State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Deputy Director
Ecosystem Conservation Division
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EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

April 27, 2018

Mr. Neal D. Ewald
Senior Vice President
Green Diamond Resource Company
California Timberlands
Post Office Box 1089
Arcata, CA 95518-1089

Dear Mr. Ewald:

Subject: SAFE HARBOR AGREEMENT FOR HUMBOLDT MARTEN ON GREEN DIAMOND RESOURCE COMPANY TIMBERLANDS IN CALIFORNIA (2089-2016-002-01)

The California Department of Fish and Wildlife (CDFW) has worked closely with your team at Green Diamond Resource Company (GDRCo) since July 2016 to negotiate and craft a safe harbor agreement under the California State Safe Harbor Agreement Program Act (Act)(Fish & Game Code, §§ 2089.2 et seq.). As described in the Act, a safe harbor agreement will contain detailed maps, a description of current and future management practices that might affect Humboldt marten and its habitat; the duration of the agreement, the management actions; and description of a monitoring program. The Act requires that a safe harbor agreement must provide a net conservation benefit to the covered species, Humboldt marten.

Please find enclosed a copy of the Green Diamond Resource Company Humboldt Marten Safe Harbor Agreement. Please review the entire document including attachments and figures, with specific attention to the commitments and management actions that CDFW and GDRCo developed together. If you concur, please sign where indicated and return two copies with original signatures to:

California Department of Fish and Wildlife
Attention: Ms. Tiffany Manko
601 Locust Street
Redding, California 96001

CDFW is grateful for the opportunity to develop this agreement with your team, and is confident that the commitments will contribute to a net conservation benefit for the covered species. Please direct questions or comments to Environmental Program Manager Joe Croteau at (530) 340-0767, or via e-mail at joe.croteau@wildlife.ca.gov.

Sincerely,

Tina Bartlett, Acting Deputy Director
Ecosystem Conservation Division

ec: **Green Diamond Resource Company**

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California Department of Fish and Wildlife

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California Department of Fish and Wildlife
Northern Region
601 Locust Street
Redding CA 96001

California Endangered Species Act
Safe Harbor Agreement No. 2089-2016-002-01

Green Diamond Resource Company Humboldt Marten Safe Harbor Agreement

Authority

This Safe Harbor Agreement (Agreement) is entered into by and between the California Department of Fish and Wildlife (CDFW) and Green Diamond Resource Company (Green Diamond) pursuant to the California State Safe Harbor Agreement Program Act (Program)(Fish & G. Code, § 2089.2 et seq.). The California Endangered Species Act (CESA) (*Id.*, § 2050 et seq.) prohibits the take[1] of any species designated by the California Fish and Game Commission as an endangered, threatened, or candidate species.[2] CDFW may authorize the take of any such species through an Agreement if the conditions set forth in Fish and Game Code section 2089.6 are met.

Covered Species and Covered Activities

The purpose of this Agreement is to provide a net conservation benefit to the CESA candidate species Humboldt marten[3] *(Martes caurina humboldtensis*) (Covered Species), and assure Green Diamond that no additional regulatory burdens, fines, or penalties will result from Management Practices or Management Activities (the Covered Activities as defined below) that are conditioned and designed to benefit the Covered Species within 363,967 acres of property, as specifically identified below (Figure 1).

Effective Date and Term of this Agreement

This Agreement shall be executed in duplicate original form and shall become effective when both copies are signed by Green Diamond and received by CDFW as described in the Execution and Delivery section of this Agreement. Unless renewed or cancelled by Green Diamond or CDFW, this Agreement shall expire on **December 31, 2057**.

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[1] Pursuant to Fish and Game Code section 86, "take' means hunt pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."
[2] The definitions of endangered, threatened, and candidate species for purposes of CESA are found in Fish and Game Code sections 2062, 2067, and 2068, respectively.
[3] Fish and Game Code section 2068. The species' status may change following the decision of the Fish and Game Commission to designate the species as threatened or endangered; if there is such a designation, the species will remain a Covered Species.

Land Classifications under This Agreement

Enrolled Lands means all forestland subject to timber harvesting rights in Del Norte and Humboldt Counties, California owned by Green Diamond and managed subject to this Agreement during its term. Figure 2a depicts the specific area this Agreement pertains to on the Effective Date as the Enrolled Lands. Green Diamond may add newly acquired forestland and timber harvesting rights acquired after the Effective Date of this Agreement to the Enrolled Area by providing written notice to CDFW describing the additional Enrolled Lands and the effect of adding such lands on landscape baseline conditions.

Potential Marten Source Area means all lands CDFW knows to be occupied by the Covered Species and that are potential source areas for Covered Species capture, collaring, assisted dispersal, and monitoring. The Marten Assisted Dispersal Feasibility Study, a prescribed Management Activity under this Agreement, will evaluate the capacity and recommended conditions for use of the Potential Marten Source Area in assisted dispersal of the Covered Species into potential marten release areas.

Marten Special Management Area (MSMA) is shown in Figure 1. The MSMA will serve several roles providing a net conservation benefit for the Covered Species. The MSMA will serve as the location for assisted dispersal of the Covered Species. The MSMA is a high priority connectivity area and habitat linkage area for marten because of its location between known occupied sites east of the Klamath River and the Redwood National and State Parks (Figure 2b).

Marten Reserve Area means a designated portion of the MSMA that is known to be occupied by the Covered Species and shall not be subject to timber harvesting during the term of this Agreement. The Marten Reserve Area is shown in Figure 2b.

Riparian Management Zone (RMZ) refers to forestlands designated in the 2008 Aquatic Habitat Conservation Plan approved by the National Marine Fisheries Service. RMZs encompass forestlands along both sides of a watercourse or around the circumference of a lake or spring, where additional practices may be required for protection of the quality and beneficial uses of water, fish and riparian wildlife habitat, other forest resources and for controlling erosion.

Introduction

The Covered Species, one of the recognized subspecies of the Pacific marten (Grinnell and Dixon 1926), was historically distributed throughout the coastal, fog-influenced forests of the coast redwood (*Sequoia sempervirens*) region in California from northwestern Sonoma County northward to the Oregon border (Figure 3; Grinnell et al. 1937). In California, the Humboldt marten has been extirpated from approximately 95 percent of its historical range. Until recently, the subspecies was known only from a single population that likely contained fewer than 100 individuals (Slauson et al. 2009a). Most recently, between 2011 and 2015 martens were detected on National Forest lands

at 8 locations near tributaries of the Middle Fork of the Smith River and 2 locations on Green Diamond's Moore Tract near the California-Oregon border, suggesting that a small population exists in that area.

In February 2016, the California Fish and Game Commission accepted a petition that requested Humboldt marten be added to the list of threatened or endangered species under CESA. CDFW has initiated a status review of the Humboldt marten in California. During this review period, the Humboldt marten holds the status of "candidate" for state listing, and is afforded all the legal protections provided a formally listed species under California law.

Of the 363,967 acres included as Enrolled Lands, 137,461 acres is within 15 km of the currently known extant populations (Figure 4). The Enrolled Lands account for approximately 12 percent of the area that includes or is within 15 km of the known extant populations.

Baseline Conditions

Baseline conditions can mean the population size, the extent and quality of habitat, or both the population size and the extent and quality of habitat for the Covered Species on the lands to be enrolled in a safe harbor agreement that sustain seasonal or permanent use by the Covered Species. For the purpose of this Agreement, the "baseline conditions" shall mean the current estimated population size of the Covered Species and the current understanding of habitat, and is defined by reference to lands covered by this Agreement.

Pursuant to Fish and Game Code section 2089.4, subdivision (b), the Program requires a complete description of baseline conditions for the species covered in this Agreement. CDFW determines baseline conditions in consultation with the applicant, and the baseline conditions are based on the best available science and objective scientific methodologies. For purposes of establishing baseline conditions, a qualified person who is not employed by CDFW may conduct habitat surveys, if that person has appropriate species expertise and has been approved by CDFW. The baseline described in this Agreement has been determined and approved by CDFW after consultation with the applicant, Green Diamond, and its qualified person. Under Fish and Game Code section 2089.4, CDFW has determined that the following individual is a "Qualified Person" for purposes of this Agreement:

Keith A. Hamm, Conservation Planning Manager, California Timberlands; Certified Wildlife Biologist®

Green Diamond Resource Company
900 Riverside Road
Korbel, CA 95550
707-668-4437

Based on survey efforts by Green Diamond and other parties, CDFW agrees that the Covered Species is rare or absent from the majority of the Enrolled Lands (Figure 4). Presence of the Covered Species has been confirmed in the Moore tract and Marten Reserve Area. Based on the limited number of detections and spatial extent of non-detections, a reliable estimate of the number of martens currently using habitat on Enrolled Lands is likely very small and transitory. Accordingly, it is not possible for CDFW to include a reliable trend assessment for the Covered Species' population on the Enrolled Lands at this time.

The Covered Species' use of habitat within the Enrolled Lands remains unknown because Covered Species expansion into managed lands is a limited and recent discovery. A reliable and accepted definition of suitable habitat for the Covered Species on managed coastal redwood forest does not exist. This Agreement characterizes the condition of forest stands on the Enrolled Lands as of the Effective Date to establish a habitat baseline at a landscape scale. This baseline condition shall be monitored over the term of this Agreement to ensure compliance and develop a better understanding of suitable habitat for the Covered Species on managed timberlands.

To evaluate current forest age and predict changes in forest age over the Enrolled Lands, Green Diamond used a focal mean analysis of its forest inventory data and output from its 50-year forest growth and harvest modeling. Green Diamond calculated the average age of forest stands for 10-meter pixels within a 1-kilometer radius circle. The radius circle was used to approximate the average home range of the Covered Species. The focal mean analysis was conducted using forest age as the metric of interest for describing baseline habitat conditions at the start of the permit and at decadal intervals over the duration of the permit (i.e., 40 years). The starting point for baseline conditions is average age at year 2015. The goal of this Agreement is to increase average forest age and retain critical habitat elements over the permit term.

Within the managed landscape of the Enrolled Lands, the starting point for baseline habitat conditions is an average forest age of approximately 41 years (Figure 5) as calculated using the focal mean. At the end of the Agreement term, the average forest age is projected to increase (Figure 5). CDFW expects that that the extent and quality of habitat will increase over the Agreement term. Riparian Management Zones (RMZ) will increase, creating networks of older forests, with high tree basal area and dense canopy cover adjacent to harvest areas (Unencumbered Areas) containing younger seral stages. Overhead tree canopy and retained individual and clumped mature trees will accelerate the development of younger stands. Approximately 25-percent of the Enrolled Lands are in RMZs (see Figure 6) and other partial harvest retention areas (Encumbered Areas) with stands that will increase from the current average stand age of 54 years to an average of 94 years over the next 40 years. While not considered old growth, stands of this age in the redwood region develop large trees with cavities, broken tops, debris accumulations and various types of nests built by a variety of birds and mammals.

Table 1. Average forest age for the Enrolled Lands (Landscape Baseline), Unencumbered Areas and Encumbered Areas using a focal mean analysis on a 1 km radius circle.

	Average Forest Age[4]					
Year	Baseline and Projected Enrolled Lands	Enrolled Lands' Unencumbered Areas	Enrolled Lands' Encumbered Areas	MSMA and Projected MSMA	MSMA Unencumbered	MSMA Encumbered
2015	40	35	54	43	41	49
2025	43	36	64	48	43	59
2035	46	36	74	50	42	69
2045	48	35	84	52	41	79
2055	50	34	94	53	38	89

The dynamic forest baseline is a matrix of Unencumbered Areas subject to even-age management under the California Forest Practice Rules with individual and group tree retention to accelerate development of key ecological elements within early seral stands after harvest. Encumbered Areas such as RMZs are subject to uneven-age management and single harvest entry within the 50-year harvest cycle, and other protected areas such as geologic zones are also subject to uneven-age management. Again, the 1-km radius circle, or approximately 776 acres, is used to approximate a marten home range. The focal mean analysis is used to calculate average forest age within a home range circle to describe baseline conditions at the beginning of the permit period and at 10-year intervals based on modeled growth and harvest of the forest landscape. The average-age analysis information is also extracted from the 127,217-acre MSMA to illustrate projected average age for the MSMA relative to the baseline and Enrolled Lands.

Summary of Development of Baseline Conditions

Population

- The Covered Species was thought to be extirpated in California due to trapping and loss of habitat from harvesting of late seral forests until a small population was rediscovered in 1996 within a portion of the historical range (Zielinski and Golightly 1996).

- Mesocarnivore surveys conducted on or near the Enrolled Lands since 1996 indicate that the Covered Species is rare or absent on the Enrolled Lands with the exception of a few recent detections on the Moore Tract and Marten Reserve Area. The Enrolled Lands are not included as locations of any of the currently extant and viable populations recognized by the Humboldt Marten Conservation

[4] Average age, expressed as a single number at a specified time, is calculated using a focal mean analysis conducted on raster data generated at 10-m resolution. The focal mean for each 10-m^2 cell is calculated over a simulated marten home range area represented by a 1-km radius circle.

Group. It is not possible to reliably assess any trend in the marten population on the Enrolled Lands at this time. The Covered Species is absent/rare/transient except for the Moore tract and Marten Reserve Area.

Habitat

- There is limited contemporary information on habitat use by the Covered Species at the home range scale, and that which is available was collected from public lands from a small portion (<5%) of the Covered Species' historic range in Del Norte County, California.

- Slauson et al. (In prep.) developed a landscape habitat suitability model (HSM) for Humboldt marten in coastal California and coastal Oregon to guide survey, monitoring, and conservation planning efforts in the region with the overall objective of creating a model that would indicate the occurrence of martens and habitat.

- Green Diamond evaluated the HSM on Enrolled Lands. The HSM includes the average Old Growth Structural Index (OGSI) at the 1km scale, precipitation, stream density, latitude adjusted elevation, and geology. The OGSI index is an average combination of four separate indices representing stand age and four structural features: number of large trees (>100 cm dbh), large snags (>50 cm dbh and >15 m tall), volume of large wood, and tree size diversity (Spies et al. 2007). The OGSI was the only vegetative model parameter in the HSM potentially influenced by Green Diamond's forest management activities.

- Initially, CDFW advocated for the use of OGSI to determine baseline. However, Green Diamond compared OGSI to inventory data and identified that the satellite imagery data on OGSI contains substantial commission and omission errors within the Enrolled Lands. Green Diamond did not have and cannot reliably predict future values of OGSI through time. Green Diamond explained in drafts of the Agreement that the RMZs would be developing into older forests over time and the expectation is that RMZs (25% of ownership) will increase in OGSI.

- CDFW then asked Green Diamond if they could analyze radio telemetry data for HUMA detections east of the Klamath and compare that to Enrolled Lands. The studies conducted east of the Klamath were not designed to estimate home range and no data were analyzed at that scale. For comparative purposes, Green Diamond provided CWHR tree size information from its forest inventory for areas east of the Klamath and the Enrolled Lands. Green Diamond used the den site information from east of the Klamath to improve the TREE model to benefit marten.

- Previous experience attempting to delineate and predict future home ranges for northern spotted owls on Enrolled Lands indicates that CDFW and Green Diamond cannot predict with high certainty when and where terrestrial species will establish home ranges. CDFW and Green Diamond agreed to allow the

Covered Species monitoring efforts to inform use of denning and home range habitat on the Enrolled Lands.

- In the absence of the ability to project future conditions for the HSM or OGSI within the Enrolled Lands, Green Diamond used forest stand age information available from Green Diamond's forest inventory data to describe the one parameter from OGSI, forest age that could be influenced by Green Diamond's forest Management Practices (defined below) through time.

- Green Diamond used GIS and stand inventory to arrive at a projected average stand age (similar moving windows analysis to OGSI) at the 10m pixel scale and arrived at the expected average forest age in Table 1 of this Agreement.

Management Practices

Green Diamond manages the Enrolled Lands primarily using Timber Harvesting Plans (THP) for timber production and other purposes pursuant to California's Timberland Productivity Act of 1982 (Gov. Code, §§ 51100-51104), the Z'Berg-Nejedly Forest Practice Act (Pub. Resources Code, § 4511 et seq.), the California Board of Forestry's Forest Practice Rules (Cal. Code Regs., tit. 14, § 895 et seq.), various other state laws, and Green Diamond's internal management documents, policies, and guidelines.

Current Management Practices are Green Diamond's land use and maintenance activities on the Enrolled Lands that affect the Covered Species or their habitat. Green Diamond's Management Practices on the Enrolled Lands include Timber Operations, as defined within the California State Forest Practices Act as of January 1, 2017.

> ***Public Resources Code section 4527 subdivision (a) (1)*** *"Timber operations" means the cutting or removal, or both, of timber or other solid wood forest products, including Christmas trees, from timberlands for commercial purposes, together with all the incidental work, including, but not limited to, construction and maintenance of roads, fuel breaks, firebreaks, stream crossings, landings, skid trails, and beds for the falling of trees, fire hazard abatement, and site preparation that involves disturbance of soil or burning of vegetation following timber harvesting activities, but excluding preparatory work such as tree marking, surveying, or road flagging.*

Green Diamond's Management Practices also include: timber cruising, tree marking, harvest planning, use of roads for transport of equipment, timber and rock, use of roads for any other forest management activities, vegetation management, pre-commercial thinning, in-woods chipping and removal of woody biomass, development and excavation of rock resources for forest management, maintenance and use of water tanks, collection of minor forest products, grazing, fire suppression, surveying, sampling, monitoring and other research activities related to fish, wildlife, and habitat, and authorized recreation (e.g., hunting).

If there are other Management Practices on Enrolled Lands that are not described above, Green Diamond shall provide CDFW with a written description of the activities and request that CDFW provide a written determination whether the described Management Practices are Covered Activities consistent with this Agreement and Fish and Game Code section 2089.14. All Exemptions (Cal. Code Regs., tit. 14, § 1038 et seq.) shall comply with the commitments under this Agreement.

Management Actions

Management Actions are activities conducted on the Enrolled Lands that are reasonably expected to provide a net conservation benefit for the Covered Species within the Enrolled Lands. The Management Actions to be conducted under this Agreement include:

Assisted Dispersal Commitments

1. Green Diamond shall provide financial and technical support for a marten assisted dispersal (MAD) feasibility analysis conducted by CDFW. Via the MAD feasibility analysis, CDFW will evaluate and assess habitat suitability of potential release sites for martens within their historical range that are within typical dispersal distance of the core population.

2. Green Diamond shall provide financial and technical support for capture and assisted dispersal of marten based on the recommendations of the MAD feasibility analysis completed under Commitment 1. Green Diamond shall work with CDFW and other partners to capture, collar, and release martens from recommended source areas for purposes of assisted dispersal into recommended release areas. Marten release areas shall include portions of Enrolled Lands.

3. Green Diamond shall provide financial and in-kind technical support to monitor collared martens in recommended release areas. The details of monitoring shall be described in the MAD feasibility analysis completed under Assisted Dispersal Commitment 1, and shall include monitoring to determine fate, movements, territory establishment, reproductive activity, use of resting and denning structures, and habitat use.

4. Green Diamond's financial commitment to the assisted dispersal project shall include funding of up to a total of $245,000, which may be disbursed over a period of up to five years following the commencement of the assisted dispersal analysis. Green Diamond shall also contribute in-kind support of staff and equipment at a total value of $245,000, which may be incurred for a period of up to five years following the commencement of the assisted dispersal project. How the funding and in-kind contributions are deployed shall be based on a feasibility study and agreed to prior to encumbering. Additionally, the MAD feasibility analysis may require third-party financial support, therefore Green Diamond's

financial commitment may be used as match to secure additional funds from other sources.

Habitat Management Commitments

Green Diamond shall develop a training program to educate managers, employees, and contractors on implementation of this Agreement on an annual basis. The training program shall include a summary of marten biology, habitat use and the management actions within this Agreement. Green Diamond shall document this training program and make a summary available to CDFW upon request.

1. Green Diamond shall implement measures as currently defined under the federally approved Aquatic Habitat Conservation Plan (AHCP) for Green Diamond Timberlands or as modified through federally approved adaptive management under the AHCP on all Enrolled Lands except those not covered by the AHCP. For Enrolled Lands outside AHCP Coverage (approximately 7,777 acres), riparian and geological retention measures shall be implemented in accordance with the California Forest Practice Rules, with the exception that RMZs in the Moore Tract (because of localized Covered Species detections) shall be limited to only one harvest entry within RMZ during the life of this Agreement concurrent with the even-aged harvest of the adjacent stand. The only exception shall be light thinning conducted with the specific objective of enhancing wildlife structure.

2. Green Diamond shall implement the TREE Guidelines for Green (Live) Tree and Snag Retention on all Enrolled Lands (Attachment 4) in THPs and Exemptions. Specific TREE measures designed as a conservation benefit to marten are applied through a marten-specific safe harbor agreement scorecard on Green Diamond timberlands within the Marten Special Management Area, the Moore Tract, (tracts 51, 53, 56, 61, 66, 67, 70, 71, 72, 73, 85, 87, 88, 98, Figure 7), and within California Interagency Watershed Map (i.e., Calwater 2.2.1) watersheds when the Covered Species are detected. Tables summarizing scorecard tree retention shall be included in proposed THPs.

3. Green Diamond shall establish a 127,217- acre "Marten Special Management Area" for the Covered Species located between the known occupied marten sites east of the Klamath River that supports an extant population of the Covered Species, and the state and federal parks to the north, west, and south of the MSMA (Figure 2b). Within the MSMA Green Diamond shall use additional habitat management and monitoring measures (Monitoring and Reporting Requirements, below) to assess whether and how dispersing marten use managed forest lands and the characteristics of habitat features that are most useful to martens.

4. Within the Special Management Area, Green Diamond shall establish a 2,098-acre "Marten Reserve Area" in Del Norte County where the Covered Species are

known to occupy an area of serpentine habitat within the Green Diamond Enrolled Lands (Figure 2b). Green Diamond shall not conduct any timber harvest within the Marten Reserve Area during the term of this Agreement.

5. Within the MSMA and the Moore Tract (shown in Figure 2) (as Enrolled Lands in northeast Del Norte County with baseline marten detection), Green Diamond shall incorporate into THPs a prescription for retention of downed large woody debris to enhance structural complexity, foraging, denning, resting and escape cover benefitting marten. Harvest units shall retain pre-existing non-merchantable large woody debris and merchantable large woody debris with existing hollows or evidence of internal rot and hollows.

6. Within the MSMA and the Moore Tract, Green Diamond shall incorporate into THPs a prescription for harvesting practices that creates slash piles to benefit marten occupancy through increased structural complexity, cover, resting and denning habitat. Within each ground-based timber harvest unit, Green Diamond shall create and retain slash pile(s) for marten at a rate averaging one structure for every 5 – 10 acres of clear-cut. Slash piles may be created over existing large woody debris to enhance function of those structures.

7. When Green Diamond discovers or is made aware of natal or maternal den structures used by marten, as determined by radio telemetry and camera monitoring through its own or cooperative efforts as part of the assisted dispersal project, Green Diamond shall retain these den structures on the landscape and incorporate tree retention (Commitment 2) around the den structure during and post timber harvest operations.

   The standard for tree retention around a natal den structure shall be a no-less-than 0.5-acre no-harvest habitat retention area (HRA). Any harvest conducted within the natal den HRA may only be done in consultation with CDFW and shall be to protect the biological integrity of the site and increase/accelerate development of large trees within the HRA.

   Habitat retention around maternal den structures shall include any of the following: the individual den structure element (live tree, snag, log, etc.), the individual structure with tree clump retention, or the individual structure and a 0.5-acre HRA with 70 percent over story tree canopy composed of a variety of tree sizes and tree species present in the existing pre-harvest stand. The intent of the tree retention around known den structures shall be to incorporate and retain existing biologically important habitat elements such as large trees, snags and large down wood. Green Diamond's Forestry and Wildlife staff shall coordinate to determine appropriate tree retention around the maternal den structure. Habitat retention around den site structures shall be summarized in annual reports, and CDFW shall be provided access to the site(s) to evaluate post-harvest retention.

8. When conducting vegetation management activities such as herbicide application

and manual treatment of brush with chainsaws, Green Diamond shall conduct the following procedures to protect habitat retained to benefit marten:

- Green Diamond's Wildlife Department shall review all proposed hack and squirt treatments.
- Wildlife habitat shall be retained in accordance with Green Diamond's TREE (Commitment 2).
- Herbicide applications shall be summarized in the annual report.

Implementation of the Covered Activities

Implementation of the Covered Activities, including Timber Operations, may result in habitat modification and the incidental take of the Covered Species. Road construction, harvest operations, and forest management practices may take denning females and kits through removal of the denning structure, or disturbance causing abandonment of the occupied den resulting in death of dependent kits and possible, but unlikely, direct harm or death to the female. Vehicular strikes resulting from use of forest roads and accidental entrapment in water storage facilities resulting in death or drowning of marten may also take marten.

The Program requires this Agreement to provide a net conservation benefit for the Covered Species. "Net Conservation Benefit" means that, considered cumulatively, Green Diamond's proposed Management Actions are reasonably expected to result in an increase in the population of the Covered Species and/or the enhancement, restoration, or maintenance of the Covered Species' habitat on Enrolled Lands.[5]

In addition to providing a Net Conservation Benefit, this Agreement includes measures designed to avoid or minimize incidental take of the Covered Species, and it includes measures to monitor the effectiveness of the Management Actions and compliance with this Agreement.

Assurances Regarding Take of Covered Species

The Safe Harbor Program is designed to increase species' populations, create new habitats, and enhance existing habitats. Although this increase may be temporary or long-term, any Agreement issued pursuant to this Program shall not reduce the existing populations of species or habitat present at the time the baseline is established by CDFW. As noted above, based on the limited number and spatial extent of detections, a reliable estimate of the number of martens currently existing on Enrolled Lands is unavailable and it is not possible to assess any trend in the marten population at this time.

[5] Fish and Game Code section 2089.4, subd. (g).

The Program allows CDFW to authorize the incidental take of a covered species through an Agreement if the conditions set forth in the Fish and Game Code section 2089.6 are met. This Agreement authorizes the incidental take of the Covered Species and only the Covered Species. With respect to incidental take of the Covered Species, CDFW authorizes Green Diamond, its employees, contractors, and agents to take the Covered Species incidental to implementing the Management Actions and Management Practices described herein subject to the limitations described in this section and the Avoidance and Minimization Measures identified below. This Agreement does not authorize take of the Covered Species from activities outside the scope of this Agreement, take of the Covered Species resulting from violation of this Agreement, or intentional take of the Covered Species except as authorized by this Agreement.

The process to return the Enrolled Lands back to baseline shall include, at a minimum, the following steps:

1. Green Diamond shall contact CDFW, with at least 60 days advance notice, to inform CDFW of the desire to return the Enrolled Lands to the baseline condition.

2. CDFW will determine if surveys/collection/relocation are appropriate or needed at the site.

3. If deemed appropriate by CDFW, Green Diamond and CDFW will schedule times when surveys/collection/relocation will occur.

Avoidance and Minimization Measures

By implementing the following Avoidance and Minimization Measures (AMM) Green Diamond agrees, to the maximum extent practicable, to avoid or minimize any incidental take of the Covered Species, including returning the Enrolled Lands to baseline conditions.

AMM 1. For any known occupied den site, Green Diamond shall mark for retention or non-disturbance the occupied den tree or other structure (e.g., leave tree or downed wood undisturbed). If the marked den site is within 0.25 miles of a timber harvesting unit included in a planned, approved or active THP, the occupied den site shall be protected with a 0.25-mile radius buffer that excludes Timber Operations during the marten denning season (March 15 – August 15) until either the marten denning season has ended, or it has been determined, with the concurrence of CDFW, that the den site is unoccupied. Timber Operations may occur within a den site buffer under the following limited circumstances:

- Timber Operations associated with road use of existing roads (i.e., log hauling, road watering, water drafting, road grading, and culvert replacement).

- If a female marten establishes an occupied den site within 0.25 miles of active timber harvesting operations after such operations have commenced, harvesting

Timber Operations that modify habitat may continue provided that area where active timber falling, yarding, and road construction occurs (the footprint of activities that modify habitat) does not move any closer to the occupied den site.

- Tail holds and guy line anchors for timber yarding are permitted within the 0.25-mile marten den site buffer provided that they are not located within 500-feet of the occupied marten den site.

- All confirmed den trees shall be retained.

AMM 2. Green Diamond shall ensure all water tanks and pipes used for timberland management in the Enrolled Lands are marten-proofed to prevent entrapment and/or drowning. Green Diamond shall ensure that any such facility or structure found to not be secured in the future shall be repaired, retrofitted, or replaced in a timely manner to ensure its inaccessibility to marten. Green Diamond shall include in the first annual report a catalog and map of all current and abandoned water tanks within the Enrolled Lands and documentation that each structure has been checked at least once a year to ensure that it is secured against potential entry by marten.

AMM 3. To discourage and prevent unauthorized marijuana cultivation and associated abuse of pesticides on the Enrolled Lands, Green Diamond shall maintain a system of controlled access for its Enrolled Lands using locked gates on roads, security patrols, and written permits for authorized use of the Enrolled Property. To detect and remove unauthorized activities, Green Diamond shall maintain security patrols for the Enrolled Property, conduct at least one annual aerial surveillance for marijuana cultivation hot spots where marten are likely to be exposed to pesticide use on the Enrolled Lands, and provide annual safety training for field employees on detection and reporting of suspicious and unauthorized use of the Enrolled Property. When Green Diamond detects unauthorized marijuana cultivation and/or pesticide abuse, it shall be reported to local law enforcement. If Green Diamond finds evidence of pesticide abuse that may take marten, it shall report the circumstances to CDFW for investigation and possible prosecution.

Monitoring and Reporting Requirements (MRR)

In accordance with Fish and Game Code section 2089.6, Green Diamond shall implement a monitoring program for this Agreement (as described in Attachment 2) and submit annual monitoring reports (Attachment 2) that are (1) based upon objective scientific methodologies, and (2) intended to provide information for CDFW to evaluate the effectiveness and efficiency of this Agreement, including whether the Net Conservation Benefits set forth in this Agreement are being achieved and whether the provisions of this Agreement are being implemented. Green Diamond will summarize the results for each of the following MRR in the annual reports for this Agreement. If results are not available or appropriate for a specific MRR, Green Diamond will provide a brief description on status of each MRR.

MRR 1. As noted in Assisted Dispersal Commitment 3, Green Diamond shall provide technical support and financial assistance to monitor radio-collared martens captured and released pursuant to the Assisted Dispersal Strategy.

MRR 2. Within three years of Agreement approval, Green Diamond shall use non-invasive survey results to estimate marten occupancy within the MSMA and Enrolled Lands and lands located within the Potential Marten Source Area. An analysis of occupancy rates shall be submitted in the fourth annual report.

MRR 3. After an initial effort to assess occupancy and trends of marten within the MSMA (lasting 3 years), Green Diamond shall continue to monitor marten occupancy by conducting non-invasive surveys on at least one-half of the MSMA every five years such that a complete survey would occur by year ten. A summary of occupancy surveys and estimates shall be included in annual reports coincident with the survey intervals.

MRR 4. After two complete surveys to assess marten occupancy within the MSMA, provided that (contingent upon) the existence of adequate sample size for analysis, Green Diamond shall attempt to develop a model estimating the probability of marten occupancy and associate with various habitat and physiographic variables. This modelling effort shall attempt to include all available and complementary survey efforts conducted within the range of the marten on the Enrolled Lands. A preliminary occupancy model, contingent upon sufficient data, shall be included in the annual reports coincident with the commitment interval.

MRR 5. Green Diamond shall designate an internal compliance team including an Agreement Coordinator working in conjunction with Green Diamond's forestry, operations, and wildlife staff. Green Diamond shall staff the Agreement Coordinator position with an academically trained and experienced wildlife biologist. Green Diamond shall ensure the Agreement Coordinator reviews each proposed THP during its development and informs the registered professional forester (RPF) preparing the THP when any special Agreement-related restrictions and/or mitigations occur in the area. Green Diamond also shall ensure the RPF completes a pre-harvest checklist during THP development covering all necessary Agreement compliance elements.

The Agreement Coordinator or compliance team members shall prepare and maintain documentation indicating Agreement compliance for internal use for every THP within the Enrolled Lands. Following state THP review and approval, Green Diamond's RPF shall implement the THP as written, prepare a THP post-harvest completion form documenting THP compliance with the Agreement provisions and submit this form to the Agreement Coordinator. Green Diamond's Agreement Coordinator shall review the form to ensure compliance.

MRR 6. When planning and seeking approval of THPs for future timber harvests on Enrolled Lands, Green Diamond shall incorporate applicable Agreement commitments into all THPs.

MRR 7. In accordance with Fish and Game Code section 2089.20, Green Diamond

shall provide CDFW with access privileges to verify compliance with baseline commitments, monitor the effectiveness of the Agreement, and salvage individuals of the Covered Species that may be taken, subject to prior notice requirements.

MRR 8. Green Diamond shall submit annual monitoring reports that are based upon objective scientific methodologies, intended to provide information for CDFW to evaluate the effectiveness and efficiency of this Agreement, including whether the Net Conservation Benefits set forth in this Agreement are being achieved and whether the provisions of this Agreement are being implemented.

Green Diamond shall prepare and submit an annual report to CDFW by March 1 following the first full year after this Agreement Effective Date and every year thereafter during the Term.

MRR 9. To evaluate Habitat Management Commitment 2, Green Diamond will use a stratified random sample to analyze 10 percent of the THP units (pre-harvest)) to quantify tree retention using the modified TREE guidelines versus other Green Diamond retention practices. Green Diamond will use the data to analyze trends in retention under the Agreement. Green Diamond will conduct and report the results of this analysis at 5-year intervals of the Agreement. Green Diamond and the CDFW will evaluate the results at the 5-year reporting intervals and during the adaptive management review in year 25 to determine if this monitoring process should be modified during the permit term.

MRR 10. To document implementation compliance with Habitat Management Commitments 5, 6, and 7, Green Diamond will report ocular estimates of pre- and post-harvest amounts of large woody debris and post-harvest amounts of slash piles retained in ground-based harvest units. Implementation of HRA's will be summarized in the annual report as appropriate.

Adaptive Management

Adaptive Management allows for mutually agreed-upon changes to the Agreement's Management Actions and Management Practices in response to changing conditions or new information, where those changes will avoid or minimize take to the maximum extent practicable and provide a Net Conservation Benefit to the Covered Species.

If the implementation of the Management Actions or Management Practices are determined to be ineffective or do not achieve the desired results as determined through annual reports or quantitative field observations by Green Diamond and CDFW, those actions or practices may be modified within a reasonable and mutually agreed upon range to meet the stated goals of the Agreement.

The following are examples of Adaptive Management changes that will occur in response to biological information indicating that the Management Actions or Management Practices are ineffective at meeting the stated goals of the Agreement:

1. Green Diamond and CDFW agree to modify Avoidance and Minimization Measure 1 if monitoring reveals that protection measures for denning female marten may be inadequate to minimize or avoid take.
2. Green Diamond and CDFW agree to modify Habitat Management Commitment 2 if monitoring of radio collared marten reveals that a specific feature of marten den tree is inadequately quantified within the TREE scorecard and the resulting changes would provide a Net Conservation Benefit to marten through increased retention of potential denning habitat.
3. Green Diamond and CDFW agree to modify Habitat Management Commitment 6 if monitoring reveals that marten are benefitting from slash piles and that either an increase in slash piles or altered arrangement of slash (windrows) would provide a Net Conservation Benefit to marten.
4. Green Diamond and CDFW agree to modify Habitat Management Commitment 7 if monitoring on Enrolled Lands indicates an insufficient or unknown quantity or quality of natal and maternal den sites in Tracts or watersheds known to support the Covered Species.
5. Green Diamond and CDFW agree to modify Assisted Dispersal Commitments 3 and 4 if it is determined that inadequate funding exists to implement the MAD or that additional time is needed to successfully implement the MAD. The annual increase in financial contribution shall not exceed $10,000 annually and extend beyond 3 years in total.

Adaptive Management Changes Resulting From Monitoring And Adaptive Management Under The AHCP

As described in Section 6.2.6.1 of the AHCP, Green Diamond shall institute the adaptive management process under the AHCP in the event of a yellow light threshold trigger, a red light threshold trigger, SSS trigger (as these terms are defined in the AHCP), or results from the experimental watersheds monitoring program that identify an appropriate change in the conservation measures. Should Green Diamond propose any adaptive management change in the RMZ width and prescriptions under the AHCP, such a proposal shall also be deemed to be a proposed adaptive management measure under this Agreement and it shall require approval by the CDFW before it shall be implemented on Enrolled Lands by Green Diamond. The intent of this provision is that no adaptive management measures shall be taken under this Agreement unless they are judged by mutual agreement between Green Diamond and the CDFW to result in neutral or positive effects to the Humboldt marten.

Year 25 Review

The term of the Safe Harbor Agreement shall be 40 years with an adaptive management review in year 25. The purpose of the adaptive management review in year 25 shall be to evaluate the effectiveness of Management Actions providing a Net Conservation Benefit to the Covered Species. The review shall include: 1) analysis of

marten occupancy and population on Enrolled Lands; 2) analysis of marten habitat on Enrolled Lands; 3) a report on the status of the Assisted Dispersal program; 4) projected habitat conditions on Enrolled Lands for the remainder of the permit term (based on the original projection of average age and potential improvements in the understanding of marten habitat use on managed lands at the time of review from 1 and 2 above); and 5) a discussion of changes, if any, to Management Actions providing a Net Conservation Benefit to marten for the remainder of the permit term.

Marten Research Commitment: Green Diamond shall cooperate with state, federal, tribal, or non-governmental organizations engaged in original research on the Covered Species to advance the understanding of the ecology, conservation, and management of the species. Cooperation shall include a range of activities including but not limited to permitted access to its timberlands, contributions of biological staff time and expertise, or voluntary monetary contributions. Any additional commitments to marten research will be voluntary and established at the time of, and subject to, the terms of an agreed study design with measurable objectives, and a demonstrated capacity to complete the research.

Funding

CDFW has determined that Green Diamond, the initial Permittee, shall provide sufficient funding to carry out Management Actions including monitoring for the Term of this Agreement. Green Diamond has provided CDFW with a letter, signed by Green Diamond's Senior Vice President and General Manager for California Operations, that includes information regarding total cost associated with Green Diamond's implementation of Management Actions under this Agreement, including all monitoring and reporting requirements set forth in this Agreement.

Green Diamond shall budget and expend such funds necessary to fulfill its obligations under the Agreement.

Land Transactions and Adjustments to Enrolled Lands

Nothing in this Agreement limits the right of Green Diamond to acquire, sell, or otherwise transfer interests in Enrolled Lands and timber harvest from Enrolled Lands nor does it limit the right of a third party to acquire Enrolled Lands.

Green Diamond may add newly acquired forestland and timber harvesting rights, located within Del Norte or Humboldt counties, acquired after the Effective Date of this Agreement, to the Enrolled Area by providing written notice to CDFW describing the additional Enrolled Lands and the effect of adding such lands on landscape baseline conditions. Within 30 days of the close of any land transactions, Green Diamond shall provide CDFW with a GIS/Geodatabase file of ownership boundaries for Enrolled Lands existing at the time of signature. Hard copy maps and spreadsheets shall be furnished

to CDFW upon request. In each annual report, Green Diamond shall provide a summary of land transactions (acquisitions and disposals affecting Enrolled Lands) and minor modifications that result from corrections to ownership boundaries from survey information and updates to GIS data.

Green Diamond may grant real property interests and property use privileges in the Enrolled Lands to third parties without approval by CDFW, provided that Green Diamond shall provide CDFW with a minimum of 60 days notice prior to alienating Green Diamond's interest in the land or water through a transfer of a fee interest in the Enrolled Lands or perpetual harvest rights. Any Green Diamond contract, lease, or other agreement transferring harvesting rights on the Enrolled Lands that are less than perpetual shall be subject to compliance with the terms of this Agreement.

Grants by Green Diamond of fee interest or perpetual timber harvesting rights in Enrolled Lands are subject to compliance with Fish and Game Code sections 2089.12, subdivision (a)(3), 2089.14, and 2089.16. If Green Diamond grants a fee interest or perpetual timber harvesting rights interest in Enrolled Lands to a third party, Green Diamond must notify CDFW 60 days prior to the transfer that either:

(1) the affected Enrolled Lands will be withdrawn from Enrolled Lands status under this Agreement pursuant to section 2089.16 (with loss of "Assurances" under this Agreement for the former Enrolled Lands), or

(2) the third party assuming the interest in the Enrolled Lands agrees to assume Green Diamond's duties under this Agreement or enter into a new Safe Harbor Agreement approved by CDFW. A prospective Permittee that acquires a fee interest or perpetual harvest rights in Enrolled Lands may assume all Permittee obligations and Assurances for and maintain the status of Enrolled Lands under this Agreement through a written and signed assignment and assumption agreement or a separate Safe Harbor Agreement approved and signed by CDFW.

Withdrawal of Lands from this Agreement

If Enrolled Lands will be removed from this Agreement, Green Diamond shall notify CDFW 60 days prior and:

(1) Provide CDFW with a description and map of the affected Enrolled Lands to be removed from Enrolled Lands status, and access and an opportunity to salvage and remove any Covered Species from the subject lands.

(2) The termination of Enrolled Lands' status, Assurances, and obligations under this Agreement shall be effective upon delivery of written notice to CDFW given in accordance with this Section.

(3) If the cumulative reduction in Enrolled Lands, after considering the cumulative total of Enrolled Lands withdrawn from this Agreement and lands added to

Enrolled Lands, is fifteen percent (15%) or less of the total Enrolled Lands on the Effective Date, no amendment to this Agreement is required for withdrawal of Enrolled Lands. For withdrawals of Enrolled Lands resulting in a cumulative reduction in the initial Enrolled Lands greater than 15%, CDFW will assess whether an amendment is necessary for this Agreement to continue to provide a Net Conservation Benefit to the Covered Species or whether to terminate the Agreement in its entirety.

The following types of transactions affecting Enrolled Lands shall not be considered reductions in the total acreage of the Enrolled Lands requiring amendment pursuant to section 2089.14:

1. Transfers of Enrolled Property to any person or nonstate or federal entity that signs an assignment and assumption of this Agreement, approved by CDFW, as it applies to the affected Enrolled Lands (Fish & G. Code, §§ 2089.4, subd. (d) and 2089.16);

2. Transfers to any person or nonstate or federal entity that enters into a new agreement with CDFW as to the affected Enrolled Lands (*Ibid.*); or

3. Transfers of Enrolled Property to an agency of the State of California or an agency of the federal government, including transfers involving third parties (i.e., conservation groups) in which the ultimate owner of the affected Enrolled Lands shall be a state or federal agency and, prior to transfer, CDFW determines that the transfer of Enrolled Lands shall not compromise the effectiveness of this Agreement based on the future management of such land by the agency, without assignment and assumption of this Agreement as it applies to the affected Enrolled Lands;

Safe Harbor Agreement Termination

This Agreement shall be for the duration of 40 years. CDFW may terminate this Agreement prior to its expiration under the following conditions.

1. Green Diamond fails to perform a mandatory Management Action after CDFW provides Green Diamond with written notice of a breach of this Agreement and a 60-day opportunity to cure or commence cure of the breach, which Green Diamond fails to do without excuse. A breach of this Agreement by Green Diamond may be excused if it is caused by force majeure conditions such as natural disasters (e.g., fire, earthquake, flood), war, or government actions (e.g., conflict with federal Endangered Species Act) beyond the reasonable control of Green Diamond; or

2. Green Diamond takes any action or actions that individually or cumulatively cause the landscape condition of the Enrolled Lands to be below the baseline; or

3. Based on the 25-Year Adaptive Management Review, CDFW determines that the

Management Actions under this Agreement have not produced a "net conservation benefit" as defined by Fish and Game Code section 2089.4, subdivision (g) for the Covered Species and Green Diamond will not agree to new or revised Management Actions that are expected to provide Net Conservation Benefits for the Covered Species.

4. CDFW determines, in its sole discretion, that the Agreement is not providing the Net Conservation Benefit anticipated or otherwise not satisfying the requirements of the Program.

Green Diamond may terminate this Agreement by providing at least 60 days advance written notice and subject to the requirements of the Safe Harbor Agreement Program for return to baseline.

Green Diamond acknowledges that termination of this Agreement shall result in a loss of the regulatory assurances and the Covered Species incidental take authority provided by the Agreement.

Contact Information

Any formal correspondence that Green Diamond or CDFW submits to the other during implementation of this Agreement shall be delivered to the addresses below. Green Diamond or CDFW shall inform the other of any changes to the contact information below. Notices, reports, and other communications shall reference this Agreement name, Green Diamond, and Agreement number (2089-2016-002-01) in a cover letter and on any other associated documents.

Unless Green Diamond is notified otherwise, CDFW's contact information for written correspondence is:

Neil Manji, Regional Manager
California Department of Fish and Wildlife
Northern Region
601 Locust Street
Redding, CA 96001

And a copy to:

Habitat Conservation Planning Branch
California Department of Fish and Wildlife
Attention: CESA Permitting Program
1416 Ninth Street, Suite 1266
Sacramento, CA 95814
CESA@wildlife.ca.gov

Unless Green Diamond is notified otherwise, CDFW's contact person for purposes of addressing issues that arise during implementation of this Agreement is:

Susan Sniado, Senior Environmental Scientist (Specialist)
619 Second Street
Eureka, CA 95501
(707) 441-3970
susan.sniado@wildlife.ca.gov

Unless CDFW is notified otherwise, Green Diamond's contact information is:

Neal Ewald
P.O. Box 68
Korbel, CA 95550
707-668-3714
707-668-4402

Unless CDFW is notified otherwise, Green Diamond's contact information person for purposes of addressing issues that arise during implementation of this Agreement is:

Desiree Early
P.O. Box 68
Korbel, CA 95550
707-668-4438
707-668-4402

Agreement Findings

These findings document CDFW's compliance with the specific findings requirements set forth in Fish and Game Code section 2089.6 under the State Safe Harbor Agreement Program Act.

(1) CDFW has received a complete application from Green Diamond that contains all of the information required by Fish and Game Code section 2089.8;

(2) Take of the Covered Species as defined in this Agreement will be incidental to the otherwise lawful activities covered under this Agreement;

(3) Implementation of this Agreement is reasonably expected to provide a Net Conservation Benefit to the Covered Species under this Agreement. This finding takes into consideration that the length of this Agreement is of sufficient duration and has appropriate assurances to realize these benefits and that implementation of this Agreement is expected to result in an increase in Covered Species productivity that more than offsets any potential impacts of the take expected from implementation of Management Actions. A summary of Net Conservation Benefit elements follow;

Assisted dispersal commitment:

- Contribute $490,000 in funds and in-kind resources toward feasibility and assisted dispersal.
- Contribute up to an additional $30,000 in adaptive management if more funds are needed.

TREE (tree scorecard)

- Modified TREE to increase score for small cavities and add a point if in the 127,217 acre Marten Special Management Area.
- Use TREE scorecard in all CalWater planning watersheds that marten disperse/expand to.

2,098 acre No-Harvest Marten Reserve

Designated portion of the Marten Special Management Area that is known to be occupied by the Covered Species and will not be subject to timber harvesting during the term of this Agreement. The Marten Reserve Area is shown in Figure 2b.

Marten Special Management Area

127,217 acres identified in connectivity area to maintain advanced stand age

The MSMA will serve several roles providing a Net Conservation Benefit for the Covered Species. The MSMA will serve as the location for assisted dispersal of the Covered Species. The MSMA is a high priority connectivity area and habitat linkage area for marten because of its location between known occupied sites east of the Klamath River and the Redwood National and State Parks (Figure 2b).

Table 1 of the Agreement demonstrates that the average tree age at the end of the permit will be greater than at initiation of the permit for the Enrolled Lands. The MSMA is where the TREE modifications will be used. The Marten Reserve area is inside the MSMA. MSMA and Moore tract are targeted for retention of downed large wood and slash piles.

Within the MSMA Green Diamond will use additional habitat management and monitoring measures (Monitoring and Reporting Requirements, below) to assess whether and how dispersing marten use managed forest lands and the characteristics of habitat features that are most useful to martens.

Expand "single entry" for RMZ to the Moore Tract

Moore Tract is not currently enrolled in the ACHP, but has previous historical marten detections. Single entry into any RMZ segment would apply for the life of the permit (40 years for both the AHCP and this Agreement). Currently Green Diamond could hypothetically enter RMZs on the Moore Tract two to three times.

Known den site habitat retention areas (HRAs) for collared martens from assisted dispersal project. When Green Diamond discovers or is made aware of natal or maternal den structures used by marten, as determined by radio telemetry and camera monitoring through its own or cooperative efforts as part of the assisted dispersal project, Green Diamond shall retain these den structures on the landscape and incorporate tree retention (Commitment 2) around the den structure during and post Timber Operations. The standard for tree retention around a natal den structure will be a no less than 0.5-acre no-harvest HRA. Any Timber Operations conducted within the natal den HRA may only be done in consultation with CDFW and shall be to protect the biological integrity of the site and increase/accelerate development of large trees within the HRA.

Habitat retention around maternal den structures will include any of the following: the individual den structure element (live tree, snag, log, etc.), the individual structure with tree clump retention, or the individual structure and a 0.5-acre HRA with 70 percent over story tree canopy composed of a variety of tree sizes and tree species present in the existing pre-harvest stand. The intent of the tree retention around known den structures will be to incorporate and retain existing biologically important habitat elements such as large trees, snags and large down wood.

Slash Pile Retention

Within the MSMA and the Moore Tract, Green Diamond shall incorporate into THPs a prescription for harvesting practices that creates slash piles to benefit Covered Species occupancy through increased structural complexity, cover, resting and denning habitat. The Covered Species specifically thrive in thick brush habitat, and slash piles will be particularly important for refuge from predators, and there is known use and suspected rest/den sites in Pecwan, so a commitment to retain is in fact valuable for the Covered Species.

Monitoring and Reporting Requirement

Attachment 2 to this Agreement is designed for martens but will also detect other species like fisher, bobcats, etc. Monitoring will also be implemented outside of Enrolled Lands in the marten source area.

Research commitment to accommodate marten-specific research on Enrolled Lands as feasible

Neighboring Landowner Enrollment

Fish and Game Code section 2089.23 allows a landowner that owns land that abuts a property that is enrolled in a state safe harbor agreement to secure incidental take authority so long as certain conditions are met. The ownership and management of areas such as Western Rivers

Conservancy, the Yurok Tribe, and others present unique opportunities for marten conservation. The Yurok Tribe plans to manage the Blue Creek drainage (roughly 17,000 acres) as a tribal park and carbon sequestration project where they will restore late seral forest conditions. The balance of roughly 30,000 acres acquired from Green Diamond are managed as timberland for the production of timber and sequestration of carbon. Approximately 24,000 acres are currently managed under the Yurok HCP, which was created by an assignment and assumption of the Green Diamond AHCP as a means for issuance of an incidental take permit and enhancement of survival permit covering Yurok forest management.

(4) The take authorized by this Agreement will not jeopardize the continued existence of the Covered Species based upon provisions of subdivision (c) of section 2081 of the Fish and Game Code. This finding is based on the best scientific and other information reasonably available, and this finding includes consideration of the Covered Species' capability to survive and reproduce, and any adverse impacts of the taking on those abilities in light of: (1) known population trends; (2) known threats to the Covered Species; and (3) reasonably foreseeable impacts on the Covered Species from other related projects and activities;

(5) Green Diamond has agreed to avoid or minimize, to the maximum extent practicable, any incidental take authorized in this Agreement including when altering or modifying the Enrolled Lands for the purpose of returning lands to baseline conditions;

(6) CDFW has established or approved a monitoring program, based upon objective scientific methodologies, to provide information for CDFW to evaluate the effectiveness and efficiency of this Agreement program, including whether or not conservation benefits set forth in this Agreement are being achieved and whether Green Diamond is implementing the provisions of this Agreement.

(7) Sufficient funding is ensured to determine baseline conditions on the Enrolled Property, implement the Management Actions, and conduct monitoring for the duration of this Agreement; and

(8) Implementation of this Agreement will not be in conflict with any existing CDFW-approved conservation or recovery programs for the species covered by this Agreement.

Figures

Figure 1 Primary Ownership Within Safe Harbor Agreement Area
Figure 2a Marten Safe Harbor Enrolled Lands
Figure 2b Marten Safe Harbor Enrolled Lands and Special Designations
Figure 3 Historic Range of Humboldt Marten
Figure 4 Marten Extent Population Areas
Figure 5 Baseline and Projected Change in Forest Stand Conditions
Figure 6 Example of Riparian Management Zones
Figure 7 Management Tracts on Enrolled Lands

Attachments

Attachment 1 California State Safe Harbor Agreement Program Act
Attachment 2 Marten Monitoring Strategy
Attachment 3 Funding Letter
Attachment 4 Live Tree Retention Scorecard

Authority of Signatory

If the person signing this Agreement (signatory) is doing so as a representative of Green Diamond, the signatory hereby acknowledges that he or she is doing so on Green Diamond's behalf and represents and warrants that he or she has the authority to legally bind Green Diamond to the provisions herein.

Execution and Delivery of this Agreement

Green Diamond shall deliver a fully executed duplicate original of this Agreement by registered first class mail or overnight delivery to the following address:

Habitat Conservation Planning Branch
California Department of Fish and Wildlife
Attention: CESA Permitting Program
1416 Ninth Street, Suite 1266
Sacramento, CA 95814

Signatures

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

on 4/27/2018

Tina Bartlett
Acting Deputy Director
Ecosystem Conservation Division

FOR GREEN DIAMOND RESOURCE COMPANY, PERMITTEE

By: _____ Date: 4/30/18

Neal Ewald, Senior Vice President
California Timberlands

References

Grinnell, J.; Dixon, J.S. 1926. Two new races of the pine marten from the Pacific Coast of North America. Zoology. 21: 411–417.

Grinnell, J.; Dixon, J.S.; Linsdale, J.M. 1937. Fur-bearing mammals of California: their natural history, systematic status, and relations to man, Vol. 1. University of California Press, Berkeley, CA, USA. 375 p.

Slauson, K.M.; Baldwin, J.A.; Zielinski, W.J. 2009a. Status and estimated size of the only remnant population of the Humboldt subspecies of the American marten (*Martes americana humboldtensis*) in northwestern California. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, Arcata, CA, USA. 28 p.

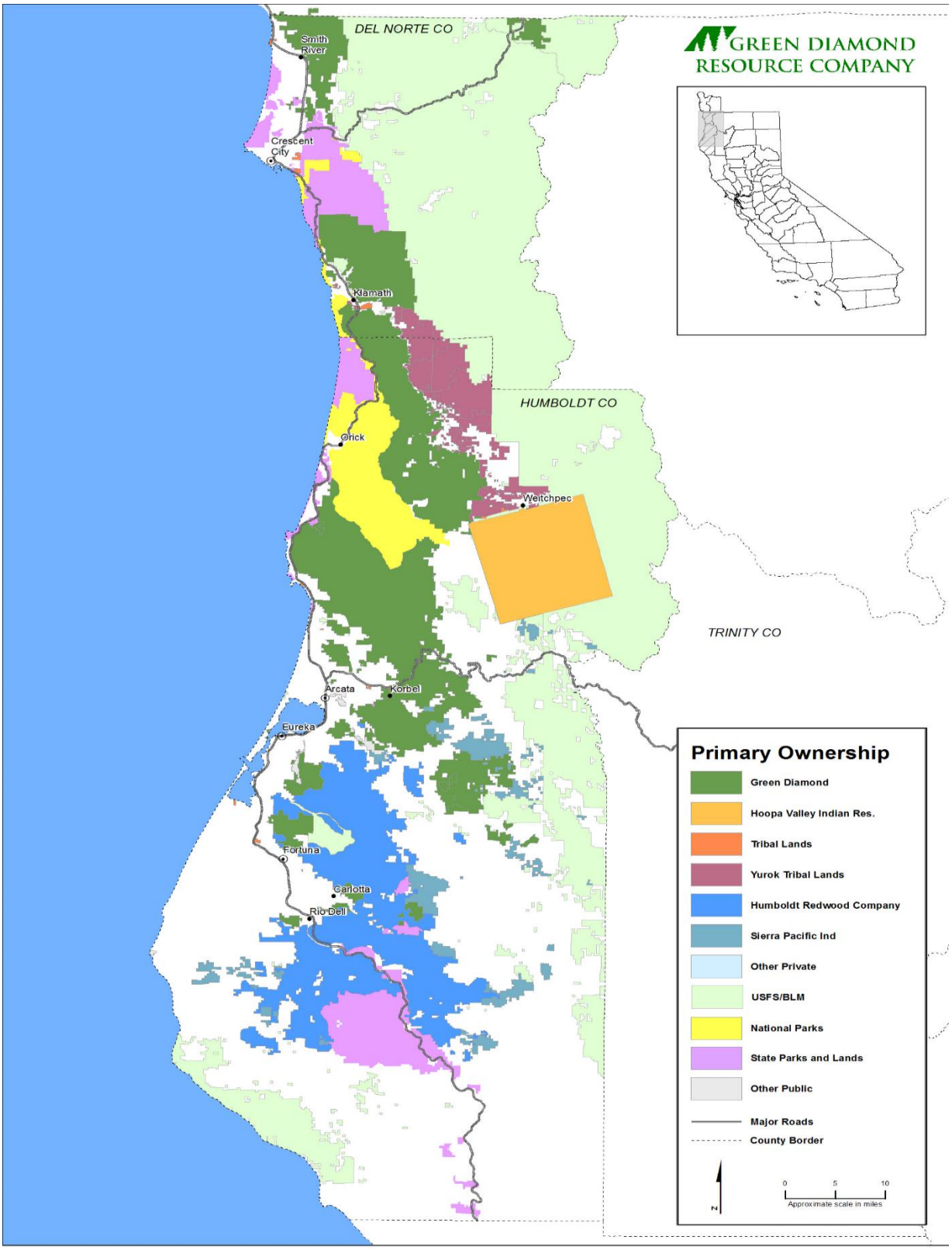

Figure 1. Primary Ownership within Marten Safe Harbor Agreement Area

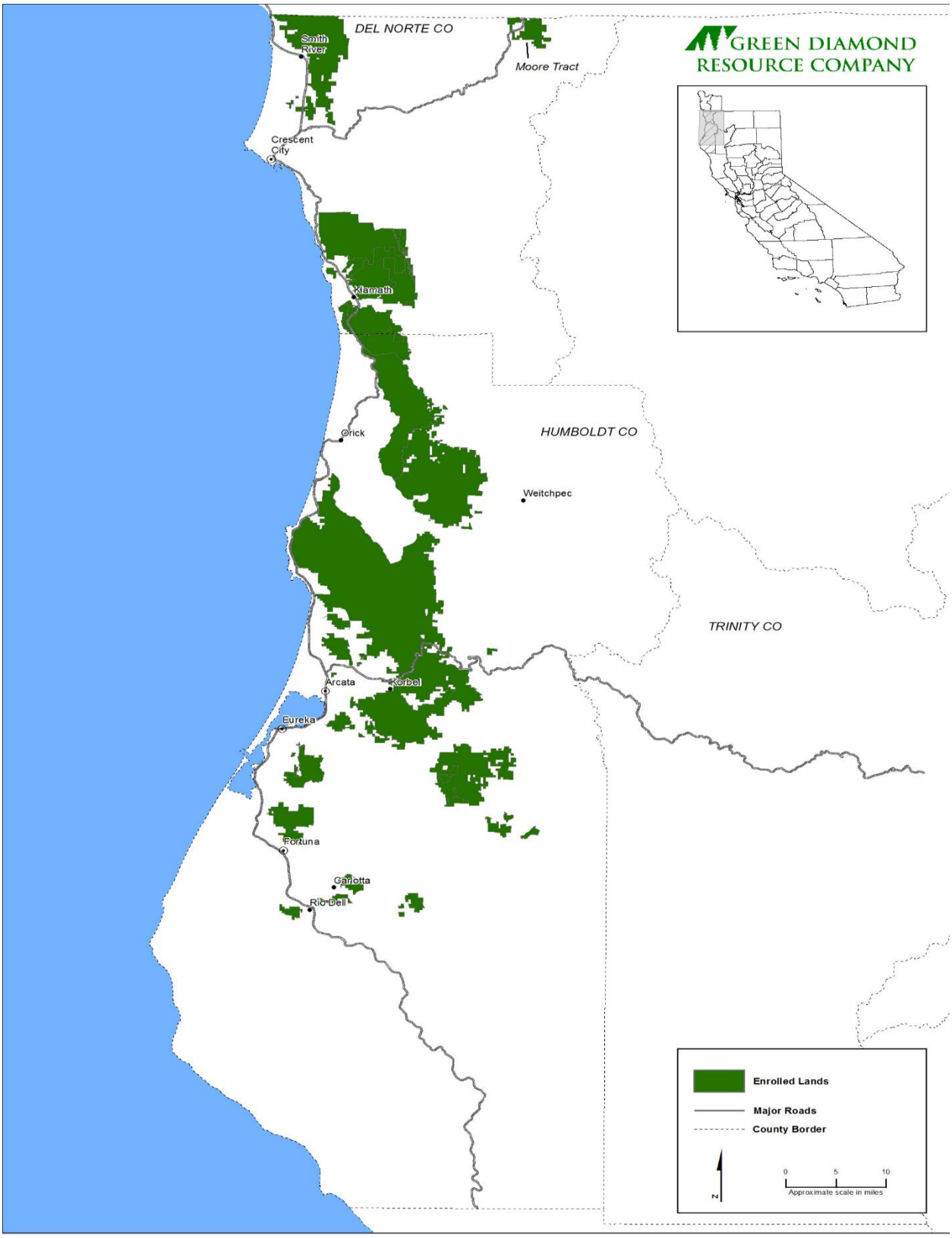

Figure 2a. Marten Safe Harbor Enrolled Lands

2a

January 2018

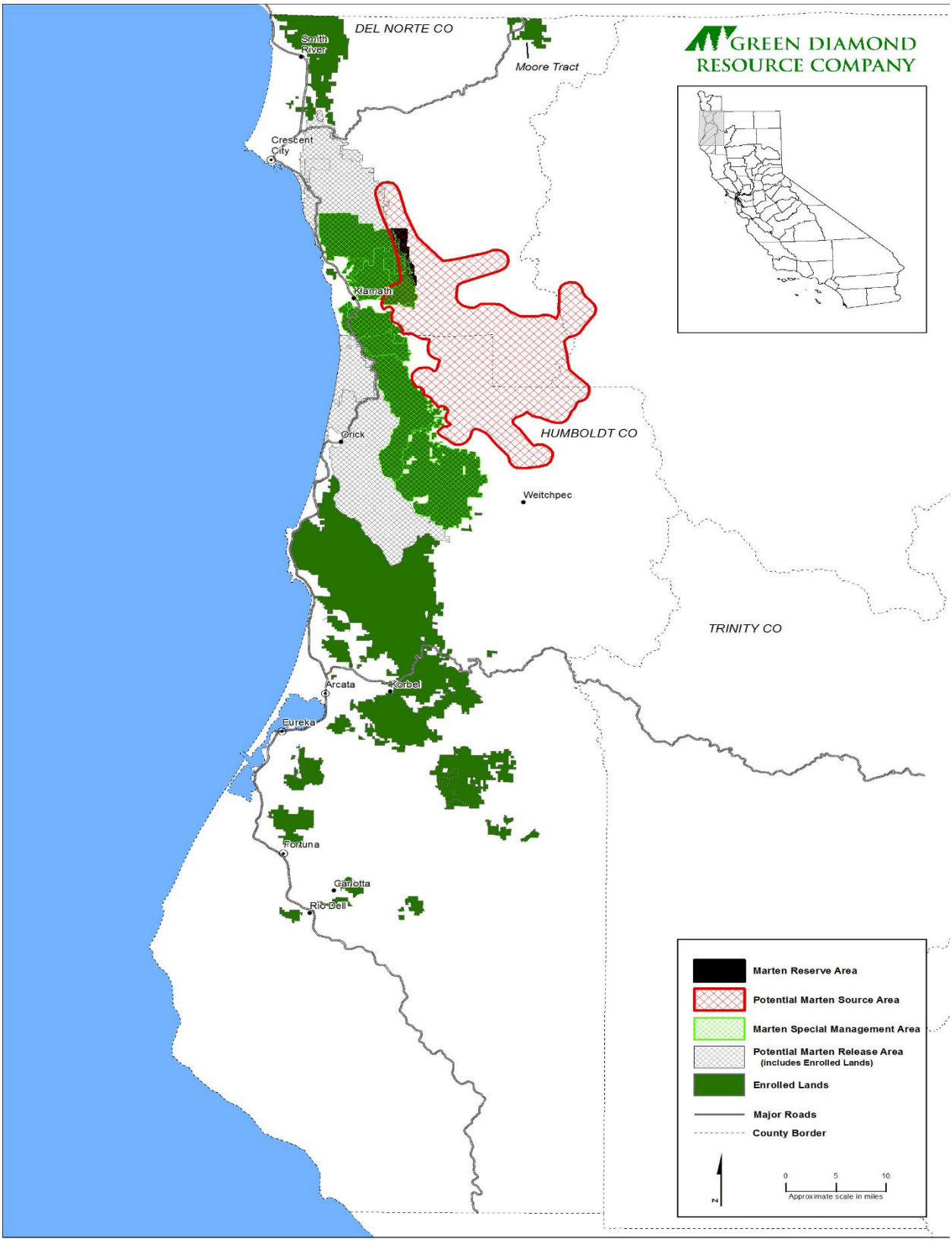

Figure 2b. Marten Safe Harbor Enrolled Lands and Special Designations

2b

January 2018

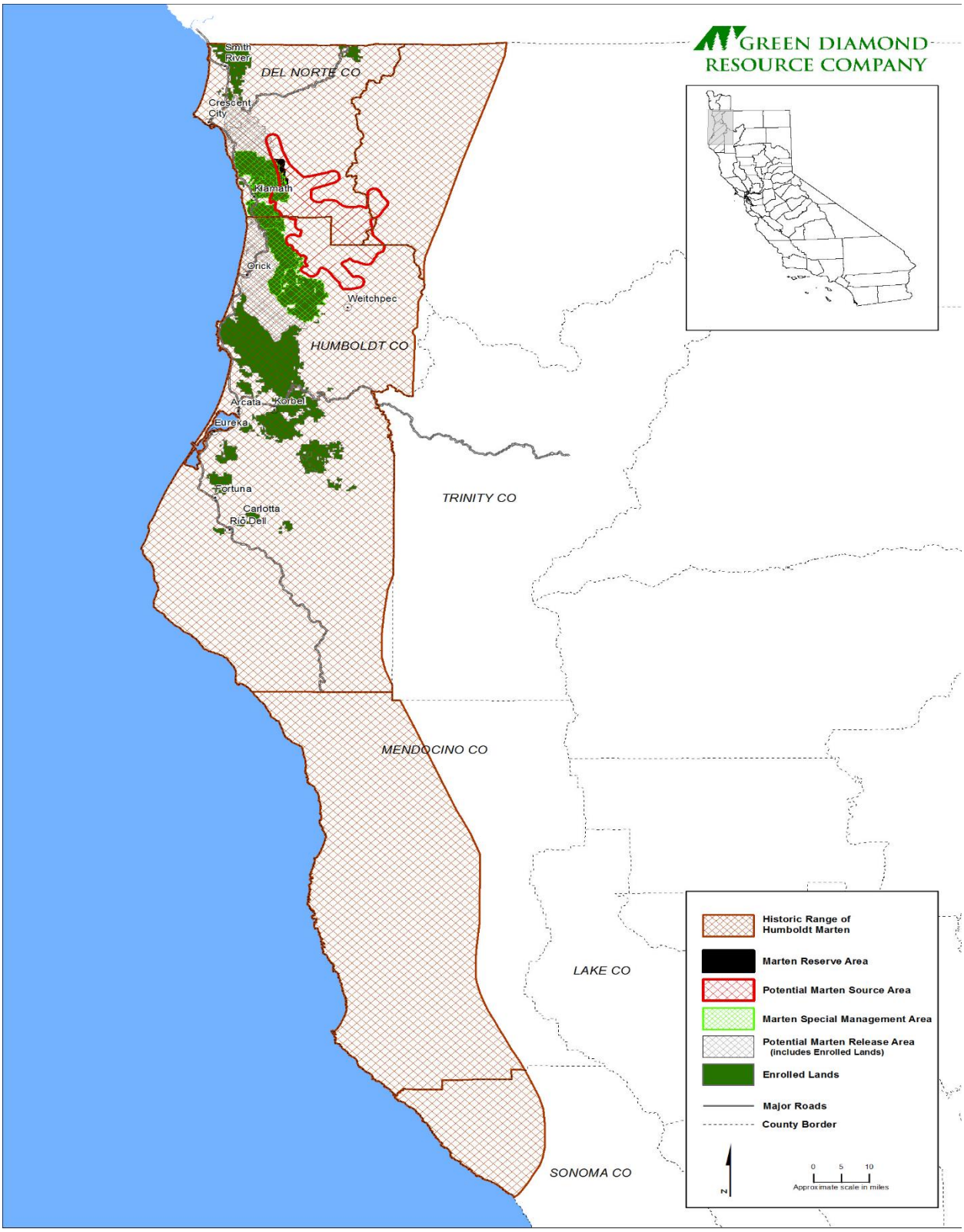

Figure 3. Historic Range of Humboldt Marten (Humboldt Marten Conservation Group 2015)

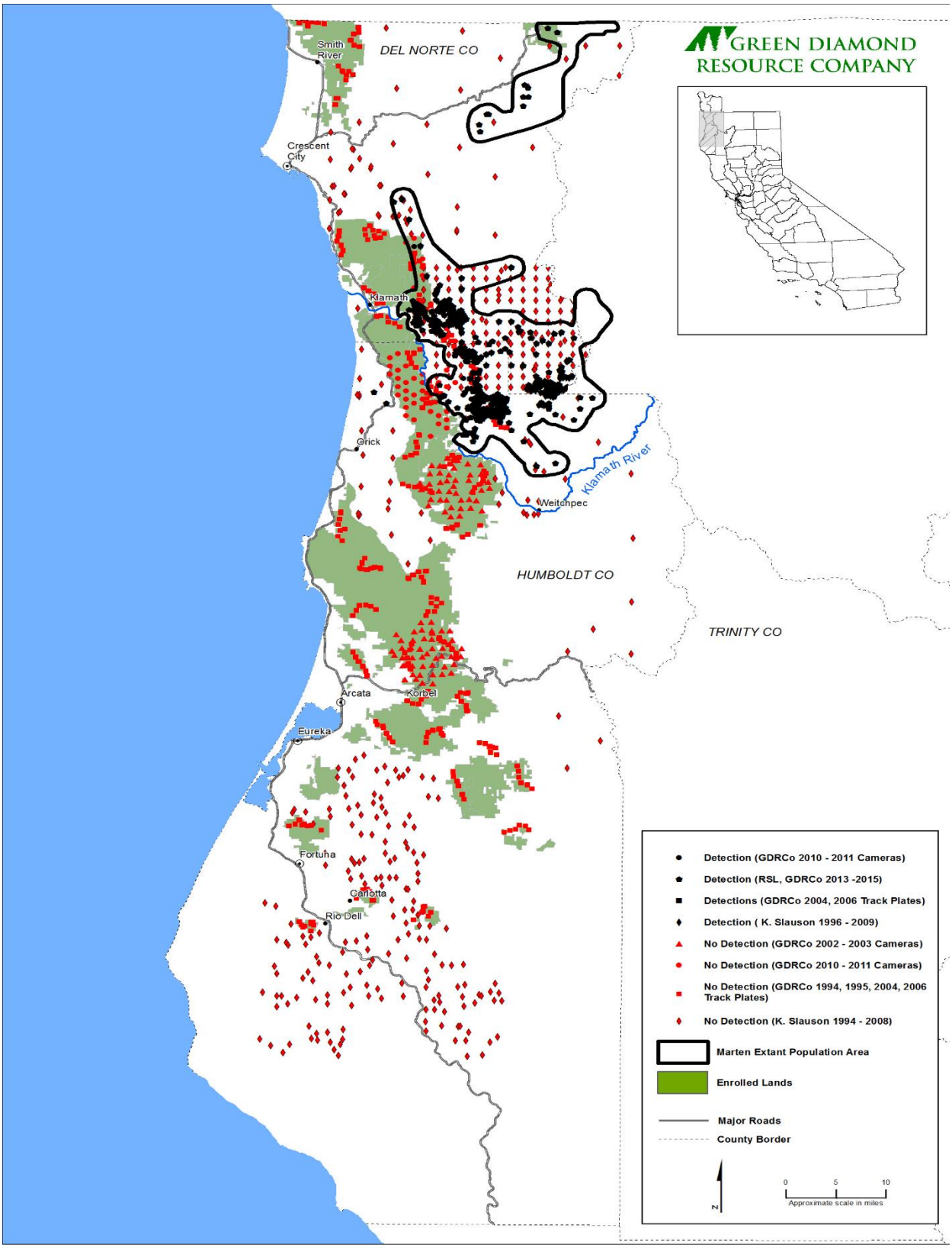

Figure 4. Marten Extant Population Area

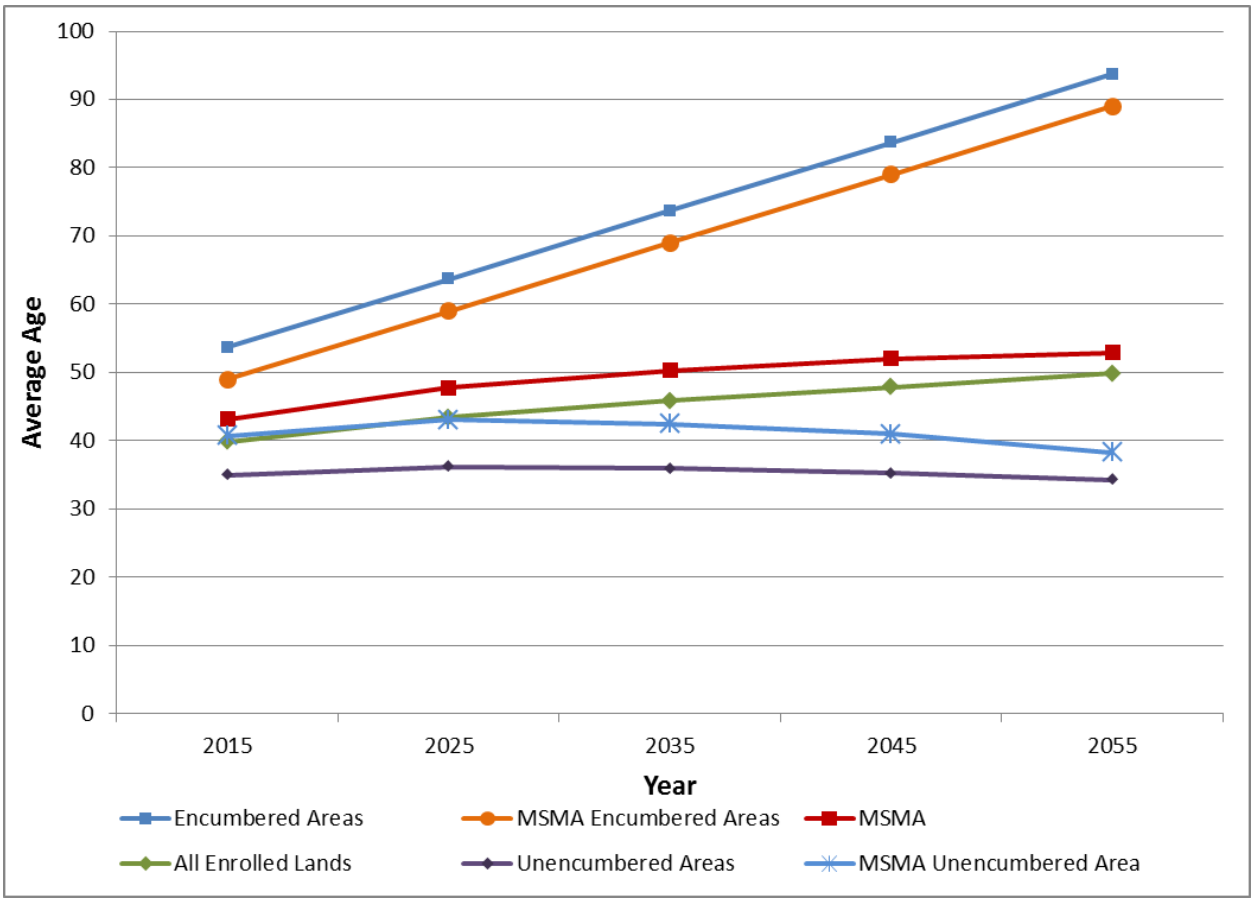

Figure 5. Baseline and Projected Change in Forest Stand Conditions

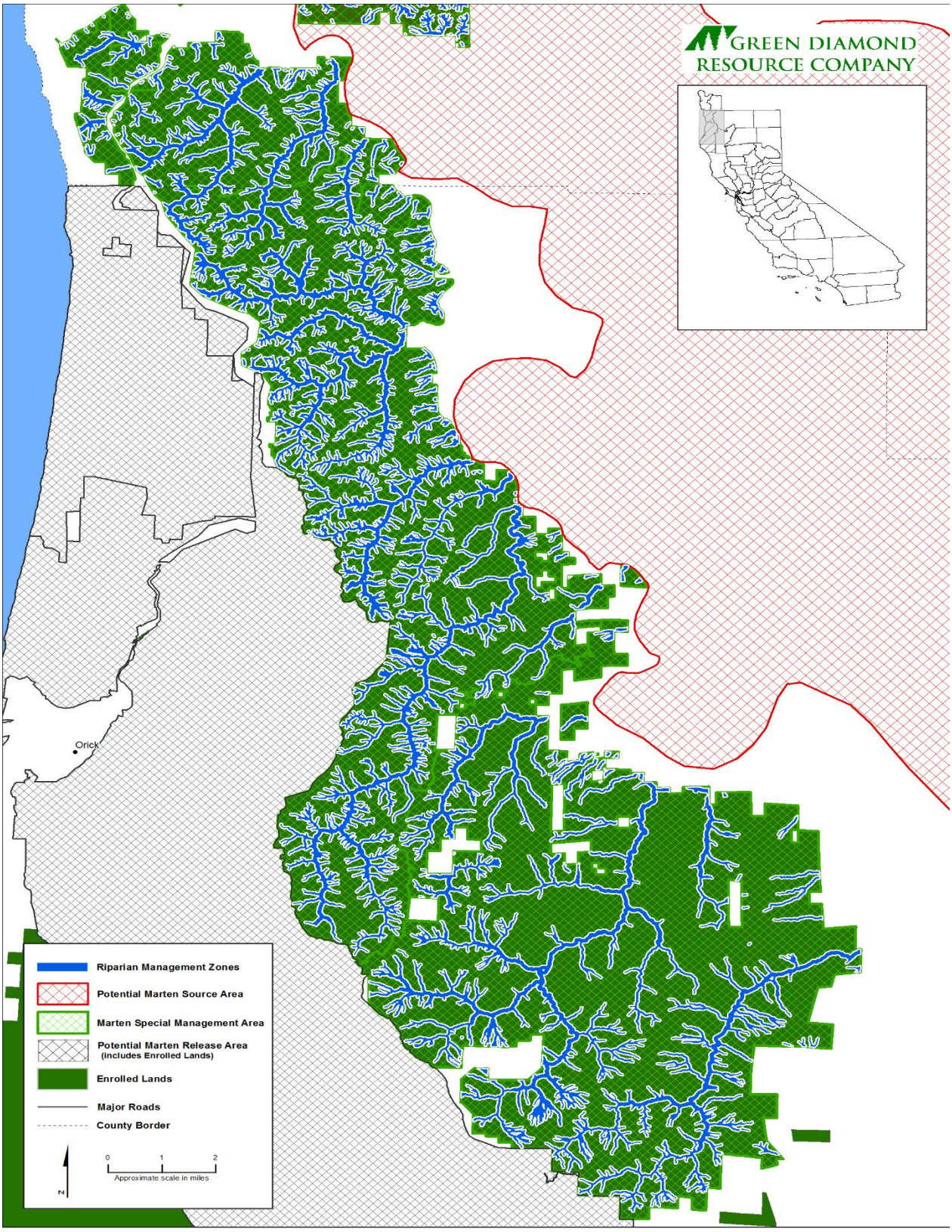

Figure 6. Example of Riparian Management Zones in Marten Special Management Area

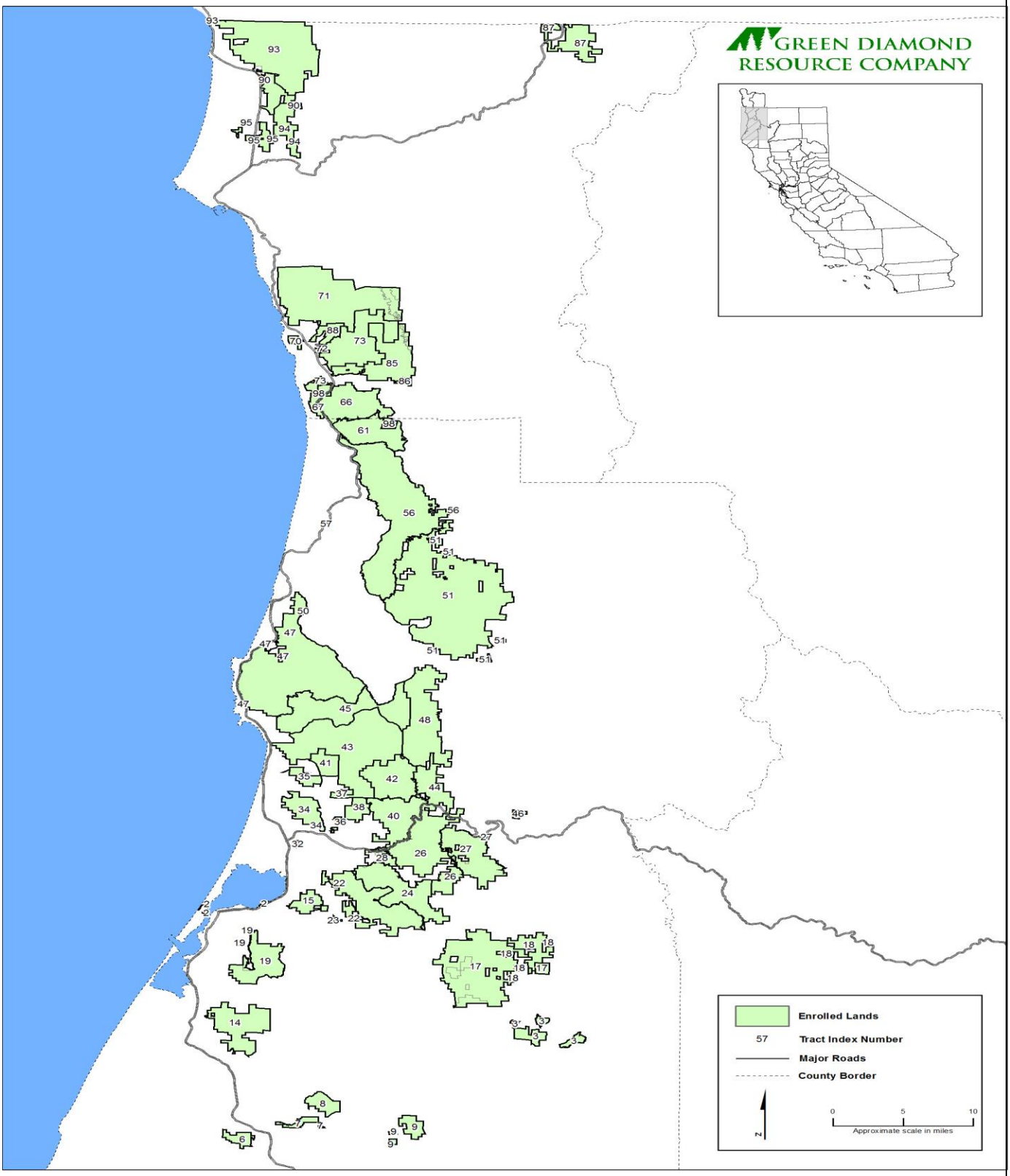

Figure 7. Marten Safe Harbor Enrolled Lands and Tracts

Attachment 1

ARTICLE 3.7. California State Safe Harbor Agreement Program Act [2089.2. - 2089.26.]

(Article 3.7 added by Stats. 2009, Ch. 184, Sec. 1.)

2089.2.

(a) This article shall be known and may be cited as the California State Safe Harbor Agreement Program Act.
(b) The Legislature finds that a key to the goals set forth in this article of conserving, protecting, restoring, and enhancing endangered, threatened, and candidate species, is their habitat. A significant portion of the state's current and potential habitat for these species exists on property owned by private citizens, municipalities, tribes, and other nonfederal entities. Conservation efforts on these lands and waters are critical to help these declining species. Using a collaborative stewardship approach to these lands and waters will help ensure the success of these efforts.
(c) The purpose of this article is to establish a program that will encourage landowners to manage their lands voluntarily to benefit endangered, threatened, or candidate species and not be subject to additional regulatory restrictions as a result of their conservation efforts.
(d) This article does not relieve landowners of any legal obligation with respect to endangered, threatened, or candidate species existing on their land. The program established by this article is designed to increase species populations, create new habitats, and enhance existing habitats. Although this increase may be temporary or long-term, California state safe harbor agreements shall not reduce the existing populations of species present at the time the baseline is established by the department.
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.4.

As used in this article, the following definitions apply:
(a) "Agreement" means a state safe harbor agreement approved by the department pursuant to this article. "Agreement" includes an agreement with an individual landowner and a programmatic agreement.
(b) "Baseline conditions" means the existing estimated population size, the extent and quality of habitat, or both population size and the extent and quality of habitat, for the species on the land to be enrolled in the agreement that sustain seasonal or permanent use by the covered species. Baseline conditions shall be determined by the department, in consultation with the applicant, and shall be based on the best available science and objective scientific methodologies. For purposes of establishing baseline conditions, a qualified person that is not employed by the department may conduct habitat surveys, if that person has appropriate species expertise and has been approved by the department.

(c) “Department” means the Department of Fish and Wildlife, acting through its director or his or her designee.
(d) “Landowner” means any person or nonstate or federal entity or entities that lawfully hold any interest in land or water to which they are committing to implement the requirements of this article.
(e) “Management actions” means activities on the enrolled land or water that are reasonably expected by the department to provide a net benefit to the species or their habitat, or both.
(f) “Monitoring program” means a program established or approved by the department in accordance with subdivision (f) of Section 2089.6.
(g) “Net conservation benefit” means the cumulative benefits of the management activities identified in the agreement that provide for an increase in a species’ population or the enhancement, restoration, or maintenance of covered species’ suitable habitats within the enrolled property. Net conservation benefit shall take into account the length of the agreement, any offsetting adverse effects attributable to the incidental taking allowed by the agreement, and other mutually agreed upon factors. Net conservation benefits shall be sufficient to contribute either directly or indirectly to the recovery of the covered species. These benefits include, but are not limited to, reducing fragmentation and increasing the connectivity of habitats, maintaining or increasing populations, enhancing and restoring habitats, and buffering protected areas.
(h) “Programmatic agreement” means a state safe harbor agreement issued to a governmental or nongovernmental program administrator. The program administrator for a programmatic agreement shall work with landowners and the department to implement the agreement. The program administrator and the department shall be responsible for ensuring compliance with the terms of the agreement.
(i) “Qualified person” means a person with species expertise who has been approved by the department.
(j) “Return to baseline” means, at the termination of an agreement, activities undertaken by the landowner to return the species population or extent or quality of habitat to baseline, excluding catastrophic events such as floods, unplanned fires, or earthquakes, and other factors mutually agreed upon prior to permit issuance and that are beyond the control of the landowner.
(Amended by Stats. 2012, Ch. 559, Sec. 17. Effective January 1, 2013. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.6.

In addition to the other provisions of this article, the department may authorize acts that are otherwise prohibited pursuant to Section 2080 through an agreement, including a programmatic agreement, if all the following conditions are met:
(a) The department receives a complete application containing all of the information described in Section 2089.8.
(b) The take is incidental to an otherwise lawful activity.
(c) The department finds that the implementation of the agreement is reasonably expected to provide a net conservation benefit to the species listed in the application. This finding shall be based, at a minimum, upon the determination that the agreement is of sufficient duration and has appropriate assurances to realize these benefits.

(d) The take authorized by the agreement will not jeopardize the continued existence of the species. This determination shall be made based on the provisions of subdivision (c) of Section 2081.
(e) The department finds that the landowner has agreed, to the maximum extent practicable, to avoid or minimize any incidental take authorized in the agreement, including returning to baseline.
(f) The department has established or approved a monitoring program, based upon objective scientific methodologies, to provide information for the department to evaluate the effectiveness and efficiency of the agreement program, including whether the net conservation benefits set forth in the agreement are being achieved and whether the participating landowner is implementing the provisions of the agreement.
(g) The department has determined that sufficient funding is ensured, for it or its contractors or agents, to determine baseline conditions on the property, and that there is sufficient funding for the landowner to carry out management actions and for monitoring for the duration of the agreement.
(h) Implementation of the agreement will not be in conflict with any existing department-approved conservation or recovery programs for the species covered by the agreement.
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.8.

The landowner shall submit all of the following:
(a) A detailed map depicting the land proposed to be enrolled in the agreement.
(b) The common and scientific names of the species for which the landowner requests incidental take authorization.
(c) A detailed description of the landowner's current land and water use and management practices that affect the covered species, and the habitat of the covered species, for which the landowner requests incidental take authorization.
(d) A detailed description of the landowner's future land and water use and management practices that may affect the covered species, and the habitat of the covered species, for which the landowner requests incidental take authorization. This description shall be used only for informational and planning purposes.
(e) The proposed duration of the agreement that is sufficient to provide a net conservation benefit to the species covered in the permit and an explanation of the basis for this conclusion.
(f) A detailed description of the proposed management actions and the timeframe for implementing them.
(g) A description of the possible incidental take that may be caused by the management actions and of the anticipated species populations and habitat changes over the duration of the permit.
(h) A detailed description of the proposed monitoring program.
(i) Any other information that the department may reasonably require in order to evaluate the application.
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.9.

(a) As used in this section, “proprietary information” means information that is all of the following:
(1) Related to an agricultural operation or land that is a part of an agricultural operation.
(2) A trade secret, or commercial or financial information, that is privileged or confidential, and is identified as such by the person providing the information to the department.
(3) Not required to be disclosed under any other provision of law or any regulation affecting the land or the agricultural operation on the land.
(b) Proprietary information received by the department pursuant to Section 2089.8 is not public information, and the department shall not release or disclose the proprietary information to any person, including any federal, state, or local governmental agency, outside of the department.
(c) Notwithstanding subdivision (b), the department may release or disclose proprietary information received pursuant to Section 2089.8 to the following entities under the following circumstances:
(1) Any person or federal, state, or local governmental agency, to enforce this article.
(2) Any person or federal, state, or local governmental agency working in cooperation with the department to provide technical or financial assistance for the purposes of implementing the program established by this article.
(3) Any entity, to the extent that the owner, operator, or producer has consented to the release or disclosure.
(4) The general public, if the information has been transformed into a statistical or aggregate form without identifying any individual owner, operator, or producer, or the specific location from which the information was gathered.
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.10.

If an agreement has been approved and the department finds that the agreement is being properly implemented, the department shall allow the landowner to alter or modify the enrolled property, even if that alteration or modification will result in the incidental take of a listed species, to the extent that the alteration or modification returns the species to baseline conditions.
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.12.

(a) Unless the department determines that it is inappropriate to do so based on the nature of the management actions being proposed, the species listed in the permit, or other factors, the agreement shall require that the landowner provide the department with at least 60 days’ advance notice of any of the following:
(1) Any incidental take that is anticipated to occur under the agreement.
(2) The landowner’s plan to return to baseline at the end of the agreement.

(3) Any plan to transfer or alienate the landowner's interest in the land or water.
(b) (1) If the department receives any notice described in subdivision (a), the landowner shall provide the department, its contractors, or agents with access to the land or water for purposes of safely removing or salvaging the species.
(2) The department shall provide notice to the landowner at least seven days prior to accessing the land or water for the purposes of paragraph (1). The notice shall identify each person selected by the department, its contractors, or agents to access the land or water.
(3) Notwithstanding paragraph (1), during the seven-day notice period, a landowner may object, in writing, to a person selected to access the land or water. If a landowner objects, another person shall be selected by the department, its contractors, or agents, and notification shall be provided to the landowner pursuant to paragraph (2). However, if a landowner objects to a selection on two successive occasions, the landowner shall be deemed to consent to access to the land or water by a person selected by the department, its contractors, or agents. Failure by a landowner to object to the selection within the seven-day notice period shall be deemed consent to access the land or water by a person selected by the department, its contractors, or agents.
(4) If the landowner objects to a person selected to access the land or water pursuant to paragraph (3), the 60-day notice period described in subdivision (a) shall be tolled for the period between the landowner's objection to a person selected for access to the land or water and the landowner's consent to a person selected for access to the land or water.
(Amended by Stats. 2010, Ch. 328, Sec. 66. Effective January 1, 2011. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.14.

An agreement may be amended with the mutual consent of the landowner and the department.
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.16.

If a landowner seeks to sell, transfer, or otherwise alienate the land or water enrolled in the agreement during the term of the agreement, the person or entity assuming that interest in the property shall (a) assume the existing landowner's duties under the agreement, (b) enter into a new agreement with the department, or (c) withdraw from an existing agreement under the terms provided in the agreement, as approved by the department.
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.18.

The suspension and revocation of the agreement shall be governed by suspension and revocation regulations adopted by the department.
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of

January 1, 2020, pursuant to Section 2089.26.)

2089.20.

(a) This section does not provide the public a right of entry onto the enrolled land or water. The landowner shall provide the department, its contractors, or agents with access to the land or water proposed to be enrolled in the agreement to develop the agreement, determine the baseline conditions, monitor the effectiveness of management actions, or safely remove or salvage species proposed to be taken.
(b) The department shall provide notice to the landowner at least seven days before accessing the land or water for the purposes of subdivision (a). The notice shall identify each person selected by the department, its contractors, or agents to access the land or water.
(c) Notwithstanding subdivision (a), during the seven-day notice period, a landowner may object, in writing, to a person selected to access the land or water. If a landowner objects, another person shall be selected by the department, its contractors, or agents, and notification shall be provided to the landowner pursuant to subdivision (b). However, if a landowner objects to a selection on two successive occasions, the landowner shall be deemed to consent to access to the land or water by a person selected by the department, its contractors, or agents. Failure by a landowner to object to the selection within the seven-day notice period shall be deemed consent to access the land or water by a person selected by the department, its contractors, or agents.
(d) (1) Notwithstanding any other law, the landowner is not required to do either of the following:
(A) Maintain enrolled land or water, or land or water proposed to be enrolled in an agreement, in a condition that is safe for access, entry, or use by the department, its contractors, or agents for purposes of providing access pursuant to subdivision (a).
(B) Provide to the department, its contractors, or agents, any warning of a hazardous condition, use, structure, or activity on enrolled land or water, or land or water proposed to be enrolled in an agreement, for purposes of providing access pursuant to subdivision (a).
(2) Notwithstanding any other law, the landowner shall not be liable for any injury, and does not owe a duty of care, to the department, its contractors, or agents resulting from any act or omission described in subparagraph (A) or (B) of paragraph (1).
(3) The provision of access to land pursuant to subdivision (a) shall not be construed as any of the following:
(A) An assurance that the land or water is safe.
(B) A grant to the person accessing the land or water of a legal status for which the landowner would owe a duty of care.
(C) An assumption of responsibility or liability for any injury to a person or property caused by any act of the person to whom access to the land or water is provided.
(4) Notwithstanding paragraphs (1) to (3), inclusive, this subdivision shall not be construed to limit a landowner's liability for an injury under either of the following circumstances:
(A) Willful or malicious failure to guard or warn against a dangerous condition, use, structure, or activity on the land or water.
(B) Express invitation to a person by the landowner to access the land or water, in a

manner that is beyond the access required to be provided pursuant to subdivision (a).
(e) Nothing in this section creates a duty of care or a ground of liability for injury to person or property.
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.22.

(a) If a federal safe harbor agreement has been approved pursuant to applicable provisions of federal law and the federal safe harbor agreement contains species that are endangered, threatened, or are candidate species pursuant to this chapter, no further authorization or approval is necessary under this article for any person authorized by that agreement to take the species identified in and in accordance with the federal Safe Harbor Agreement, if that person and the department follow all of the procedures specified in Section 2080.1, except that the determination of consistency shall be made by the department based only on the issuance criteria contained in this article.
(b) The department may adopt nonregulatory guidelines to clarify how the provisions of this chapter may be used in connection with voluntary local programs for routine and ongoing agricultural activities adopted pursuant to Article 3.5 (commencing with Section 2086) and natural community conservation plans adopted pursuant to Chapter 10 (commencing with Section 2800).
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.23.

(a) A landowner that owns land that abuts a property enrolled in a state safe harbor agreement shall not be required, for purposes of an incidental take permit, to undertake the management activities set forth in the state safe harbor agreement, if all of the following conditions are met:
(1) The neighboring landowner allows the department to determine baseline conditions on the property.
(2) The neighboring landowner agrees to maintain the baseline conditions for the duration specified in the safe harbor agreement.
(3) The department determines that allowing the neighboring landowner to receive an incidental take permit for the abutting property does not undermine the net conservation benefit determination made by the department in the approval of the safe harbor agreement.
(4) The take authorized by the department will not jeopardize the continued existence of the species. This determination shall be made in accordance with subdivision (c) of Section 2081.
(b) (1) Unless the department determines that it is inappropriate to do so based on the species listed in the permit, or any other factors, the neighboring landowner shall provide the department with at least 60 days' advance notice of any of the following:
(A) Any incidental take that is anticipated to occur under the permit.
(B) The neighboring landowner's plan to return to baseline conditions.

(C) Any plan to transfer or alienate the neighboring landowner's interest in the land or water.
(2) (A) If the department receives any notice described in paragraph (1), the neighboring landowner shall provide the department, its contractors, or agents with access to the land or water for purposes of safely removing or salvaging the species.
(B) The department shall provide notice to the neighboring landowner at least seven days before accessing the land or water for the purposes of subparagraph (A). The notice shall identify each person selected by the department, its contractors, or agents to access the land or water.
(C) Notwithstanding subparagraph (B), during the seven-day notice period, the neighboring landowner may object, in writing, to a person selected to access the land or water. If the neighboring landowner objects, another person shall be selected by the department, its contractors, or agents, and notification shall be provided to the neighboring landowner pursuant to subparagraph (B). However, if the neighboring landowner objects to a selection on two successive occasions, the neighboring landowner shall be deemed to consent to access to the land or water by a person selected by the department, its contractors, or agents. Failure by the neighboring landowner to object to the selection within the seven-day notice period shall be deemed consent to access the land or water by the person selected by the department, its contractors, or agents.
(Amended by Stats. 2010, Ch. 328, Sec. 67. Effective January 1, 2011. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.24.

The department, for informational purposes, shall maintain a list of qualified persons who have worked with the department on an approved agreement, and persons, entities, and organizations serving as program administrators for approved agreements.
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.25.

The department may promulgate regulations to implement this article.
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of January 1, 2020, pursuant to Section 2089.26.)

2089.26.

This article shall remain in effect only until January 1, 2020, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2020, deletes or extends that date.
(Added by Stats. 2009, Ch. 184, Sec. 1. Effective January 1, 2010. Repealed as of January 1, 2020, by its own provisions. Note: Repeal affects Article 3.7, commencing with Section 2089.2.)

Marten Monitoring Strategy - Safe Harbor Agreement

Introduction

Green Diamond has committed to use non-invasive survey techniques (i.e., remote cameras) to survey for presence-absence of Humboldt marten *(Martes caurina humboldtensis*) within portions of the enrolled lands (MSMA, Moore Tract) and portions of the potential marten source area (Figure 1). Presence (detection) and apparent absence (non-detection) are the biological outcome of sampling that result from detection or non-detection of the target species (Mackenzie and Royle 2005). Within three years of approval, Green Diamond proposes to survey for Humboldt marten and estimate occupancy or proportion of area used as a state variable on enrolled lands.

Proportion of area used is considered a more appropriate state variable for analysis of detection/non-detection data for wide ranging territorial carnivores that may not "occupy" a sampling plot (in our case the camera station) due to disparate sizes of home ranges within continuous habitat relative to the unknown plot size of baited camera stations (Efford and Dawson 2012, Royle and Nichols 2003). When plot size is small (or unknown) relative to home range size, proportion of area used is the more appropriate state variable (MaKenzie et al. 2004). Henceforth, occupancy and proportion of area used are considered synonymous. The analytical methods incorporate imperfect detection or detection probability (*p*) as a nuisance variable into estimates of the state variable, occupancy (ψ) and have this advantage over simple indices of population density (Efford and Dawson 2012).

Analysis of Pilot Study Data

To inform future marten survey protocols, West Inc. statistical consultants conducted an analysis based on pilot data Green Diamond Resource Company collected during non-invasive surveys for martens (Hamm et al. 2012). The analysis addressed the following objectives:

1. Analyze pilot data to estimate the detection probability of martens surveyed using a paired-camera setup at bait stations.
2. Describe the tradeoff between survey effort (i.e., length of time cameras are deployed) and estimates of detection probability from an occupancy model.

The dataset contained detection/non-detection data collected at eight sites, and each site was comprised of two independent cameras focused on a single bait station. The data consisted of summarized encounter histories, one per camera, where each day was considered a capture occasion. Values within the encounter history could be one (marten detected that day), zero (no marten detected that day), or NA (no camera deployed that day). The number of days cameras were deployed at a site ranged from 28 – 57 days.

Methods

We calculated the proportion of sites that had accumulated at least one marten detection over the course of the study (from 6 – 57 days). Next, we fit an occupancy model to the full dataset, estimating the detection probability (p). We used a single-season occupancy model (MacKenzie et al. 2002) fit using the unmarked package (Fiske and Chandler 2011) in Program R (R Core Team 2017) for all analyses.

We also conducted a simulation to describe the tradeoff between survey effort (i.e., the length of time cameras are deployed, hereafter "study length") and the stability of the detection-accumulation pattern and the stability and precision of estimates of p from occupancy models. We re-ran the analysis after selecting a hypothetical study length and randomly selecting the start of the hypothetical study. In all, we ran the analysis 520 times, once for each of 52 study lengths times each of 10 randomly selected study starts. The shortest study we considered was the number of days it took to record the first detection (6 days), and the longest study length we considered was the full study (57 days). For each study length, we randomly selected 10 study periods of that length from the data, and refit the occupancy model to that data subset. The number of possible study periods declined as study length increased, so all estimates converge at the maximum study length of 57 days.

Results of Pilot Analysis

The first marten was detected on day 6, and all sites (but not all cameras) had detected a marten by day 17 (Figure 1). Using the full data set, the probability of detecting a marten at a site given it was present was 0.703 (95% CI = 0.514 – 0.841).

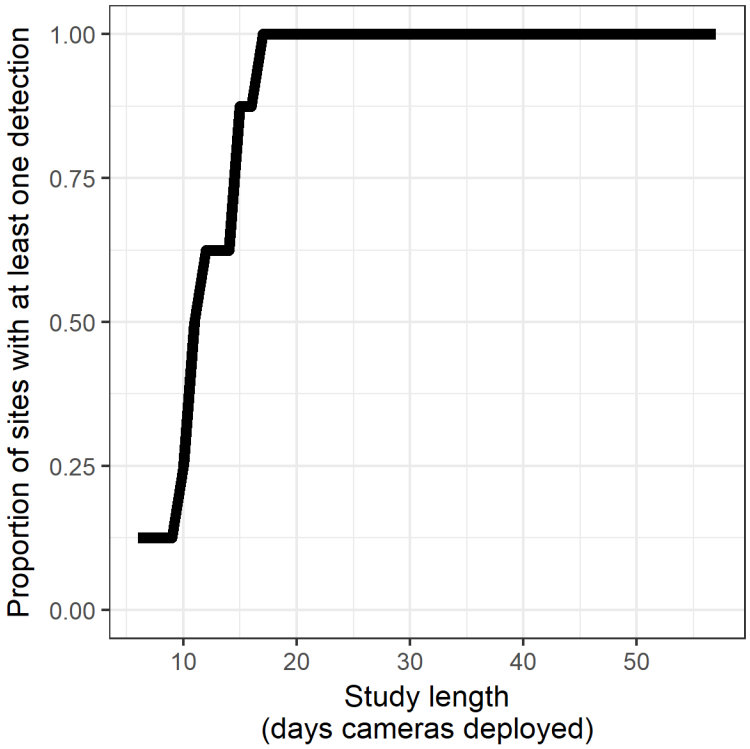

Figure 1. Detection-accumulation curve for full dataset of marten surveys at eight sites in 2011.

Across simulated subsets of the dataset of various lengths, the earliest that all sites had detected a marten was day 13 (Figure 2). The probability of detecting a marten at a site given it was present ranged widely from 0 – 1 across the simulated datasets (Figure 2). The point estimates for detection probability stabilized with increasing study length, with a noticeable gain for surveys longer than ~20 days (Figure 3).

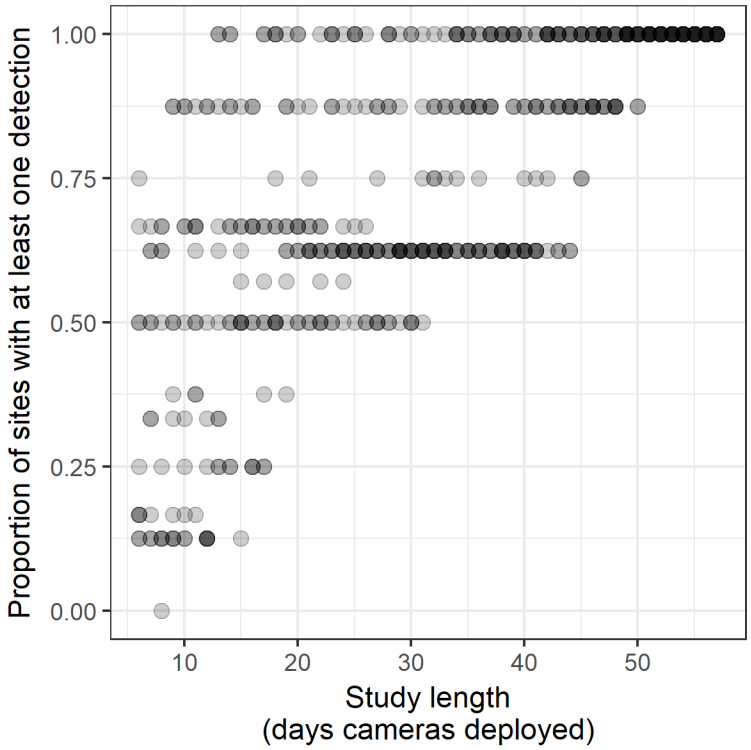

Figure 2. Detection-accumulation patterns across simulated subsets of marten survey data collected at eight sites in 2011. Points are transparent, so darker colors represent more realizations of the simulation that had the same value.

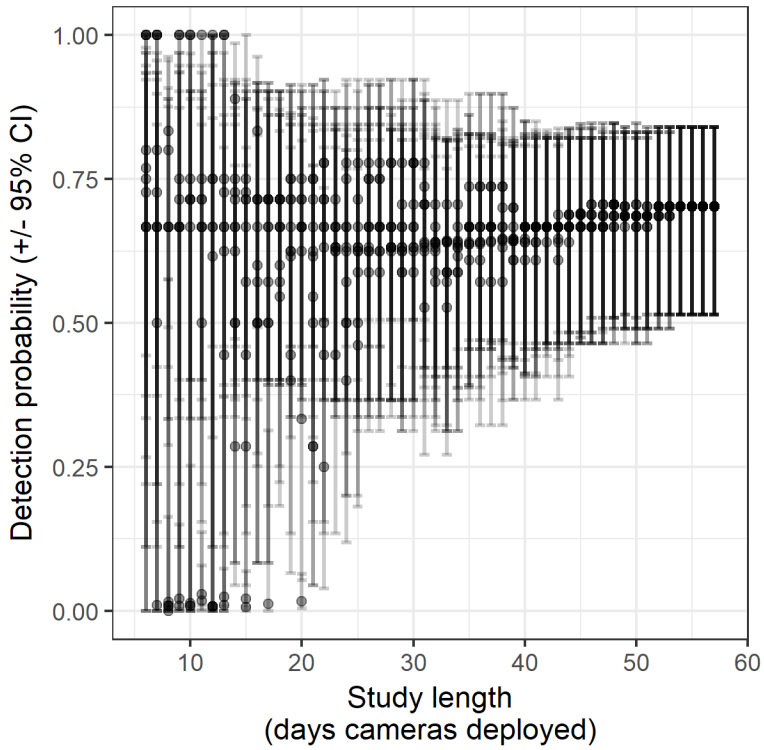

Figure 3. Point estimates (and 95% confidence interval) of detection probability (p) across simulated subsets of marten survey data collected at eight sites in 2011. Points and error bars are transparent, so darker colors represent more realizations of the simulation that had the same value.

Proposed Field Methods

To accomplish Marten Monitoring and Reporting Commitment Two, Green Diamond will establish a randomly located sampling frame for remote camera stations within its Initial Enrolled Lands and portions of the potential marten source area formerly owned by Green Diamond and now held in ownership by Western Rivers Conservancy and the Yurok Tribe.

An example sampling frame consists of points centered at 2-km grid spacing. The spacing between sampling units (camera sites) was chosen based on prior work conducted on Humboldt marten (Slauson et al. 2007) within the region (Figure 4). There are approximately 128 sample units within the MSMA and 37 sample units within the source area owned by the Yurok Tribe and Western Rivers Conservancy. The survey area may expand as agreed to by the Department and Green Diamond to include more of the IEL (Marten Monitoring and Reporting Commitment Five). Survey design is intended to be complimentary to and compatible with other regional survey efforts for marten. As part of a proposed Federal Habitat Conservation Plan, Green Diamond intends to conduct similar non-invasive surveys for fisher (*Pekania pennanti*). Those surveys would also be suitable for detecting marten. Approximately 64 sampling units for fisher occur on the enrolled lands outside of the MSMA and potential marten source area. The difference in survey protocol for fisher and marten is the spacing of sampling units. The fisher

surveys will occur at a 4-km grid spacing as compared to 2-km for marten. However, all other aspects of the protocol will be identical, so surveys at the 4-km spacing will also be suitable for detecting marten.

Sampling will consist of one or two cameras (Reconyx Hyperfire HC500, HC600, PC800 or PC900) placed at the center (within the limits of accuracy of the GPS units) or within 100 m of the center of the grid location if hazardous terrain or other obstacles limit access to the site center. If placement of cameras within 100-m of the site center cannot be achieved, a site-specific evaluation will be made to determine if placement beyond 100-m raises concern over independence of adjacent sampling units. It may be possible to move site centers in a random direction to avoid issues of site independence. Sampling units will be located in the field with handheld global positioning systems and maps with light imaging detection and ranging base information (LiDAR). Whenever possible, cameras will be placed at the center of the sampling location based on accuracy of handheld GPS units and LiDAR maps. The actual location of sampling units in the field will be semi-permanent to adhere to goals and objectives for monitoring under the safe harbor agreement (Marten Monitoring and Reporting Commitment Two) to achieve multiple estimates of occupancy and distribution over time and assess variation in those estimates and distribution of marten over the permit term. In this survey, each grid location represents a site or plot and the camera station is the location where data are gathered within continuous habitat. The detection zone for a sampling unit is some unknown maximum area around the camera location potentially containing marten home range(s) with some chance of the marten(s) moving into the detection zone during the sampling period (Burton et al. 2015). The maximum detection zone of the cameras is approximately 18-m, but the actual detection zone of the cameras to the bait tree will typically be less than 10-m.

Green Diamond anticipates initially using two cameras at approximately fifty percent of survey stations to further evaluate influence of multiple cameras on estimates of detection probability. The settings on each camera will be standardized and reported. For example, the sensitivity of the camera, delay between pictures, height above ground and distance to bait.

The outcome of the survey at a site is a series of detection (1), non-detection (0) data, or a non-functional device. Green Diamond will use these repeat surveys at independent sample sites to estimate probability of detection and the outcome of presence at sample sites will be used to estimate occupancy of the survey area. Cameras will be placed on trees 1-2-m above the ground and focused on a piece of chicken attached to a nearby tree within 3-5-m of the camera location (Figure 5). A commercial trapping lure (Caven's Gusto) will be placed on the bait tree as an added attractant. Cameras will be deployed for at least 21 days based on prior analyses of pilot data and will be checked and rebaited weekly. A three-week survey period is represented by the initial deployment and baiting followed by a rebaiting/check at one week, a rebaiting/check at two weeks, and a final check/removal of equipment at three weeks. Detection data from cameras will be transferred at each weekly check period by switching secure data cards and downloading information to a computer database at the office. Detection results will be recorded in the database and catalogued with photographic evidence of detections. Surveys will be conducted during the six-month period from November through April. The survey area will be divided into subareas to accommodate logistical considerations regarding the number of

sampling units that can be deployed and checked on a weekly basis. Green Diamond estimates that one technician can deploy and check approximately 25 sampling units during each 21-day survey period. An assumption in this survey approach is that occupancy state does not change within the 21-day survey period (i.e., there is closure and no temporary emigration). A sampling unit is occupied if it overlaps with any marten home range and the marten is detected, but the plot may not be instantaneously occupied given marten movement within the home range (Efford and Dawson 2012). Temporary absence within a plot due to movements within a home range is absorbed in calculations of detection probability. As Green Diamond accumulates survey information and occurrence data on marten, additional analyses can be conducted to predict probability of occupancy by marten within the survey area of the IEL. Green Diamond will attempt a modeling effort to associate habitat information stored within its FRIS with marten detection and non-detection data from the camera surveys. A variety of habitat and physiographic variables may help to predict marten probability of occupancy within the IEL. Ultimately, these data will help inform various adaptive management approaches available within the SHA.

As field and analytical techniques are refined and developed, modifications to the protocol may be undertaken as agreed to by Green Diamond and the Department. However, the primary goal will be to conduct surveys within the IEL to allow for a consistent estimate of marten occupancy through time. The proposed protocol is based upon the best available information for Humboldt marten. Past non-invasive surveys found that marten were rare or absent from the majority of IEL and surrounding lands and that occupancy was confirmed in two locations on the IEL based upon Green Diamond's systematic and opportunistic survey efforts using remote cameras. The two occupied locations are Rattlesnake Mountain reserve area and the Moore tract near the Oregon border. **Summary of Marten Monitoring Commitments Related to Non-invasive Surveys:**

Marten Monitoring and Reporting Commitment Two: Within three years of Safe Harbor Agreement approval, Green Diamond will use non-invasive survey results to estimate marten occupancy within the Special Management Area and Lands Eligible for Enrollment that are located within the Potential Marten Source Area. A summary of occupancy surveys will be submitted in each annual report. An analysis of occupancy rates will be submitted in the fourth annual report.

Marten Monitoring and Reporting Commitment Three: After an initial effort to assess occupancy of marten within the Special Management Area (lasting 3 years), Green Diamond shall continue to monitor marten occupancy by conducting non-invasive surveys on at least one-half of the Special Management Area every five years such that a complete survey would occur by year ten. A summary of occupancy surveys and estimates will be included in annual reports coincident with the survey intervals.

Marten Monitoring and Reporting Commitment Four: After two complete surveys to assess marten occupancy within the Special Management Area, provided that (contingent upon) the existence of adequate sample size for analysis, Green Diamond shall attempt to develop a model estimating the probability of marten occupancy and associate with various habitat and

physiographic variables. This modelling effort would attempt to include all available and complementary survey efforts conducted within the range of the marten on the Enrolled Lands. A preliminary occupancy model, contingent upon sufficient data, will be included in the annual reports coincident with the commitment interval.

Marten Monitoring and Reporting Commitment Five: As marten occupancy expands on IEL as documented by surveys under Marten Monitoring and Reporting Commitments Two and Three, GDRCo will also expand non-invasive surveys on IEL outside of the MSMA as agreed to between GDRCo and the Department.

Attachment 2

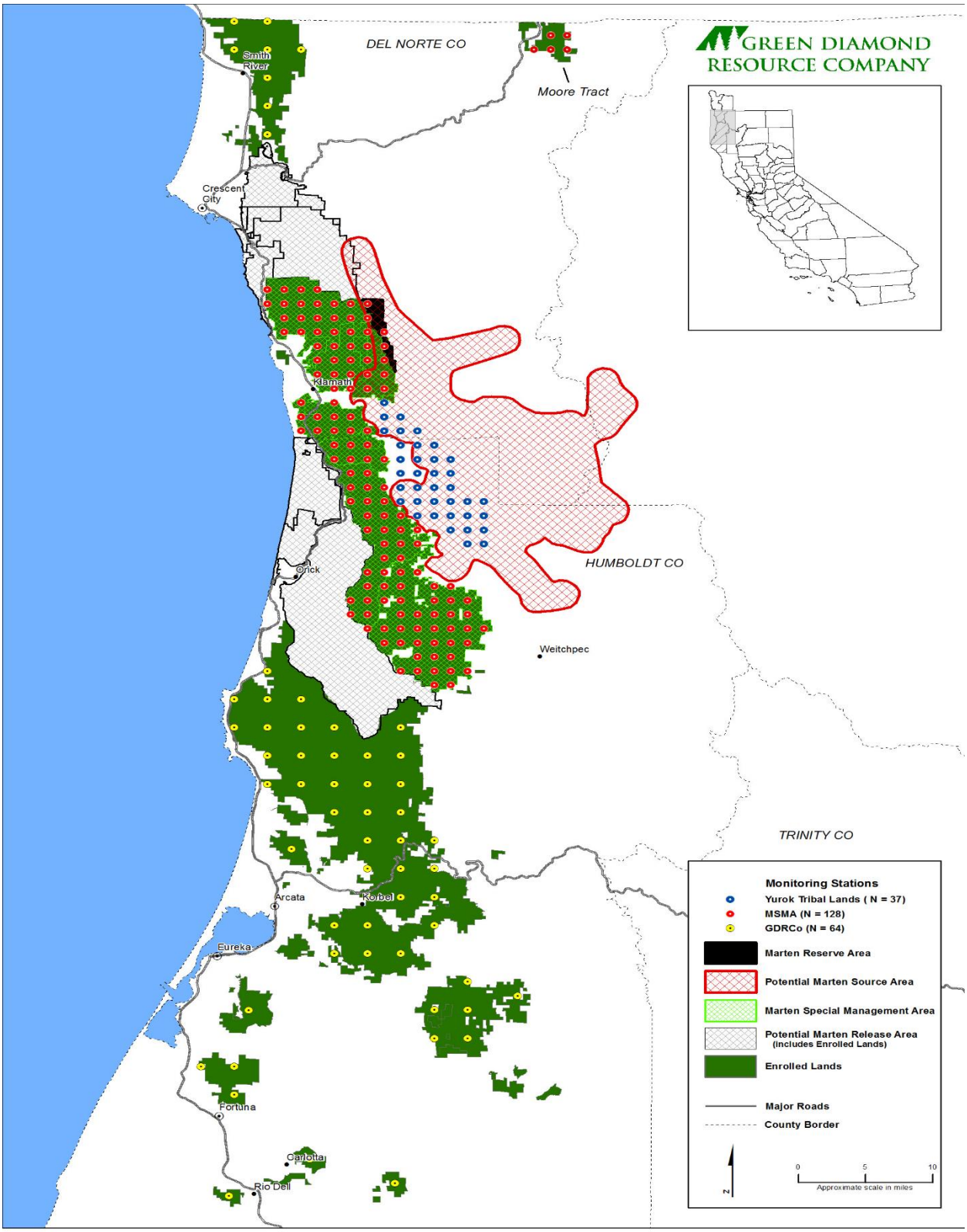

Figure 4. Monitoring Stations within the Marten Safe Harbor Agreement Area

Figure 5. Typical configuration of bait tree and remote cameras for detecting mesocarnivores.

References

Burton, A.C., E. Neilson, D. Moreira, A. Ladle, R. Steenwag, J.T. Fisher, E. Bayne, and S. Boutin. 2015. Wildlife camera trapping: a review and recommendations for linking surveys to ecological processes. Journal of Applied Ecology. 52:675-685.

Efford, M.G., and D.K. Dawson. 2015. Occupancy in continuous habitat. Ecosphere 3(4):32.

Fiske, I. J., and R. B. Chandler. 2011. unmarked: an R package for fitting hierarchical models of wildlife occurrence and abundance. Journal of Statistical Software 43:1–23.

Hamm, K. A., L.V. Diller, D.W. Lamphear and D.A. Early. 2012. Ecology and management of Martes on private timberlands in north coastal California. Proceedings of the coast redwood forests in a changing California: a symposium for scientists and managers. PSW GTR 238:419-425.Royle, J.A., and J. D. Nichols. 2003. Estimating abundance from repeated preence-absence data or point counts. Ecology 84:777-790

MacKenzie, D. I., J. D. Nichols, G. B. Lachman, S. Droege, J. A. Royle, and C. A. Langtimm. 2002. Estimating site occupancy rates when detection probabilities are less than one. Ecology 83:2248–2255.

MacKenzie, D. I., and J. A. Royle. 2005. Designing occupancy studies: general advice and allocating survey effort. Journal of Applied Ecology 42:1105–1114.

MacKenzie, D. I., J. A. Royle, J. A. Brown, and J. D. Nichols. 2004. Occupancy estimation and modeling for rare and elusive populations. Pages 149–172 in W. L. Thompson, editor. Sampling rare or elusive species: concepts, designs, and techniques for estimating population parameters. Island Press, Washington, D.C., USA.

R Core Team. 2017. R: a language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. <https://www.r-project.org/>.

Slauson, K.M., W.J. Zielinski, and J.P. Hayes. 2007. Habitat selection by American martens in coastal California. Journal of Wildlife Management 71:458–468.

GREEN DIAMOND
RESOURCE COMPANY

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April 30, 2018

Mr. Neil Manji, Region 1 Manager
California Department of Fish and Wildlife
601 Locust Street
Redding, CA 96001

Re: Financial Assurances for Marten Safe Harbor Agreement

Dear Neil:

Green Diamond Resource Company ("Green Diamond") is prepared to enter into a Safe Harbor Agreement ("Agreement") with the California Department of Fish and Wildlife ("CDFW") for the conservation of Humboldt Marten pursuant to California Fish and Game Code Section 2089.2 et seq.

In connection with the Agreement, Green Diamond is required to provide CDFW with financial assurance that the management actions and monitoring specified by the Agreement will be carried out through the term of the Agreement. This letter describes the financial assurance of Green Diamond for the performance of the Agreement.

There are two components of Green Diamond's financial assurance for implementation of the Agreement; (1) direct implementation of habitat management, marten protection, monitoring and adaptive management measures, and (2) financial assistance for assisted dispersal and monitoring.

Green Diamond will fund the direct implementation of habitat management, marten protection, monitoring and adaptive management measures under the Agreement through the dedication of staff time and Company property to implementation of management actions consistent with the Agreement. As a commercial forest land owner and manager, Green Diamond can assure CDFW that Green Diamond property will be used in compliance with the Agreement and the revenues generated by the harvest and sale of timber will pay Green Diamond's direct expenses for implementation of the Agreement.

In addition, by entering into the Agreement, Green Diamond has committed to provide CDFW with direct financial aid of up to $49,000 per year for five years ($245,000 total) for the development and initial implementation of a marten assisted dispersal program. In addition, Green Diamond is

committed to provide CDFW with up to an additional $30,000 for adaptive management and extension of the marten assisted dispersal program. This letter provides Green Diamond's assurance that the funding will be provided to CDFW as an expense paid from Green Diamond revenues derived from the harvest and sale of timber from the lands managed subject to the Agreement.

Because Green Diamond manages its lands for long-term sustainable yield of timber, in accordance with California law (and in compliance with state and federal laws including several long-term permits and agreements), CDFW can be assured that Green Diamond will continue to generate harvestable timber and produce timber revenues that are sufficient to sustain these financial assurances for the term of the Agreement.

We look forward to CDFW's approval and implementation of the Agreement in partnership with Green Diamond so that we can promote the expansion of the range and population of the Humboldt marten and learn more about how our management practices can effectively conserve marten.

Sincerely,

Neal Ewald, Senior Vice President
California Timberlands

Cc: Keith Hamm, Conservation Manager

Riparian and Geological Management Measures

Class I RMZ Characteristics – Green Diamond will establish a RMZ of at least 150 feet (slope distance) on each bank of all Class I watercourses[1] in the Plan Area. The width will be measured from the watercourse transition line or from the outer Channel Migration Zone (CMZ) edge where applicable.

Where the floodplain is wider than 150 feet on one side, the outer zone of the RMZ will extend to the outer edge of the floodplain.

An additional buffer will be added to the RMZ immediately adjacent to a floodplain, as follows:

Slide Slopes	Additional Floodplain Buffer
0-30percent	30 feet
30-60percent	40 feet
>60percent	50 Feet

Green Diamond will establish an inner zone within each RMZ, the width of which will depend upon the streamside slope in accordance with the following:

Side Slopes	Inner Zone Width
0-30percent	50 feet
30-60percent	60 feet
>60percent	70 Feet

Green Diamond will also establish an outer zone within each RMZ, which will extend from the outside limit of the Inner Zone edge to at least 150 feet from the bankfull channel (or CMZ edge) with the additional floodplain buffer set forth above.

- Conservation Measures within Class I RMZs:
  - Single Harvest Entry – During the life of the Plan, Green Diamond will carry out only one harvest entry within Class I RMZs, which will coincide with the even-aged harvest of the

[1] Class I watercourse is defined as all current or historical fish-bearing watercourses and/or domestic water supplies that are on site and/or within 100 feet downstream of the intake. The watercourse transition line is defined as that line closest to the watercourse where perennial vegetation is permanently established. The Channel Migration Zone is defined as Current boundaries of bankfull channel along the portion of the floodplain that is likely to become part of the active channel in the next 50 years. The area of the channel defined by a boundary that generally corresponds to the modern floodplain, but may also include terraces that are subject to significant bank erosion.

adjacent stand. The only exception will be light thinning conducted with the specific objective of enhancing wildlife structure. If cable corridors through RMZs are necessary to conduct intermediate treatments, e.g., commercial thinning, in adjacent stands before even-aged harvest, Green Diamond will apply the restrictions in this section except harvesting of trees in the RMZs will be limited to cable corridors only. Any cable corridors established in the RMZ as part of the intermediate treatment will, to the extent feasible, be reused during the even-aged entry in the adjacent stands.

- Overstory Canopy Closure:

  - Green Diamond will retain at least 85 percent overstory canopy closure within the Inner Zone

  - At least 70 percent canopy overstory closure will be retained within the Outer Zone

  CalFire protocol in effect as of the date of the Plan will be used for sampling overstory canopy cover to determine compliance with the overstory canopy closure requirements.

Class II RMZ Characteristics – Green Diamond will establish an RMZ of at least 75 or 100 feet on each bank of all Class II watercourses[2], as follows:

- A 75-foot minimum width will be used on the first 1,000 feet of 1st order Class II watercourses (Class II-1 watercourses[3]). Downstream of this first 1000-foot section, the RMZ will be expanded to at least 100 feet.
- A 100-foot minimum width will be used on all 2nd order or larger Class II watercourses (Class II-2 watercourses[4]).
  Green Diamond will establish an Inner Zone within the RMZ, the width of which will be 30 feet measured from the first line of perennial vegetation.
  Green Diamond will also establish an Outer Zone within the RMZ, which will extend the remaining 45 feet or 70 feet (depending on whether it is a Class II-1 watercourse or a Class II-2 watercourse, respectively).

- Conservation Measures within Class II RMZs:

  - Single Harvest Entry – During the life of the Plan, Green Diamond will carry out only one harvest entry into Class II RMZs, which will coincide with the even-aged harvest of the adjacent stand. The only exception will be light thinning conducted with the specific objective of enhancing wildlife structure. If cable corridors through RMZs are necessary to conduct intermediate treatments, e.g., commercial thinning, in adjacent stands before even-aged harvest, Green Diamond will apply the restrictions in this section except harvesting of trees in the RMZs will be limited to the cable corridors only. Any cable corridors established in the RMZ as part of the intermediate treatment will, to the extent feasible, be reused during the even-aged entry in the adjacent stand.

[2] A Class II watercourse is defined as a watercourse that contains no fish, but supports or provides habitat for aquatic vertebrates. Seeps and springs that support or provide habitat for aquatic vertebrates are also considered Class II watercourses with respect to the conservation measures.
[3] A *Class II-1 watercourse* is defined as a subset of Class II watercourses, as illustrated in Appendix C.
[4] A Class II-2 *watercourse* is defined as a subset of Class II watercourses, as illustrated in Appendix C.

- Overstory Canopy Closure:
  - Green Diamond will retain at least 85 percent overstory canopy closure within the Inner Zone
  - At least 70 percent overstory canopy closure will be retained within the Outer Zone

Class III RMZ Characteristics – Additional tree retention will occur in certain Class III watercourses[5] to maintain stream bank stability, and in geologically unstable areas. However, tree retention associated with unstable areas is a relatively minor component (approximately 10percent) of the total riparian retention.

- Conservation Measures within Class III Equipment Exclusion Zones (EEZ) – Green Diamond will apply one of two tiers of protection measures within Class III watercourses in accordance with HPA Groups and slope gradient (the average slope as measured with a clinometer, starting from the watercourse bank and running upslope for a distance of 50 feet), as follows:

HPA Group	Slope Gradient
Smith River	<65percent=Tier A
	>65percent=Tier B
Coastal Klamath	<70percent=Tier A
	>70percent=Tier B
Korbel	<65percent=Tier A
	>65percent=Tier B
Humboldt Bay	<60percent=Tier A
	>60percent=Tier B

- Class III Tier A Protection Measures:
  - EEZ:
    - Green Diamond will establish a 30-foot EEZ, except for a) existing roads; b) road watercourse crossings; and c) skid trail watercourse crossings.
    - The exception for skid trail watercourse crossings is only applicable when the following conditions are met – Construction and use of skid trail watercourse crossings within the Class III EEZ may occur only when construction and use of alternative routes to otherwise inaccessible areas outside of the RMZ would result in substantially greater impacts to aquatic resources. Preference shall be given to using existing skid trail watercourse crossing sites in the Class III over establishing new skid trail watercourse crossing sites in the Class III.
    - Within Class III EEZs, trees may be felled and harvested to facilitate skid trail watercourse crossing construction and use.
  - LWD Retention – Green Diamond will retain all LWD on the ground (not including felled trees) within the EEZ

[5] A *Class III watercourse* is defined as small seasonal channels that do not support aquatic species, but has the potential to transport sediment to Class I or II watercourses.

- Site Preparation – Green Diamond will not ignite fire during site preparation within the EEZ

- Class III Tier B Protection Measures:

  - EEZ – Green Diamond will establish a 50-foot EEZ, except for a) existing roads; b) road watercourse crossings; and c) skid trail watercourse crossings.
  - The exception for skid trail watercourse crossings is only applicable when the following conditions are met – Construction and use of skid trail watercourse crossings within the Class III EEZ may occur only when construction and use of alternative routes to otherwise inaccessible areas outside of the RMZ would result in substantially greater impacts to aquatic resources. Preference shall be given to using existing skid trail watercourse crossing sites in the Class III over establishing new skid trail watercourse crossing sites in the Class III.
  - Within Class III EEZs, trees may be felled and harvested to facilitate skid trail watercourse crossing construction and use.
  - Hardwood Retention – Green Diamond will retain all hardwoods and non-merchantable trees within the EEZ except where necessary to create cable corridors or for the safe falling of merchantable trees.
  - Site Preparation – Green Diamond will not ignite fire during site preparation within the EEZ.
  - Conifer Retention – Green Diamond will retain conifers where they contribute to maintaining bank stability or if they are acting as a control point in the channel.
  - A minimum average of one conifer 15 inches Diameter at breast height (DBH) or greater per 50 feet of stream length within the EEZ will be retained.
  - LWD Retention – Green Diamond will retain all LWD on the ground (not including felled trees) within the EEZ.

- Geological Management Measures – Green Diamond will establish a variety of measures to address geologically unstable areas. These measures include retention of trees to minimize and mitigate sediment input from steep streamside slopes, headwall swales, deep-seated landslides and shallow rapid landslides.

Attachment 5

Live Tree Retention Scorecard Used for Identification of Existing Wildlife Structure – Marten-specific SHA Tracts[a]

	Tree elements						Unit Scarcity Factor[b]	Planning Watershed Factor[c]	
	DBH[d]	Bole and Crown features[e]							
	conifer >30" hardwood >18"	large cavity, hollow, basal hollow.	small cavity, broken top, reiteration	internal decay, mistletoe broom	crevice cover (fissure, loose bark, furrowed bark)	complex crown (dead or forked top, lateral large limbs, epicormic branching, ledge/platform)	Post-harvest Residual Tree density: ≤1 ac, add 2 pts >1/ac<2/ac, add 1 pt ≥2/ac, add no pts	Impaired or special wildlife value, add 1 point. All others, add no points	Total score
Wildlife score	3	4	3	2	1	1			

[a] This score card incorporates tree retention measures specifically formulated to benefit Humboldt marten and is implemented on Green Diamond lands north of the Bald Hills Road, and Moore Tract, on Tracts 51, 56, 61, 66, 67, 70, 71, 72, 73, 85, 87, 88, 98 (Figure 7) and in future planning watersheds where Humboldt marten are detected.

[b] Unit scarcity factor is determined at the Unit level based on the number of residual trees post-harvest (conifers and hardwoods are to be evaluated separately) and is added to the tree elements score for each individual residual tree. Estimate is based on entire unit acres (including RMZs). Young-growth (i.e. non-residual) trees are assessed using the scorecard but are not subject to the addition of the unit scarcity factor.

[c] Planning watershed factor is determined programmatically based on management tract and is added to the tree elements score. The planning watershed factor is added to all trees assessed (residual and non-residual). Tracts listed in "a" above receive one point for special wildlife value.

[d] Trees not meeting the diameter threshold but exhibiting the described habitat elements should be considered as prime candidates for meeting the green tree retention guidelines if large trees are not available.

[e] See Definitions and descriptions

Trees with a score equal to or greater than 7 will be retained except under very rare circumstances where operational constraints prohibit retention as justified by Forestry and Wildlife. Trees with scores less than 7 can be harvested. The maximum score for each tree element column is depicted in the gray shaded box. For example, a tree with a complex crown and large lateral limbs would receive only 1 point for Crown Features.

Note: Trees not meeting the minimum retention score but exhibiting high potential defect (standing slash) or high harvesting costs so as to negate their value should also be considered as prime candidates for meeting green tree retention guidelines if high-scoring trees are not available.

Live Tree Retention Scorecard Used for Identification of Existing Wildlife Structure – Balance of Enrolled Lands

	Tree elements					Unit Scarcity Factor[a]	Planning Watershed Factor[b]	
	DBH[d]	Bole features[c]			Crown features[c]			
	conifer >30" hardwood >18"	internal hollow or large cavity	small cavity, internal rot or mistletoe broom	crevice cover (loose or deeply furrowed bark)	complex crown, lateral large limbs, epicormic branching	Post-harvest LSE density: =<1 ac, add 2 pts >1/ac, <2/ac, add 1 pt =>2/ac, add no pts	Impaired or special wildlife value, add 1 point. All others, add no points	Total score
Wildlife score	3	4	2	1	1			

[a] Unit scarcity factor is determined at the unit level based on the number of residuals post harvest (conifers and hardwoods are to be evaluated separately) and is added to the total score. Estimate is based on entire unit acres (including RMZs).
[b] Planning watershed factor is determined programmatically and is added to the total score.
[c] See Definitions and descriptions.
[d] Trees not meeting the diameter threshold but exhibiting the described habitat elements should be considered as prime candidates for meeting the green tree retention guidelines if large trees are not available.
Trees with a score equal to or greater than 7 will be retained except under very rare circumstances where operational constraints prohibit retention as justified by Forestry and Wildlife. Trees with scores less than 7 can be harvested. Maximum obtainable score for combined tree elements is 11. The maximum score for each tree element column is depicted in the gray shaded box. For example, a tree with a complex crown and large lateral limbs would receive only 1 point for Crown Features.

Note: Trees not meeting the minimum retention score but exhibiting high potential defect (standing slash) or high harvesting costs so as to negate their value should also be considered as prime candidates for meeting green tree retention guidelines if high-scoring trees are not available.

Late Seral Habitat Elements – Definitions and Descriptions

The following information is intended to provide guidance for foresters and biologists assessing the relative value of wildlife trees in harvest units. The terms listed here should provide a common language for describing the various late seral habitat structures encountered in California north coast forests. These definitions and descriptions are not perfect, and if interpreted too narrowly may exclude some trees of obvious wildlife value or if interpreted too broadly may include some trees of little wildlife value. These descriptions should be used to obtain a general impression of the types of structures that may be visible in the field during THP development and review.

I. Trees and Snags

A. Residual tree (Legacy tree): A tree that existed in a stand prior to the most recent harvest entry.

Description: Structure and appearance varies substantially depending on residual tree age, species, and harvest history of the stand. For conifers, including redwood, the residual tree will almost always exhibit a greater diameter than the regenerated trees in the stand. If the residual has a live top it will likely project well above the surrounding canopy.

Two types of residual tree may be recognized:

1. Old-growth residual (Legacy tree): A residual tree at least two centuries old; minimum age varies by species

Description: Usually has a much greater diameter than the second-growth trees in the stand (for redwood, dbh is typically well over 4 feet for site class I, II, or III conditions) and often relatively tall (at "true" site potential height for site class). In addition to large size, old-growth residual trees usually exhibit one to several readily observable features of "old-growth" including broken top, large reiterations and large-diameter limbs, thick bark that may have deep furrows, fire scars or basal cavity, other cavities, possibly well-developed duff layers, moss, or lichen accumulations on horizontal limbs or platforms. Crown architecture visible from the air may include emergent crown (where the surrounding stand is relatively young), irregular or flat-topped shape (as opposed to conical top), obvious dead or spike top (note these may also occur in large second-growth trees), multiple leaders due to large reiterations (which may give the crown the appearance of a cluster of tall young trees).

2. "Mature" residual ("released-growth"; Legacy tree): A residual that was probably less than 100 years old at the time of the initial harvest. The age at present is around 100 to 200 years old.

Description: Usually at or above the maximum dbh of the second-growth trees in the stand. Other characteristics (height and defect) vary depending on age, age relative to other trees in the stand, fire history, and whether damage to the residual occurred during the initial entry.

Typically, “mature” residuals show a much smaller dbh than an old-growth residual for the site class and exhibit fewer of the structural features listed above for old-growth residuals. From the air, the crown of a “mature” residual tree may emerge above the surrounding canopy (where the surrounding stand is relatively young) or may not be particularly evident if the surrounding stand is mature second-growth. If the “mature” residual grew for an extended period above a regenerating stand, it may exhibit a relatively broad crown and high degree of taper, but otherwise be relatively free of physically induced defect.

B. Snag: A standing dead tree.

Description: Snags vary tremendously in appearance and function for wildlife depending on species, size, and decay class.

C. Green Wildlife Tree: A standing live tree with important, existing wildlife structure.

Description: A conifer or hardwood tree with existing habitat elements (II. and III. described below) that result in a score ≥7 based on evaluation from the score card.

D. Green Tree: A standing live tree

Description: A conifer or hardwood tree lacking existing habitat structure and possessing few elements that contribute to a score of ≤7 based upon evaluation from the score card. It is common for trees with low economic value but some wildlife value to be retained (e.g. hardwoods, hemlock, and cedar). These trees with low economic value but some existing wildlife structure should always be considered as prime candidates for retention even where there is no requirement for retention.

II. Bole Features

A. Large cavity: A cavity (or void within a tree bole or large limb) with a relatively small entrance suitable for use by a variety of wildlife species, such as spotted owl, wood rats, Pacific fisher, or American marten, or colonies of Vaux’s swift, purple martin, or bats. The small entrance precludes the entry of larger predators into the cavity. Cavities with larger entrances (classified as hollows, see below) may also be used by these species.

Description: A large cavity is generally several feet deep and at least 8 to 12 inches in diameter with an entrance size ranging from about 2.5 to 6 inches diameter. Entrance height is often at least 15 feet above the ground, but lower entrances may also be used. In practice, interior dimensions will usually just be a guess based on entrance size and appearance, as well as the characteristics of the tree, plus any observations of wildlife use of the cavity.

B. Hollow: A large cavity with an entrance or opening greater than 6 inches diameter.

Description: Hollows have similar interior dimensions as large cavities and may be used by the same suite of species for cover; however, the larger entrance size of a hollow may not prevent larger predators from entering the hollow.

C. Basal hollow (Goose pen): A large hollow at ground level typically created by fire that destroys the cambium on a portion of the bole's circumference. Repeated fires play an important role in maintaining and enlarging basal hollows.

Description: A basal hollow is a hollow that extends at least a third of the tree's diameter into the bole and is generally several feet in height. It should be capable of providing shelter to small or medium-sized wildlife.

D. Small cavity: A cavity suitable for use by a variety of small to medium-sized wildlife species, such as small to large woodpeckers, secondary cavity-nesting birds, wood ducks, individual or small numbers of bats, northern flying squirrel, Douglas squirrel, and small owls.

Description: A small cavity is generally between about 7 inches and a few feet deep and between about 4 and 8 inches in diameter with an entrance size ranging from about 1.5 to 3 inches in diameter. Entrance height is often at least 10 feet above the ground, but lower entrances may also be used. Interior dimensions will usually be a guess based on entrance size and appearance, characteristics of the tree, plus observations of wildlife.

E. Internal decay (Heart rot): Widespread or localized heart rot fungus infection within the bole of a tree. Decayed, softened wood encompasses at least enough volume to allow excavation of a small cavity.

Description: Decayed wood in old scars may be visible at ground level or with binoculars well above the ground. Good indicators of internal decay include fungal fruiting bodies, such as conk, cavity entrances, and sloughing wood and bark. In practice, it may be difficult to discern the extent of internal decay in some cases.

F. Crack (Fissure): A longitudinal gap in the bole of a tree caused either by physical damage (including wind, lighting, or fire) or by growth of two trees or leaders into each other where the gap provides cover for wildlife.

Description: Cracks must be sufficiently deep relative to their width to provide partial cover for foraging birds or complete cover for nesting birds, roosting bats, or small- to medium sized mammals. Longitudinal indentations in which the deepest portions are visible from outside the tree are not considered cracks unless they are capable of providing cover for foraging or roosting small vertebrates.

G. Furrowed bark: A relatively deep linear indentation in the bark of a tree capable of providing cover for roosting bats or foraging bole-gleaners.

Description: Furrowed bark occurs where an underlying defect (crack, old lightning or fire scar, narrow strip of removed cambium) or the line of contact between two trees growing into each other has been covered by bark. The furrow is sufficiently deep and narrow to be capable of providing cover for small vertebrates. Furrowed bark should not be used to describe the bark of a large or fast-growing redwood tree on which the bark has developed a ropey or braided look, but does not provide cover for foraging or roosting small vertebrates.

H. Loose bark: A discrete, large piece of bark that has separated from the underlying tree bole but remains attached to the tree.

Description: "Loose bark" refers to a portion of a tree's bark that provides cover for roosting bats, nesting birds, or possibly foraging bole gleaners. Typically, such bark pieces provide relatively tight, stable cover for small animals. The distance of separation from the underlying tree should be 2 inches or less and should not be so loose that the bark piece flaps in the wind. As a general rule, loose bark is attached along at least one edge at least 1 foot long. Although some bear-stripped trees may meet the definition of "loose bark", most bear-stripped trees have bark that has been pulled away from the bole along most of the strip's edges, flaps against the underlying wood in the wind, and only provides a small amount of cover at one end of the strip. Such bear-stripped bark should not be scored as "loose bark".

I. Ledge (Platform): A relatively horizontal portion of a tree limb, exposed old cavity, or cluster of epicormic branches on the bole of a tree.

Description: A ledge or platform must be of sufficient size and have adequate cover to provide a nesting or resting opportunity for a moderately large wildlife species, such as Pacific fisher or peregrine falcon.

III. Crown Features (features contributing to a "complex crown")

A. Dead top (Spike): A dead tree leader.

Description: "Dead top" refers to dead leaders that are evidenced by leaf die-back along at least the top one-fifth of the tree height or with a minimum diameter at the lowest extent of leaf die-back of about 12 inches.

B. Broken top: A tree with the original leader broken off.

Description: "Broken top" refers to broken-topped trees with a minimum diameter at the original break of about 12 inches.

C. Reiteration (Reiterated top, Bayonet, "Schoolmarm", Candelabra): A sprouted leader or limb that exhibits apical dominance.

Description: Reiterations vary greatly depending on relative age and position on tree. All reiterations include some vertical growth that gives them the appearance of a "tree-on-a-tree". Old reiterations may exhibit a high degree of decadence and may themselves have additional reiterations. A tree should be scored for reiteration only if the reiteration provides opportunities for resting, denning, or nesting, or includes a substrate or epiphytes providing foraging opportunities for vertebrate wildlife.

D. Forked top: A split in a tree's leader.

Description: A tree should only be scored for a forked top if the structure provides an opportunity for resting or nesting for vertebrate wildlife, or if defect associated with the fork suggests that other structures may be present (such as internal rot or cavity).

E. Mistletoe broom (Witch's broom): A compact spray of branches infected with mistletoe.

Description: A tree should be scored for mistletoe broom if the structure is large and solid enough to provide an opportunity for resting or nesting of vertebrate wildlife, or if smaller brooms occur in multiple locations within the tree.

F. Large limb (Platform limb): A relatively horizontal limb of sufficient girth for vertebrate wildlife to use the structure for resting or nesting (but not including bird perches).

Description: A tree should be scored for large limbs if the limbs are distinctly larger than typical for similar size trees with good growth form. Generally, such trees in a stand of merchantable age will have at least two branches at least 12 inches in diameter.

Habitat Management Commitment Two: Green Diamond shall implement the TREE Guidelines for Green (Live) Tree and Snag Retention on all Enrolled Lands. Specific TREE measures designed as a conservation benefit to marten are applied through a marten-specific SHA scorecard (items "b-d") on Green Diamond timberlands north of the Bald Hills road, and the Moore Tract, (tracts 51, 56, 61, 66, 67, 70, 71, 72, 73, 85, 87, 88, 98) (Figure 7), and in future planning watersheds where Humboldt marten are detected. Tree retention guidelines and associated scorecard criteria for the balance of Enrolled Lands are found in items "a, e-g."

a. General Candidate Tree Selection for all Green Diamond timberlands:

Retain large defective trees using the TREE's tree retention scorecard
Retain defective or poorly formed trees, e.g., animal damaged, forked top, broken top, mistletoe broom, etc.
Retain a mix of conifers and hardwoods (approximately 50/50 mix where possible
Retain conifer species preference: Douglas-fir, hemlock, white fir, cedar, spruce, redwood
Preference for evergreen hardwood species retention: tanoak, chinquapin, Pacific madrone, California laurel,
Consider protection from wind throw and site preparation burning when designating HRA and tree clump locations
Retain trees with the average diameter equal to or greater than the average diameter of trees in the THP area

b. Retention Guidelines for marten-specific SHA tracts – Evaluate the method and level of tree retention needed within each THP unit as follows:

Conifer Dominated Harvest Areas[6] with RMZ Retention:

[6] Forest stands with >15,000 board feet conifer per acre

- Retain all conifer scorecard trees ≥7 in non-clearcut areas and in clearcut areas retain conifer scorecard trees at a rate of two trees per clearcut acre. Trees with greatest wildlife value (greatest scores) will be given priority for retention.
- Retain all hardwood scorecard trees ≥7 in non-clearcut areas and in clearcut areas retain hardwood scorecard trees at a rate of three trees per clearcut acre. Trees with greatest wildlife value (greatest scores) will be given priority for retention.
- Retain other evergreen hardwoods in clearcut areas at a rate of two trees per clearcut acre where they exist. Hardwood scorecard trees in clearcut acres will be counted toward the rate of two hardwood trees per clearcut acre where they exist.

Conifer Dominated Harvest Areas without RMZ Retention:

- Retain all conifer scorecard trees ≥7 in non-clearcut areas and in clearcut areas retain conifer scorecard trees at a rate of two trees per clearcut acre. Trees with greatest wildlife value (greatest scores) will be given priority for retention.
- Retain other conifer at a rate of two trees per clearcut acre. Scorecard conifer count toward the rate of two trees per acre.
- Retain all hardwood scorecard trees ≥7 in non-clearcut areas and within clearcut areas retain hardwood scorecard trees at a rate of three trees per clearcut acre. Trees with greatest wildlife value (greatest scores) will be given priority for retention.
- Retain other evergreen hardwoods within clearcut areas at a rate of two trees per clearcut acre where they exist. Hardwood scorecard trees within clearcut acres will be counted toward the rate of two hardwood trees per clearcut acre where they exist.If the unit lacks hardwoods to meet minimum retention standards, retain conifers up to two trees per acre within clearcut areas.
- Retention should be a combination of approaches (HRA, tree clumps or scattered trees). HRAs are typically prescribed in cable yarding areas since this type of clumped retention is more practical in these areas.

Hardwood Dominated Harvest Areas[7] with RMZ Retention:

- Retention in hardwood dominated areas is at least two trees per acre within clearcut areas regardless of the watershed
- Retain all conifer scorecard trees ≥7 within non-clearcut areas and in clearcut areas retain conifer scorecard trees at a rate of two trees per clearcut acre. Trees with greatest wildlife value (greatest scores) will be given priority for retention.
- Retain all hardwood scorecard trees ≥7 in non-clearcut areas and in clearcut areas retain hardwood scorecard trees at a rate of three trees per clearcut acre. Trees with greatest wildlife value (greatest scores) will be given priority for retention.
- Retain other evergreen hardwoods in clearcut areas at a rate of two trees per clearcut acre where they exist. Hardwood scorecard trees within clearcut acres will be counted toward the rate of two hardwood trees per clearcut acre where they exist.
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Hardwood Dominated Harvest Areas without RMZ Retention:

[7] Forest stands with <15,000 board feet conifer per acre and dominated by hardwood stems.

- Retain all conifer scorecard trees ≥7 in non-clearcut areas and in clearcut areas retain conifer scorecard trees at a rate of two trees per clearcut acre.
- Retain all hardwood scorecard trees ≥7 in non-clearcut areas and in clearcut areas retain hardwood score card trees at a rate of three trees per clearcut acre. Trees with greatest wildlife value (greatest scores) will be given priority for retention.
- Retain a minimum 0.5 acre HRA or clumps totaling 0.5 acres and additional scattered or clumped evergreen hardwood trees at a rate of two trees per clearcut acre.

c. Relationship with Snag and RMZ Retention – Live tree retention is in addition to snag and RMZ retention. Green trees retained as described in these retention guidelines will augment structure provided by snag retention and within AHCP areas, i.e., Green Diamond will not include retained snags and trees left within RMZs as part of the count for Wildlife Tree Retention.

d. Live Tree Retention Scoring Criteria Used for Identification of Existing Wildlife Habitat Elements for marten-specific SHA tracts:

Dbh – Conifers ≥30 inches and Hardwoods ≥18 inches (3 points)
Bole and Crown features[8]:

- Trees with a large cavity, hollow, basal hollow (4 points)
- Trees with a small cavity, broken top, reiteration (3 points)
- Trees with internal decay, mistletoe broom (2 points)
- Trees with crevice cover, fissure, loose bark, furrowed bark (1 point)
- Trees with complex crown, dead or forked top, lateral large limbs, epicormic branching, ledge/platform (1 point)

Unit scarcity factor, i.e., post-harvest residual tree density, <1 acre (2 points), >1/acre but <2/acre (1 point), >2/acre (0 points)
Planning watershed factor is determined programmatically based on management tract and is added to the total score. All marten-specific SHA tracts receive a watershed factor score of one point.

e. Retention Guidelines for tracts other than the marten-specific SHA Tracts – Evaluate the method and level of tree retention needed within each THP unit as follows:

Conifer Dominated Harvest Areas with RMZ Retention:

- Retain all scorecard trees ≥7
- Retain other evergreen hardwoods within clearcut areas at a rate of two trees per clearcut acre where they exist

Conifer Dominated Harvest Areas without RMZ Retention:

- Retain all scorecard trees ≥7
- Retain other conifer within clearcut areas at a minimum rate of one tree per clearcut acre.

[8] See Definitions and Descriptions in Green Diamond's TREE document

- Retain other qualifying evergreen hardwoods within clearcut areas at a rate of two trees per clearcut acre where they exist. If the unit lacks hardwoods to meet minimum retention standards, retain an additional conifer up to two trees per acre if harvest unit is in a one or two tree per clearcut acre retention area.
- Retention should be a combination of approaches (HRA, tree clumps or scattered trees). HRAs are typically prescribed in cable yarding areas since this type of clumped retention is more practical in these areas. Trees retained in Streamside Management Zones (SMZ) and Class III Tier B areas count toward overall tree retention.

Hardwood Dominated Harvest Areas with RMZ Retention:

- Retention in all hardwood dominated areas is at least two trees per acre within clearcut areas regardless of the watershed
- Retain all scorecard trees ≥7
- Retain scattered or clumped evergreen hardwood trees at a rate of two trees per clearcut

Hardwood Dominated Harvest Areas without RMZ Retention:

- Retain all scorecard trees ≥7
- Retain ½ acre HRA or clumps totaling 0.5 acres and scattered evergreen hardwood trees within clearcut areas at a rate of two trees per clearcut acre

f. Relationship with Snag and RMZ Retention – Live tree retention is in addition to snag and RMZ retention. Green trees retained as described in these retention guidelines will augment structure provided by snag retention and within AHCP areas, i.e., Green Diamond will not include retained snags and trees left within RMZs as part of the count for Wildlife Tree Retention.

g. Live Tree Retention Scoring Criteria Used for Identification of Existing Wildlife Habitat Elements:

Dbh – Conifers ≥30 inches and Hardwoods ≥18 inches (3 points)

Bole and Crown features:

- Trees with a large cavity, hollow, basal hollow (4 points)
- Trees with a small cavity, internal decay or mistletoe broom (2 points)
- Trees with crevice cover, fissure, loose bark or furrowed bark (1 point)

– Trees with complex crown, dead, broken or forked top, lateral large limbs, epicormic branching, ledge/platform (1 point)

Unit scarcity factor, i.e., post-harvest density of residual trees, <1 acre (2 points), >1/acre but <2/acre (1 point), >2/acre (0 points)

Planning watershed factor is determined programmatically and is added to the total score, impaired or special wildlife value (1 point), all others (0 points)