. Portions of the NTMP area in the Satellite Stands Unit were subsequently logged using a high-grade method the 1950 and 1960. The South Fork Unit was selective harvested in 1989 and North Fork Unit was selectively harvested in 1993 and 1994. Scattered areas in the Satellite Stands Unit were planted with non-native Monterey Pine between 1979 and 1984 and are now nearly pure stands of non-native pine that is destined for gradual removal. Rangeland in the assessment area has been seasonally grazed for many years. Agricultural fields in the assessment area are planted in row crops and are mostly certified organic by California Certified Organic Farmers.

The post-project conditions in the assessment area are anticipated to continue to provide suitable habitat for various plants and animals. The redwood forest habitat shall be selectively harvested and mitigation measures incorporated in the NTMP strive to ensure continued presence of all species currently present. Prescriptions and mitigations also protect the beneficial uses of water in Big Creek, Little Creek, Winters Creek, Archibald Creek, and downstream in Scotts Creek so as not to harm aquatic species.

## **Evaluation of Watershed Inputs Related to Integrity of Fishery**

The following is an evaluation of the 5 watershed inputs (sediment, nutrients, wood, temperature, water quality):

### **Sediment**

Sediment delivery to Little Creek and export out of the watershed are largely episodic and typical of both managed and unmanaged watersheds in the region. Natural background embeddedness conditions in the Santa Cruz Mountain watercourses is most likely high due to the unstable sandstone and mudstone parent material of the mountains combined with one of the highest rainfall intensity ratings on the west coast. The stream substrate is primarily cobbles, boulders and decomposed granite. Overall, pool filling is minimal in Little Creek, however it increases downstream which is most likely due to the lessening gradient as Little Creek approaches Scotts Creek. The channel gradient of Scotts Creek is relatively less as it flows into the estuary before reaching the Pacific Ocean.

The mitigation measures incorporated into the NTMP should reduce sediment delivery below current levels. Roads proposed for use on the property will be upgraded with rolling dips and the surface will be rocked, straw mulched, or seeded where necessary to reduce the transport of surface fines. The rolling dips will reduce any amounts of sediment discharging from the roads into the stream system. Skid trails and landings will be slashed or seeded. A flat-car bridge failure on the property that has the potential to cause bank erosion and scouring will be repaired to reduce significant adverse impacts on the watershed in the future.

### **Nutrients**

The riparian corridor on Little Creek is forested, ensuring abundant deposition of leaf litter to supply nutrients to the stream. Little Creek has steep stream-side topography along some stretches and canopy closure over the stream is moderately high. It appears as though leaf drop and the subsequent introduction of nutrients into the system is, at the very least, adequate to support the macroinvertebrates found within the creek.

Harvest intensities within the WLPZ shall comply with 14 CCR 916.9 "Protection and Restoration in Watersheds with Threatened or Impaired Values." Canopy retention within the first 75 feet of the 150 foot WLPZ on Little Creek shall be 85% and retention in the second 75 feet shall be 65%. No tree removal or ground disturbance shall occur within the channel zone of the Class I watercourse, except as approved in Department of Fish and Game Lake and Streambed Alteration Agreements.

### **Large Woody Material**

Large woody debris (LWD) is present in moderate to high amounts and is the formative agent of many of the pools on Little Creek. The stream profile of Little Creek, included in Section III, diagrams the presence of large woody debris in and directly above the stream channel. No LWD shall be removed from the watercourse as part of the proposed NTMP. The WLPZ restrictions identified in the operational portion of the NTMP will be sufficient to ensure that potential recruitment of material is maintained.

## Temperature

Stream temperature has been monitored on Little Creek from 1997-2007. Hobo data loggers have been placed in Little Creek at various locations within and near the proposed harvest area during the period of peak summer water temperatures. Although the number of data loggers has varied over the years, hobos have consistently been placed upstream from the flume in the North Fork, upstream from the flume in the South Fork, and upstream from the flume in the Mainstem of Little Creek. The data from these hobos in 1997-2000 and 2003 is summarized in the following tables:

North Fork Flume	Days > = to 64° Fahrenheit	Days > = to 62° Fahrenheit	Mean Daily Temp	Period Max Temp	Begin Record	End Record
1997	0	0	54.4	58.7	10/10/1997	11/14/1997
1998	8	53	57.1	64.9	7/9/1998	10/27/1998
1999	0	0	55.8	60.8	7/8/1999	11/4/1999
2000	15	32	56.2	67	6/23/2000	10/27/2000
2003	0	1	56.7	62.2	8/8/2003	11/8/2003

South Fork Flume	Days > = to 64° Fahrenheit	Days > = to 62° Fahrenheit	Mean Daily Temp	Period Max Temp	Begin Record	End Record
1997	0	0	54.6	60.8	10/10/1997	11/14/1997
1998	0	9	56.6	62.2	7/9/1998	10/27/1998
1999	0	0	55.4	60.1	7/8/1999	11/4/1999
2000	13	24	56	67	6/23/2000	10/27/2000
2003	0	0	56.3	61.5	8/8/2003	11/8/2003

Main Stem Flume	Days > = to 64° Fahrenheit	Days > = to 62° Fahrenheit	Mean Daily Temp	Period Max Temp	Begin Record	End Record
1997	0	0	54	58.7	10/10/1997	11/14/1997
1998	12	76	57.5	65.6	7/9/1998	10/27/1998
1999	0	2	55.9	62.2	7/8/1999	11/4/1999
2000	28	44	57	69.7	6/23/2000	10/27/2000

Note: 2003 Main Stem Flume temperature data is unavailable due to equipment malfunction.

The hobo data shows warmer temperatures in 1997 and 2000 than in the other years. There is no significant warming trend in the downstream direction. The data is more realistically interpreted as a mean weekly average temperature (MWAT) to take into account the cumulative effect of elevated temperatures. Anadromous salmonids are not likely to face hardship from brief periods of elevated temperature but from extended intervals of increased temperature. The maximum MWAT for 2000 from any sampling station near the NTMP area were 60.1°F, well within the acceptable range. The thresholds of 62°F and 64°F as shown on the above table and the MWAT

graphs were established by the Environmental Protection Agency. It should be noted that these thresholds were determined in a laboratory setting and are somewhat arbitrary.

Canopy retention standards in the WLPZ will minimize the effects of timber harvesting on stream temperatures. Timber harvesting in the WLPZ will focus on thinning out clumps of trees and retaining those trees providing the most shade for the water system. Per the current canopy cover assessed within the inner and outer bands of the Class I WLPZ, shown in Section III under Item 26, no harvesting is proposed within the inner band (first 75 feet) of the Class I WLPZ. Very limited harvesting is proposed within the outer band (second 75 feet) of the Class I WLPZ.

### **Water Quality**

There are no Clean Water Act 303(d) designated reaches within the Watershed Assessment Area. Scotts Creek is one of the healthiest riparian systems in the county and levels of chemical contamination are likely quite low. Industry is absent from the majority of the Little Creek and Big Creek watersheds. The areas surrounding the NTMP are primarily rural properties, farms, and commercial timberland. Lockheed Martin facilities are located at the top of Ben Lomond Mountain, approximately 4.1 miles from the NTMP area. Agricultural operations in the downstream reaches of Scotts Creek are organically grown row crops. Big Creek and other timber companies operating within the watershed do not use chemical fertilizers or pesticides in forestry operations.

### **Habitat Condition**

Describe the pre-project condition of the following habitat components within the biological assessment area and in the immediate vicinity outside the assessment area. Rate each: 0-none, 1-well below average, 2-below average, 3-average, 4-above average, 5-well above average. Consider "average" to be the typical forest in the Santa Cruz Mountains.

Habitat Components	Pre-Project		Post-Project
	On-site	Off-site	On-site
Snags	2	3	3
Nest Trees	3	3	3
Down Woody Debris	3	3	4
Multistoried Canopy	2	3	3
Road Density	3	3	3
Hardwoods	3	3	3
Late Seral Stage	0	0	0
Continuity Late Seral Stage	0	0	0

**Snags/Nest Trees:** Snag density varies in the project area. In the NTMP area where second growth redwood is the dominant tree type, snag density is low and averages approximately one snag per acre. This low snag density is typical of second growth redwood forests that were originally clear-cut. On the ridges, snag density increases where Douglas-fir and knobcone pine become more prevalent. Based on RPF observation, snag density is higher in these portions of the project area, primarily comprised of larger Douglas-fir. Planted Monterey pine stands on

Swanton Pacific Ranch are experiencing some mortality from pitch canker and have a slightly higher snag density.

Snags shall not be harvested as part of this NTMP, unless they pose a safety hazard as described in Section II under Items 14 and 33. Snag density will increase over time by proactively retaining suitable recruitment trees, including but not limited to, large stand alone Douglas-fir trees with a “woffy” branching structure, Douglas-fir trees significantly infected with *fomes pini*, Douglas-fir and redwood trees with visible top die-back, redwoods with “goose pen” boles from fire having a high defect rate, and granary trees. Snag density is anticipated to increase over time as a result of NTMP operations due to the proactive snag recruitment guidelines outlined in Section II under Item 14.

**Down Large Woody Debris:** There is a moderate amount of downed, large woody debris in the NTMP area. The material that is present shall be retained, particularly in the General Smith Sub-unit. No burning or site preparation is proposed that would remove or damage the material present. A majority of the cull material and chunks created by the operations will be left in the woods. This will lead to an increase in the large woody debris component on the site.

**Multistoried Canopy:** This habitat feature varies throughout the project area. The majority of the watershed was clearcut between 1908 and 1922. Portions of the harvest area were last logged in 1955 when primarily Douglas-fir was removed and sold to the box factory in Santa Cruz. Much of the stand, particularly in redwood dominated areas, is stocked with a single canopy layer approximately 125 feet above the ground level. The North and South Forks of Little Creek, in the assessment area, were selectively logged in 1989, 1993 and 1994 and are already closer to a two canopy levels than most of the harvest area, as uneven-age management progresses. Furthermore, along Little Creek, alders, maples and other riparian vegetation create a multistoried canopy with redwoods. The project will increase the multistoried component of the forest by creating a new age class.

**Road Density:** The road density in the assessment area is average compared to other forestland in the general vicinity of the harvest area. Several roads adjacent to the harvest area are located near the bottom of drainages because of historic logging methods. Road density is higher in the lowlands of the watershed where residential development occurs. Road density decreases trails in the upper reaches of the watershed although there are many trails. No new road will be constructed as part of the proposed NTMP.

**Hardwoods:** Hardwood cover in the project area is typical of coniferous forests in the Santa Cruz mountains and throughout the watershed. Hardwood harvesting will not be a major component of this harvest operation. Hardwoods will only be removed when they are damaged during falling or skidding operations or for regeneration and rehabilitation of conifers per 913.8(b). Hardwood cover in the project area will be similar following the project.

**Late Seral Stage:** Please refer to Section III, Item 34 for a discussion of Late Succession Forest Stands and Section II, Item 14 for protection measures for late seral stage trees within the NTMP area. Also refer to the Botanical Conservation Map at the end of Section II for the locations of areas that contain late seral trees.

## **Significant Wildlife Areas**

**Are there any of the following significant wildlife areas located within the biological assessment areas or in the immediate vicinity outside the assessment area?**

	On-site	Off-site
Deer Fawning Areas	Yes	Yes
Deer Migrating Corridors	Yes	Yes
Deer Winter Range	Yes	Yes
Deer Summer Range	Yes	Yes
Wetlands	Yes	Yes
Riparian Areas	Yes	Yes

**Will the project significantly affect the use of those areas by wildlife?**

The deer habitat will not be negatively impacted by the proposed project. Deer forage will likely improve as a result of the openings created by the harvests, resident deer are fond of new tanoak sprouts.

Wetlands and riparian habitat will not be negatively impacted by the proposed project. Upper and lower Staub pond and the in-stream stock pond on Winters Creek are perennial wet areas that may be used as breeding grounds for California red-legged frogs. The harvest operation will not negatively impact these sites. See Section II, Item 32 and Section III, Item 32 for more information on this subject.

## **Other Projects**

Identify and discuss the effects of the following projects within the biological assessment area that might interact with the effects of the proposed project.

**Past and future projects in the biological assessment area under the control of the timber owner or timberland owner that did or could cause a significant impact on biological resources.**

Periodic selective harvesting under the control of the timber owner is planned and carried out with attention to protection of critical biological resources. Future timber harvests, including the potential tractor/cable operation planned for the North Fork of Little Creek in approximately 2008, will be regulated by the California Department of Forestry and will not have a significant impact on biological resources.

**Past and future projects planned or expected within the biological assessment area not under the control of the timber owner or timberland owner that did or could cause a significant impact to biological resources.**

There can be no doubt that the clear-cut and burn harvests between 1908 and 1922 bore significant effects to the biological resources within the assessment area. Current timberland



owners within the assessment area will likely continue to manage their timber resource. The biological impacts of these projects are expected to be similar to those anticipated for the Lower Little Creek project – that is, none are expected to be significant to biological resources based on the silviculture proposed, the logging system propose, and the mitigations to be implemented.

Past and future residential development has surely affected biological resources in terms of loss of range, habitat, water, and nutrient sources in addition to fragmentation of habitat, predation by and of domestic pets and the risk of human-caused wildfire. Based on population trends in California, residential development will likely increase over time. The rate of growth in the assessment area will likely be relatively low due to the large parcel size and zoning. Livestock grazing and agriculture in the assessment area also alter the landscape and potentially have an impact on biological resources. Road construction and culvert installation alter natural drainage patterns and therefore impact the beneficial uses of water and habitat for aquatic biological resources. Grazing and agriculture are expected to continue in the watershed at a similar scale to what is practiced now. Road construction is expected to increase, commensurate with increased residential development.

### **Interactions**

In consideration of the biological resources inventoried and their interactions as defined above, is the potential high, medium, or low for developing significant cumulative effects to the biological resources within the assessment area as a result of:

**The proposed project combined with the future effects of past projects without the impacts of future projects?**

Low

**The proposed project combined with the effects of past projects and the expected impacts from future projects listed in Part D?**

Low

### **Impacts Evaluation**

Based upon the information presented and all other available resources, is the proposed project likely to produce significant adverse cumulative effects to the biological resources within the biological resources assessment area?

No, the proposed project will not produce significant adverse cumulative effects to the biological resources within the assessment area. The mitigations identified in Section II of this NTMP in combination with the proposed silvicultural and yarding methods will serve to protect all biological resources within the assessment area. In fact, the harvest will improve the habitat available for plants and animals alike by creating increased growing space and available forage following operations.

Will the proposed project, as presented, have a reasonable potential to cause or add to significant cumulative impacts to biological resources within the biological resources assessment area?

Yes (after mitigation)	<input type="checkbox"/>
No (after mitigation)	<input checked="" type="checkbox"/>
No (no reasonable potential significant effects)	<input type="checkbox"/>

## **VI. CUMULATIVE RECREATION IMPACTS ASSESSMENT**

### **Recreational Impacts Assessment Area**

The Recreational Assessment Area is the harvest area, including the area within 200 feet of the project boundaries, and the haul route. This Assessment Area is designated for the purposes of evaluating potential impacts from implementation of this NTMP and represents the extent to which potential cumulative recreational impacts could be realized as a result of proposed operations. The assessment area extends 200 feet past the harvest boundary to include areas within close visual range of the operation. The haul route is also included in the Recreational Assessment Area due to a moderate presence of log trucks on rural Swanton Road and Highway 1 during the short duration operations that will occur periodically, every five to ten years.

### **Recreational Resources Inventory**

**Identify the recreational activities involving significant numbers of people within the recreational assessment area.**

Cal Poly, Swanton Pacific Ranch issues an extremely limited amount of day permits to the general public for hiking and horseback riding on the property. A network of trails is also used by local community members for horseback riding and outdoor recreation. An annual ride and tie horse race takes place every year on the extensive trail network in the Swanton Valley. Most of the surrounding land is private and closed to the public, or open for recreational opportunities by permit of the landowner only.

The facilities, including the Swanton Pacific Railroad Station are available to the public for scheduled events. The Cal Poly Conclave team has a competition grounds on the property, which they also use to train for the event. Field trips and demonstrations conducted by professors and researchers utilize the property as an outdoor classroom.

Swanton Road, designated as a scenic road in the Santa Cruz County General Plan, is a popular route for bicycle riders, especially on the weekends.

**Identify any recreational Special Treatment Areas as defined by the Board of Forestry rules within the recreational assessment area.**

There are no known Recreational Special Treatment Areas within the Recreational Assessment Area.

## **Change in Recreational Resources**

Discuss whether the project will significantly alter the recreational opportunities within the Recreational Assessment Area.

The project will not significantly alter the recreational opportunities within the Recreational Assessment Area. Trails will be unavailable for use during harvesting operations, but will remain scenic places to hike or ride horses after harvesting is complete. Specific mitigation provides for horse-friendly skid trail erosion control practices.

For demonstration purposes, the proposed operation will perpetuate the management of Cal Poly's school forest, making it a more useful place to showcase active management practices.

Log hauling shall not significantly interfere with those utilizing Swanton Road or Highway 1 for recreational activities, such as bicycle riding. Conscientious driving on the part of log truck drivers, hauling from the project area, will minimize the risk of interference. Log hauling shall not occur on weekends or nationally designated holiday (except Columbus Day), when recreational activities are most likely to occur.

## **Other Projects**

Identify and discuss other projects within the recreational assessment area that might interact with the effects of the proposed project.

**Any past or future projects within the recreational assessment area that are under the control of the timber owner or timberland owner that will impact recreational opportunities identified above.**

The timberland owner is in the process of applying for a development permit that would allow expansion of the education and meeting facilities at the Ranch. Should this project be approved, more student and public participation can be expected at intervals when classes or workshops are being held at the facilities. The opportunities provided by an enhanced education center would increase recreational and educational prospects in-kind with current uses.

**Any known future projects planned or expected in the recreational assessment area that are not under control of the timber owner or timberland owner that will impact recreational opportunities identified above.**

No known past or future projects of other landowners in the assessment area are anticipated to impact recreational opportunities.

## **Impacts Evaluation**

Will the proposed project as presented have a reasonable potential to cause or add to significant cumulative impacts to recreational resources?

Yes (after mitigation)	[ ]
No (after mitigation)	[X]
No (no reasonable potential significant effects)	[ ]

## VII. CUMULATIVE VISUAL IMPACTS ASSESSMENT

### Visual Impacts Assessment Area

The visual impacts assessment area is that portion of the proposed project area readily visible to significant numbers of people who are no further than three miles away from the project area (14 CCR 912.9). Outside of this distance the selective harvest method will not be discernable to people viewing the project area.

The NTMP area is located upslope from Swanton Road and spans several drainages and the broad ridges in between. Apart from the segment adjacent to Swanton Road, the majority of this area is on side slopes and is generally not visible except from a few residential homes in the Scotts Creek valley-bottom, and surrounding hillsides. Single-family residences are located on the ridge south of Big Creek and on the ridge south of Archibald Creek. From a distance, the southern portion of the NTMP area is partially visible from Highway 1 on the rise south of the Scotts Creek bridge. North of the bridge, however, the crest of rangeland between Highway 1 and the project area obscures views of the project area from Highway 1. Also from a distance, from Swanton Road overlooking the Scotts Creek estuary, the southern portion of the NTMP area is partially visible. In addition to views from the road, visitors to the Ranch that travel into the forest will have the opportunity to see the timber harvest operation up close.

### Visual Resources Inventory

**Identify any Special Treatment Areas designated by the Board of Forestry for their visual value within the visual assessment area.**

The Molino Creek Coastal Commission Special Treatment Area (CCSTA) spans 235 acres of the Satellite Stands Unit, as shown on the Operations Maps at the end of Section II. This CCSTA was established to protect the visual character of the wooded groves, situated in finger-like gulches from the relatively flat agricultural lands eastward to the first coastal ridge, for the continued enjoyment of highway travelers and beach users (see the Molino Creek CCSTA description in Section V). Proposed NTMP operations are in-keeping with the goals of the CCSTA, and need not be modified significantly to maintain and protect the scenic resources within the CCSTA. Measures to ensure maintenance of visual aesthetics such as RPF designation of skid trails and marking to retain wildlife habitat features are described throughout Section II. Alternatives to the standard CCSTA rules, 14 CCR 921.1-921.8, are proposed which will achieve protection at least equal to the rules and in harmony with the goals of Section 921. A photo showing the landscape of the CCSTA, along with explanation and justification for the proposed alternatives to 14 CCR 921 are included in Section III under Item 14.

Swanton Road is designated as a Scenic Road in the Santa Cruz County General Plan from Highway 1 at Davenport Landing to Highway 1 at Greyhound Rock, the entire length. As stated

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above, a segment of the harvest area is adjacent to Swanton Road, south of the Little Creek crossing for approximately 1,800 feet. For this stretch, a 100 foot wide Special Management Area (SMA) has been designated by the RPF. Within the SMA, harvesting shall occur according to the selection silviculture proposed in the standard regeneration method, 14 CCR 913.8(a) and 926.25. Maintenance of the quality of the view from Swanton Road shall be a primary consideration in timber marking and harvest operations within the SMA.

**Describe how far the proposed project is from the nearest point that significant numbers of people can view the project.**

Highway 1 is approximately 1 mile southwest of the harvest area at the closest point it is visible, the Scotts Creek bridge. Swanton Road is adjacent to the harvest area for approximately 0.3 miles. A remote glimpse of the harvest area may be had from the Scotts Creek bridge and the bend in Swanton Road overlooking the Scotts Creek estuary. The aesthetic appeal of Swanton Road and Highway 1 will not be degraded whatsoever by the proposed operation. The NTMP does not propose any road or skid trail construction in areas which are sensitive to visual impacts. The selection silviculture method and hazard reduction mitigations will retain the forested landscape throughout the Special Treatment Area and Special Management Area. The Swanton Road corridor, designated as a Special Management Area, shall be provided special consideration during timber marking and operations to ensure that the forest aesthetic from close-range is maintained. Refer to language above and in Section II, Item 14. The remainder of the CCSTA shall also be managed to maintain the integrity of the visual aesthetic by nature of light-touch selective harvesting. This type of harvesting, as practiced routinely in Santa Cruz County, is so selective it cannot be discerned from a distance. A major portion of the harvest area in the Satellite Stands Unit, including the stretch nearest to Swanton Road, was recently harvested under the Lower Little Creek THP #1-04-053. No negative visual impacts resulted from that operation

**Identify the manner in which the public identified in Parts A and B will view the proposed project.**

The public may view a small portion of the harvest area from afar while driving on Highway 1 or Swanton Road. The public may view an even smaller portion of the harvest area from close proximity while driving or bike riding on Swanton Road. In addition, a few people will view the project area from scattered residential homes on nearby slopes, or when studying or recreating on Swanton Pacific Ranch.

**Change in Visual Resources**

Discuss the probability of the project changing the visual setting viewed by the public as a result of vegetation removal, creation of slash and debris or soil exposure.

The proposed project is a low-impact selective timber harvest. From a distance, the timber harvest operation and resulting forest stands will not change perceptibly. From Swanton Road, the very lowest portion of the harvest area will be visible but the change in forest structure will not be dramatic, perhaps more sunlight will filter through the trees. Motorists or bicyclists may

be able to see stumps or tractor-crushed slash on skid trails within the project area. The hazard reduction guidelines will result in negligible slash remaining within 100 feet of Swanton Road. Slash within 50 feet of the road shall be removed if it is between 1 and 8 inches in diameter. Slash within 100 feet of the road shall be removed, burned, chipped, or lopped to within 12 inches above the ground not later than April 1 of the year following its creation. The visual setting afforded to neighbors will not change significantly. There may be more of a view from some residences, if trees that obstruct the view are removed.

### **Other Projects**

Identify and discuss other projects in the visual assessment area that might interact with the effects of the proposed project.

**Any past and future projects in the visual assessment area that are under the control of the timber owner or the timberland owner that could interact to cause a significant change in any identified visual resource.**

Future harvests would render the same change in appearance identified above.

**Known future projects in the visual assessment area that are not under the control of timber owner or timberland owner that could interact with any identified visual resource.**

No known future projects.

### **Impacts Evaluation**

Will the proposed project have a reasonable potential to cause or add to significant cumulative impacts to visual resources?

Yes (after mitigation)	<input type="checkbox"/>
No (after mitigation)	<input checked="" type="checkbox"/>
No (no reasonable potential significant effects)	<input type="checkbox"/>

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## VIII. CUMULATIVE TRAFFIC IMPACTS ASSESSMENT

### Traffic Impacts Assessment Area

The Traffic Impacts Assessment Area includes the entire length of the designated haul route from the private ingress points onto Swanton Road to the sawmill on Highway 1. This Assessment Area includes the sum of all public roads that will be used by log trucks over the course of this operation. A haul route map is included at the end of Section II.

#### **Identify any public roads to be used for transporting logs.**

Access to the NTMP area is from several private roads adjoining Swanton Road. The turnoff for the northern portion of the harvest area is located approximately one-half mile north of the CDF Big Creek Fire Station, adjacent to the Swanton Road crossing of Little Creek. This road is rocked intermittently up to the confluence of the North and South Forks of Little Creek. Another short spur road to landing L8 is located six hundred feet south of the Little Creek Road. The road from Swanton Road past the spur to landing L6, continuing on to the conclave site (landing L7) is not ideal for log hauling in its current condition, although it was used successfully in 2004. The primary access to the South Fork Unit is on a road approximately one-quarter mile south of the CDF Big Creek Fire Station, at the Swanton Road crossing of Archibald Creek. This road is rocked past the crossing of Archibald Creek. Trucks will leave the project area from one of these four roads and travel south on Swanton Road for 2 to 3 miles. Once at Highway 1, trucks will turn left on Highway 1 and go for approximately 1 mile, then left onto Cement Plant Road and exit Cement Plant Road at the 700 Highway 1 CEMEX Cement Plant driveway, where visibility is clear and trucks turn often. Truck traffic will then travel north on Highway 1 toward the Big Creek sawmill.

#### **Identify any public roads that have not been used recently for the transport of logs.**

Highway 1 within the haul route is used annually for the transport of logs. Swanton road is used every three to four years for the transport of logs.

**Identify any public roads to be used to transport logs that have existing traffic or maintenance problems.**

Swanton Road is built on weak base and has an undulating surface in some areas. This is due to the high water table along the agricultural fields, which are just above the floodplain of Scotts Creek. The county does not adequately maintain the inside ditch along Swanton Road and the water table is near the surface. Several culverts under Swanton Road have overflowed in recent years as well. The water washing over the road surface has caused cracking and pitting in the pavement surface, which has been temporarily repaired with hot-patch. The rest of the haul route, including Highway 1 and Cement Plant Road are in good condition. Highway 1 was repaved recently and has good visibility at all ingress and egress points.

**Activity Levels**

Discuss how the log trucks used on the project will change the amount of traffic on public roads, especially during heavy traffic conditions.

The approximate number of log trucks loads to be removed from the project area per day will vary, but is estimated to be between 4-15 loads per day on average each weekday while operations are on-going. Short periods of hauling in excess of 15 loads per day could occur on occasion, when deemed necessary by the RPF, in which case loads will be staggered as much as possible.

Operations are anticipated to last for 6 to 8 weeks every 5 to 10 years, depending on the scale of the scheduled harvest and the capabilities of the LTO. Log truck staging areas shall be located within the Ranch boundaries.

The haul route is not subject to heavy traffic. Large trucks, including log trucks and cement trucks often travel the Highway portion of the route. Motorists on Swanton Road have experienced intermittent log truck traffic in the past and have not suffered. Log trucks will be no more than a minor inconvenience to motorists, at most slowing only the fastest traffic.

Swanton Road is a popular route for cyclists. On weekends and holidays, there can be quite a few cyclists enjoying a scenic tour of Swanton Road. There will be no log hauling on the weekends and holidays, except Columbus Day.

**Other Projects**

Identify and discuss other projects in the traffic assessment area that might interact with the effects of the proposed project.



**Other past or future projects on lands under the control of the timber owner or timberland owner that will add significantly to traffic on public roads during the period the roads are used by log trucks from the proposed project.**

The timberland owner is in the process of applying for a development permit that would allow expansion of the education and meeting facilities at the Ranch. Should this project be approved, the traffic on Swanton Road can be expected to increase at intervals when classes or workshops are being held at the facilities.

**Any known future projects not under the control of the timber owner or timberland owner that will impact public road traffic during the period that the roads are being used by log trucks from the proposed project.**

It is anticipated that other harvest operations will be using portions of the haul route designated for this NTMP, as other proactive timberland managers reside in this valley. Use of Highway 1 is a normal occurrence in any given harvest season by most log truck traffic delivering to Big Creek's Mill. To date, use of neither Swanton Road nor Highway 1 has not resulted in quantifiable negative impacts upon roads or commuters.

### **Impacts Evaluation**

Will the proposed project as presented have a reasonable potential to cause or add to significant cumulative impacts to traffic on public roads?

The number of log trucks and duration of hauling anticipated from operations associated with this NTMP is not expected to have a potential to cause or add to significant cumulative impacts to traffic on public roads. The log truck traffic generated by the proposed operation is insignificant as it will occur during short intervals only every few years.

Yes (after mitigation)	<input type="checkbox"/>
No (after mitigation)	<input checked="" type="checkbox"/>
No (no reasonable potential significant effects)	<input type="checkbox"/>

## **IX. CUMULATIVE NOISE IMPACTS ASSESSMENT**

### **Noise Impacts Assessment Area**

The Noise Impacts Assessment Area shall include the area with 3000 feet of the NTMP harvest boundary, slightly over ½ mile. This area shall be assessed for the potential significant impacts from occasional use of chainsaws and heavy equipment, and infrequent helicopter operations.

**Identify neighbors and the public interface in the assessment area.**

Notices were sent to all landowners within 3000 feet of the NTMP area. Many of the parcels on that list do not have residences as they are owned by local land managers including Coast Dairies & Land Co., MPK Frams, CEMEX, and Big Creek Timber Company. The residences within the

assessment area are scattered. Approximately 11 inhabited structures are located within 500 feet of the harvest boundary. Of those, approximately 6 are occupied by employees or part-time visitors to Swanton Pacific Ranch. Approximately 4 more structures within 500 feet of the harvest boundary are kept as second residences, visited periodically by the owners. Approximately 14 more inhabited structures are located within 3000 feet of the harvest boundary. A portion of Swanton Road is also located within the assessment area.

### **Activity Levels**

#### **Discuss how operations will change the amount of noise in the assessment area.**

Noise levels in the assessment area will be elevated for the short duration of the harvest. For ground-based or cable operations, the operation of chainsaws and all other power equipment is anticipated to be significantly audible within 500 feet of the activity center. Operations will occur in phases, commencing with falling operations, accompanied by the noise of chainsaws. Next, yarding equipment will move through each area of the harvest, yarding logs, followed by installation of erosion controls and clean-up, including slash packing skid trail. Later in the year, logging with chainsaws will commence and move through the harvest area.

Helicopter operations are anticipated to be significantly audible within 3000 feet of the flight path. Helicopter yarding is proposed for a maximum of approximately 2-3 weeks every 15-20 years. The majority of the area designated for helicopter operations also has an alternate yarding method. Where feasible, helicopter operations will be avoided due to the increased costs to yard by helicopter. However, where helicopter operations are the best solution for access and environmental protection, this method will be utilized and likely when a reputable helicopter yarding operator is already contracted in the local area.

The three most likely models of helicopter to be used for helicopter operations on Swanton Pacific Ranch include the Boeing Vertol BV-234 Chinook, the Boeing Vertol BV-107 and the Sikorski S-54/64 Sky Crane. For these three models, the maximum load lifting capacity ratings are 28,000 pounds, 12,500 pounds, and 25,000 pounds respectively.

A study conducted by the Boeing Vertol Company (dated 3/27/81) assessed the external noise levels generated by helicopters such as those used in logging operations. The report from the study indicates that the noise signature from 800 meters away (~ ½ mile) from the source is “equivalent to that encountered on a street.” The study assessed noise levels generated by the model of aircraft preferred to perform the operations proposed in this NTMP, due to its lifting capacity, the Boeing Model 234 Commercial Chinook helicopter. The model 234 Chinook has the greatest lifting capacity when compared to most other helicopters used for logging. This assessment measured noise levels in decibels during several different maneuvers from a variety of distances and altitudes. The noise levels generated from the Model 234 with a sling load complies with the helicopter noise standards of the International Civil Aviation Organization (ICAO). The following table displays quantitative noise levels that are similar to those that may occur during operations of this NTMP should the helicopter yarding option be implemented. Also displayed are quantitative noise levels generated by typical diesel truck travel and passenger cars, for comparison.

Sideline Distance from Source of Noise	External Noise Levels in decibels (dBA)			
	Diesel Trucks	Passenger Cars (50 MPH)	Boeing 234 Helicopter Hover (10-100 Meter Altitude)	Boeing 234 Helicopter Flyover (10-100 Meter Altitude)
Audible Range 1 (50 meters)	78-98	64-82	--	--
Audible Range 2 (200 meters)	--	--	78-92	78-85
Audible Range 3 (400 meters)	--	--	68-78	74-84
Audible Range 4 (800 meters)	--	--	55-72	68-74

Significant numbers of people will not be within the distance of helicopter operations where significant noise impacts are anticipated. As depicted above, the noise impacts associated with helicopters at 800 meters (½ mile) away are roughly equivalent to the passing sounds on a street. Helicopter noise is loudest when the aircraft is passing directly overhead, however the helicopter will not leave the Ranch boundaries while conducting yarding activities, therefore the potential for significant noise impacts on neighbors is reduced. Within the Swanton area, north of NTMP approximately 2.5 miles, a tractor, cable, and helicopter logging operation occurred in 2003 on lands owned by Big Creek Timber Company. The duration of helicopter operations was slightly longer than is anticipated in conjunction with this NTMP, due to a comparison of the volume removed. No significant noise impacts resulted from that helicopter yarding operation and good neighbor relations were maintained. Likewise, no significant noise impacts are anticipated from proposed NTMP and mitigation measures are proposed to minimize local disruption.

Minor disruptions may be experienced by local wildlife populations, although the disruption of helicopters would be of much shorter duration than conventional logging systems due to the relative speed of operations. Restrictions on helicopter operations are described in Section II under Items 16 and 38. The helicopter flight path shall take into account spatial or temporal flight restrictions due to wildlife considerations. The helicopter shall stay outside the minimum restricted distance for any species of concern, as identified in 14 CCR 919.3(e).

Mitigation measures to minimize the noise impacts of the proposed NTMP are laid out in Section II under Item 38, Hours of Operation. Within 300 feet of any occupied dwelling, other than those owned by Cal Poly Corporation, the operation of chain saws and other power equipment, except licensed highway vehicles, shall be restricted to the hours between 8:00 a.m. and 6:00 p.m., and shall be prohibited on Saturdays, Sundays and nationally designated legal holidays. More than 300 feet from any occupied legal dwelling, the operation of chain saws and other power-driven equipment shall be restricted to the hours between 7:00 a.m. and 7:00 p.m., and shall be prohibited on Sundays and nationally designated legal holidays, except Columbus Day. Due to the rural surroundings of the NTMP area, operation of chain saws and other power-driven equipment, excluding log hauling, may proceed on Saturdays, so long as there are no neighbor complaints. Previous harvest operations on the Ranch have included Saturday operations while maintaining good neighborly relations. If one complaint is received by an adjacent landowner,

contact will be made with the landowner to see if the location of harvest operations can be changed to mitigate their concerns. If an agreement cannot be reached with the landowner, then harvest operations on Saturdays will cease for the duration of the operation.

Helicopter yarding shall be restricted to the hours between 7:00 a.m. and 6:00 p.m. and shall be prohibited on Saturdays, Sundays, and nationally designated legal holidays, except Columbus Day. Helicopter flight operations are expected to last up to three weeks total, weather permitting. The flight paths for helicopter yarding are contained within the project area parcels. Prior to future helicopter operations, the neighbors on the noticing list shall be re-noticed to keep them apprised of upcoming planned helicopter operations.

### **Other Projects**

**Identify and discuss other projects in the noise assessment area that might interact with the effects of the proposed project.**

The background noise level in the assessment area is generally low. Neighbors may use chainsaws or other power equipment to work on their property periodically. Traffic on Swanton Road or gatherings at the Swanton Pacific Railroad facilities may periodically increase the ambient noise level in the area. CDF helicopter fly-overs may occasionally occur throughout the fire season to survey for smoke or during a response to a fire. Neighbors who own commercial timberland may elect to harvest and yard with ground-based equipment or even helicopters on occasion.

The proposed project will not significantly add to noise impacts in the Assessment Area. Operations will be somewhat infrequent, occurring somewhere on the Ranch approximately every 5 years on average, with helicopter operation even more rare, planned for once every 15-20 years. The topography lends itself to shielding many neighbors from potential noise impacts. The proposed plan, utilizing selection silviculture, will perpetuate the presence of tall trees, which aid in absorbing potential noise impacts. The majority of the harvest area is in the Little Creek drainage, where no inhabited structures other than the landowner's are located. Mitigation measures will further reduce the noise impacts by limiting work hours. The duration of operations will naturally be curtailed as much as possible due to the desire for efficiency on the part of the RPF and landowner. These measures, along with the mostly favorable disposition of neighbors and the low density of houses in the assessment area lead to the conclusion that no reasonable potential to cause or add to significant cumulative impacts to noise levels in the assessment area exists.

### **Impacts Evaluation**

Will the proposed project as presented have a reasonable potential to cause or add to significant cumulative impacts to noise levels in the assessment area?

Yes (after mitigation)	<input type="checkbox"/>
No (after mitigation)	<input checked="" type="checkbox"/>
No (no reasonable potential significant effects)	<input type="checkbox"/>

## **X. CUMULATIVE AIR QUALITY IMPACTS ASSESSMENT**

### **Air Quality Impacts Assessment Area**

The Air Quality Impacts Assessment Area includes the proposed project area, which is the area where air quality impacts from planned operations have the potential to occur.

### **Activity Levels**

Few aspects of the proposed operation have the potential to negatively impact air quality within the Assessment Area. Generation of dust is one potential impact; however, measures in Section II under Item 18 are designed to minimize conditions that would lead to dust. Per Item 18, haul roads will be watered to maintain them in a reasonably dust-free condition during use. Dust created in the movement of tractors quickly dissipates within the forest.

### **Other Projects**

No other projects are anticipated within the Assessment Area that have the potential to cumulatively impact air quality.

### **Impacts Evaluation**

Will the proposed project as presented have a reasonable potential to cause or add to significant cumulative impacts to air quality in the assessment area?

Yes (after mitigation)	<input type="checkbox"/>
No (after mitigation)	<input checked="" type="checkbox"/>
No (no reasonable potential significant effects)	<input type="checkbox"/>

## **XI. CUMULATIVE FIRE HAZARD IMPACTS ASSESSMENT**

### **Fire Hazard Impacts Assessment Area**

The Fire Hazard Impacts Assessment Area includes the extent of Swanton Pacific Ranch. This is the area where the landowner has the prospect of manipulating the vertical and horizontal distribution of vegetation. The proposed NTMP area is the extent to which commercial timber operations can be used to alter vegetation distribution. Throughout the Santa Cruz Mountains, including within the Assessment Area, the California Department of Forestry administers fire suppression services regardless of ownership. The long-term continuous suppression effort has contributed to a buildup of fuels across the landscape over time. Within the context of widespread fire suppression, the Ranch offers an opportunity to study various management techniques, including single-tree selection, as they affect the behavior of an eventual wildfire within the Assessment Area.

## **Activity Levels**

The proposed management under this NTMP will alter the distribution of fuels within the harvest area. Single-tree selection silviculture, as described in Section II under Item 14, has the potential to reduce the vertical and horizontal continuity of fuels, thereby reducing the ladder fuels and the potential for “crowning”. Residual logging slash from operations has the potential to increase surface fuels immediately following operations; however, the hazard posed by slash decreases rapidly as the material drops needles and small branches and starts to decompose. Proposed hazard reduction measures described in Section II under Item 30 will address treatment of surface fuels in proximity to inhabited structures and the county road, likely sources of ignition. Per 14 CCR 917.2 and 917.4, to reduce fire hazards, treatment of slash created by timber operations shall include: Areas within 50 feet of the edge of Swanton Road shall be kept free of slash greater than 1 inch in diameter and less than 8 inches. Slash between 50 feet and 100 feet of the edge of said roads and slash within 200 feet of all permanently located structures currently maintained for human habitation shall be treated by piling and burning, chipping, burying, removal, or lopping to within 12 inches above the ground not later than April 1 of the year following its creation. Distances shall be measured along the surface of the ground. Timber operations shall not cause a violation of PRC 4291, which generally requires defensible space within 100 feet of structures. Concentrations of slash created by the current operation around landings or located within the logging area, excluding those areas substantially covered with logs on the ground, shall be lopped, crushed, chipped, spread, piled and burned, or otherwise treated no later than April 1<sup>st</sup> of the year following creation. Slash created by operations along roads not in the harvest area shall be lopped concurrent with its creation. Per 14 CCR 895.1, slash created by timber operations shall be severed and/or spread so that no portion of it remains more than 30 inches above the ground. Special slash requirements pertaining to Monterey pine, including lopping all branches from the sides and tops of the bole of the tree bole which are three inches or more in diameter, and avoiding piling of slash are described in Section II under Item 32.

## **Other Projects**

Other projects within the Assessment Area that have the potential to impact fire hazard include grazing, mowing, brush removal, and maintenance of access routes. Several vegetation communities on the Ranch are particularly fire-adapted, such as the Northern Maritime Chaparral and Monterey/knobcone pine forest. Per Dr. Grey Hayes recommendations, the Ranch may evaluate the potential for prescribed fire in a future Management Plan, separate from the NTMP.

Fire history work done in the Santa Cruz Mountains within the distribution of coast redwood trees suggests that fires were very frequent prior to the displacement of Native Americans in the mid-1800s. (Stephens and Fry, 2005) The ethnographic literature supports the notion that Native Americans were responsible for the majority of the fires in the coastal forests (Lewis 1973, Boyd 1999)

Many studies revealed that fire occurred at least once per decade, and sometimes several times per decade. Most of these fires are thought to have been “surface fires”, meaning they burned fuels on the ground surface and did not ignite the tree canopies. The forest structure is thought to

have been far more open than the current forest structure. These pre-European forests had a larger component of old growth, with very tall trees and towering tree canopies. There were far fewer trees per acre and the individual tree boles were spaced much further apart. There was less vertical and horizontal continuity of fuels than in modern unmanaged stands. These conditions made it more conducive for redwood and Douglas-fir trees to survive the surface fires.

In contrast, the second growth forests on the Ranch today have vastly different stand conditions. These stands originated from the extensive clearcut of the San Vicente Lumber Company era (1907-1923). The lumber company typically burned the area after falling to facilitate easier log yarding. The second growth forest regenerated after the logging and burning exhibits a dramatic structural change from the old growth redwood that had been present beforehand.

Since multiple trees species in the southern redwood region regenerate by coppice sprout including redwood, tanoak and madrone. After a disturbance such as the expansive clearcut in Little Creek, multiple times more stems per stump regenerated after the harvest. With the increase in the sheer number of stems present, the horizontal and vertical continuity is increased and surface fuels accumulate more rapidly.

Without surface fires or hands-on management, in-growth of young trees, often tolerant of the shade and competition, increase continuity of the canopy (horizontally and vertically), leading to hazardous fuel conditions that are difficult to remedy with prescribed fire until a more open stand structure is achieved.

Natural fires are also suppressed in modern times, so spreading fires occur much less frequently. The last wildfire to burn through the NTMP area was a large conflagration in 1948. The approximate extent of this fire is shown on a map in Section V. The scarcity of low-intensity fires on the landscape causes surface fuels to accumulate and prolific regeneration does not get thinned out. Introducing prescribed fire to the Ranch stands would be an expensive and risky undertaking. Re-introduction of fire would not likely be a sound management decision unless pre-fire fuel treatments were implemented first and significant resources were expended constructing fire lines, monitoring conditions, and enlisting capable crews. This may be undertaken in a future overall Ranch Management plan, but is outside the scope of this NTMP.

There is no hope of acceptably mitigating fire hazard by doing nothing and letting nature take its course. The more time that elapses in these dense forests, during the era of fire suppression, the more fuel accumulates and the worse the fire hazard becomes. The actions proposed in this NTMP are intended to keep the forest healthy and therefore more resistant to devastating wildfires. Harvest operations will entail thinning the overstory trees to decrease continuity of the tree crowns, which decreases the potential for crown fire to spread from tree to tree. NTMP operations will also decrease the continuity of ladder fuels by knocking down hardwoods and brush during operations. The height of these fuels as well as limbs and tops of the harvested trees will be lopped to reduce the height of flammable material.

Lopping the slash and distributing it on bared soil surfaces reduces the potential for erosion subsequent to the harvest operation. The slash is dead fuel material, which inherently contributes to the fire hazard for a few years following the harvest. However, the slash provides valuable nutrient cycling for the soil and having it cut up in pieces and packed close to the ground keeps it moist and hastens decomposition. The harvest helps mitigate the fire hazard by altering the

vegetation arrangement through economical means. While harvesting contributes some slash to the forest floor that would otherwise be in the canopy, it removes hazardous brush from the mid-canopy in the process and condenses it in a moisture-retaining layer on the forest floor.

Marking prescriptions proposed in this NTMP focus on increasing vigorous growth in the forest, while considering the balance of wildlife goals, which seek to maintain structurally complex and often defective trees. The harvest aims to retain the best residual crop trees and maintain and improve biological diversity. Most snags on the property will also be saved. Snags pose a risk to fire hazard, however they are a desired component of a healthy ecosystem. This plan proposes an operation which balances a variety of objectives from different disciplines to responsibly manage the forest. Short term increases in fire hazard may result immediately after operations as the slash dries, however the short-term increase in hazard will subside and the health and vigor of the forest will be improved.

### **Impacts Evaluation**

Will the proposed project as presented have a reasonable potential to cause or add to significant cumulative impacts to fire hazard in the assessment area?

Yes (after mitigation)	<input type="checkbox"/>
No (after mitigation)	<input checked="" type="checkbox"/>
No (no reasonable potential significant effects)	<input type="checkbox"/>

## **XII. CUMULATIVE CHEMICAL IMPACTS ASSESSMENT**

### **Chemical Impacts Assessment Area**

The Chemical Impacts Assessment Area includes the extent of the Calwater watersheds where this NTMP is located, Little Creek and Big Creek. The assessment area encompasses the project area where the application of herbicides may be appropriate to reduce competing vegetation for regeneration or invasive species, as well as the downstream extent of the major watercourses flowing through the project area.

### **Activity Levels**

Judicious herbicide application is proposed as a potential tool to reduce hardwood site occupancy in areas planted with redwood and Douglas-fir seedlings. In addition, judicious herbicide application could be used to reduce the presence of invasive species noted by the California Invasive Plant Council as high priority for removal. In all cases, herbicide application would strictly follow specific recommendations made by a state-licensed Pest Control Advisor in compliance with the County Agricultural Commissioner's regulatory program. In addition, in order for Cal Poly to maintain the FSC certification of their forestlands, rigorous certification standards including justifications for purpose of use, application methods, and chemicals used shall apply.

The most likely target species include tanoak, poison oak, blackberry, ceanothus, periwinkle, French broom, pampas grass, eucalyptus, cape ivy, and forget-me-not.



The herbicides selected for potential application include those registered for use in forestry with demonstrated effectiveness for the intended treatment. Potential herbicides include: Arsenal® or Chopper®, active ingredient Imazapyr; Garlon 3® or Garlon 4®, active ingredient Triclopyr; Roundup®, Honcho®, Mirage® or Rodeo®, active ingredient Glyphosate; or Riverdale LV6 active ingredient 2,4-D. These chemicals are all primarily post-emergent and shall be applied by hand. They shall be used in restoration forestry work to control weeds and brush, especially invasives, and to prepare sites for reforestation as well as conduct timber stand improvement and release conifers from competing vegetation to ensure seedling survival. Specific methods of application could include basal application on cut tanoak stumps; "hack n' squirt" or "frilling" consisting of girdling a tanoak and applying a drop or two of chemical to the cut; or foliar application, spraying specific target species with a back-pack or trailer and a wand. Best management practices (BMPs) such as avoiding application on days with wind or elevated temperatures shall control the application conditions and prevent unintended drift. For protection of aquatic species, only chemicals approved for use near water, such as Rodeo®, may be used in the Watercourse and Lake Protection Zones.

Herbicide use will be prescribed by an Agricultural Pest Control Advisor (PCA) licensed by the state of California, and will be applied by trained and certified applicators according to product label instructions and federal and state regulations governing use. Studies conducted during the registration process by both the federal Environmental Protection Agency and California Department of Pesticide Regulation, and many years of monitoring conducted by various government agencies, have consistently reaffirmed that there are no significant problems associated with accumulation or persistence in soil or water of registered herbicides commonly used in forestry, when applied according to product label instructions and as prescribed by a PCA. For these reasons, the limited herbicide application proposed for in conjunction with this plan should not pose a significant risk of chemical contamination to assessment area watercourses.

### **Other Projects**

Swanton Pacific Ranch has a complex history of landuse, including sporadic herbicide use. Al Smith, the Ranch benefactor, reportedly enjoyed conducting herbicide trials and did so on several occasions with cooperation from the chemical company, Wilbur Ellis. In the 1970's, the Range on the west side of Scotts Creek was treated to control thistles by aerial spraying. Between 1989 and 1992, trials on treatment of thistles, Ceanothus, and poison oak were undertaken, also on the Range, west of the Monterey pine stands, to test the efficacy of Glyphosate applications. During that period, 2,4-D and 2,4-5T with a surfactant were sprayed along roads and the railroad, to keep brush from encroaching. An experimental tanoak application was done in the late eighties to early nineties in the South Fork of Little Creek to test the efficacy of Garlon 3-A (amine form) and Garlon 4, applied using three methods. The herbicide was applied in ¼ - ½ acre areas using one of the three methods: basal application on the bole, basal application on the cut stump, and "frilling", aka girdling the tree and applying 1 syringe-drop of chemical to cut per 1 foot of diameter. This research demonstrated that the latter two methods were effective at thwarting tanoak growth in the short term. The research paper was published in the *Western Journal of Applied Forestry* in 1991 and the *Journal of Weed Science* in 1994.

The extensive cultivated agricultural fields in the low lands of the Chemical Impacts Assessment Area have likely had repeated chemical inputs over the years. The chemical Sevin® was reportedly used extensively in brussel sprout production in the area and Roundup® was likely used to control weeds in the fields as well. The crop fields have all been transitioned from these methods and are now managed with restrained chemical inputs according to California Certified Organic standards.

### **Impacts Evaluation**

Potential chemical contamination from proposed operations in watercourses with the Chemical Impacts Assessment Area could come from one of two sources: 1) accidental release of fuel or oil from heavy equipment or 2) accidental spills from mishandling of herbicides if herbicide application is prescribed to control vegetation competing with planted seedlings or to control invasive species.

The risk of spills entering a watercourse from refueling heavy equipment is mitigated by protection measures specified in Section II under Item 32, which state, "All refueling, maintenance, and staging of equipment and vehicles will occur at least 60 feet from riparian habitat or water bodies in a location where a spill would not drain directly toward aquatic habitat. The LTO will insure that all heavy vehicles and equipment are inspected for fuel leaks, oil leaks, and other fluid leaks before and during their operation, to ensure that aquatic and upland habitats are not contaminated. Prior to the onset of work, the LTO will ensure that a plan is in place for prompt and effective response to accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur."

The risk of chemical contamination from herbicides is limited by the practice of mixing herbicides in authorized mixing tanks with air gap separation devices that prevent backflow. In addition to using the Department of Pesticide Regulation approved mixing equipment, the mixing of herbicides will be done in locations well away from watercourses. The pesticide regulatory program administered by the Department and County Agricultural Commissioners is a certified regulatory program under the California Environmental Quality Act, meaning the requirements of CEQA are satisfied by that environmental review and documentation as it applies to specific proposals for herbicide use. Further, pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), EPA evaluates all herbicides for environmental risks, then registers herbicides for use in compliance with labeling conditions tailored to each herbicide. Since any application undertaken to improve conditions in the NTMP area will follow appropriate laws, labeling, best management practices, and proposals from a PCA familiar with on-site conditions, herbicide application will have no negative impacts within the assessment area.

**Will the proposed project as presented have a reasonable potential to cause or add to significant chemical cumulative impacts in the assessment area?**

Yes (after mitigation)	<input type="checkbox"/>
No (after mitigation)	<input checked="" type="checkbox"/>
No (no reasonable potential significant effects)	<input type="checkbox"/>

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### **XIII. DETERMINATION FOR POTENTIAL OF CUMULATIVE IMPACT**

#### **Introduction:**

The following is a concise summary of the subjects discussed within the context of this assessment. The questions and answers are definitive and intended only to summarize the findings of each specific section of analysis. The answers indicated for each question below account for all mitigations, proposed or required by the forest practice rules.

#### **Will the project adversely affect a threatened or endangered species of animal or plant or the habitat of the species?**

No. Refer to NTMP Section II, Items 14 and 32 and NTMP Section III, Plan Addendum to Item 32 for measures that will mitigate any impacts on threatened or endangered plant or animal species or their habitats.

#### **Will the project interfere significantly with the movement of any resident or migratory fish or wildlife?**

No. Refer to NTMP Section II, Items 18, 23, 26, 27 and 32, and NTMP Section III, Plan Addendum to Item 32 for measures that address maintenance of healthy fish and aquatic habitat, including ease of migration. Additional measures referred to in #1 above, specifically in Section II Item 14, ensure that healthy forest habitat with tree cover and a snag component is maintained throughout the project area. Due to the selective nature of the proposed operation, no migratory routes will be significantly altered.

#### **Will the project significantly diminish habitat for fish, wildlife, or plants?**

No. As stated in #1 and #2 above, habitat for fish, wildlife, and plants shall be maintained as described in multiple portions of the Operations Section of the plan.

#### **Will the project significantly degrade water quality including temperature, chemical composition, pH, and color?**

No. The NTMP proposes limited selection harvesting in the watercourse and lake protection zones such that canopy will not be reduced to a level that would cause significant increases in water temperature. Other water quality objectives including chemical composition, pH, and color will not be compromised by the proposed project. Refer to NTMP Section II, Items 18, 23, 26, 27, and 32 for specific measures to ensure protection of the beneficial uses of water.

#### **Will the project contaminate a domestic water supply?**

No. As stated in #4 above, mitigations are proposed to protect the beneficial uses of water, particularly in the area around domestic water supplies, which shall be treated with Class I protection measures.

**Will the project cause significant flooding, erosion or siltation?**

No. Refer to NTMP Section II, Item 18.

**Will the project have a significant, demonstrable, negative aesthetic effect as viewed from areas of high public use such as roads and parks?**

No. Refer to NTMP Section II, Items 14 and 16 for description of the proposed silviculture, which leaves an intact forest in place and the proposed yarding methods, which minimize disturbance. Much of the project area is not visible to significant numbers of people. A Special Management Zone is proposed adjacent to Swanton Road to ensure that visual impacts are considered during marking and operating in this area.

**Will the project significantly increase the long-term ambient noise levels for the adjoining areas?**

No. Operations associated with this NTMP will be infrequent and for a short duration each time. Long term increases in the ambient noise levels for adjoining areas will result from the proposed project.

**Will the project violate ambient air quality standards?**

No. Haul roads will be watered to maintain them in a reasonably dust-free condition during use. Dust created in the movement of tractors quickly dissipates within the forest.

**Will the project create a potential public health hazard or involve the use of, production or disposal of material, which poses a hazard to human, animal or plant populations in the area?**

No. No impact to public health hazard shall result from this proposed project.

**Will the project disrupt or adversely affect a prehistoric or historic archaeological site or property of historic or cultural significance to a community, ethnic, or social group?**

No. Refer to NTMP Section II, Item 36 and NTMP Section VI.

**Will the project conflict with established recreational, educational, religious or scientific uses of the area?**

No. The implementation of this NTMP will enable continuation of scientific research underway on Swanton Pacific Ranch to elucidate the water quality impacts, if any, of harvest operations conducted per the California Forest Practice Rules in the Southern Subdistrict, as well as other harvest-related research. NTMP operations will also enhance education opportunities on the Ranch associated with responsible forestland management, specifically for classes in the Cal Poly Natural Resource Management Department, including Industry Agency University (IAU)

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based courses. Recreation opportunities will not be diminished by proposed operations, in fact, specific mitigation are proposed in Section II under Items 18 and 22 to maintain access to existing skid trails which are also used as horseback riding trails.

**Will the project disrupt or divide the physical arrangement of an established community?**

No.

**Will the project cause an increase in traffic that is significant in relation to the existing traffic load and capacity of the public road system or as it interferes with the scheduled school bus traffic and commute traffic?**

No. Refer to Section II, Item 38 for specific mitigation measures to minimize the impact of operations on the flow of traffic. Per Item 38, log hauling on public roads shall be prohibited on weekends and nationally designated legal holidays, except Columbus Day, and "Caution Log Truck" signs shall be posted on either side of the haul route entering Swanton Road and at regular intervals along Swanton Road to inform road users of the presence of log trucks.

**Will the project interfere with emergency response or emergency plans?**

No.

**Will the project increase fire hazard significantly?**

No. During the harvest operation there is an increased risk of ignition; however, at the same time, the risk of spread is considerably reduced because people and equipment are on-site and available for fire suppression. Proposed silvicultural treatments in the NTMP area will decrease horizontal and vertical continuity of fuels by reducing the number of trees per acre. Following log removal, surface fuels will be treated further by tractor crushing or lopped with chainsaws to within 30 inches of the mineral soil layer and slash will be additionally lopped or removed altogether in proximity to public roads and houses. These treatments reduce ladder fuels and speed decomposition by increasing ground contact. Proposed operations will not exacerbate the potential wildfire problem in the area as many decades of fire suppression have led to increased fuel loading across the landscape. However, this NTMP is an opportunity to manage fuel levels according to Ranch objectives and Forest Practice Rule standards, while collecting extensive pre and post harvest data on CFI plots, which may later help answer important questions on the effect of the treatment on fire behavior, as contrasted with the lack of management that occurs on many forested acres in the Santa Cruz Mountains.

**Cumulative Impacts Assessment**

In consideration of the Forest Practice Rules for 2007, mitigation measures proposed in this plan, the discussions above, and the field of review and appraisal of similar harvest operations in the Santa Cruz Mountains which demonstrate that timber harvesting, as proposed here, did not cause any significant adverse environmental impact, I have concluded that the proposed operation will not have a significant adverse impact on the environment or watershed, and will in fact have a positive impact in many respects.

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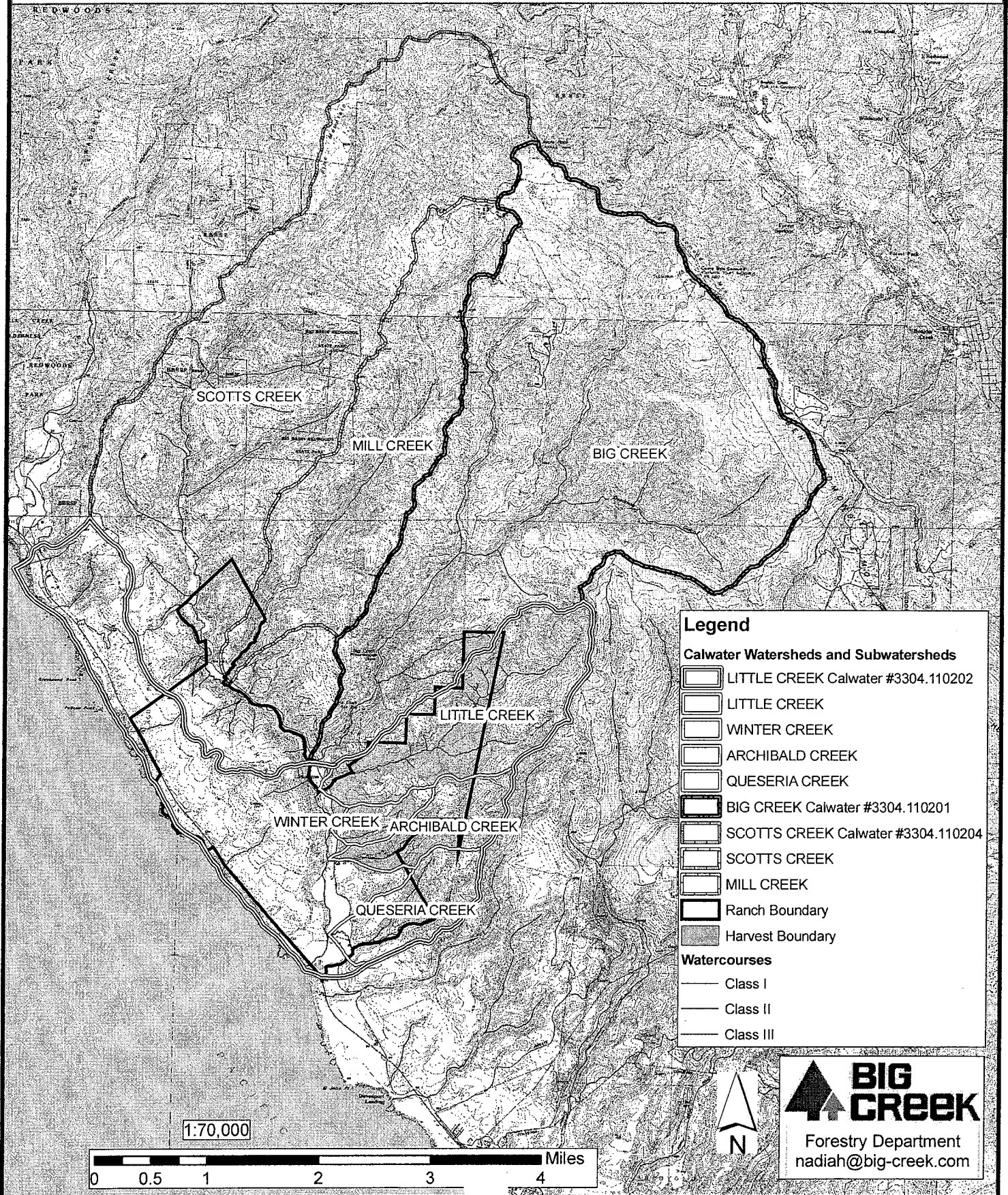
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# Swanton Pacific Ranch NTMP - Watershed Map

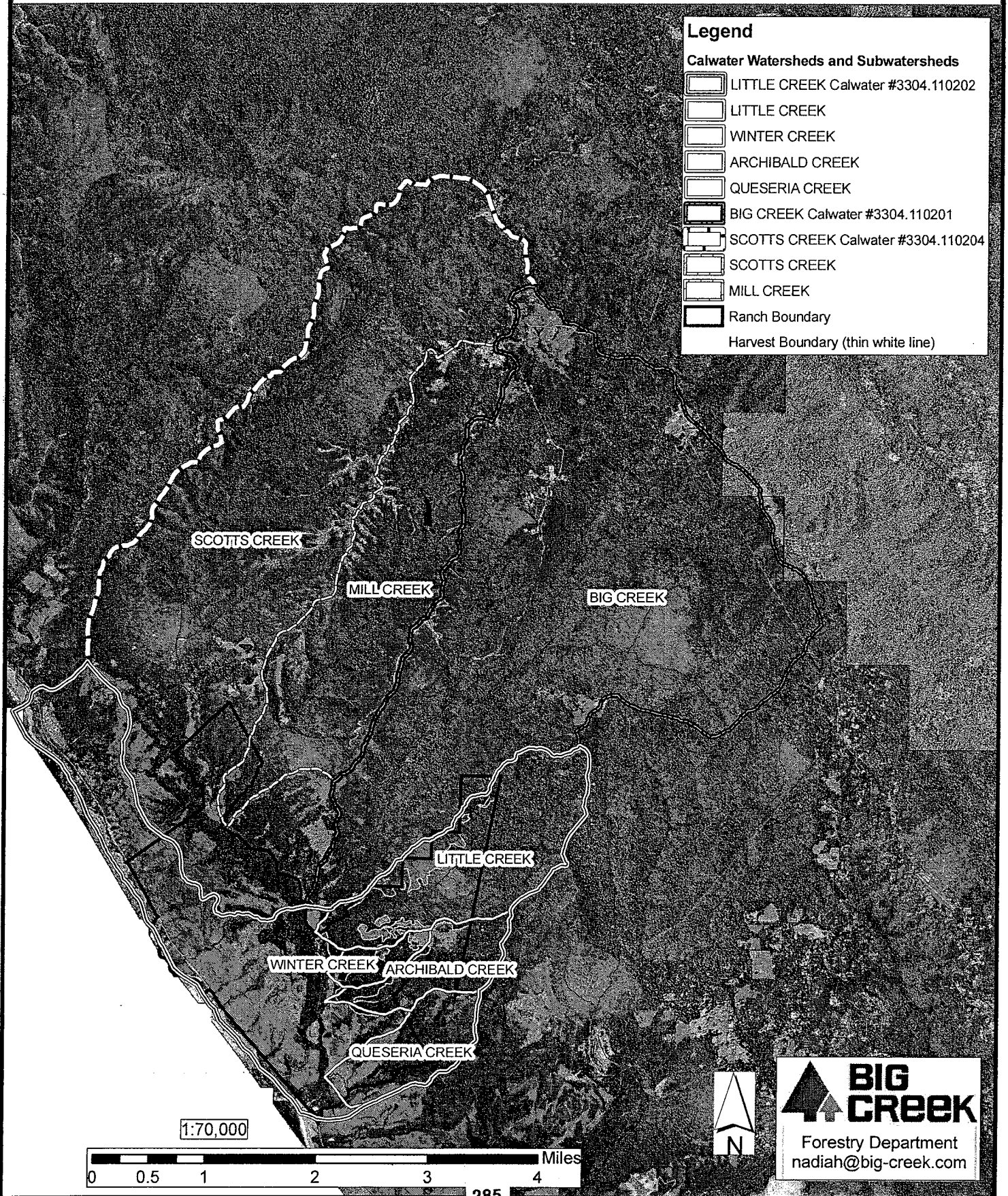
T10S R3W, Portions of Sections 8,9,16,17 and Rancho Agua Puerca y Las Trancas, MDBM  
USGS Davenport 7.5' Quadrangle





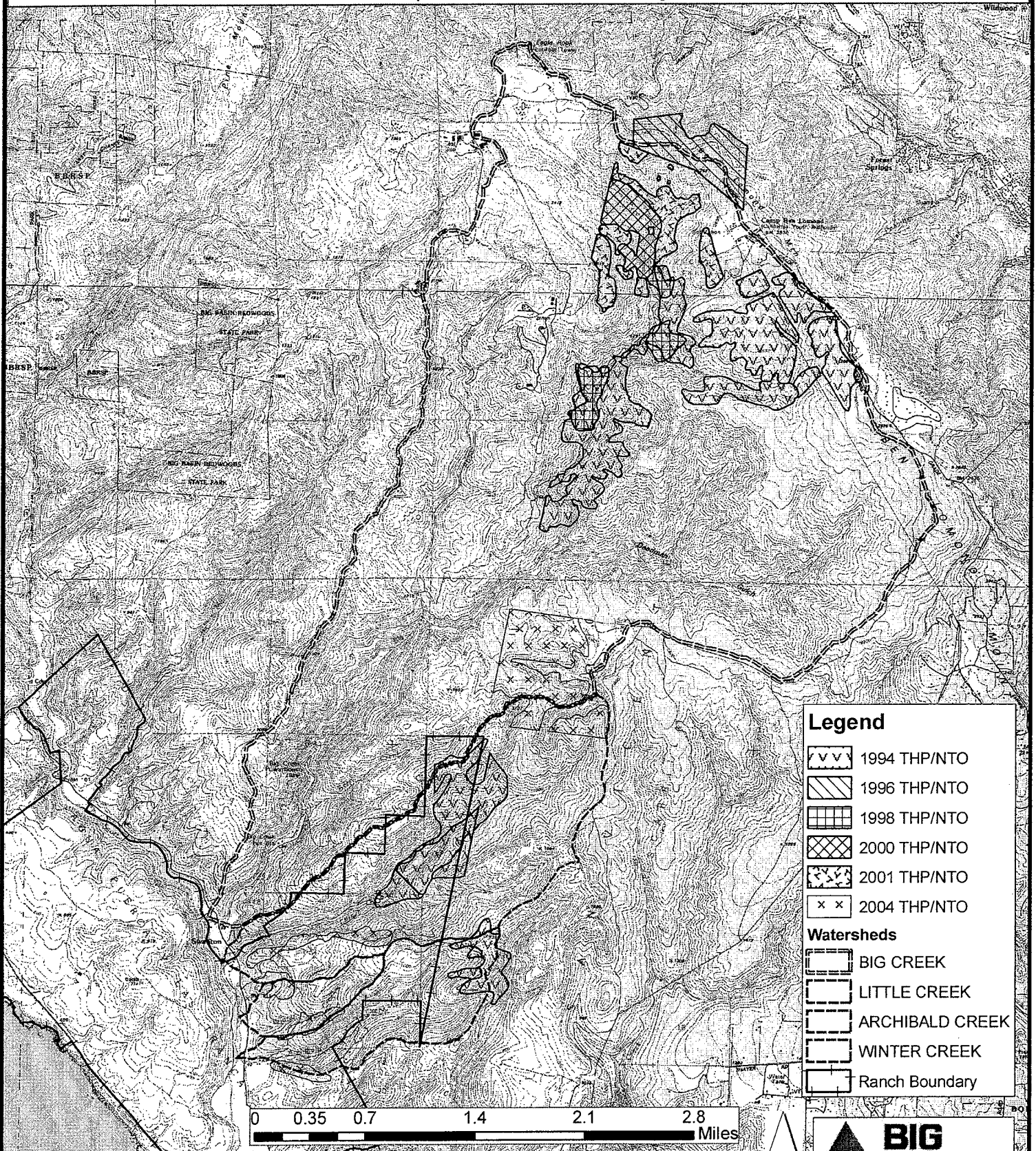
# Swanton Pacific Ranch NTMP - Watershed Map

T10S R3W, Portions of Sections 8,9,16,17 and Rancho Agua Puerca y Las Trancas, MDBM  
USGS Davenport 7.5' Quadrangle



# Swanton Pacific Ranch NTMP - Past CDF Projects Map

T10S R3W, Portions of Sections 8,9,16,17 and Rancho Agua Puerca y Las Trancas, MDB&M  
Davenport USGS 7.5' Quadrangle



NOTE: Silvicultural Method for each timber harvest is selection. Spatial information adapted from THP maps, Calwater 2.2 planning watershed maps, and the CDF Northern Region Forest Practice GIS Department coverages. This map includes ALL CDF-approved harvest plans that all wholly or partially in the Watershed Assessment Area and is intended to satisfy AB 47 mapping requirements.

**BIG CREEK**  
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# Swanton Pacific Ranch NTMP - Noise Impacts Assessment Area

T10S R3W, Portions of Sections 8,9,16,17 and Rancho Agua Puerca y Las Trancas, MDB&M  
Davenport USGS 7.5' Quadrangle

