Midpeninsula Regional OpenSpace | Midpeninsula Regional Open Space District

REQUEST FOR QUALIFICATIONS

FOR

DESIGN-BUILD SERVICES

MINDEGO RANCH PONDS ENHANCEMENT PROJECT

RFQ Issued on: April 18, 2018

Statement of Qualifications due on: May 4, 2018

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1.0 INVITATION

1.1 Request for Qualifications. The Midpeninsula Regional Open Space District ("**District**") invites you to submit a Statement of Qualifications ("**SOQ**") to provide design-build delivery of the District's Mindego Ranch Ponds Project ("**Project**") as a design-build entity ("**DBE**"). The required design-build services for the Project ("**Services**") will include Project design, geotechnical, hydrological and topographical surveys, regulatory permitting, construction, biological monitoring during surveys and construction, development, and implementation of a re-vegetation plan for the enhancement of habitat at two bodies of water within the District's jurisdiction, one known as the "Upper Spring," and the other known as "Knuedler Lake" (individually referenced as a "**Pond**," and collectively as the "**Ponds**").

1.2 Procurement Procedures. The District intends to use design-build delivery for this Project, in accordance with Public Contract Code sections 22160 et seq., and pursuant to the District's authority under Public Resources Code section 5580. The purpose of this Request for Qualifications ("**RFQ**") is to prequalify DBEs to be eligible to submit proposals in response to the District's Request for Proposals ("**RFP**"), which will be issued to all prequalified DBEs at the conclusion of this RFQ process. Following evaluation of the proposals submitted during the RFP phase, the design-build contract for the Project will be awarded, if at all, to the DBE that offers the best value to the District.

1.3 Additional Information. Questions or objections regarding the Project, the RFQ, or the procurement procedures must be submitted in writing, no later than 5:00 PM on April 27, 2018, to: Lupe Hernandez lhernandez@openspace.org. Any questions or objections that are not submitted within the time and manner specified will be deemed waived.

2.0 THE MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

The District, which is located on the San Francisco Peninsula, owns and manages approximately 63,000 acres of land in 26 open space preserves ranging in size from 55 to more than 15,000 acres. The District's purpose is to acquire, permanently protect, and restore lands forming a regional open space greenbelt. The preserves are generally

kept in a natural condition to protect their ecological integrity and habitat, and are developed with only those amenities needed for low-intensity recreation, such as signed trails for hiking, dog walking, bicycling, and equestrian use, restrooms, gravel parking areas, and an occasional bench or picnic table. The preserves are open to the public year-round and contain many diverse ecosystems, including redwood, oak, and fir forests; chaparral-covered hillsides; riparian corridors; grasslands; and shore frontage along San Francisco Bay.

3.0 PROJECT SCOPE AND OBJECTIVES

3.1 Project Objectives. The Ponds are located in the 3,137-acre Russian Ridge Open Space Preserve in San Mateo County, California. The Ponds are habitat for three special status species: the San Francisco garter snake, the California red-legged frog, and the western pond turtle. The Project objectives include a low cost, feasible design for Pond enhancements to improve the habitat for these sensitive species, with emphasis on habitat needs for the San Francisco garter snake and its prey base (California red-legged frog and other amphibians), and to provide for cost-efficient maintenance and repair of the improvements. The District's primary objective in using design-build delivery for this Project is to select the team with the best combined design and construction experience and expertise to work collaboratively with District personnel to address the unique challenges presented by this Project.

3.2 Project Background. A San Francisco Garter Snake Habitat Management Plan was completed in September 2012 (2012 Plan) (Attachment 1) that identified site-specific management strategies for enhancing SFGS habitat within the preserve. This project will focus on design plans and associated geotechnical, topographical, and hydrological, investigations, and construction and implementation of the following recommendations, listed by water body, for two of the three ponds listed in the Management Plan. This work is permitted under the District's existing 10(a)1(A) Recovery Permit for San Francisco garter snake issued by the US Fish and Wildlife Service. Other project permits anticipated for the project include: Regional Water Quality Control Board Section 401 Waste Discharge Requirements, US Army Corps of Engineers Section 404 Nationwide permit, California Department of Fish and Wildlife Lake and Streambed Alteration Agreement, and San Mateo County grading permit and/or grading exemption through the San Mateo County Resource Conservation District (RCD). The RCD has expressed a willingness to obtain the appropriate grading exemption through San Mateo County in support of this project. The DBE, using information generated during project design will complete all permitting applications with these agencies, however permits will be issued in the name of the District.

Upper Spring (referred to as Upper Lake in 2012 Plan):

- Perform limited topographic surveys and bathymetric surveys of the water body to determine the amount of sediment removal required for intended enhancement (refer to design parameters (Attachment 2), i.e. minimum of 3-foot depth, ponding through August etc. or see below)
- Perform geotechnical investigations of outlet as appropriate, which may include (but is not limited to): the cement lined outlet structure embedded within the earthen berm that forms Upper Spring, the degraded downstream outlet, and the main berm. The District reserves the right to have a third party review all geotechnical survey results
- There is access to the berm but it is possible that the geotechnical investigation will require removal of up to 125 linear feet of vegetation to gain access, hand augurs may be used as an alternative if appropriate
- Provide design to achieve the habitat enhancement recommendations from the 2012 Plan to meet the following objectives: 1) removal of 80-90% of emergent vegetation while maintaining 20-50% of perimeter vegetation. 2) removal of an estimated 75-125 cubic yards of sediment within the basin so that 50% of the water body is at least 3 feet deep with a gradual 20-30% slope allowing for transition between shallow and deep water on at least one side of the pond
- Once a preliminary 35% design is produced, the storage of the pond shall be reviewed by the District's water resources specialist to ensure compliance with existing water rights
- Provide design to repair and/or replace eroded outlet once the water body has been cleaned. The existing outlet should be stabilized, and/or replaced to support a ponding capacity that is conducive to frog rearing and development (generally 4-6 feet deep in ponds that are not spring fed. Since Upper Springs is spring fed the depth may be reduced to a minimum of 3 feet if this will allow for a long enough ponding duration to support CRLF development)
- Design should accommodate a 100-year flow from outlet and/or spillway without failing or causing erosion. Preferably this would include both a primary and secondary outlet but a single outlet system could be acceptable if justified
- Provide detailed geotechnical information and associated plans and specifications as needed to fulfill San Mateo County and other permitting needs
- The District reserves the right to hire a third party to review any and all geotechnical, topographical, and hydrological survey results

Knuedler Lake:

- Perform limited topographic surveys and bathymetric surveys of the pond to determine the amount of sediment removal required for intended enhancement
- Perform geotechnical investigations of outlet as appropriate, which may include (but is not limited to): the downstream outlet, and the main berm
- Assess the erosion potential of the incised creek channel 75 feet from the high water line along the pond outlet (below the pond).
- Provide design to eliminate future downstream erosion below the pond. Elements can include adequate sizing of spillway to prevent further head cutting, more extreme measures such installing an energy dissipater to stabilize the channel (if warranted), or other approaches as appropriate
- Provide design to achieve the habitat enhancement recommendations from the 2012 San Francisco Garter Snake Habitat Management Plan (to include entire lake if access is granted) to meet the following objectives: 1) removal of 80-90% of vegetation from the pond basin (property line with City and County of San Francisco Juvenile Probation Department bisects the pond) 2) Removal of an estimated 600 (+/- 200) cubic yards of sediment from the pond to deepen the pond to a maximum depth of 4-6 feet with a gradual 20-30% slope allowing for transition between shallow and deep water.
- Design should accommodate a 100-year flow without failing or causing erosion from outlet and/or spillway. Preferably this would include both a primary and secondary outlet but a single outlet system could be acceptable if justified
- Provide detailed geotechnical information and associated plans and specifications as needed to fulfill San Mateo County and other permitting needs
- The District reserves the right to hire a third party to review any and all geotechnical, topographical, and hydrological survey results

The primary objective of the project is to provide a low cost, feasible, and implementable design for maintenance/repair of the pond inlet, basin, berm, and outlet(s) to improve aquatic habitat for California red-legged frog and San Francisco garter snake.

3.3 Scope of Services. The Services will include design and construction of inlet, outlet, earthen berm, and basin improvements for the Ponds; measures to ensure ponding depth and duration for the benefit of sensitive species; and decreasing or elimination of erosive features above and below the Ponds, to reduce sedimentation

and provide long-term viability of each Pond. The Project also includes geotechnical, topographical, and hydrologic surveys associated with design and permit requirements; removal of vegetation and sediment that has accumulated in each Pond; removal of trees (where applicable) to allow greater sun exposure to the Ponds; acquiring all required regulatory permits associated with the Project; providing biological monitoring during construction in compliance with all applicable regulations; development and implementation of a re-vegetation plan; removal of excess vegetation, providing or ensuring continued access to the ponds for cattle, and prevention of ongoing erosion and downstream sedimentation.

3.4 Estimated Project Cost. The District currently estimates that the Project will cost approximately ($200,000-$300,000). More detailed information on the Project scope will be included in the RFP.

3.5 Location and Site Description. The ponds are located approximately 2 miles southeast of the Town of La Honda in rural San Mateo County. The Project area is accessible from unpaved rural ranch roads departing from Alpine Road via State Route 35 (Attachment 3, Site Map).

3.6 Site Access. Access to each of the water bodies is by dirt ranch road that is primarily accessible during the dry season. There are specific driving requirements and a biological monitor must be present for access beyond the 2000 ft. driving buffer around each water body that is designated SFGS habitat (Attachment 4). The DBE will be expected to provide qualified biological monitors for all fieldwork. The District will only provide biological monitors during the pre-proposal site tour. A year-round cattle grazing operation having seasonal access to each of the water bodies exists on site. Cattle graze in the northern winter pastures from September through March, and are in the Southern winter pasture from March through September. Access to the western portion of Knuedler Lake is contingent upon gaining a Site License from City and County of San Francisco, which owns this portion of the water body (Attachment 5). The selected consultant will be expected to modify their approach to design for only the eastern section of Knuedler if the right to enter permit is not obtained prior to the commencement of fieldwork.

4.0 DBE, DB TEAM, AND KEY PERSONNEL

This RFQ seeks specific information regarding each DBE submitting an SOQ, including information regarding the proposed design-build team and key personnel. Pursuant to Public Contract Code section 22161(d), “design-build entity” (DBE) means a

corporation, limited liability company, partnership, joint venture or other legal entity that is able to provide appropriately licensed contracting, architectural, and engineering services as needed for a design-build contract. Pursuant to Public Contract Code section 22161(e), "design-build team" ("**DB Team**") means the DBE itself and the individuals and other entities identified by the DBE as members of its team for the Project. The term "**Key Personnel**" as used in this RFQ means those individuals within the DB Team who will have primary responsibility for oversight and management of the Services during the course of the Project, including the licensed design professional who will stamp and sign the Project plans, the designated project manager(s), and site superintendent(s).

5.0 DB TEAM QUALIFICATIONS

5.1 Technical Design and Construction Expertise. The DB Team, including the DBE, should possess relevant technical design and construction expertise for this Project, including the following:

(A) *Pond Restoration Experience.* The Project designer should have demonstrated successful completion within the past eight years of at least three pond restoration projects that are similar in scope, size, and region to this Project.

(B) *Habitat Development Experience.* The Project designer should have demonstrated experience with projects focused on designing and constructing habitat for the San Francisco garter snake and California red-legged frog.

(C) *Project Management.* Key Personnel must have sufficient experience and training to competently manage and complete design and construction of the Project.

(D) *Biological experience*. Key Personnel must have sufficient experience including biological monitoring, handling, and work on San Francisco garter snake and California red-legged frog Western pond turtle, and their associated habitat.

5.2 Licensing and Registration. The DB Team members must be duly licensed, registered, or authorized in good standing as required by California law, including the following:

(A) *Contractor.* The contractor must possess a Class A California contractor's license, and must be registered with the California Department of Industrial Relations ("**DIR**") to perform public works projects.

(B) *Subcontractors*. Each subcontractor must possess the license classification required under California law for the type of work to be performed by that subcontractor, and each subcontractor must be registered with the DIR to perform public works projects. Any fencing subcontractor must possess a California C-13, Fencing Contractor license.

(C) *Design Professional.* The design professional with primary responsibility for the Project design must possess a California Civil Engineering License.

(D) *Geotechnical, Topographical, and Hydrological Surveys.* Each individual responsible for providing services under these categories must possess the required California license, and, if applicable, must be registered with the DIR to perform pre-construction surveying on public works projects.

(E) *Biological Monitor.* The biological monitor(s) must possess current authorization from U.S. Fish and Wildlife Services, and California Department of Fish and Wildlife to work with the San Francisco garter snake, California red-legged frog, and western pond turtle, including handling. This usually requires a federal recovery permit and state authorization for each species.

5.3 Safety Record. A DBE's safety record will be deemed acceptable if its experience modification rate for the most recent three-year period is an average of 1.00 or less, and its average total recordable injury or illness rate and average lost work rate for the most recent three-year period does not exceed the applicable statistical standards for its business category or if the Respondent is a party to an alternative dispute relation system as provided for in Section 3201.5 of the Labor Code. (See Public Contract Code § 22164(b)(3)(G).) See Attachment 6 for form to utilize to respond to this.

5.4 Financial, Insurance, and Bonding Capacity. The DBE must have the financial capacity to complete the Project on time. The DBE must also have the capacity to obtain all required payment and performance bonding, liability insurance, and errors and omissions insurance. Pursuant to Public Contract Code section 22165, the DBE awarded the Project must provide payment and performance bonds, each for 100% of the cost to construct the Project. The payment bond must comply with Civil Code section 9550. Errors and omissions insurance coverage is required for the design

elements of the Project. The District's standard insurance requirements are attached as **Attachment 7** to this RFQ.

5.5 Availability and Staff Capacity. The DBE must be available and have sufficient staffing and capacity to provide the Services in the time contemplated by the currently anticipated Project schedule, as further detailed in Section 6.0, below.

5.6 DB Team Members and Key Personnel. At a minimum, the DB team must include a licensed civil engineer, with the qualifications and experience necessary to design the Project; a general contractor with a Class A license; and a qualified and experienced biologist.

5.7 Skilled and Trained Workforce. Pursuant to Public Contract Code section 22164(c), DBE will not be prequalified unless it agrees to an enforceable commitment that contractors and subcontractors of any tier will use a skilled and trained workforce to perform all work on the Project that falls within an apprenticable occupation in the building and construction trades, as further detailed in Public Contract Code sections 2600-2602.

6.0 ANTICIPATED PROJECT SCHEDULE

The Anticipated Project Schedule is Attachment 8. Please refer to Attachment 8 and subsequent addendums, if any for the Project Schedule and deadlines. The following reflects the District's anticipated schedule for the design-build procurement process, award of the design-build contract, and design and construction of the Project. This anticipated schedule is provided for convenience only and is subject to change without prior notice.

7.0 SOQ CONTENTS

Each SOQ must include the contents specified in this Section 7.0, and must be submitted as specified in Section 8.0, below. Clarity and brevity are preferable to volume. Each SOQ should be clearly organized and labelled to follow the sequence of requirements set forth below. If, and only to the extent that, any required information is not applicable, briefly explain why that information is not applicable. Information required for this SOQ that is a public record under the California Public Records Act (Government Code § 6250 et seq.) will be open to public inspection at the appropriate time.

7.1 Cover Letter. Each SOQ must include a cover letter that includes all of the following:

(A) *The DBE.* Identify the DBE and provide a concise, fact-based statement as to why the DBE is qualified for to serve as the DBE for this Project. State whether the DB Team will be available to provide the Services in accordance with the anticipated schedule set forth in Section 6.0, above.

(B) *DBE Address.* The address for the DBE's principal place of business.

(C) *DBE Contact.* Identify the individual who will serve as the DBE's primary point of contact for the RFQ and RFP processes, including name, title, direct phone number(s), and email address.

(D) *Enforceable Commitment for Skilled and Trained Workforce.* State whether the DBE, if awarded the design-build contract for the Project, will enter into an enforceable commitment to use a skilled and trained workforce to perform the work on the Project, in compliance with Public Contract Code sections 2600-2602.

(E) *Authorization.* The SOQ must contain the following statement:

> "By submitting this SOQ, the DBE waives any objections to the RFQ contents or RFQ process, and authorizes the District to obtain credit reports, contact references for DBE, and to conduct any other investigation the District determines is reasonably necessary to confirm the DBE's qualifications or the veracity of this SOQ. DBE agrees that upon request, it will sign any releases, authorizations, or other documents required for disclosure of relevant information."

(F) *Certification Under Penalty of Perjury.* The DBE and, if applicable, its general partners or joint venture members, must certify under penalty of perjury that the information provided in the SOQ is accurate and complete, to the best of the DBE's knowledge.

7.2 DBE Business Information.

(A) *DBE Individuals Designated to Perform Work on Project.* If the DBE is a privately held corporation, limited liability company, partnership, joint venture, or other legal entity, the SOQ must include a listing of all the shareholders, partners, or members known at the time of SOQ submission who will perform work on the Project.

(B) *Organizational Documents.* Provide a copy of the organizational documents or agreements committing to form the business organization.

7.3 DB Team Members and Key Personnel.

(A) *Identification and Contact Information.* Identify the members of the DB Team by name and title, including Key Personnel for each member, and provide contact information for each, including business address, phone number, and email address.

(B) *Evidence of Experience and Capacity.* Provide evidence that the members of the DB Team have completed, or demonstrated the experience, competency, capability, and capacity to complete projects of similar size, scope, or complexity, and that proposed Key Personnel have sufficient experience and training to competently manage and complete the design and construction of the Project.

(C) *Financial Statement(s).* Provide a financial statement(s) that ensures that the DB Team has the capacity to complete the Project.

(D) *Claims History.* For each member of the DB Team, including the DBE, briefly describe any design or construction related claims or litigation that the member has been a party to within the past five years, with respect to claims or litigation involving $100,000 or more. Provide contact information for the representatives of the parties involved in the claims or litigation, including name, title, role, party represented, nature of involvement, address, phone number, and email address.

7.4 License and Registration Information. For each member of the DB Team and for each of the Key Personnel identified in the cover letter, provide current information on the licenses, registration, authorizations, and credentials required to design and construct the project, including, but not limited to, information on the revocation or suspension of any license, credential, authorization, or registration.

7.5 Insurance and Bonding Capacity. Provide evidence that establishes that the DBE has the capacity to obtain all required payment and performance bonding, liability insurance, and errors and omissions insurance.

7.6 Workers' Compensation History and Safety Program. Provide information concerning workers' compensation experience history and a worker safety program for each member of the DB Team.

7.7 Safety Record. Provide evidence that the DBE has an acceptable safety record, as further specified in Section 5.3, above. See Attachment 6.

8.0 SOQ SUBMISSION

8.1 Submission Instructions and Deadline. The DBE must submit an electronic PDF copy, and five sealed, hard copies of the SOQ to the address and email specified below. The SOQ, including electronic and hard copies, must be received by the District no later than **12:00 noon on Friday May 4, 2018**, addressed as follows:

For Hard Copy Submission:
Lupe Hernandez, Administrative Assistant
Midpeninsula Regional Open Space District
330 Distel Circle, Los Altos, CA 94022-1404

For Electronic Submission:
lhernandez@openspace.org

8.2 District Representative. Lupe Hernandez is the designated District Representative and can be reached at (650) 625-6578, solely for questions about SOQ submission or to confirm receipt of submitted SOQs. All other comments and questions should be submitted in writing and all responses will be in writing.

8.3 Disclaimers and Reservations of Rights. Upon receipt, the SOQs are the sole property of the District, and will not be returned to the DBE. Each DBE is solely responsible for its costs to prepare and submit its SOQ. By submitting an SOQ, the DBE agrees that, subject to the limitations of law, the District may exercise its sole discretion for prequalification determinations, and in the course of evaluating the DBE's qualifications, may consider information it obtains independent of the SOQ, including, but not limited to, license and registration records, court filings, and reliable references. The District reserves the right to issue an addendum to modify or waive any of the requirements of this RFQ, subject to the limitations of law. The District reserves the right to cancel this procurement process at any time, and the right to decline to award the design-build contract to any DBE.

8.4 **Public Records and Proprietary Information, Indemnification**. The District recognizes that DBE's will occasionally believe that all or portions of their proposals are confidential or proprietary. This can present problems in participating in a public agency RFQ process. All proposals, strategies, supporting information, rate schedules and other information and documents are presumptively public records under the California Public Records Act (Gov't Code section 6250 et seq.), subject to prompt disclosure upon request by any member of the public.

The District is not soliciting, does not wish to receive, and will not treat any information received under this proposal as proprietary or confidential information, unless specifically called for or expressly accepted by the District General Counsel in writing, and will be accepted and considered only when, in the sole discretion of the District it is necessary to serve the public purpose of the project. If the inclusion of confidential or proprietary information is determined to be necessary to the proposal, proposers must identify each and every specific item and each and every page and segregate the information into a separate envelope or electronic file labeled conspicuously as confidential, with a cover page describing the information and applicable law exempting the same from disclosure. Any material marked or claimed as confidential or proprietary may be returned to the DBE by the District or destroyed and may not be considered in the review of proposals if the claim does not appear justified or would inhibit the public purposes of the project proposed.

If the documents have been properly marked and expressly accepted as confidential and proprietary in writing by the District General Counsel, the District will make its best effort to advise the DBE of any Public Records Act request, should any be received, seeking documents claimed to be confidential or proprietary, to give the proposer an opportunity to take legal steps to protect such property from disclosure to third-party requester. The District expressly disclaims any duty and will not defend the confidentiality or proprietary nature of any information submitted. **By submitting any confidential or proprietary information to the District, the DBE agrees to holds harmless and indemnify and defend the District and its officers, employees, and agents for any and all costs, including attorney's fees, incurred by the District or awarded to a Public Records Act requester relating to a request for release of proposer's data should the proposer ask the information to be handled as proprietary or confidential**

9.0 SOQ EVALUATION AND PREQUALIFICATION

9.1 SOQ Review. The SOQs will be opened and reviewed privately by District personnel and/or District consultants assigned by District to evaluate and score the SOQs.

9.2 Evaluation Factors. Significant factors that the District will consider in evaluating the SOQs include:

(A) Responsiveness to this RFQ and ability to meet anticipated schedule;

(B) Technical design and construction expertise;

(C) Relevant experience and successful completion of similar projects;

(D) Qualifications of DB Team members and Key Personnel, including applicable experience, licenses, registration, authorizations, and credentials;

(E) Financial capacity and ability to meet insurance and bonding requirements;

(F) Safety program and acceptable safety record;

(G) Workers' compensation history;

(H) Commitment to use of a skilled and trained workforce;

(I) Claim and litigation history; and

(J) References.

9.3 Scoring and Prequalification. For each of the factors listed above, each SOQ will be scored relative to the other SOQs on a zero-to-ten basis, with zero being the lowest (not qualified) score and ten the highest (most qualified) score for each factor. The scores assigned by individual reviewers will be averaged across each A San Francisco Garter Snake Habitat Management Plan was completed in September 2012 (2012 Plan) category to provide the final scores for each factor. The highest possible score is 100, and a minimum score of 60 will be required to prequalify. However, in the absence of compelling mitigating circumstances, a zero score for any one of the evaluation factors will be grounds for disqualification of a DBE, even if the overall score exceeds the required minimum.

9.4 Notification of Determinations. Upon conclusion of the District's review and evaluation of the SOQs, each DBE will be notified by email as to whether or not the DBE is prequalified for submitting a proposal for design-build construction of the Project. The email notice will attach an electronic copy of the RFP for each DBE that is prequalified and an invitation to attend the mandatory field tour, as specified below, in Section 10.

10.0 MANDATORY FIELD TOUR FOR PREQUALIFIED DBES

A mandatory pre-proposal tour for all prequalified DBEs is scheduled for **Thursday May 17, 2018 beginning at 9:30 a.m**. Monday, May 21, 2018 has been reserved as a back-up date. Additional information, including any change to the date or time for the mandatory tour will be included in the emailed notice of prequalification.

Attachment 1: San Francisco Garter Snake Habitat Management Plan (2012 Plan)
Attachment 2: Design Parameters
Attachment 3: Site Map Mindego Ranch Locality Map
Attachment 4: Mindego Ranch SFGS Access Guidelines
Attachment 5: Knuedler Lake Map
Attachment 6: Safety Statement
Attachment 7: Insurance Requirements
Attachment 8: Project Schedule

SAN FRANCISCO GARTER SNAKE HABITAT MANAGEMENT PLAN, MINDEGO RANCH, RUSSIAN RIDGE OPEN SPACE PRESERVE, SAN MATEO COUNTY, CALIFORNIA

Prepared for:

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5 September 2012

SAN FRANCISCO GARTER SNAKE HABITAT MANAGEMENT PLAN, MINDEGO RANCH, RUSSIAN RIDGE OPEN SPACE PRESERVE, SAN MATEO COUNTY, CALIFORNIA

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EXECUTIVE SUMMARY

This habitat management plan was created to provide the Midpeninsula Regional Open Space District (District) with management and monitoring strategies and specific recommendations to improve habitat conditions for the San Francisco garter snake (SFGS) (*Thamnophis sirtalis tetrataenia*) at Mindego Ranch. The 1,047-acre ranch, which is managed by the District as part of the Russian Ridge Open Space Preserve, is located off Alpine Road near the crest of the Santa Cruz Mountains in San Mateo County, California. Mindego Ranch was acquired from the Peninsula Open Space Trust (POST) in 2008. The property was used as a cattle ranch for approximately 150 years prior to acquisition.

The SFGS is listed as endangered under both the California and federal Endangered Species Acts, and designated as a Fully Protected Species under the California Fish and Game Code. Two other special-status species, the California red-legged frog (CRLF) (*Rana draytonii*), listed as threatened under the Federal Endangered Species Act and as a Species of Special Concern by the California Department of Fish and Game (CDFG), and the Western pond turtle (WPT) (*Actinemys marmorata*), designated as a Species of Special Concern by CDFG, are also present on the site and addressed in the plan.

The SFGS was first documented at Mindego Ranch in 1986. Previous studies and data collected for this plan indicate that reproductive populations of SFGS are currently present at both Mindego Lake and Knuedler Lake. Although the CRLF is present at Mindego Lake in relatively low numbers, breeding is severely depressed as a direct result of the presence of a variety of non-native predatory fish and bullfrogs (*Lithobates catesbeianus*).

Management for SFGS will focus on creating habitat conditions that will result in increased abundance of its primary prey species, including CRLF and Pacific tree frog (*Pseudacris sierra* [= *regilla*]). This recovery strategy focuses on improving habitat conditions through removal of non-native, centrarchid and ictalurid fishes, on-going bullfrog control, improving breeding habitat for CRLF, and managing upland areas through re-introduction of cattle grazing. In order to measure the effectiveness of this management approach, baseline and post-activity SFGS population studies are recommended. These studies will also provide valuable data regarding estimated population size and population structure.

The Management Plan is expected to contribute to recovery actions as identified in the U.S. Fish and Wildlife Service (USFWS) Recovery Plans for SFGS and CRLF. Mindego Ranch represents the only SFGS population along the crest of the Santa Cruz Mountains that is currently afforded protection. The site also provides an ideal opportunity for

research opportunities regarding life history aspects of a relatively undisturbed SFGS population.

The District's mission is to protect and restore the natural environment, and to provide opportunities for ecologically-sensitive public access and education. To achieve these goals, the District performs a variety of activities including patrol, emergency response, road and facility maintenance, grazing, grazing infrastructure improvements, and non-native plant control. Specific management and monitoring recommendations are recommended to maintain and improve habitat conditions for the SFGS, CRLF and WPT. This plan is intended to function as an attachment to a District permit application to the regulatory agencies for incidental take of listed species, including the SFGS, that could occur during management and monitoring activities designed to conserve and aid in recovery of the protected species while allowing for ongoing use of the site as an active cattle ranch and open space preserve.

SAN FRANCISCO GARTER SNAKE HABITAT MANAGEMENT PLAN, MINDEGO RANCH, RUSSIAN RIDGE OPEN SPACE PRESERVE, SAN MATEO COUNTY, CALIFORNIA

1.0 INTRODUCTION

In 2008, the Midpeninsula Regional Open Space District (District) acquired the 1,047-acre Mindego Ranch from Peninsula Open Space Trust (POST). Mindego Ranch is situated approximately two miles east of the town of La Honda near the crest of the Santa Cruz Mountains in San Mateo County, California. The property was used as a cattle ranch for approximately 150 years prior to acquisition. Mindego Ranch is managed by the District as part of the Russian Ridge Open Space Preserve.

Mindego Ranch is occupied by the San Francisco garter snake (SFGS) (*Thamnophis sirtalis tetrataenia*), which is State- and federally-listed as Endangered, and is designated as a Fully Protected Species under the California Fish and Game Code. The entire range of the SFGS is restricted to San Mateo County and northwest Santa Cruz County. Mindego Ranch is unique in that it supports the only protected population of SFGS along the crest of the Santa Cruz Mountains. Reported observations of the SFGS are associated with at least two significant aquatic features onsite: Mindego Lake and Knuedler Lake.

The California red-legged frog (CRLF) (*Rana draytonii*), which is federally-listed as Threatened and considered a Species of Special Concern by the California Department of Fish and Game (CDFG), is also present on Mindego Ranch. Although CRLF are relatively common in the Santa Cruz Mountains, the species has disappeared from an estimated 70% of its historic range (Jennings and Hayes 1994). CRLF are an important food source for SFGS, and so are considered critical to maintaining healthy SFGS populations (USFWS 2002).

Mindego Ranch is also occupied by the Western pond turtle (WPT) (*Actinemys marmorata*), which is designated as a Species of Special Concern by CDFG. Since the WPT occupies the same habitats as SFGS and CRLF, it is expected to benefit from many of the proposed management actions over time.

Previous studies and data collected during this project indicate that reproductive populations of SFGS are present at both Mindego Lake and Knuedler Lake (Swaim Biological, Inc. 2009; Condor Country Consulting, Inc. 2009; CNDDB 2012). Although the CRLF is present at Mindego Lake, its numbers are currently depressed due to the presence of a variety of non-native predatory fish and American bullfrogs (*Lithobates catesbeianus*). The presence of predatory fish, particularly centrarchids, has been implicated in the decline of CRLF in many parts of their range (USFWS 1996). Bullfrogs prey directly on CRLF, and also have a competitive advantage based on larger size, greater reproductive output, and the fact that their larvae are unpalatable to predatory fish (USFWS 1996). The removal of predatory fish and control of bullfrogs are considered essential to the recovery of the CRLF population at Mindego Lake. It has

been demonstrated that reproductive success for CRLF increases dramatically after predatory fish removal (Alvarez *et al.* 2003). This in turn would improve habitat conditions for the SFGS. The CRLF is present as a breeding species at Knuedler Lake, which currently does not support fish. However, a lack of open water likely reduces current productivity of CRLF and SFGS at that site. Two other aquatic features—Upper Pond and Big Spring—do not currently provide suitable breeding conditions for CRLF, and improvements to both sites are recommended.

The District's mission includes protecting and restoring the natural environment, as well as allowing ecologically-sensitive public access and education. Appropriate management of Mindego Ranch for the SFGS, CRLF and other sensitive wildlife should focus on rehabilitating four lentic sites: Mindego Lake, Knuedler Lake, Big Spring (pond) and Upper Pond. Concurrently, cattle should be reintroduced throughout approximately 330 acres of grasslands onsite to control invasive plant species and maintain open grassland habitat.

1.1 Purpose of Plan

The primary purpose of the Management Plan is to contribute to the recovery of the SFGS by improving habitat conditions for SFGS and CRLF at Mindego Ranch. The management strategy focuses on improving aquatic habitats through removal of non-native predators and increasing open-water habitat, and maintaining associated upland habitats through conservation grazing (Sage Associates 2008, 2012). Ongoing land stewardship actions, such as road maintenance, are also included in the Plan. The overall goal is to increase the current population size of SFGS by managing for habitat conditions that will increase the numbers of its primary prey species, CRLF and Pacific treefrogs [*Pseudacris sierra* (= *regilla*)].

Implementation of the Management Plan will also contribute to recovery actions as identified in the U.S. Fish and Wildlife Service (USFWS) Recovery Plans for SFGS (USFWS 1985) and CRLF (USFWS 2002). One of the primary goals of the SFGS Recovery Plan is to identify and protect four significant populations beyond the six identified when the document was released. Given that Mindego Ranch has two productive breeding areas that have supported the subspecies for at least 25 years, the Mindego population should be considered "significant." The CRLF Recovery Plan identifies the area in which Mindego Ranch is located (South San Francisco; Area 18) as a core area for focused recovery efforts. Conservation needs specified for the area include protection of existing populations, increase of habitat connectivity between watersheds, control of non-native predators, and implementation of guidelines for recreation activities. This Management Plan contributes to all of these goals.

Appropriate long-term management and monitoring of the SFGS and CRLF at Mindego Ranch is expected to increase numbers and help recover both listed species. Since some level of “take” of listed species is anticipated in the short-term as a result of the recommended management actions, consultation with State and federal regulatory agencies will be required. This Management Plan is intended to provide the necessary

information for a Section 7 permit application to the USFWS, an Incidental Take Permit under the CESA, and a request for a Memorandum of Understanding regarding take of a Fully Protected Species (i.e., the SFGS) for scientific purposes.

1.2 Plan Preparation

This Management Plan was developed by Biosearch Associates (Mark Allaback and David Laabs) in association with The Wildlife Project (Jeff Alvarez) and Coast Range Biological, LLC (Tom Mahony). The Management Plan is based upon both existing information and on field efforts conducted in the Fall of 2011 and Spring of 2012. District biologists Lisa Bankosh, Julie Andersen, and Kirk Lenington reviewed and improved the conceptual approach, and draft and final documents.

1.2.1 Literature and Data Review

Previous biological investigations of the site were reviewed (Swaim Biological, Inc. 2009; Condor Country Consulting, Inc. 2009). Studies on other District lands were also reviewed (i.e., Seymour and Westphal 2000; Richard Seymour and Associates 2007; Vollmar Consulting 2009). A grazing management plan (Sage Associates 2008, 2012), a resource management plan (Koopman 2008), and an invasive species control plan (MROSD 2009) were also reviewed. The California Natural Diversity Database (NDDB) maintained by CDFG was searched for records in the vicinity. The herpetological collection at the Museum of Vertebrate Zoology (MVZ) was queried for records. Several meetings, phone calls and field visits with District staff were made to discuss management priorities and constraints.

1.2.2 Field Surveys

Field efforts in the Fall of 2011 and the Spring of 2012 were conducted to augment data from previous biological surveys of the site. Visual Encounter Surveys (VES) were conducted in appropriate habitat on 12, 20 and 29 September 2011, 19 April 2012 and 17 May 2012. Surveys were conducted under authority of a federal recovery permit (TE-78251) issued to Biosearch Associates. Surveys for SFGS were conducted by Jeff Alvarez, Mark Allaback, and David Laabs - all named as Authorized Individuals. Surveys were also consistent with the terms of a Memorandum of Understanding issued by the CDFG issued to Jeff Alvarez and with authorizations attached to Scientific Collecting Permits for all investigators. All garter snakes were captured by hand whenever possible to confirm species identification.

1.3 Regulatory Framework

Mindego Ranch is occupied by the SFGS and CRLF, two species afforded significant protections by the USFWS and CDFG. The WPT, designated by the State as a Species of Concern, is also present at Mindego Ranch. The management actions recommended in this Management Plan are subject to regulatory review regarding potential impacts to protected species.

1.3.1 U. S. Fish and Wildlife Service

The USFWS has jurisdiction over species listed as threatened or endangered under the federal Endangered Species Act (ESA). The ESA defines "take" as: "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect", or attempt to engage in any such conduct. Any activity that could result in take of a federally listed species requires an ESA Section 10 take permit from USFWS or an ESA Section 7 consultation with USFWS, in conjunction with a federal permit process.

1.3.2 California Department of Fish and Game

The CDFG has jurisdiction over species listed as threatened or endangered under the California Endangered Species Act (CESA). Species that have been proposed for listing are also provided protection under the provisions of CESA. CESA generally follows the same provisions of the federal ESA. Mitigation for unavoidable take can be authorized through an Incidental Take Permit.

CDFG is also responsible for enforcing the California Fish and Game Code, which has several sections relevant to the proposed project. The California Fish and Game Code (§5050) designates certain species as Fully Protected, including the SFGS. Under this code, fully protected species cannot be taken or possessed at any time. Moreover, no permits or licenses can be construed to authorize the take of any fully protected species. However, CDFG may authorize the taking of these species for necessary scientific research, including efforts to recover the species. The Fish and Game Code further specifies that scientific research does not include any actions taken as part of specified mitigation for a project. The fully protected statute in California was one of the earliest attempts to provide protection for species at risk of extinction; it predates both federal and state Endangered Species Acts. The SFGS was subsequently covered under the federal and California Endangered Species Acts, which provide additional protections as well as flexibility to develop mitigation in the case of unavoidable take. However, the fully protected statute is still in place, meaning that the only take authorizations allowable for SFGS are those for scientific research and recovery actions. Lastly, Section 1602 of the California Fish and Game Code requires any person, business, State or local government agency, or public utility to notify CDFG of any proposed activity that may substantially modify the bed or banks of a river, stream, or lake. A Section 1602 Permit, or Streambed Alteration Agreement, will likely be required due to recommended pond enhancement actions.

1.3.3 U. S. Army Corps of Engineers

The U. S. Army Corps of Engineers (USACE) is responsible for enforcing Section 404 of the Clean Water Act, which regulates the discharge of fill material into waters of the United States. Waters of the U. S. are defined in 33 CFR Part 328.3(a) and include streams that are tributaries to navigable waters and jurisdictional wetlands.

Major work to repair dams/berms that form ponds may require a Section 404 Permit. It is unclear if excavation (= dredging) of pond basins will require a permit. The USACE should be contacted informally to determine if a permit is required for the necessary work proposed as part of this Management Plan at Upper Pond, Big Spring and Knuedler Lakes (see Section 6.4).

1.3.4 State/Regional Water Resources Control Board

The State Water Resources Control Board (SWRCB) regulates water quality of streams and jurisdictional wetlands. The SWRCB enforces Section 401 of the Clean Water Act.

A 401 Water Quality Certification may be required during major repair of pond dams or when Mindego Lake is drained (see Section 6.5). The SWRCB should be contacted informally to determine if a permit is required when Mindego Lake is drained, even though measures are proposed to ensure that only clear water is discharged.

1.4 Relevance to Existing Recovery Plans

The Management Plan will contribute to the recovery actions as identified in the USFWS Recovery Plans for SFGS (USFWS 1985) and CRLF (USFWS 2002). One of the primary goals of the SFGS Recovery Plan is to identify and protect four significant populations beyond the six identified when the document was released. Given that Mindego Ranch supports the subspecies in a relatively undisturbed area that will be conserved as open space in perpetuity, it is likely that the USFWS will consider the Mindego population to be "significant." Furthermore, the location of Mindego Ranch may facilitate SFGS dispersal and colonization of sites on both sides of the crest of the Santa Cruz Mountains. This Management Plan includes a research component that will provide much-needed data regarding population size and demographic structure, as recommended in the most recent 5-year status review for the species (USFWS 2006).

The Management Plan will also contribute to the goals of the CRLF Recovery Plan by enhancing aquatic habitats for the species. The Recovery Plan identifies the area in which Mindego Ranch is located (South San Francisco; Area 18) as a core area for focused recovery efforts. Conservation needs specified for the area include protection of existing populations, increase of habitat connectivity between watersheds, control of non-native predators, and implementation of guidelines for recreation activities.

2.0 EXISTING CONDITIONS

2.1 Physical Setting

The former Mindego Ranch covers ~1,047 acres and is situated in the Santa Cruz Mountains 2 miles east of La Honda in unincorporated San Mateo County, California (Figure 1). The proposed project site lies near the headwaters of Mindego Creek and Alpine Creek, which are both tributaries to San Gregorio Creek. The site is ~1 mile west of the crest of the Santa Cruz Mountains and is accessed from Alpine Road via a paved ranch road.

Elevations on the site range from 700 feet above sea level along Mindego Creek to 2,143 feet at the top of Mindego Hill. Contours are steep with deeply cut drainages. The topography of the area is influenced by the San Andreas fault zone. Four ponds are currently present: Mindego Lake, Knuedler Lake, Big Spring and Upper Pond (Figure 2).

2.2 Historic and Current Land Use

Prior to European contact, the land that includes Mindego Ranch was used by several tribal groups of the Ohlone Indian cultural sphere (Hylkema 2011). Mindego Ranch may have played a significant role in the area's prehistory and contains at least one recorded archaeological site (Hylkema 2011). In 1859, Juan Medico, a Basque farmer, and the first non-native settler, established a homestead on the east flank of Mindego Hill and began raising cattle on the property. The True family purchased the ranch in 1954, and the ranch was then used to raise cattle. The family sold the property to POST in 2007. The property was subsequently transferred to the District in 2008. Following the transfer of the land to the District, it was recommended that grazing be suspended for at least three years to repair or replace infrastructure and allow grassland habitats to recover from recent heavy grazing (Koopman 2008).

Anticipated future land use may include low intensity outdoor recreation, the reintroduction of a cattle grazing operation, and management to protect and enhance natural resources. Mindego Ranch has not yet been opened to general public access, however small docent-led tours are currently offered. In the future, a trail will provide hiking and equestrian access to the summit of Mindego Hill, and hiking access to the "Council Circle," a donor recognition feature located approximately 1,000 feet northeast of Mindego Lake. No off-trail use will be permitted. It is anticipated that much of the remainder of the property will be designated as a Conservation Management Unit and will be closed to the public, with the exception of docent-led tours.

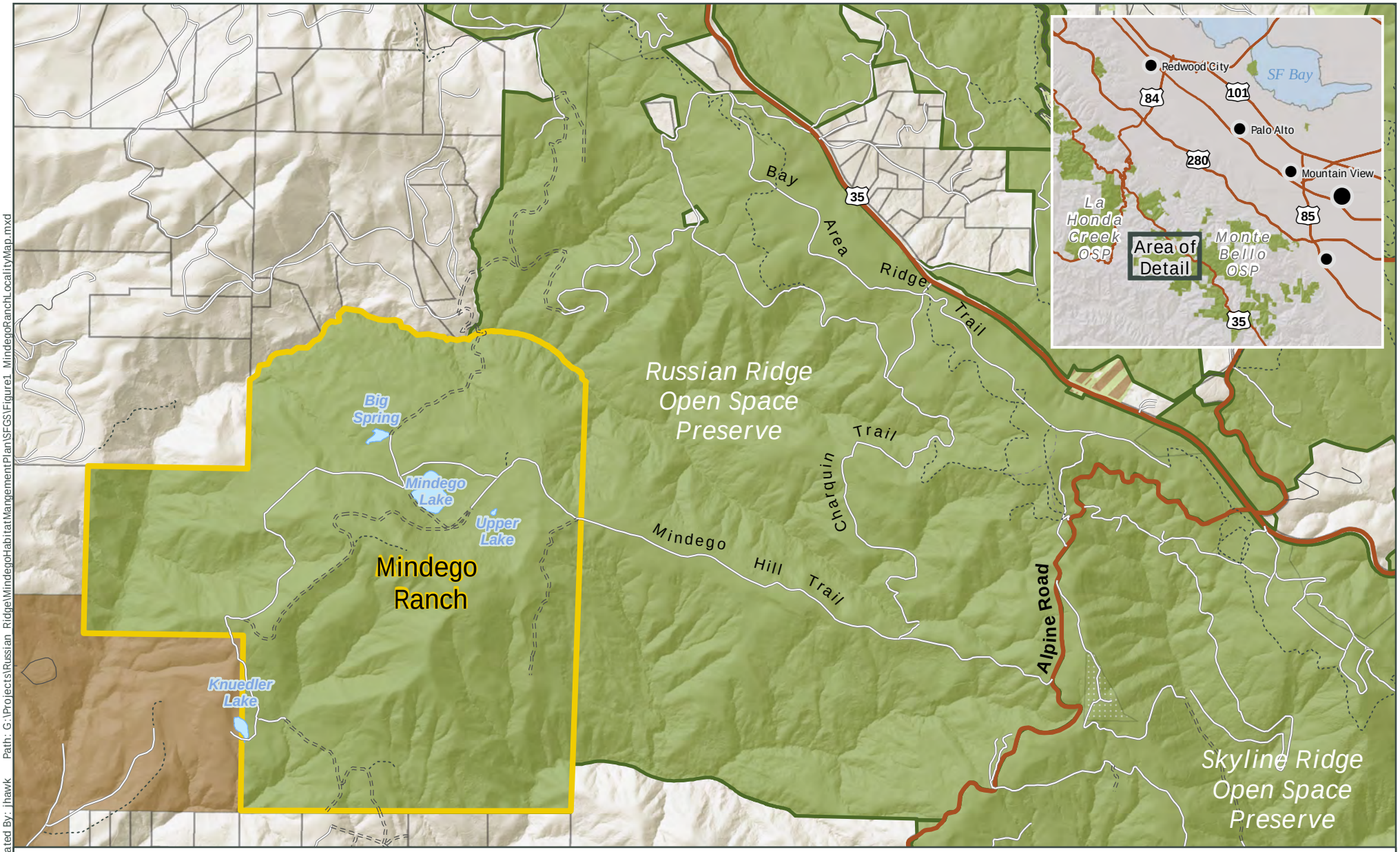

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Figure 1: Mindego Ranch Locality Map

- Mindego Ranch Property
- MROSD Preserves
- Other Public Agency
- Private Property

Midpeninsula Regional Open Space District *(MROSD)*

October, 2012

Miles 0 0.5 1

While the District strives to use the best available digital data, this data does not represent a legal survey and is merely a graphic illustration of geographic features.

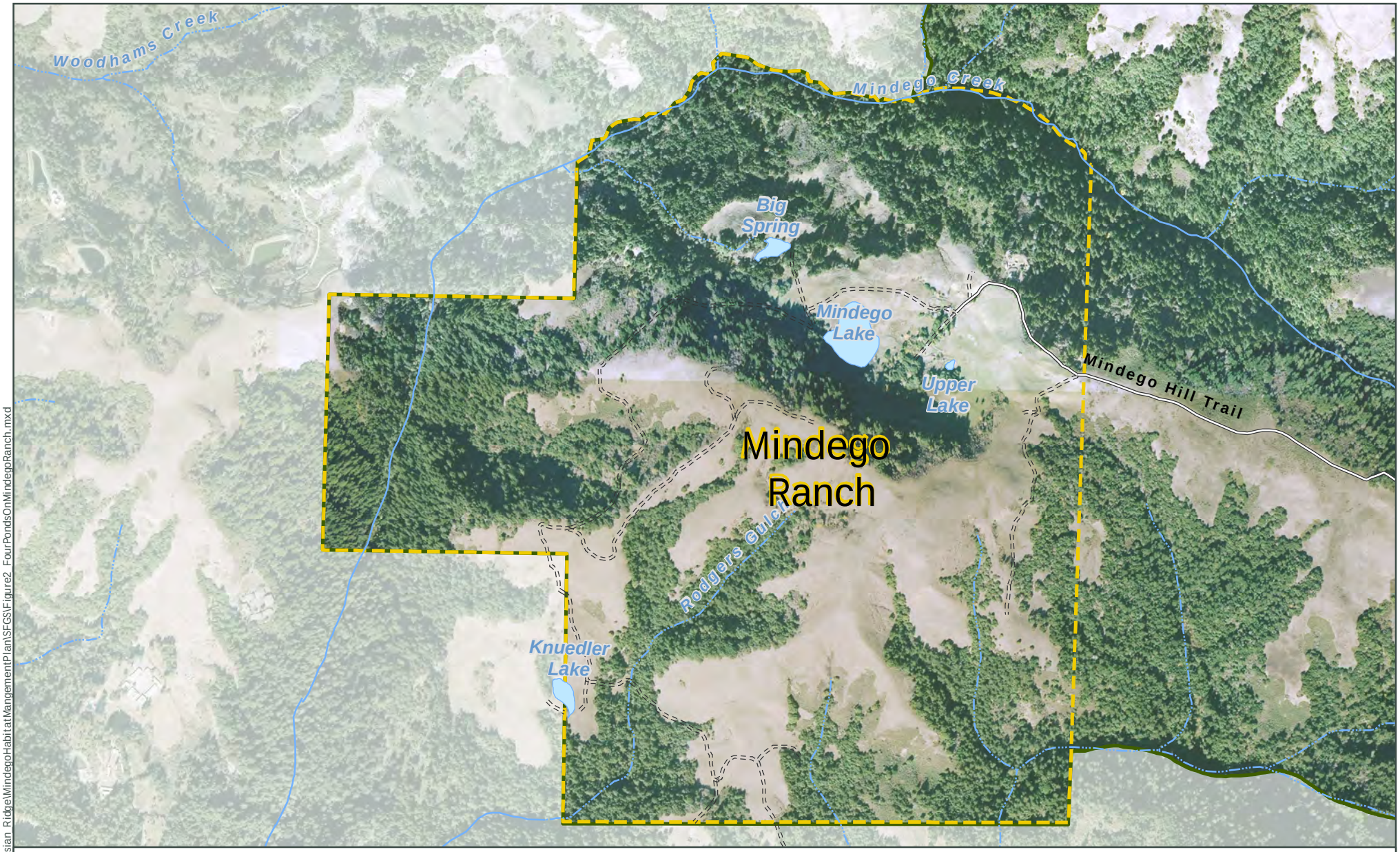

Figure 2: Four Ponds on Mindego Ranch

Mindego Ranch Property
MROSD Preserves
Other or Private Land
Pond
Perenial Stream
Intermittent Stream

Midpeninsula Regional Open Space District *(MROSD)*

October, 2012

Miles 0 0.25 0.5

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2.3 Wildlife Habitats

2.3.1 Uplands

Mindego Ranch supports a mosaic of upland plant communities within four general habitat types: Developed/Ruderal, Mixed Evergreen Forest, Non-native Grassland, and Coyote Brush Scrub (Figure 3). Representative wildlife, vegetation types, and opportunities for enhancement are described below.

Developed/Ruderal Habitat consists of areas developed by roads, residences, and other structures, along with ruderal (highly disturbed) areas dominated by weedy, non-native grasses and forbs characteristic of California Annual Grasslands (see below). This habitat is associated with the dirt road system, and the abandoned residence, ranch buildings and corrals near Mindego Lake. Despite its disturbed nature, several wildlife species may take advantage of open ground to forage or bask in Ruderal Habitat, or use the structure in Developed Habitat provided by fence-lines and abandoned buildings for perching, roosting or nesting. Western fence lizard (*Sceloporus occidentalis*) and mourning dove (*Zenaida macroura*) may forage in open areas, and SFGS and gopher snake (*Pituophis catenifer*) may be found basking on roads. Abandoned structures could provide roosting sites for a variety of bat species or nesting locations for barn swallow (*Hirundo rustica*), cliff swallow (*Petrochelidon pyrrhonota*) and black phoebe (*Sayornis nigricans*). San Francisco dusky-footed woodrats (*Neotoma fuscipes annectens*) may colonize abandoned buildings. Developed/Ruderal Habitat may be enhanced onsite by removing structures and restoring the former building sites. The existing dirt road system should be maintained to provide access to the property.

California Annual Grassland is dominated by non-native grasses and forbs including yellow star-thistle (*Centaurea solstitialis*[1]), wild oats (*Avena* sp.), wild radish (*Raphanus sativus*), soft chess (*Bromus hordeaceus*), Italian ryegrass (*Lolium multiflorum*), barley (*Hordeum murinum*), sheep sorrel (*Rumex acetosella*), hedgehog dogtail (*Cynosurus echinatus*), summer mustard (*Hirschfeldia incana*), and Italian thistle (*Carduus pycnocephalus*), with occasional native species including California poppy (*Eschscholzia californica*), milk thistle (*Silybum marianum*), slender tarweed (*Madia gracilis*), blue wild rye (*Elymus glaucus*), purple needlegrass (*Nassella pulchra*), and soap plant (*Chlorogalum pomeridianum*). This habitat supports small mammals including Botta's pocket gopher (*Thomomys bottae*) and California vole (*Microtus californicus*). Coyote (*Canis latrans*) and black-tailed deer (*Odocoileus hemionus*) may be seen foraging. Western pond turtles use grasslands in proximity to aquatic habitats for nesting. The open habitat provides foraging habitat for a variety of raptors, including red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), Turkey vultures (*Cathartes aura*) require open habitat to search for food. The grassland onsite offers enhancement opportunities that are addressed in this Management Plan, since much of the acreage has been negatively affected by past grazing practices and infestations of noxious weeds.

[1] Botanical nomenclature follows Hickman (1993).

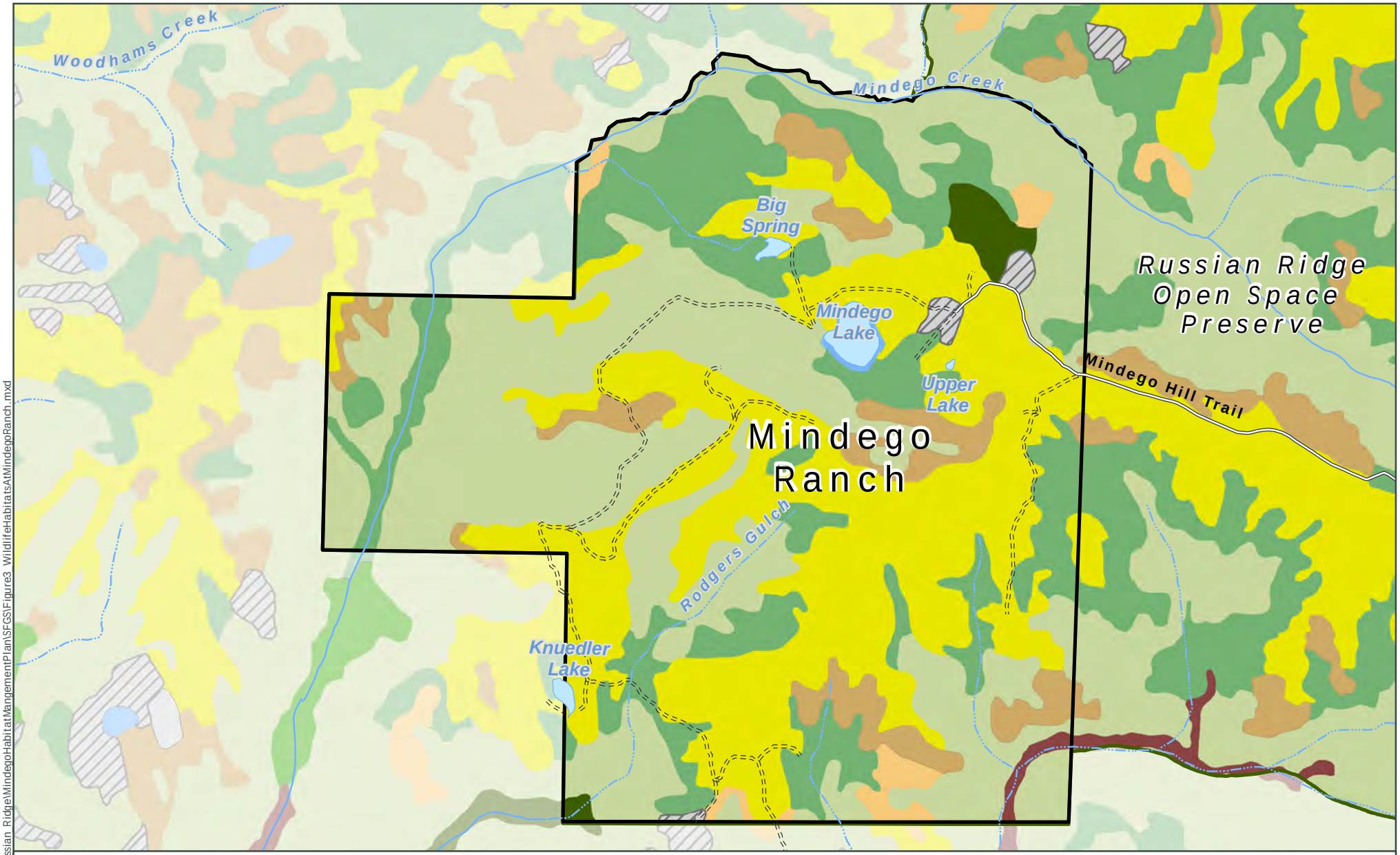

Figure 3: Wildlife Habitats at Mindego Ranch

- Douglas-fir/Redwood
- Mixed Evergreen Forest
- Douglas-fir/Mized Evergreen Forest
- California Annnual Grassland
- Coytote Brush Scrub
- Chaparral-Coastal Scrub Transition
- Red Alder
- Developed/Ruderal
- Aquatic Habitat
- Pond
- Perenial Stream
- Intermittent Stream

Midpeninsula Regional Open Space District *(MROSD)*

October, 2012

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While the District strives to use the best available digital data, this data does not represent a legal survey and is merely a graphic illustration of geographic features.

Mixed Evergreen Forest is dominated by a canopy of native trees including coast live oak (*Quercus agrifolia*), canyon live oak (*Q. chrysolepis*), tanoak (*Lithocarpus densiflorus*), California bay (*Umbellularia californica*), California buckeye (*Aesculus californica*), big-leaf maple (*Acer macrophyllum*), and madrone (*Arbutus menziesii*). The understory consists of native shrubs and herbs including poison oak (*Toxicodendron diversilobum*), California hazelnut (*Corylus cornuta* var. *californica*), California blackberry (*Rubus ursinus*), wood rose (*Rosa gymnocarpa*), toyon (*Heteromeles arbutifolia*), oceanspray (*Holodiscus discolor*), wood fern (*Dryopteris arguta*), Douglas iris (*Iris douglasiana*), trailplant (*Adenocaulon bicolor*), and swordfern (*Polystichum munitum*). Included in this unit are occasional stands of California black oak (*Q. kelloggii*). Douglas-fir/Mixed Evergreen Forest is similar to Mixed Evergreen Forest, but Douglas-fir (*Pseudotsuga menziesii*) forms a significant component of the canopy. Douglas-fir/Redwood is similar to Douglas-fir/Mixed Evergreen Forest, but redwood (*Sequoia sempervirens*) forms a significant component of the canopy. A variety of native wildlife is expected to use this habitat type, including black-tailed deer, raccoon (*Procyon lotor*) and mountain lion (*Felis concolor*). Broad-footed mole (*Scapanus latimanus*), Merriam's chipmunk (*Neotamias merriami*) and western tree squirrel (*Sciurius griseus*) are present. Northern flicker (*Colaptes auratus*), oak titmouse (*Baeolophus inornatus*), Stellar's jay (*Cyanocitta stelleri*) and band-tailed pigeon (*Patagioenas fasciata*) nest in this habitat. Rough-skinned newt (*Taricha granulosa*) and California newt (*T. torosa*) over-summer underground. The Mixed Evergreen Forest appears to be largely undisturbed onsite, although some weedy species that have become established along the road system could be periodically controlled and cattle should generally be excluded in the future.

Coyote Brush Scrub is dominated by coyote brush (*Baccharis pilularis*), with native shrubs and herbs present including poison oak, California blackberry, toyon, wood fern, sticky monkey flower (*Mimulus aurantiacus*), and blue elderberry (*Sambucus mexicana*), with more open stands supporting grasses and forbs characteristic of California Annual Grassland. Chaparral-Coastal Scrub transition is generally similar in terms of strand structure and species composition as Coyote Brush Scrub, but also contains additional native shrub species characteristic of chaparral or coastal scrub, including manzanita (*Arctostaphylos* spp.), California sagebrush (*Artemisia californica*), blue blossom (*Ceanothus thyrsiflorus*), and California coffeeberry (*Rhamnus californica*). A wide variety of native birds occur in coyote brush scrub including California quail (*Callipepla californica*), Lazuli bunting (*Passerina amoena*) and Western scrub-jay (*Aphelocoma californica*). Native mammals include brush rabbit (*Sylvilagus bachmani*) and bobcat (*Lynx rufus*). Succession of this habitat type within grassland is common following the cessation of grazing, which is addressed in the Grazing Management Plan (Sage Associates 2008, 2012). Enhancement will be achieved by managed grazing to create a mosaic of open grassland and Coyote Brush Scrub, which together provides high quality wildlife habitat.

2.3.2 Aquatic Resources

Mindego Ranch supports natural and manmade ponds/lakes, seasonal wetlands, springs and creeks. Representative wildlife, vegetation communities, habitat characteristics and opportunities for enhancement are summarized below.

Red Alder Forest occurs along streams and other wet areas and forms a riparian canopy dominated by red alder (*Alnus rubra*), with arroyo willow (*Salix lasiolepis*), red willow (*S. laevigata*), and/or shining willow (*S. lucida* ssp. *lasiandra*) occasionally present. Allen's hummingbird (*Selasphorus sasin*) and Wilson's warbler (*Wilsonia pusilla*) nest in this habitat. San Francisco dusky-footed woodrat houses are common in some areas. A variety of wildlife species use riparian areas for cover and to seek water.

Aquatic habitat is present in lakes and other perennial wet areas, including the four ponds found on Mindego Ranch. Open water dominates the deeper portions of ponds, with fringing hydrophytic species present in shallower areas along pond margins. Dominant species are primarily emergent, herbaceous hydrophytic species, such as spikerush (*Eleocharis macrostachya*), tall flatsedge (*Cyperus eragrostis*), soft rush (*Juncus effusus*), narrowleaf cattail (*Typha angustifolia*), horsetail (*Equisetum* sp.), seep monkeyflower (*Mimulus guttatus*), and small-fruit bulrush (*Scirpus microcarpus*). Riparian vegetation, including willows and creek dogwood (*Cornus sericea*) are also present in some aquatic areas.

Mindego Ranch supports four aquatic resources that are central to this Management Plan: Mindego Lake, Knuedler Lake, Big Spring and Upper Pond. These are discussed in further detail below.

Mindego Lake

Mindego Lake covers ~5.4 acres (234,405 ft^2) and is composed primarily of open water, due to water depths greater than four feet throughout most of the lake (Figure 4). Herbaceous wetland vegetation dominated by a mixture of native and non-native species grows in shallow areas along the lake fringe. Native species include spreading rush (*Juncus patens*), iris-leafed rush (*J. xiphioides*), spikerush (*Eleocharis macrostachya*), tall flatsedge (*Cyperus eragrostis*), cocklebur (*Xanthium* sp.), and water cress (*Nasturtium officinale*). Non-native species include curly dock (*Rumex crispus*), rabbits-foot grass (*Polypogon monspeliensis*), prickly sow thistle (*Sonchus asper*), and mint (*Mentha* sp.). Small stands of willow (*Salix* sp.) grow along the southern perimeter of the lake near the water line. A seep wetland, dominated by spike rush, water cress, and curly dock, feeds into the lake from the east. Uplands around the northern portion of the lake are heavily disturbed and dominated by ruderal, non-native herbaceous species including milk thistle (*Silybum marianum*) and Italian thistle (*Carduus pycnocephalus*). Habitats surrounding the lake include California Annual Grassland, Mixed Evergreen Forest, and Douglas-fir/Mixed Evergreen Forest.

The barrier to the outlet of Mindego Lake is a large earthen ridge and does not appear to be modified. The northern portion of the pond has a very gradual slope, and the amount of area inundated varies greatly throughout the year. Measurements taken in September 2011 showed the pond had a maximum depth of 12 feet and an average depth of 7 feet. Based on these measurements, it is estimated that Mindego Lake held 37.1 acre-feet (~12 million gallons of water).

Mindego Lake supports large, reproducing populations of large-mouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), catfish (*Ameiurus* sp.) and mosquitofish (*Gambusia affinis).* All of these fishes were introduced prior to ownership of the site by the District. Bullfrogs also breed in Mindego Lake. Bullfrogs were apparently introduced by the original owner, Juan Mendico, in a failed attempt to establish a profitable fishery (Bankosh, pers. comm.). Despite the numerous introduced species, California newts breed in the lake (Swaim Biological, Inc. 2009; Condor Country Consulting, Inc. 2009). Several species of waterfowl winter on the lake and great blue heron (*Ardea herodias*) and green heron (*Butorides virescens*) are regularly seen foraging. In addition to SFGS and WPT, aquatic garter snakes (*Thamnophis atratus*) are common. Mindego Lake will be dramatically enhanced for native wildlife when the predatory fishes are removed, which is addressed in detail in Section 6.5.

Figure 4. Mindego Lake.

Knuedler Lake

Knuedler Lake covers ~1.15 acres (49,909 ft^2), with the majority of the lake composed of a dense cover of emergent wetland vegetation dominated by California bulrush (*Schoenoplectus californicus*), bur-reed (*Sparganium eurycarpum*), and cattail (Figure 5). The periphery of the lake is dominated by a mixture of native and non-native herbaceous wetland species including spikerush, water cress, tall flatsedge, soft rush, curly dock, rabbits-foot grass, and mint. A seep wetland dominated by spikerush and mint occurs on a slope above the southeastern portion of the lake. Surrounding habitats include California Annual Grassland and Mixed Evergreen Forest. A variety of large mammals likely use the pond for water and wild pigs forage and wallow along the perimeter. In addition to SFGS, low numbers of CRLF are present, and rough-skinned newt (*Taricha granulosa*) also breed at Knuedler Lake. Aquatic garter snakes (*Thamnophis atratus*) are common along the lake margin. A Virginia rail (*Rallus limicola*) was heard in April 2012.

The pond appears to be permanent, although water levels recede dramatically in the summer. Until 2008, the area was heavily grazed, and the amount of emergent vegetation was less extensive. Heavy grazing in and around Knuedler Lake presumably contributed to sediment accumulation in the basin. The pond will be enhanced by increasing water depth in approximately 50% of the basin as described in Section 6.4.

Figure 5. Knuedler Lake.

Big Spring

Big Spring covers ~1 acre (43,985 ft^2) and is composed of a multilayered canopy of willow, white alder (*Alnus rhombifolia*), and wax myrtle (*Morella californica*), with a dense herbaceous understory of cattail (*Typha* sp.), bulrush, water cress, soft rush, and stinging nettle (Figure 6). Native tree and shrub species, including coast live oak, California bay, California hazelnut, coyote brush, poison oak, and California blackberry grow around the pond fringe. Surrounding habitats include Mixed Evergreen Forest and California Annual Grassland. Big Spring supports an extensive amount of riparian habitat that is beneficial to a variety of wildlife, and low numbers of CRLF are present. WPT also uses the site, and Pacific treefrogs (*Pseudacris regilla*) breed at Big Spring. The pond is used regularly by wild pigs, and the frequency of use may be increasing based on observations of sign from 2008-2012 (Alvarez, pers. obs.).

Although portions of Big Spring are seasonal, some standing water is expected all year. In the northwest corner, an earthen berm appears to have eroded. Repair of the berm would increase water depth and open water habitat that would enhance habitat for CRLF and WPT as described in Section 6.4.

Figure 6. Big Spring.

Upper Pond

Upper Pond covers ~0.15 acre (6,402 ft^2) and is composed of a dense cover of herbaceous wetland vegetation dominated by native species, such as bulrush, water cress, and soft rush (Figure 7). It is also referred to as Ranch Pond. Several willows form an emergent tree canopy above the dense herbaceous wetland vegetation. A berm surrounding the pond is densely covered with non-native species such as poison hemlock, along with native species such as coyote brush, poison oak, stinging nettle, and California blackberry. Surrounding habitats include Mixed Evergreen Forest and California Annual Grassland. Although very little open water is present and the pond appears shallow due

to sediment accumulation, Pacific treefrogs are able to breed and aquatic garter snakes are present.

The berm of the pond captures water from a spring that appears to be perennial; and there is a concrete outlet structure with wooden weirs that may need repair. The earthen berm also appears to have eroded in one area that receives flow. It is likely that the amount of vegetation was less and the amount of open water was greater when cattle grazed the site. Open water habitat at Upper Pond will be dramatically increased following sediment and vegetation removal as described in Section 6.4.

Figure 7. Upper Pond.

3.0 SPECIES ACCOUNTS

3.1 San Francisco Garter Snake

3.1.1 Description and Range

The SFGS is found only on the San Francisco peninsula in San Mateo County and the northern portion of Santa Cruz County (Barry 1978; Brode 1990; USFWS 2006). The subspecies ranges from the vicinity of Woodside and Crystal Spring Reservoir in eastern San Mateo County, west across the crest of the Santa Cruz Mountains to the coast, from Mori Point near Pacifica to Waddell Creek in northern Santa Cruz County. However, within its range, it is apparently absent at numerous locations that appear to provide appropriate habitat. It is an extremely colorful snake with a bright orange-red head, blue ventral surface, greenish-yellow dorsal stripe and generally continuous red and black stripes along either side. It can grow to a length of three to four feet (Stebbins 2003). Much of its current range lies within urbanized areas, and alteration and isolation of habitats has been identified as the primary threats to the subspecies (Brode 1990; USFWS 2006). Agricultural development, excessive cattle grazing, and illegal collecting have been implicated in its decline. However, at one coastal location currently managed for conservation purposes, the only comprehensive demographic study to date indicated a stable population is extant (Halstead *et al*. 2011). The SFGS is listed under both the State and federal Endangered Species Acts as Endangered and is also designated as "Fully-Protected" under the California Fish and Game Code.

3.1.2 Habitat Requirements and Life History

The SFGS occupies areas that support freshwater marshes, ponds, sloughs, and associated riparian corridors, especially where dense shoreline vegetation is present. Uplands in proximity are used extensively including grassland, coastal scrub, mixed hardwood forest and willow riparian (USFWS 2006). Open coastal scrub appears to provide an appropriate mix of sun and shade, as well as predator protection, while aquatic sites provide prey. Adults feed primarily on frogs, especially post-metamorphic juvenile (metamorph) CRLF, bullfrogs, Pacific treefrogs, as well as fish [including non-native mosquitofish (*Gambusia affinis*)], salamanders, newts, and earthworms (Larsen *et al.* 1991; USFWS 2002; Stebbins 2003). Although generally assumed to be diurnal, adults have been observed foraging on warm nights (Allaback, pers. obs.). Pacific treefrogs appear to be an important part of the diet of young snakes (Larsen 1994). Larsen *et al.* (1991) found that neonate SFGS showed preference for Pacific treefrog metamorphs and California slender salamanders (*Batrachoceps attenuates*).

During the winter, the SFGS is generally inactive underground in rodent burrows or other cover but may emerge during warm periods (Larsen 1994). Males generally emerge first in the early spring and promptly begin searching for mates. Female emergence follows thereafter and pheromone trails bring the sexes together (Rossman *et al.* 1996). Mating aggregations have also been observed in the fall, and females can store viable sperm for many months including over the winter (Rossman *et al.* 1996). Females produce between

12 and 24 live young in July or August. Those neonates that survive through the first winter, may disperse following emergence the following spring.

Although no studies have been published to determine home range, McGinnis *et al.* (1987) reported SFGS up to ~450 feet from water. A study of SFGS in coastal San Mateo County (Halstead *et al.* 2011), found SFGS up to ~700 feet from aquatic habitat, with the greatest trap success near wetland and pond margins (Halstead pers. comm). No data is available regarding SFGS dispersal distances. Other subspecies of *T. sirtalis* are known to move significant distances: 2.5 to 10.9 miles between foraging sites and hibernacula (Gregory and Stewart 1975). Gregory and Stewart (1975) suggested that dispersal in northern populations can be a distance of over 11 miles. Fitch (1965) found an activity range (~home range) of 35 acres in males and 23 acres in females.

3.1.3 Regional Records

Mindego Ranch is situated near the center of historic SFGS range. A specimen (#28576) housed at the Museum of Vertebrate Zoology (MVZ) at UC Berkeley was collected in 1939 from the "E. L. Sumner Ranch, ca. 5 miles E La Honda." Although the specific location is unknown, it is near the summit just to the east of Mindego Ranch (Barry 1975).

Barry (1978) determined the presence of SFGS at Pearsons Pond and two other nearby sag ponds ~2.9 miles NNW Mindego Lake, which corresponds to record #22 as shown in the latest USFWS 5-year review (USFWS 2006). Aerial photographs show that two of these ponds are still extant and appear to provide suitable habitat conditions for SFGS. Native habitats are contiguous between Mindego Ranch and these ponds.

Barry (1975) observed a SFGS at a sag pond near Pomponio Reservoir, ~4.9 miles WSW of Mindego Lake. Presence of the subspecies was re-confirmed in 1986 (CNDDB 2012). There are three additional sag ponds in this area, and Barry speculated that the ponds could support a significant population despite of the presence of non-native bullfrogs. This record corresponds to record #25 as shown in the latest USFWS 5-year review for the species (USFWS 2006).

There are unconfirmed reports of SFGS from the ponds at the San Francisco Log Cabin Ranch situated immediately to the west of the site (J. Andersen, District Biologist, pers. comm.).

3.1.4 Observations Onsite

An adult and a juvenile SFGS were first identified at Mindego Lake in 1986 (USFWS 2002; CNDDB 2012). This record corresponds to record #23 as shown in the latest USFWS 5-year review for the subspecies (USFWS 2006) and as recorded in the CNDDB. During surveys conducted between April and June 2009, seven adult SFGS were observed at Mindego Lake (Condor Country Consulting, Inc. 2009; Alvarez, pers. comm.). During 2011 VES efforts at Mindego Lake, conducted in September, six adult

and four neonate SFGS were captured. Another three SFGS (two adults and one subadult) were observed in April and May 2012 (Table 1). The subadult was clearly a first year individual indicating that reproduction in proximity to Mindego Lake was successful.

SFGS were first identified at Knuedler Lake in 1986 (USFWS 2002; CNDDB 2012), when nine adults and two juveniles were observed. This record corresponds to record #24 as shown in the latest USFWS 5-year review for the subspecies (USFWS 2006) and as recorded in the CNDDB. An injured SFGS was observed at Knuedler Lake in February 2008 (Swaim Biological, Inc. 2008). During surveys conducted between April and June 2009, eight adult SFGS were observed at Knuedler Lake (Condor Country Consulting, Inc. 2009; Alvarez, pers. comm.). Although no SFGS were detected during VES in 2011, two adult SFGS were observed at Knuedler Lake on 17 May 2012.

In May 2010, an adult SFGS was seen basking at Upper Pond by J. Andersen (District Biologist). This is the first and only observation of the subspecies at Upper Pond.

Previous research indicates that SFGS individuals remain within 100 to 200 meters of aquatic foraging habitat and upland wintering sites (USFWS 2006). Of the 51 SFGS sightings made since 2009, 48 (94%) have been within 660 feet (200 meters) of aquatic habitat (Condor Country Consulting, Inc. 2009; District unpublished data, Biosearch unpublished data; Figure 8). The other three observations were made at considerably greater distances from aquatic habitats. An adult SFGS was observed ~1,000 feet northeast of Mindego Lake in November 2009, and another was reported along Mindego Ridge Trail ~4,200 feet ESE of Mindego Lake in April 2009. During surveys on 19 April 2012, a large adult female SFGS was captured ~1,400 feet west of Mindego Lake. It was also an especially noteworthy observation because the individual was observed in closed-canopy Mixed Evergreen Forest and, based on the date and the age of the individual, likely recently emerged from hibernation. A summary of SFGS observations made at Mindego Ranch since 2009 is provided in Appendix A.

Table 1. Results of Visual Encounter Surveys for San Francisco garter snakes at Mindego Ranch, Sept. 2011–May 2012. AD = NEO = Neonate; SA = Subabult; AD = Adult; ns = not surveyed. Note: 1 adult observed on 4/19/12 ~1,000 feet SW Big Spring and ~1,400 feet WNW of Mindego Lake is not included in table.

	Survey Area			
Survey Date	Mindego Lake	Upper Pond	Big Spring	Knuedler Lake
9/12/2011	2 AD	ns	ns	ns
9/20/2011	5 AD; 3 NEO	0	0	0
9/29/2011	2 AD; 2 NEO	ns	ns	0
4/19/2012	1 AD	0	0	0
5/17/2012	1 SA	0	0	2 AD

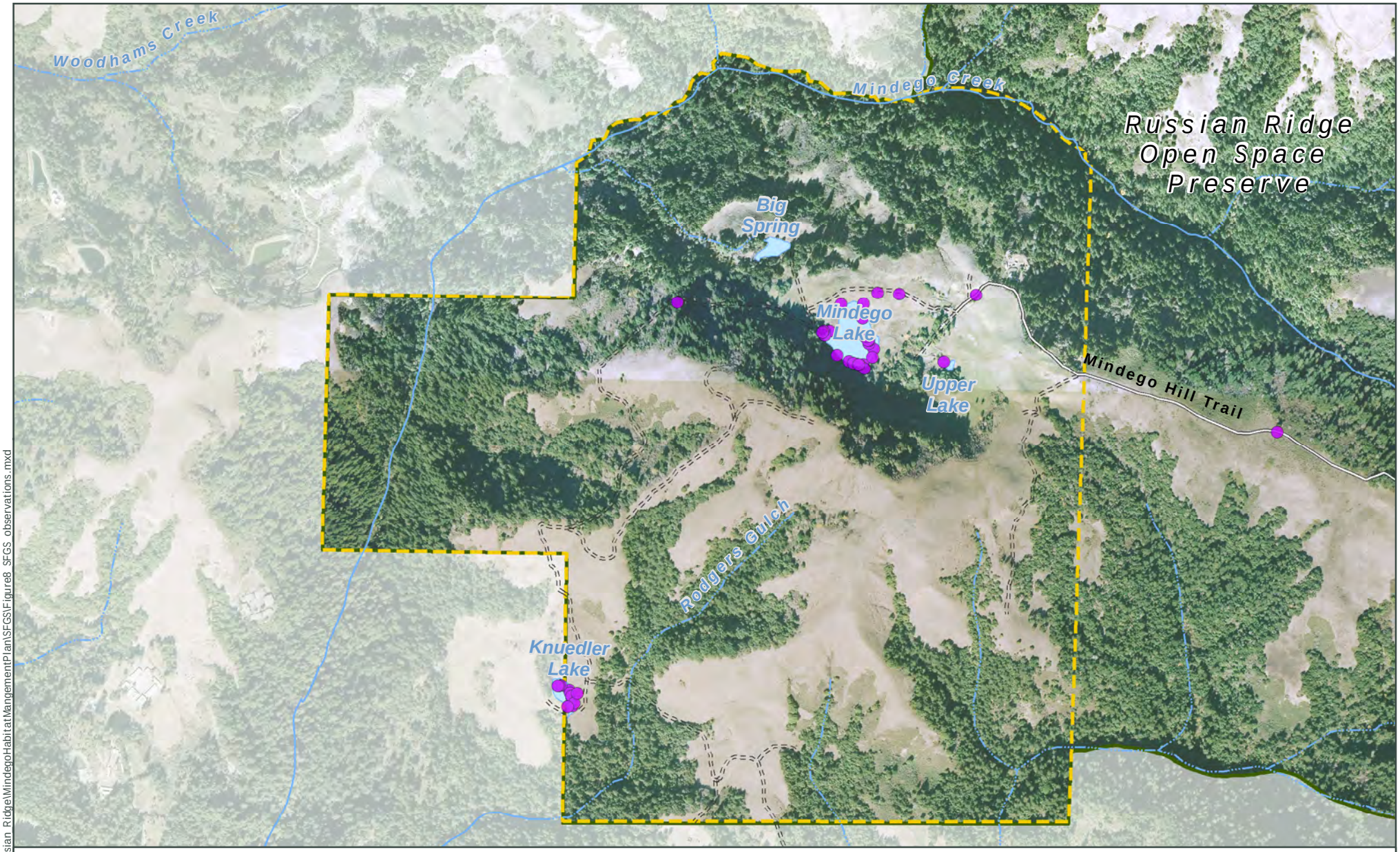

Figure 8: SFGS Observations at Mindego Ranch, 2009 - 2012

Mindego Ranch Property

MROSD Preserves

Other or Private Land

San Francisco Garter Snake Sightings
Various Sources, 2009-2012

Pond

Perennial Stream

Intermittent Stream

Midpeninsula Regional
Open Space District
(MROSD)

October, 2012

Miles
0 0.25 0.5

Created By: jhawk Path: G:\Projects\Russian Ridge\MindegoHabitatMangementPlan\SFGS\Figure8_SFGS_observations.mxd

While the District strives to use the best available digital data, this data does not represent a legal survey and is merely a graphic illustration of geographic features.

3.2 California Red-legged Frog

3.2.1 Description and Range

The CRLF is the largest native frog in California. It is currently restricted to the Coast Range from Mendocino to Ventura Counties. Small, isolated populations persist in the western foothills of the Sierra, and in southern California into Baja California, but the species is absent from the Central Valley and an estimated 70% of its historic range (Jennings and Hayes 1994; USFWS 2002,). The CRLF can grow to be 5 inches or more (snout-urostyle length), although post-metamorphic juveniles (metamorphs) are only about 1.5 inches long. The back of its body varies in coloration from bright red to brown or reddish with dark spots. The undersides of the body are white with the undersides of the legs usually being orange or red. Two prominent ridges run down the back and it has a tympanum (ear disk) that is equal in size or smaller than the eye (Stebbins 2003). The CRLF is listed as Threatened by the USFWS and as a Species of Concern by CDFG.

3.2.2 Habitat Requirements and Life History

The CRLF requires still or slow-moving water during the breeding season, where it deposits large egg masses, usually attached to submerged or emergent vegetation. Breeding typically occurs between December and April, depending on annual environmental conditions and locality. Eggs require 6–12 days before hatching and metamorphosis often occurs 3.5–7 months after hatching, although larvae may overwinter (Stebbins 2003; Fellers *et al.* 2001). Following metamorphosis, which occurs between July and September, metamorphs generally do not travel far from aquatic habitats. Movements of metamorphs and adults generally occur with the first rains of the weather-year, in response to receding water, or following the breeding season (Fellers and Kleeman 2007; Allaback *et al.* 2010; pers. obs.). Radio-telemetry data indicates that individuals generally engage in straight-line movements irrespective of riparian corridors, and can move up to two miles (Bulger *et al.* 2003; Fellers and Kleeman 2007). CRLF utilize a variety of water sources during the non-breeding season, and females are more likely than males to depart from perennial ponds shortly after depositing eggs (Fellers and Kleeman 2007). They may take refuge in small mammal burrows, leaf litter, or other moist areas during periods of inactivity or whenever it is necessary to avoid desiccation (Rathbun *et al.* 1993; Jennings and Hayes 1994). Occurrence of this frog has been shown to be negatively correlated with presence of introduced bullfrogs and/or fish (Moyle 1973; Hayes and Jennings 1986, 1988; Alvarez *et al*. 2003). Sites comprised of both shallow (breeding) and deep water (escape) habitat that hold water through the summer months allowing full metamorphosis to occur and are spatially adjacent to other water features are the most beneficial to sustain a long-term viable population of CRLF.

3.2.3 Regional Records

CRLF are known from numerous localities in the vicinity of Mindego Ranch (Seymour and Westphal 2000; Richard Seymour and Associates 2007; Vollmar Consulting 2009; CNDDB 2012). The species is known from numerous stock ponds and sag ponds in the

area, including ponds at La Honda OSP and Skyline Ridge OSP. It has also been observed in several creeks in the area, including Peters Creek and El Corte de Madera Creek (CNDDB 2012). The species is common in both natural and man-made aquatic habitats in the region (Seymour and Westphal 2000).

3.2.4 Observations Onsite

CRLF have been observed at three aquatic features on Mindego Ranch – Mindego Lake, Knuedler Lake and Big Spring.

No CRLF were observed at Mindego Lake during two nocturnal and five diurnal surveys in 2008 (Swaim Biological, Inc. 2008). Two adult CRLF were detected at Mindego Lake during field surveys in 2009 (Condor Country Consulting, Inc. 2009). Presence of CRLF was reconfirmed during diurnal surveys conducted at Mindego Lake as part of this study, although no more than two individuals were seen in a single day. During three surveys in September 2011, no CRLF metamorphs were detected although all sizes of bullfrog were present, including hundreds of bullfrog metamorphs. However, one CRLF metamorph was observed on 31 August 2012, confirming reproduction at Mindego Lake (Allaback, pers. obs.).

At least four calling male CRLF were detected at Knuedler Lake during field surveys in 2008 (Swaim Biological, Inc. 2009). A single CRLF tadpole was detected on 16 June 2008 (Swaim Biological, Inc. 2009). Presence of CRLF was reconfirmed during diurnal surveys conducted at Knuedler Lake as part of this study, although only a single individual was seen. During three perimeter searches conducted in September 2011 no CRLF metamorphs were detected.

CRLF were heard calling at Big Spring pond in February 2008 and a single egg mass was detected in April 2008 (Swaim Biological, Inc. 2009). One CRLF adult was detected at Big Spring during field surveys in 2009 (Condor Country Consulting, Inc. 2009).

3.3 Western Pond Turtle

3.3.1 Description and Range

The WPT ranges from western Washington to northern Baja California, mostly west of the Sierra Nevada-Cascade crest (Ernst *et al*. 1994; Stebbins 2003). It has a low carapace that reaches just over 8 inches in length and is generally olive, brownish, or blackish (Stebbins 2003; Jennings and Hayes 1994). The WPT is designated by CDFG as a California Species of Concern (Jennings and Hayes 1994).

3.3.2 Habitat Requirements and Life History

The WPT inhabits permanent freshwater ponds, lakes, marshes, streams (including some seasonal riparian systems) and rivers (Bury and Holland 1993; Rathbun *et al.* 2002). It favors sites with deep pools and with an abundance of basking sites, such as partially

submerged logs or rocks, matted emergent vegetation, floating aquatic vegetation or exposed shorelines. Basking sites are not always obvious. Undercut banks, root masses and boulder piles provide underwater escape cover, especially for small size classes (Bury and Holland 1993). WPT may also utilize deep silt loads in ponds and creeks or the burrows of beavers (Alvarez 2006b). Wild populations are wary and individuals will often plunge for cover after detecting movement from a considerable distance. This behavior may make the species difficult to detect visually, particularly if no obvious basking sites are present or if the environmental conditions are not favorable.

WPT may move up to 1.25 miles or more across terrestrial habitats in response to fluctuating water levels, an apparent adaptation to the variable rainfall and unpredictable flows that occur in many coastal California drainage basins, and they will over-winter in uplands or in water (Jennings and Hayes 1994; Rathbun *et al*. 1992, 1993). At a study location in coastal San Luis Obispo County, WPT spent an average of 111 days per year in uplands (Rathbun *et al.* 2002). They may also remain active in the winter, depending on environmental conditions (Jennings and Hayes 1994). Females travel from aquatic sites into open, grassy areas to lay eggs in a shallow nest (Holland 1992; Rathbun *et al*. 1992, 2002). Although nests have been reported up to 1,300 feet from water bodies (Jennings and Hayes 1994), Rathbun *et al.* (2002) found the average distance perpendicular to water was 92 feet (range 31–260 feet). It appears that most hatchlings overwinter in the nest (Holland 1992; Jennings and Hayes 1994), and placing nests away from watercourses makes them less susceptible to flood events that commonly occur during the winter (Rathbun *et al*. 1992). Additional explanations for placing nests away from watercourses include avoidance of predators such as raccoon, and sex determination, which may be affected by temperature (Rathbun *et al.* 1992). Pond turtles may live for 40 years or more (Jennings and Hayes 1994), and are therefore sometimes found in degraded areas for several decades without nearby nesting habitat.

3.3.3 Regional Records

WPT inhabits scattered localities in the vicinity of Mindego Ranch. The species is present at a perennial pond on private property ~1.5 miles SW of Knuedler Lake along Alpine Road (Allaback, pers. obs.). It inhabits Alpine Pond on District property located ~2.5 miles W of Mindego Lake near the intersection of Alpine Road and Highway 35 (Wetland and Water Resources, Inc., 2008). A large population is known from two ponds at the former Driscoll Ranch, located approximately 3 miles NE of Mindego Ranch (Richard Seymour & Associates 2007; pers. obs.). A single WPT was observed at Jakoji Pond in 2000, approximately 5 miles SE of Mindego Ranch (Richard Seymour & Associates 2007).

3.3.4 Observations Onsite

A significant population of WPT inhabits Mindego Lake. At least 21 WPT were observed at Mindego Lake on 15 May 2009 (Condor Country Consulting, Inc. 2009). The species was detected at Mindego Lake during every visit conducted in support of this Management Plan. On 19 April 2012, an adult female WPT was observed in upland

grassland/coyote brush scrub between Mindego Lake and Big Spring, ~400 feet from the edge of Mindego Lake. Based on the time of year, the individual was presumably returning to aquatic habitat from its over-wintering site. Although the individual was oriented towards Mindego Lake, it is unknown if it was moving towards Mindego Lake or Big Spring.

Due to vegetative cover, it is difficult to search Big Spring for WPT, although at least five were observed there in February 2008 (Swaim Biological, Inc. 2009). On 11 April 2008, an adult male WPT was observed in the uplands on the path to Big Spring (Swaim Biological, Inc. 2009). Dense vegetation limits open water habitat, which may reduce habitat quality for WPT at Big Spring.

One WPT was observed at Knuedler Lake in June 2009. Knuedler Lake is considered to provide only marginal habitat for the species given the lack of open water during most of the year (Condor Country Consulting, Inc. 2009; Allaback, Alvarez and Laabs, pers. obs.).

4.0 MANAGEMENT GOALS AND OBJECTIVES

This section outlines overall goals and objectives for recovery of special-status species. Although biological goals focus on the SFGS and CRLF, they are expected to benefit a wide range of native species. Strategies to achieve these goals are detailed in Section 5.0. Specific management recommendations for Mindego Ranch are presented in Section 6.0. Monitoring to measure the success of management actions essential to the Management Plan are described in Section 7.0

4.1 Maintain and Increase Distribution and Abundance of Listed Species

Ensuring the long-term viability of SFGS and CRLF at Mindego Ranch is the primary goal of this Management Plan. Mindego Ranch supports SFGS, but habitat quality has been reduced by the presence of exotic plant and wildlife species. Enhancement of aquatic and upland habitats is expected to provide SFGS with a native prey base that will benefit the entire ecosystem over time.

While CRLF are present on Mindego Ranch, they do not appear to be abundant on the site, based on surveys conducted to date. It is presumed that their numbers are severely depressed at Mindego Lake due to the presence of predatory fish. In September 2011, three surveys were conducted by visually searching the perimeter of the pond at a time of year when CRLF metamorphs are typically present and readily observed. None were detected at either Knuedler or Mindego Lake, while hundreds of bullfrog metamorphs were present at Mindego Lake. In August 2012, it was estimated that ~20,000 bullfrog metamorphs and ~5 CRLF metamorphs were present at Mindego Lake. There appears to be very little CRLF recruitment on the site. However, a significant number of CRLF likely emigrate to the property from offsite sources annually. Also, it seems likely that both Knuedler Lake and Big Spring may have been more productive CRLF breeding locations in the past, when regular cattle grazing created open water habitat. Enhancement of the ponds will contribute to the recovery of the species by providing breeding habitat for the species. This is expected to benefit SFGS by providing a more robust population of native prey species.

4.2 Contribute to Regional Recovery of Listed Species

Mindego Ranch provides a conservation opportunity as identified in the USFWS Recovery Plans for SFGS (USFWS 1985) and CRLF (USFWS 2002). The primary goal of the SFGS Recovery Plan is the protection of 10 significant populations (>200 individuals) (USFWS 1985). Only six populations were known at the time the Recovery Plan was prepared (i.e., West-of-Bayshore, Crystal Springs & San Andreas Reservoirs, Laguna Salada/Mori Point, Pescadero Marsh, and Año Nuevo State Reserve). Creation or protection of significant populations at four additional sites was considered necessary to the recovery of the subspecies.

The transfer of Mindego Ranch from private ownership to the District provides an opportunity to protect and enhance ~1,000 acres with at least two ponds that support

populations of the SFGS. The proposed project site also represents the only population from the crest of the Santa Cruz Mountains that is currently afforded protection.

Enhancement of essential habitats at Mindego Ranch for the SFGS will contribute to the regional recovery of the species and can promote genetic exchange with nearby populations on the crest of the Santa Cruz Mountains. Viable SFGS populations at Mindego Ranch will also increase the potential for dispersing SFGS to colonize new locations both east and west of the crest of the Santa Cruz Mountains.

Habitat improvements at Mindego Lake are expected to contribute to the recovery of CRLF by removing predatory species that severely curtail successful CRLF breeding at the site. It is likely that CRLF continue to deposit eggs into Mindego Lake, resulting in the potential for a population sink. The removal of predatory fish from Mindego Lake is expected to directly benefit the local CRLF population by allowing for increased survivorship of eggs and metamorphs. Habitat improvements at Big Spring and Upper Pond are expected to result in conditions suitable for CRLF breeding, whereas current conditions are not suitable.

4.3 Increase Knowledge of Listed Species

An increased understanding of the ecological factors that influence SFGS distribution and abundance will contribute to its recovery. Since the property is anticipated to be designated as a Conservation Management Unit with very limited use and access, Mindego Ranch provides an ideal opportunity for research opportunities regarding life history aspects of a relatively undisturbed SFGS population. Field studies are recommended to investigate and estimate relative abundance and population structure. There are very few publications related to the natural history of SFGS, and populations on the crest of the Santa Cruz Mountains have received very little study. Baseline demographic data gathered at Mindego Ranch can be compared with recent research conducted along the coast by Halstead *et al.* (2011).

Maintenance of a database by the District, and regular reporting to the CNDDB will add to the knowledge of the current distribution of the species. As incidental observations accumulate over time, the collective records may contribute to a better understanding of upland habitat use relative to ponds that provide prey.

4.4 Reduce Impacts to Listed Species

Impacts to SFGS and CRLF should be avoided wherever possible. Although the likelihood of detecting SFGS and CRLF is greater in close proximity to aquatic habitats, either species could be encountered throughout the property during certain times of the year. Activities in potential habitat may negatively affect SFGS and CRLF. In order to reduce impacts to listed and other sensitive species, minimization and avoidance measures, as recommended in Section 6.0, should be implemented when undertaking projects or accessing the property.

4.5 District Operational Goals

The District's mission is to protect and restore the natural environment, and provide opportunities for ecologically-sensitive public access and education. To achieve this goal, the District performs a variety of activities, including, but not limited to the following:

- Regular Patrol
- Emergency Response
- Road and Facility Maintenance
- Grazing
- Grazing Infrastructure Maintenance
- Non-native Plant Control
- Invasive Animal Species Control
- Docent-led Hikes
- Research

All of these activities have the potential to negatively affect SFGS, CRLF and other special-status species. However, only a very low number of individuals are likely to be negatively affected, which is not expected to affect the populations.

The District owns and operates 26 Open Space Preserves that are host to many special-status species. The District strives to protect these biological resources through site specific surveys, worker orientation programs, biological monitoring, and adherence to required State and federal permits and regulations. These procedures are further outlined in Section 6.1.

5.0 MANAGEMENT STRATEGIES

5.1 Upland Habitats

There is growing evidence that the SFGS makes extensive use of upland areas in proximity to aquatic habitats (Halstead *et al.* 2011). Upland areas are known to be used for thermoregulation and foraging, and SFGS use rodent burrows in upland habitats for hibernacula during the winter. Maintenance of appropriate upland habitat conditions in proximity to occupied SFGS aquatic habitats is therefore considered crucial. Although some researchers note that SFGS appear to prefer upland areas with a grassland/shrub matrix that provides sufficient cover and open areas to facilitate thermoregulation (USFWS 2006), more research is necessary to determine upland habitat use, particularly regarding the micro-habitats utilized for hibernacula.

5.1.1 Grazing

Under the previous landowner, cattle congregated near ponds on Mindego Ranch due to the lack of a developed water system on the property. This, coupled with the absence of cross-fencing and a developed pasture system, resulted in areas of the property that were either chronically overgrazed or not grazed at all. These ranching practices led to severe infestations of purple star thistle, a non-native perennial plant that is very difficult to control. Soon after the District acquired Mindego Ranch, the grazing operation was suspended to allow an intensive weed abatement program to be implemented. Before the cattle grazing operation can be re-activated, a water system must be installed that will promote a more even distribution of cattle throughout the property, as well as provide an alternative to watering within sensitive aquatic habitats (Figure 10). Managed livestock grazing can be used to provide suitable grassland to shrub ratios by limiting the density of shrub species. In the absence of grazing, coyote brush is expected to increase in density and reduce the amount of grassland adjacent to Mindego and Knuedler Lakes. Over-grazing in proximity to aquatic habitats, however, may decrease escape cover for SFGS.

Managed grazing can also be beneficial to the CRLF by reducing the amount of emergent vegetation in breeding ponds and maintaining open water conditions (USFWS 2002). However, livestock grazing can also have negative effects on aquatic habitats, including erosion, excessive nutrient loading, and removal of native vegetation (USFWS 2002). Although water infrastructure improvements necessary to re-introduce grazing have the potential to temporarily affect low numbers of SFGS and CRLF during installation, after the system is installed and maintained it will facilitate grazing throughout the site in a manner that will benefit listed species and other wildlife that use grasslands (Sage Associates 2008; 2012). Measures to reduce impacts to aquatic resources, including exclusionary fencing and water troughs, are discussed in Sections 6.9 and 6.10.

5.1.2 Invasive Plant Control

The spread of certain invasive plants at Mindego Ranch reduces the biological values of native habitats. As discussed above, past ranching practices have led to severe

infestations of perennial thistles (Koopman 2008; Sage Associates 2011). Although intensive weed abatement efforts have been implemented, annual species, such as milk thistle, have colonized bare ground. A well-managed grazing operation is necessary to effectively control invasive annuals on the property. Invasive plants reduce habitat quality for SFGS and other wildlife by outcompeting native species. WPT, for example, nest in open grassy areas and the dense thistle patches near Mindego Lake may affect their overland movements and likely do not provide nesting habitat.

The District utilizes a variety of techniques to control invasive plants on its Preserves. This includes herbicide spraying, prescribed burning, mechanical removal, and livestock grazing. It is anticipated that, over time, all of these techniques will be used at Mindego Ranch.

5.2 Aquatic Habitats

SFGS require freshwater pond and marsh habitats with emergent vegetation. Shallow water areas that provide appropriate habitat conditions for prey species, including Pacific treefrog and CRLF, are considered essential. The presence of non-native, aquatic predators and competitors can dramatically affect the native amphibian prey base.

CRLF require still or slow-moving water during the breeding season. Both Mindego Lake and Knuedler Lake provide suitable breeding conditions for CRLF. However, the presence of predatory fish at Mindego Lake severely reduces successful CRLF reproduction.

The WPT is a highly aquatic species, although it utilizes uplands in the vicinity of aquatic habitats for nesting and overwintering. The pond habitats onsite provide suitable habitat for the species, although the lack of open water habitat at Big Spring and Upper Lake reduces habitat quality for WPT at these sites.

Although the creeks onsite (Mindego Creek and its tributaries) may be used to a certain extent by CRLF during the non-breeding season, these habitats are generally well-shaded and of limited utility for SFGS and WPT. Therefore, management actions are focused on pond habitats.

5.2.1 Non-native Species Control

5.2.1.1 Non-native Fish Control

Numerous species of non-native game fish have been introduced into aquatic habitats in California. Several of these introduced species, including members of the sunfish family (Centrarchidae) and catfish family (Ictaluridae), thrive in warm, nutrient-rich impoundments (Moyle 2002). Mindego Lake has large, reproducing populations of largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), catfish (*Ameiurus* sp.) and mosquitofish (*Gambusia affinis*).

Predatory fish have been implicated in the decline of numerous native amphibians, including CRLF (Fisher and Shaffer 1996; Kiesecker and Blaustein 1998; Knapp and Matthews 2000). At Mindego Lake introduced fish may feed on CRLF egg masses and likely consume nearly all tadpoles prior to transformation. Largemouth bass are capable of consuming all CRLF age classes. This also has implications for SFGS, which utilizes CRLF as an important food resource (Larsen 1994). Removal of fish has been shown to result in increased use of ponds by CRLF (Alvarez *et al.* 2003).

In order to completely eradicate fish, ponds are typically drained or poisoned. Poisoning is not considered as an option due to the presence of listed species. Gill-nets and electro-fishing may be useful to reduce numbers of fish, but these techniques would not eliminate them from a pond as large as Mindego Lake. Draining Mindego Lake is therefore considered the only option to successfully remove predatory fish from this site and is described in greater detail in Section 5.2.2.

5.2.1.2 Bullfrog Control

The American bullfrog, which is native to the eastern United States, can grow to 8 inches snout-vent length (Stebbins 2003). The species was introduced to California on several occasions, with the earliest documented introduction in 1896 (Jennings and Hayes 1985). Females lay large, football- to basketball-sized egg masses, which may consist of up to 20,000 individual eggs. Bullfrogs breed in permanent ponds, canals, slow-moving streams and rivers, lakes, reservoirs and other impoundments. Typically bullfrog tadpoles over-winter in California and can grow to a length of 16.2 cm. However, the species is capable of transforming in six months in certain parts of their range, including the San Joaquin Valley (Cohen and Howard 1958) and in coastal Santa Cruz County (M. Allaback and D. Laabs, pers. obs.). Although considered a highly aquatic species, overland movements by bullfrogs are common (Morey and Guinn 1992; Nusbaum *et al.* 1993) and sub-adult bullfrogs readily use seasonal ponds for shelter and foraging.

There is considerable evidence that bullfrogs are negatively associated with native frogs (Moyle 1973; Hayes and Jennings 1988; Fisher and Shaffer 1996; Kiesecker and Blaustein 1998). Bullfrogs are known to prey on CRLF and compete for limited resources around breeding locations (Hayes and Jennings 1988). It has been experimentally demonstrated that bullfrog tadpoles can significantly reduce the survivorship and delay the onset of metamorphosis of larval CRLF (Lawler *et al.* 1999) and significantly reduce the survivorship and size at metamorphosis of larval foothill yellow-legged frogs (Kupferberg 1997). While the CRLF is occasionally known to persist in the presence of either bullfrogs or mosquitofish (and other non-native species), the combined effects of both non-native frogs and non-native fish often leads to extirpation of CRLF (Kiesecker and Blaustein 1998, Lawler *et al.* 2000).

The history of bullfrogs at Mindego Lake appears to include an attempt at farming them at an industrial level by a previous landowner (Bankosh, pers. comm.). Currently at Mindego Lake, the reproducing bullfrog population is providing a food source for SFGS, primarily because its biology is similar to CRLF. On 20 September 2011, an adult SFGS

was observed preying on a bullfrog metamorph. This phenomena has been documented at other locations (Alvarez, pers. comm.). In August 2012, ~ 20,000 post-metamorphic bullfrogs were observed at Mindego Lake, with fewer than five post-metamorphic CRLF observed. A critical element of the management approach is to effectively replace the non-native bullfrog population with a reproducing population of CRLF. If bullfrogs were brought in as a potential business venture in the past, Mindego Lake may represent a source population for nearby sites. Eliminating them as a breeding species may potentially have a significant negative effect on their persistence in the vicinity.

Pond draining can be used to dramatically reduce numbers of bullfrogs, especially if it can be conducted before tadpoles reach transformation. Timing is essential since receding water may incite early transformation of tadpoles. During the draining process, post-metamorphic juvenile, subadult, and adult bullfrogs may be exposed and more easily captured and destroyed. A variety of techniques are used to eliminate bullfrogs including capture by hand, dip-net, seine, use of a frog-gig, or a high-powered pellet rifle (0.177 caliber, lead-free pellets). Draining Mindego Lake will not eliminate bullfrogs, since not every individual will be destroyed, and due to immigration from both onsite and offsite sources. But when performed in conjunction with ongoing annual monitoring, eradication efforts can be effective. It will be necessary to search for and eradicate bullfrogs annually at Mindego Ranch.

5.2.1.3 Other Exotic Species

Wild (= feral) pigs (*Sus scrofa*) are present at Mindego Ranch and damage to aquatic habitats at both Mindego Lake and Big Spring was noted in the fall of 2011. During the spring and summer of 2012, pig activity had increased such that wallows and trails were observed at all four ponds, and extensive damage (~40% of the shoreline edge) was observed at Mindego Lake in August 2012. Wild pigs are highly adaptable and reproduce rapidly. They can cause damage to native plants, wildlife and rangelands. They may degrade aquatic habitats and increase erosion and sedimentation in aquatic habitats resulting from trampling, rooting, foraging, and wallowing behavior. Wild pigs also have the potential to damage and detach CRLF egg masses during the winter and affect tadpoles and/or metamorphs from Spring through Fall. Negative effects may also be exacerbated in the late summer and fall, if pigs concentrate their activity at the perimeter of ponds at a time when high numbers of CRLF morphs may be present. Measures to control the pig population at Mindego Ranch should be implemented. Direct removal through shooting or trapping is recommended.

Non-native turtles can compete with native turtles and are often released into native ponds and streams. Red-eared sliders (*Trachemys scripta*) are considered to be one of the most invasive species globally, and are expected to compete with WPT for resources. Although non-native turtles have not been observed on Mindego Ranch to date, continued monitoring should be conducted to determine their presence. If any red-eared sliders or other exotic turtles are encountered, an eradication program should be developed and implemented.

Presence of Louisiana red-swamp crayfish (*Procambarus clarkii)* could complicate enhancement efforts at Mindego Lake if they are present. Although the species has not been reported at Mindego Lake, it may be present in depressed numbers since both bullfrogs and bass are known predators that may keep crayfish populations low. Where red-swamp crayfish lack significant predatory pressure, they reproduce so rapidly that they can be difficult or impossible to eradicate. Pond draining alone is not expected to eradicate crayfish since they can disperse overland or burrow deeply in and around the pond basin, and are adapted to surviving many months underground.

5.2.2 Pond Draining

The pond draining process is conceptually simple, especially if there are nearby areas to relocate native species and if the topography is appropriate to discharge water below the grade of the pond basin. A pond is typically drained completely dry late in the summer and either naturally rehydrates from subsurface and/or overland flow or fills with the onset of winter rains. But implementation can be challenging, especially at larger lentic sites, and at locations where the subsurface flow continually rehydrates the pond.

The draining process typically involves initiating a siphon, actively pumping, or a combination of both. The pump inlet is screened to insure that no invasive, aquatic species are released and to minimize affects to native aquatic wildlife. The inlet hose is typically submerged in the deepest portion of the pond, often near the outlet. It may be necessary to first discharge turbid water into upland areas through a sediment control system, or into a settling basin or tank to minimize negatively affecting aquatic habitat downstream. One or more biologists, qualified to handle special-status species, monitor the draining process. Affected native animals are captured and released in the nearest appropriate upland or aquatic habitat. Non-native species are destroyed soon after capture and are disposed of on site. When the water level reaches about two feet deep, additional labor may be required to relocate high concentrations of native wildlife and destroy exotic species. The pond should be dried completely before being rehydrated or before the onset of the rainy season. At some locations, it may be challenging to completely dry the pond basin, especially if it is uneven and filled with a deep sediment layer. To concentrate the remaining water, small sumps may need to be dug by hand and pumped dry. If a high water table or nearby spring rehydrates the basin, continuous pumping out of the sumps may be necessary, until a biologist confirms that all the targeted non-native species are captured. If the sediment layer is deep, temporary plywood boardwalks may be required to access portions of the pond basin. The biological monitor should record the number of individuals relocated or destroyed by species, and describe the pond draining process in a standardized report.

5.2.3 Outlet Structure Maintenance/Modification

CRLF have adapted to use man-made aquatic features including stock ponds (Miller *et al.* 1996). Two aquatic resources at Mindego Ranch, Big Spring and Upper Pond, are spring-fed features that have been modified to increase the hydro-period of each site, presumably as part of past cattle ranching activities. Since it appears to feed an existing

water tank, the cement-lined outlet structure embedded within the earthen berm that forms Upper Pond should be inspected, The nearby outlet, which was spilling water every visit in 2011 and 2012, appears to have eroded over time due to lack of maintenance. Similarly, a short earthen barrier installed across the outlet in the northwest corner of Big Spring appears to have degraded. When outlets are repaired, they can be elevated and/or fitted with a weir or similar structure to help manage water depths. Repair of the earthen berms and associated outlet structures, together with sediment and vegetation removal, will result in deeper ponds with more open water habitat that may provide appropriate breeding conditions for CRLF.

Knuedler Lake appears to be a natural sag pond. However, the outlet at the southern tip of the pond is eroding and threatens to dramatically reduce the capacity of the pond. Measures to ensure that the outlet does not fail are therefore considered essential to maintaining current pond capacity. All outlet structures should be excluded from regular grazing since excessive trampling may cause erosion.

5.2.4 Sediment/Aquatic Vegetation Removal

Ponds frequently collect sediment from surface flow, especially if nearby uplands are degraded. Livestock trampling of banks and nearby areas may contribute to sediment accumulation. Over time, ponds that are not regularly or periodically maintained may simply fill in. Emergent marsh vegetation, typically dominated by cattails and bulrush, often dramatically expands throughout shallow areas where sediment accumulates. Loss of open water habitat due to expanding wetland vegetation may reduce habitat quality or eliminate breeding opportunities for CRLF, especially at smaller ponds. Wherever productive CRLF ponds are established onsite, SFGS will have foraging opportunities.

Sediment and aquatic vegetation removal requires periodic maintenance using a tractor or excavator. Ideally, sites should only be maintained as-needed, preferably every 20 years or more. Given the Fully Protected status of the SFGS, biological monitoring will be required to avoid direct "take" of individuals. In the event an individual is impacted by project activities, disturbance to low numbers is considered minor compared to maintaining productive breeding habitat.

5.2.5 Livestock Exclusion Fencing

Intensive cattle grazing can negatively affect aquatic resources. In order to reduce impacts from cattle, livestock exclusion fencing should be installed at each pond onsite. The intent of the fencing is typically to exclude cattle from a portion of the pond basin and perimeter to ensure growth of appropriate vegetative cover that provides structure for egg-laying, as well as foraging and sheltering microhabitat for CRLF and SFGS. CRLF metamorphs for example, which are targeted by SFGS as a prey item, frequent perimeter vegetation adjacent to ponds as they transform in the Summer and Fall.

If earthen berms were used to create the impoundment, they should be included within the exclusion zone to reduce degradation by regular trampling. Cattle typically have free access to the remainder of the pond for water, and their foraging activity often helps maintain open water habitat that may improve most CRLF breeding locations. It is recommended that the exclusion fencing at each pond be gated to facilitate periodic controlled access by cows as needed to help manage any infestations of non-native vegetation.

5.2.6 Livestock Water Troughs

The grazing management plan discusses the benefits of using water troughs as an alternate water source to sensitive pond and stream habitats (Sage Associates 2008, 2012). Troughs provide a source of clean water that may promote healthier cows less prone to disease. If nearby ponds are fenced and water is pumped to a trough, aquatic habitat conditions and water quality may be improved for special-status amphibians and other wildlife. This approach may be especially useful at small ponds. Although the initial infrastructure is costly, it may be cost effective over time and beneficial for both wildlife and cattle to restrict access to some impoundments through the use of water troughs and fencing.

6.0 MANAGEMENT RECOMMENDATIONS

The following sections present specific actions intended to improve habitat onsite by creating productive breeding locations for CRLF and Pacific tree frogs, which will provide consistent, native food sources for SFGS. Since some level of "take" of listed species is anticipated in the short-term, as a result of the recommended management actions, consultation with State and federal regulatory agencies will be required. This plan in intended to provide the necessary information for a Section 7 permit application to the USFWS, an Incidental Take Permit under the CESA, and a request for a Memorandum of Understanding regarding take of the SFGS for scientific purposes. Appropriate long-term management and monitoring of the SFGS and CRLF at Mindego Ranch is expected to increase and support a sustainable population, and facilitate recovery of both listed species.

6.1 Minimization and Avoidance Measures

Activities that have the potential to negatively affect the SFGS and CRLF should be avoided. While both SFGS and CRLF are expected to occupy aquatic habitats during much of the year, either species could be incidentally encountered in upland habitats during certain times of the year. In order to further minimize or eliminate the potential for take of SFGS or CRLF, the following measures should be implemented:

- *Limit Public Access.* Access to Mindego Ranch should be controlled to minimize the potential for injuring or killing SFGS along roads or trails. A Conservation Management Unit (CMU) should be considered around each pond (i.e., Mindego Lake, Knuedler Lake, Upper Pond, and Big Spring) that extends a minimum of 660 feet (200 meters) from the high water line in all directions (Figure 9). The CMU should be closed to general public access and delineated with appropriate signage. This will provide significant additional protection in areas where both SFGS and CRLF are expected to be concentrated throughout much of the year. Outside the CMU, public access should be limited to designated trails for hiking and equestrian use.

- *Signage.* Restricted areas will be delineated by appropriate signage. Within the CMU, access will be by permit only and limited to trained District staff, sub-contractors, the livestock lease-holder, docent led-tours and researchers. Due to the constant contact of tires to the ground, propensity for snakes to bask in open areas, and known mortality to both special-status and common snake species, use of mountain bikes is not recommended on trails within or providing access to Mindego Ranch. Hiking and equestrian use should be restricted to designated and marked trails only.

- *Avoid Aquatic Habitats.* Activities within 660 feet of Mindego Lake, Knuedler Lake, Upper Pond, and Big Spring should be restricted to those actions necessary for research, management and monitoring.

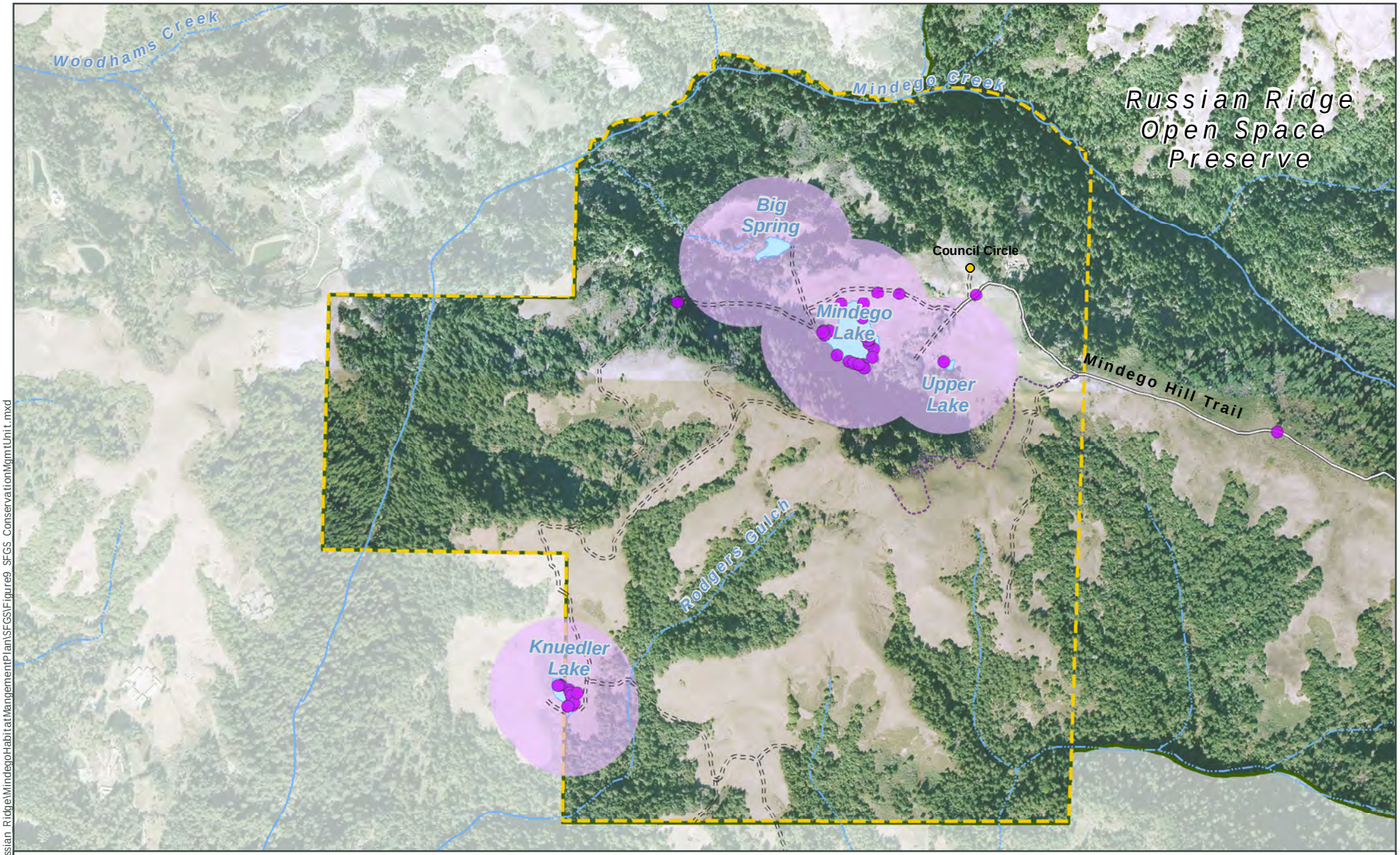

Figure 9: Recommended Extent of Conservation Management Unit

Mindego Ranch Property

MROSD Preserves

Other or Private Land

San Francisco Garter Snake Sightings
Various Sources, 2009-2012

660ft Buffer Around Ponds

Future Mindego Hill Trail

Pond

Perennial Stream

Intermittent Stream

Midpeninsula Regional Open Space District *(MROSD)*

October, 2012

Miles 0 0.25 0.5

Created By: jhawk Path: G:\Projects\Russian Ridge\MindegoHabitatMangementPlan\SFGS\Figure9_SFGS_ConservationMgmtUnit.mxd

- *Speed Limits.* Use of vehicles on Mindego Ranch should be strictly controlled by the District to reduce the potential for take of SFGS and CRLF. Other than emergencies, access should be limited to necessary patrols and authorized persons that follow a 5-mph speed limit within 2,000 feet of Mindego Lake, Knuedler Lake, Upper Pond or Big Spring.

- *Worker Education Seminar*. Prior to conducting any action that may negatively affect listed species, all staff, contractors and persons associated with the project must attended a worker-education seminar delivered by a qualified District biologist or other qualified biologist. The seminar will include written information regarding identification, natural history, legal status, onsite observations, and related information. Names and phone numbers of the biological monitors and CDFG and USFWS contacts should be included in the written information. The District should maintain a signature sheet to document compliance, which will be made available upon request.

- *Pre-activity Surveys.* Prior to ground disturbing actions, pre-activity surveys should be conducted by a qualified biologist to search for SFGS during periods when they are active, and to minimize affecting potential SFGS cover-sites and hibernacula during all times of the year.

- *Biological Construction Monitoring*. A qualified biologist should conduct a pre-activity survey for SFGS and CRLF and WPT prior to implemented actions that include ground disturbance or other activities that could otherwise harm either species. The biological monitor should oversee compliance with this plan and all associated permits and should be the point of contact for regulatory agencies, if needed. If protected species are observed within the study area by anyone involved in the project, work should cease and the animal will be allowed to move out of the area under its own motivation, and under the direct observation of the biological monitor (if feasible). If a WPT nest is discovered, CDFG will be contacted for guidance to protect such a unique resource. Relocation of any protected species to the nearest appropriate habitat will not be conducted, unless specifically authorized by the regulatory agencies.

6.2 Re-introduce Cattle Grazing to Grasslands

A detailed analysis of grazing is provided in the Grazing Management Plan for the site (Sage Associates 2008, 2012). Seasonal cattle grazing of the 330 acres of grassland onsite is recommended (Sage Associates 2008, 2012). Implementation of this plan should be considered a priority in order to maintain upland vegetation conditions used by protected species.

Implementation of the grazing management plan will require certain infrastructure improvements that could affect low numbers of SFGS and CRLF during installation. Most notably, the plan requires installation of a new water system (Figure 10).

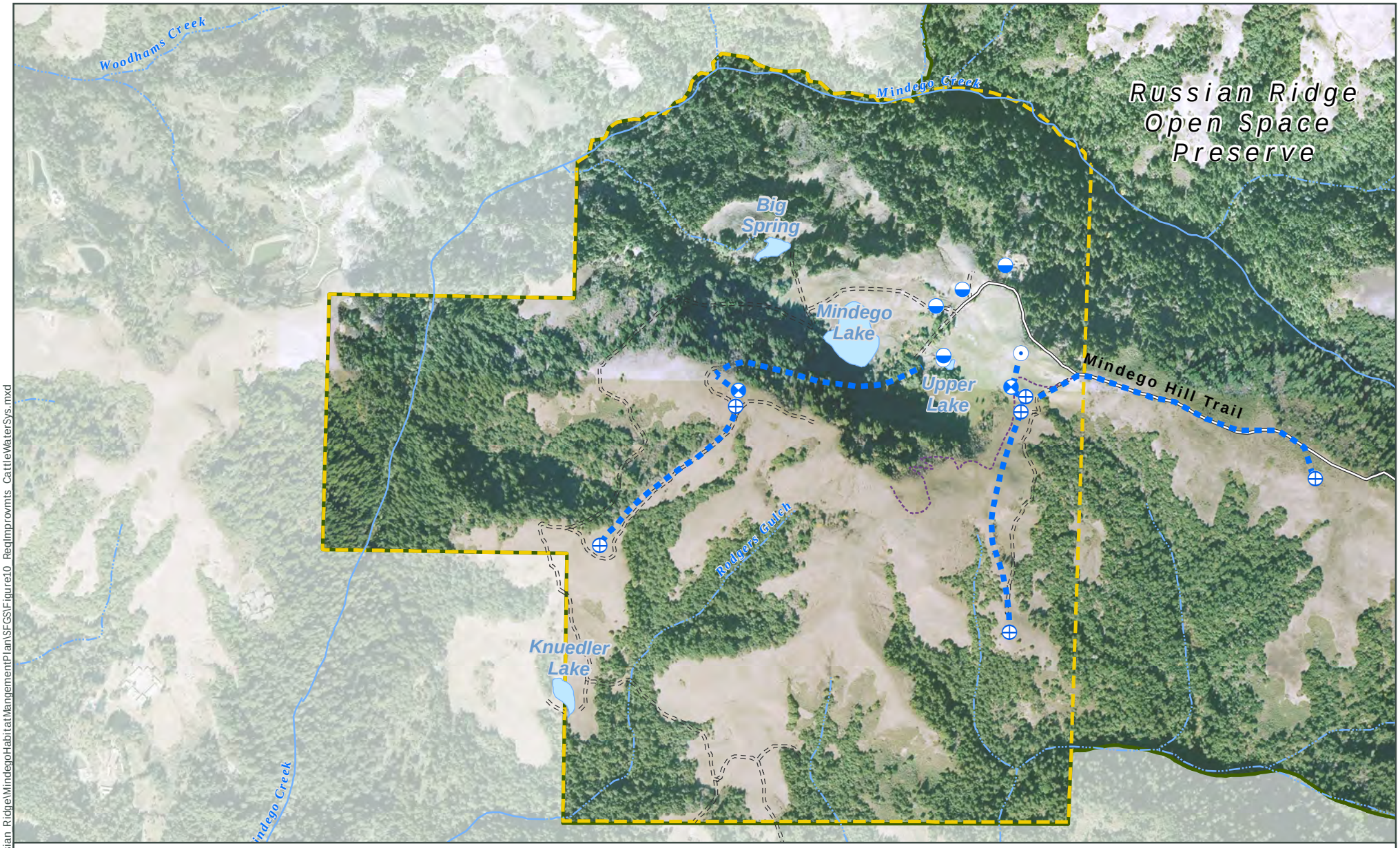

Figure 10: Required Improvements to Mindego Ranch Cattle Water System

- Mindego Ranch Property
- MROSD Preserves
- Other or Private Land
- Water Tank (Existing)
- Water Tank (Proposed)
- Trough (Existing)
- Trough (Proposed)
- Water Line (Proposed)
- Future Mindego Hill Trail

Midpeninsula Regional
Open Space District
(MROSD)

October, 2012

Miles
0 0.25 0.5

Created By: jhawk Path: G:\Projects\Russian Ridge\MindegoHabitatMangementPlan\SFGS\Figure10_ReqImprovmts_CattleWaterSys.mxd

While the District strives to use the best available digital data, this data does not represent a legal survey and is merely a graphic illustration of geographic features.

Proposed improvements include placing water troughs along ridgelines and swales, and to the extent possible, away from access roads, to facilitate distribution of cattle. Troughs will be situated away from existing natural water sources to reduce siltation, improve water quality, and facilitate wetland habitat management to benefit wildlife. Four new trough locations, two new water tanks, a pump, and approximately 8,000 feet of new water line (anticipated to be buried plastic pipe) are required (Figure 10). The pump would be installed in the vicinity of Upper Pond. New water lines would extend east along Mindego Ridge Trail, south along the eastern flank of Mindego Hill, and to the west and south to the ridgeline above Knuedler Lake.

6.3 Control Invasive Non-Native Plants

Severe infestations of purple starthistle and smooth distaff thistle have been documented on the site (Koopman 2008; Sage Associates 2008, 2012). Lowland areas near the ponds are currently heavily infested with annual species, primarily milk thistle. Ongoing treatment of perennial weeds has reduced these infestations. Control of the noxious species, particularly in proximity to aquatic resources, is considered a priority.

The District utilizes a variety of means to control invasive plants on its Preserves, including herbicide spraying, prescribed burning, and mechanical removal. Management recommendations specific to Mindego Ranch are developed on an annual basis by District Resource Management staff and licensed pest control advisors. As part of its initial Use and Management planning for the property, the District developed a series of guidelines for invasive plant control in or near sensitive aquatic habitat (MROSD 2009), which ensure that herbicide spraying is carefully controlled in proximity to aquatic habitats to avoid impacts to native amphibians, reptiles, and other wildlife. These guidelines include limiting use of herbicides and mechanized equipment adjacent to wetland/riparian habitat areas. Hand removal of invasive plant species is required within a 15-foot aquatic buffer zone around wetland/riparian areas. When glyphosate is used, only spot treatments using handheld devices is permitted beyond the 15-foot hand removal buffer, and up to 260 feet from wetland/riparian areas. To minimize the potential for spray drift near wetland/riparian areas, only power wands or hand application will be permitted in the floodplain of Mindego and Knuedler Lakes. These guidelines will continue to be implemented through the life of this Habitat Management Plan.

6.4 Remove Sediment and Emergent Aquatic Vegetation from Upper Pond, Big Spring, and Knuedler Lake

Sediment and emergent marsh vegetation must be removed from portions of Upper Pond, Big Spring, and Knuedler Lake to extend pond hydro-period and to provide or improve breeding habitat for CRLF, which will also increase foraging and sheltering habitat for SFGS. This will require using an excavator to remove sediment and emergent marsh vegetation to create open water habitat that will not be quickly re-invaded by emergent wetland vegetation. If feasible, a long-reach excavator would be appropriate at Upper Pond, since it can reach ~60 feet, and it would therefore only need to access ~50% of the

perimeter of the pond. If a standard excavator is the only feasible option, then it will likely need to access the entire perimeter, which may disturb more upland immediately adjacent to the pond.

Although all three locations will require a similar treatment and level of effort, the first priority is Upper Pond, which must be enhanced to provide a potential relocation site for special-status species when Mindego Lake is drained (see Section 6.5). Following the initial treatment, the process will be repeated as needed, when monitoring reveals that 50% or more of the open water habitat supports emergent marsh vegetation. Ideally, it will only be necessary to repeat the process, approximately every 20 years.

Upper Pond is currently filled with sediment and the entire basin is colonized by emergent freshwater marsh vegetation. But because it is spring-fed and still supports standing water during the dry season, it appears to be an ideal pond to improve. Since the spring that feeds Upper Pond appears to be perennial, it will presumably provide sufficient water to support both CRLF breeding and the livestock grazing operation, since it is considered a critical water source for cattle. The following methodology is recommended:

1) During the dry season, a biologist should conduct a visual encounter survey for WPT, CRLF, and SFGS the morning that pond vegetation is to be removed. Any special-status species observed should be moved to the nearest appropriate habitat, either in nearby uplands or willow riparian habitat. In addition to the pond basin, the access route used by the excavator will require a pre-activity survey. To minimize the size of the footprint required to perform the work, the biologist should flag the limits of the access road that the excavator will use from the nearest road, as well as the areas around the pond that will be accessed by the excavator (Figure 11).

2) Immediately following the biological survey, vegetation along the access route and in areas around the pond that will be accessed by the excavator should be removed by hand-held power equipment (i.e., chainsaws and brush removal equipment) to a height of ≤4 inches. A minimum of 10–20% of the emergent vegetation within the pond should remain untouched, as delineated by the monitoring biologist. A minimum of 20–50% of the pond perimeter vegetation should also be retained, as directed by the biologist. After the vegetation is cleared, the biologist should repeat the visual encounter survey.

3) Following hand-clearing of vegetation, a qualified biologist should lead the excavator to edge of the pond and monitor the entire process. The excavator should access the pond basin from as few locations as necessary to complete the task. The excavator should carefully remove emergent marsh vegetation and associated root-balls. The spoils should be contained in a scrape situated in the field immediately north of Upper Pond, so that the spoils can dry (Figure 11). After drying, the material may be spread if considered necessary. Sediment should be excavated as needed to ensure that up to ~50% of the Upper Pond basin

is 4–6 foot deep. It is roughly estimated that between 75 and 125 cubic yards of sediment will require removal. If it is necessary to pump water to access sediment, the discharge should be directed to a nearby field through appropriate energy dissipation devices (i.e., hay bales) and sediment entrapment materials, and not released downstream. The biologist should also direct the operator to sculpt the pond basin, where possible, to create as much of a gradual transition from shallow to deep water (~20–30% slope). The intent is to maintain the original contours of the pond, while removing the sediment that has accumulated from sloughing banks and lack of maintenance. It is anticipated that the operator will be able to sculpt the pond to approximately its original shape while avoiding penetration of the compacted clay soils that form the basin.

4) If any special-status species are observed that may be harmed by the process, they should be moved by the monitoring biologist to the nearest appropriate habitat. It is anticipated the individuals will be moved <100 feet to moist vegetation either at the edge of the pond or in the willow riparian vegetation immediately below the berm of the pond. All mortalities should be recorded and preserved as specimens, if appropriate and according to permit conditions.

5) Efforts should be made to complete the entire excavation in one day. This will reduce impacts to special-status species that may return to the pond overnight. If more than one day is required, the qualified biologist should repeat preconstruction surveys each morning and continue biological monitoring until the process is complete.

The entire process should be repeated similarly at Big Spring and Knuedler Lake, either at the same time as Upper Pond or during subsequent years. At Big Spring, only a small portion of the wetland—situated in the north corner—should be returned to the original contours (Figure 12). It is roughly estimated that between 75 and 125 cubic yards of sediment will require removal. The remaining portion of Big Spring should not be disturbed, as it provides a combination of seasonal wetland, emergent freshwater marsh and riparian vegetation that provides quality foraging and sheltering habitat for both CRLF and SFGS.

Since Big Spring supports a WPT population, the preconstruction survey at Big Spring should also include a live-trapping effort for WPT prior to excavation. Live-trapping may only require 1-2 days and should be restricted to the area proposed for excavation. Depending on whether excavation will require more than one day, WPT may be held in captivity in predator-proof pens, moved to other portions of Big Spring, or relocated to Mindego Lake.

Knuedler Lake is bisected by the Preserve property line. For this reason, sediment and vegetation removal should be restricted to the eastern side of the basin (Figure 13). The remaining portion of the pond should be left undisturbed to provide a refuge for CRLF and SFGS during the maintenance process. To avoid heavy equipment entering the pond, a long-reach excavator should be used at Knuedler Lake. If possible, the District should

arrange road access from the adjacent property owner. It is roughly estimated that approximately 300 cubic yards (± 100 cubic yards) of sediment should be removed from the east half of Knuedler Lake. Any amount over 150 cubic yards requires a permit from San Mateo County with detailed geotechnical drawings and associated plans. Alternatively, up to 150 cubic yards could be removed and the process repeated, as needed, in the future.

6.5 Eradicate Fish from Mindego Lake

Mindego Lake is the only pond onsite that supports reproducing populations of fish. In order to improve aquatic breeding habitat for CRLF, and improve foraging habitat for juvenile SFGS and other native wildlife, Mindego Lake should be drained to eliminate introduced predatory fish and initiate a bullfrog management program. Although this management action will require significant effort, there are no nearby sources of introduced fishes, and it is not expected to be a recurring action. Furthermore, subadult and adult CRLF use Mindego Lake and nearby ponds as summer habitat, and the species is expected to promptly colonize and reproduce in a fishless pond.

Since Mindego Lake is a large, 5.4-acre pond, draining it may reveal unanticipated complications, some of which are discussed below. It is recommended that the pond draining begin the summer following improvements to Upper Pond, which will provide a potential relocation site for native aquatic species that may be affected by draining Mindego Lake, in particular CRLF tadpoles. This timing is very important since bullfrogs may also attempt to colonize Upper Pond after it is improved. The draining effort will target complete eradication of all introduced species except mosquitofish, since they provide a consistent food source for most size classes of SFGS and WPT. If all predatory fish are successfully removed, it is anticipated that Mindego Lake will only need to be drained one time.

Efforts to initiate draining should commence on 1 July, although this date is flexible based on construction scheduling and environmental conditions. The process should be completed as soon as possible and before the onset of winter rains. Ideally, the pond would be drained dry in ~30 days, and/or after the monitoring biologist confirms eradication of all predatory fishes. If the pond is drained by 1 August, it is unlikely that any bullfrog eggs laid the same year would reach transformation, which would facilitate bullfrog management (see Section 6.6). Since more than one spring appears to feed Mindego Lake, it is possible that hydration could commence promptly, before the winter rains, which could facilitate reintroduction of WPT and may minimize effects to SFGS, especially neonates that emerge in the fall. Special-status species will likely be affected by the proposed action, however, draining the pond according to the process detailed below will likely reduce negative effects greatly.

1) Within one week before draining is initiated, install a temporary exclusion fence around the entire perimeter near the existing high water line to keep SFGS out of the pond basin and to help contain dispersing bullfrogs. The exclusion fence may consist of 3-foot high silt fence ("Caltrans" grade, with attached wooden stakes

every 8 feet) or similar material, buried 2–4 inches, and supplemented as needed with additional stakes to keep it taut and vertical. Outside the exclusion fence, cover-boards shuld be placed along the fence every 100–200 feet (4 by 4 feet sheets of plywood, elevated ~2 inches on the side that abuts the exclusion fence). Installation should be monitored by a qualified biologist.

2) The draining process will require actively pumping water. Given the large volume, it is expected to require two trailer-mounted, 6-inch pumps that should be set up near the outlet barrier. Water should be discharged onto the grassy slope toward Big Spring along the low hill above the west side of Mindego Lake (Figure 14). Water should be discharged at two or three locations through an energy dissipater and passed through three lines of hay bales lined with filter fabric. The surface water will travel a long distance through grass, which will offer additional filtration and slow the flow. Only clear water will be allowed to reach Big Spring and continue downstream into the watershed. When 6-inch pumps become ineffective, 4-inch and 2-inch pumps can be floated on a flat-bottomed boat to remove the majority of the remaining water. Inlet hoses of all pumps should be screened with 3/32-inch mesh and placed within a 5-gallon bucket or similar container to limit plugging from aquatic vegetation and ensure that no vertebrates pass through the pump. For as long as possible, inlet screens should be floated to reduce discharging turbid water. After most of the water has been removed, it is likely that the pond basin will recharge from subsurface flow and springs. If so, one or more sumps and associated channels will be dug by hand to direct surface flow to localized areas (about the size of a 55-gallon drum), and sump pumps installed that are able to run off of a generator continuously, if needed, to remove all standing water. As the water level recedes, if the basin is uneven, several smaller ponds may form, each of which will be drained to a point where all the target fishes are eliminated.

3) Shortly after water levels begin receding, a minimum of two pools just inside the high water line and in proximity to vegetative cover, will be created to contain mosquitofish as a food source for juvenile SFGS. The pools will be void of all other fish species. One potential location is along the north edge of Mindego Lake, and another is in the southeast area, where nearby emergent or perimeter vegetation provides escape cover. When completed, the depressions should provide a ~300 square feet of standing water surface area, which may be up to 12-inches deep. Alternatively, an "aqua dam," which uses plastic tubes filled with water to make an impoundment, may be useful to create the temporary pools described above (see: http://www.layfieldenvironmental.com). The monitoring biologists will relocate mosquitofish to the pools as needed. After creating the depressions, temporary perimeter fencing should be adjusted so that the pools are on the outside of the fenced area and may therefore be accessed by SFGS.

4) Prior to draining the pond, WPT should be live-trapped and held nearby in a predator-proof pen that provides an appropriate sun/shade mosaic, as well as aquatic escape habitat. A simple predator-proof pen can be constructed using

cattle troughs covered with hardware cloth, half shaded with plywood and weighted with cinder blocks. WPT must be fed and their pen cleaned as needed, but with as little additional human contact as possible. Live-trapping should be conducted for a minimum of three days and may also continue as appropriate while the pond is drained. Although generally trappable, not all WPT will be captured. The remaining individuals will be collected by hand or net and held in the predator-proof pens. WPT should be reintroduced to Mindego Lake as it is rehydrated. They must be reintroduced during their Fall activity period before temperatures drop. If it becomes clear that the draining process will require more time, WPT should be relocated to Upper Pond and/or Big Spring while they are still active.

5) One or more biologists, qualified to handle SFGS, CRLF and WPT, must monitor the process to move native species out of harm's way and destroy non-native animals. When water level reach approximately 2–3 feet it is recognized that, significant labor may be required to relocate native wildlife and destroy exotic species, primarily fishes and bullfrogs. Native wildlife should be released in the nearest appropriate habitat adjacent to the site, either in nearby uplands (i.e., SFGS), at Upper Pond (i.e., CRLF), or within the predator-proof pens (i.e., WPT). Although large numbers of fishes and bullfrogs are anticipated, all non-native animals should be destroyed. It is recommended that nearby pits be dug or augured to bury dead fishes and bullfrogs. The pits for bullfrogs should have vertical walls and be several feet deep. If time permits, the stomach contents of a portion of the fishes and bullfrogs should be examined and the contents recorded. The pond should be either drained dry or nearly so, such that the monitoring biologist can conclusively state that all predatory fish are eradicated. Mosquitofish are capable of surviving for many days in small pockets of water no larger than a footprint, so removing them may not be practicable. But perhaps more importantly, at this particular site it is recommended that mosquitofish be retained as a food source for SFGS, for neonates in particular, that emerge in the late Summer and Fall. In addition, mosquitofish provide a consistent food source for WPT. We consider the presence of mosquitofish to be relatively benign, since there are numerous examples of CRLF breeding sites throughout the species range, that also support mosquitofish.

6) There may be unanticipated issues encountered during the draining process, since Mindego Lake is a large pond that supports multiple species. The pond may take longer than anticipated to drain due to the large volume of water, an uneven basin or it may recharge from subsurface flow. It may be difficult to reach stranded species due to a deep sediment layer, which may require creating temporary boardwalks using sheets of plywood. Additional biologists may be required to process higher than anticipated numbers of individual species. Since catfish are breeding and young may persist in small pools of watery mud, extra days may be necessary to ensure complete eradication. There may be unanticipated invasive creatures such as burrowing crayfish. Louisiana red swamp crayfish, for example, have been reported from Alpine Pond located 2.5 miles east. These crayfish are

very difficult to eradicate because in response to receding water they will burrow deeply and promptly re-colonize the pond after it is hydrated. They can persist in burrows without standing water for at least four months and perhaps many more. Indeed, draining the pond may significantly increase crayfish numbers, at least in the short term, since centrarchid fishes are active predators and the species is adapted to periodic drying and will reproduce rapidly if numbers are reduced (Allaback, pers. obs.).

7) The number of animals affected by the pond draining should be tallied by species and recorded as part of baseline data collection. The methods and results of the pond draining effort should be detailed in a written report.

6.6 Control Bullfrogs at Mindego Lake

A reproducing population of bullfrogs inhabits Mindego Lake. Several hundred post-metamorphic juveniles (metamorphs) were observed during field visits in September and October 2011, with 10s of thousands observed in August 2012. Previous surveys noted bullfrog presence at Knuedler Lake and Big Spring (Swaim Biological, Inc. 2009; Condor Country Consulting, Inc. 2009). There are several perennial ponds that may support bullfrogs offsite that are within dispersal distance. Since the improvements to all four ponds onsite will also improve breeding habitat for bullfrogs, a long-term management plan is critical. The District should therefore be prepared to engage in annual bullfrog management for many years.

During the process of draining Mindego Lake, all bullfrogs encountered should be destroyed. Individuals will be captured by hand, net, and gig. If needed, high-powered, lead-free pellet rifles may also be used. Additional night surveys will only be conducted if considered necessary, although subsequent annual monitoring (Section 7.1) will rely on night surveys to census CRLF and control bullfrogs. Efforts will be made to keep all first-year bullfrog tadpoles from reaching transformation by conducting the pond draining effort from ~1 July–1 August. If it takes longer than anticipated to drain the pond, high numbers of bullfrog tadpoles may transform, and although the monitoring biologists should destroy as many as possible, many metamorphs may escape. The perimeter fence will help contain bullfrog metamorphs and other size classes that may attempt to disperse in response to receding water, but some may circumnavigate the fence and many individuals may burrow into the muddy pond basin and not be found until later survey efforts. If time permits, the stomachs of adults will be inspected or frozen for later inspection. Numbers of individuals by size class will be recorded.

Both the experience of consulting biologists, and the reports from many bullfrog management projects, suggest that long-term efforts will likely be necessary to keep bullfrogs from breeding at Mindego Lake and at the other ponds onsite. Complete eradication may not be possible, due to the possibility of emigration from offsite sources, and because individual bullfrogs that are missed and repeatedly hunted often engage in evasive behavior that makes capture difficult (Allaback, pers. obs.). However, if recent information suggesting that a previous landowner planted bullfrogs at Mindego Lake is

accurate, a very robust initial effort may reduce numbers so low that control of the population becomes practical and elimination may be possible. Initial efforts should focus on eliminating all the large adults. But bullfrogs may immigrate to Mindego Ranch from offsite source ponds. If large populations have colonized sites on adjacent lands, the District should assume that following restoration, bullfrogs may annually attempt to colonize all four ponds on the property. It is important to reduce the bullfrog population to a level that will allow the CRLF to become a productive breeding species. To achieve this goal, it is considered mandatory to not allow bullfrogs to become established as a breeding species at the three smaller sites: Upper Pond, Big Spring, and Knuedler Lake. Conversely, if bullfrogs were planted at Mindego Lake, our observations of 10s of thousands of post-metamorphic bullfrogs would suggest that Mindego Lake is in fact the source population in the vicinity. Elimination or extreme reduction of this population could reduce the likelihood of emigration to onsite and offsite habitats for several to many years. In either case, some level of monitoring following draining efforts would result in significantly informative data.

Since Mindego Lake will be drained in Year-3, the bullfrog breeding cycle will be interrupted, which presents the best opportunity to dramatically reduce the population. Within the first month after the pond is hydrated, monthly night visits to control bullfrogs are recommended for at least one additional year. A number of daytime visits may also be necessary, particularly if bullfrog breeding is suspected. All ponds onsite should be searched each visit, and a boat would be useful for surveys at Mindego Lake. Based on the results of the first year of bullfrog control, monitoring could be decreased. Over time, it is anticipated that quarterly visits will be necessary to monitor the CRLF population and dispatch any new bullfrogs that immigrate to the property.

6.7 Repair Outlets at Upper Pond, Big Spring, and Knuedler Lake

The outlet at Upper Pond has eroded and will require remediation to ensure the integrity of the berm that forms the pond (Figure 11). Since water levels will likely drop at Upper Pond during maintenance efforts, it is recommended that the repair be conducted when the pond is cleaned. The outlet should either be stabilized as is or raised in order to ensure that the capacity of Upper Pond is at least ~4 feet deep.

At Big Spring, the low, earthen berm near the northwest corner has eroded. The outlet should be repaired and likely raised to re-create the original capacity of the pool. It may be appropriate to design a new outlet with a weir to help control water levels.

At Knuedler Lake, there is an actively eroding head-cut approximately 75 feet from the high water line that must be repaired along the outlet. Further erosion could dramatically affect capacity. Note that the work should be conducted during the dry season when there is little or no surface flow. At all appropriate times Best Management Practices should be used to ensure that no sediment is discharged downstream to minimize affecting special-status species, such as steelhead (*Onchorhynchus mykiss*), in the lower watershed.

6.8 Install Livestock Exclusion Fencing at all Ponds

Five-strand barbed-wire fencing to exclude and manage livestock is recommended for portions of all four ponds. The intent is to allow cows to drink at specific locations to help maintain open water habitat while excluding cattle from portions of the pond to ensure adequate growth of emergent and perimeter vegetation. Gates should be installed in the exclusion fencing to allow cattle periodic access when considered necessary to help control invasive plants. At Mindego Lake, the approximate southern half should be excluded, which could be accomplished by installing two lengths of fencing perpendicular to the shore that extend from deep water to dense brush (Figure 14). This is compatible with the Sage Associates (2008) recommendation for exclusionary fencing along the south and southwestern edges of Mindego Lake to improve water quality and riparian habitat.

At Knuedler Lake, the outlet and the eastern part of the pond should be excluded by following the property line, which roughly bisects the pond (Figure 13). The exclusion fence should follow the property line and tie in with the perimeter fence to the south and northwest. The outlet area should be excluded from cattle to reduce downstream erosion.

At Upper Pond, the berm and northern half of the pond should be excluded (Figure 11). The exclusion fence should tie in with an existing fence immediately north of the pond.

At Big Spring, the culvert/berm and approximately half of the pool from which vegetation is removed should be excluded (Figure 12). If cattle graze too heavily in other portions of this large wetland, the fence may need to be expanded.

Hog wire fencing to exclude wild pigs could also aide in the protection of habitat, water quality and special status-species. Upper Pond and portions of Big Spring, Knuedler Lake and Mindego Lake could have hog wire installed in conjunction with or in place of barbed wire. If hog wire is used, fencing that includes progressively smaller openings should be installed with the small boxes at the top of the fence to facilitate small animal (i.e., WPT, CRLF, etc.) movements through the fence.

6.9 Install Livestock Water Troughs

In addition to allowing cattle to freely access portions of each pond, installation of water troughs is also recommended. Water in troughs typically provides cleaner water with fewer parasites, which is healthier for livestock (O. Sage, pers. comm.). Water troughs improve grazing distribution and can divert grazing from sensitive habitats (Sage Associates 2008). Having both options would allow land managers more flexibility to manage herds, which may vary in numbers from year to year. Locations for livestock water troughs should be chosen in consultation with the District's rangeland ecologist. A trough may not be necessary at Knuedler Lake, since at that particular site cattle are expected to help maintain open water habitat east of the exclusion fence.

6.10 Enhance Mindego Lake for Western Pond Turtle

The WPT at Mindego Lake have few natural basking sites. Suitable basking sites are important for thermoregulation and for retarding epizootic and epiphytic infestations. Basking substrate for the species should be added to aquatic refuge sites through the placement of 5–6 large logs (minimum 10-inch diameter, 8-foot length) that extend from above the high water line to deep water and should be spaced well apart in the area recently cleared. Each log should be anchored with stainless steel cables and permanent anchors, if necessary. At least one site should receive morning sun and one site should receive afternoon sun (between 1000hrs–1600hrs). In addition, several floating basking platforms can be constructed and deployed following plans by Alvarez (2006) or other designs.

6.11 Limit Public Access

To reduce the potential for both intentional and unintentional take of protected species, public access to the most sensitive habitats onsite should be limited or avoided. The District should consider establishing a Conservation Management Unit (CMU) around each pond that extends a minimum of 660 feet (200 meters) from the high water line in all directions. The CMU should be closed to public access and delineated with appropriate signage. This will provide significant additional protection in areas where both SFGS and CRLF are expected to be concentrated throughout much of the year. Outside the CMU, public access should be restricted to designated trails for hiking and equestrian use only.

6.12 Maintain or Repair Access Roads Onsite

Access roads are currently overgrown with vegetation, or in some areas roads are washed out or greatly degraded. These roads will be required for access to conduct research, perform maintenance, implement habitat improvements, manage livestock grazing, and patrol the site. Each of these activities is a critical part of improving site suitability and population stability for SFGS and CRLF. Current conditions do not allow vehicle access to some of the managed areas. The District will need to repair head cuts that intersect roads, mow or scrape roads to increase visibility, and repair crossings at several small drainages to allow for vehicle access

Crossing repair may include installing culverts, placing or replacing soils over culverts and installing energy dissipation and erosion control structures. These repairs and modifications will reduce siltation downstream where habitat is present for steelhead and other salmonids. Additionally, these repairs will allow vehicle access to areas such as Upper Pond and Knuedler Lake.

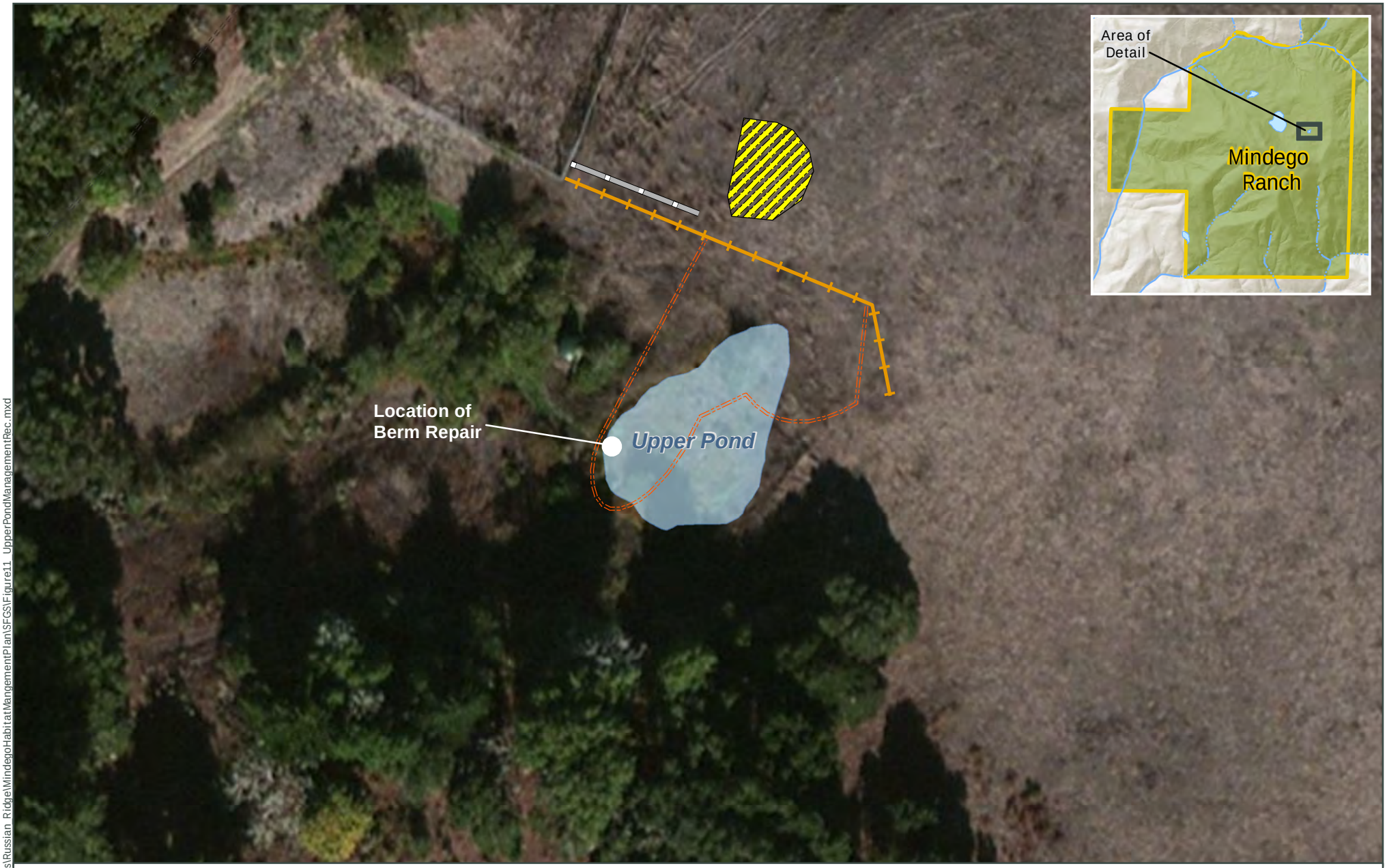

Figure 11: Upper Pond Management Recommendations

Existing Fence

Proposed Cattle Exclusion Fence

Excavator Route

Proposed Spoils Area

Pond

Midpeninsula Regional Open Space District
(MROSD)

October, 2012

Feet
0 50 100

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Figure 12: Big Spring Management Recommendations

Proposed Cattle Exclusion Fence

Intermittent Stream

Pond

Midpeninsula Regional Open Space District *(MROSD)*

October, 2012

Feet 0 100 200

Created By: jhawk Path: G:\Projects\Russian Ridge\MindegoHabitatMangementPlan\SFGIS\Figure12_BigSpringManagementRec.mxd

Figure 13: Knuedler Lake Management Recommendations

Mindego Ranch Property
MROSD Preserves
Existing Fence
Proposed Cattle Exclusion Fence
Pond
Intermittent Stream

Midpeninsula Regional Open Space District *(MROSD)*

October, 2012

Feet 0 100 200

Created By: jhawk Path: G:\Projects\Russian Ridge\MindegoHabitatMangementPlan\SFGIS\Figure13_KnuedlerLakeManagementRec.mxd

Figure 14: Mindego Lake Management Recommendations

Proposed Cattle Exclusion Fence

Pond

Midpeninsula Regional Open Space District *(MROSD)*

October, 2012

Feet 0 100 200

Created By: jhawk Path: G:\Projects\Russian Ridge\MindegoHabitatMangementPlan\SFGS\Figure14 MindegoLakeManagementRec.mxd

Table 2. Summary of Management Actions and associated priority levels for SFGS and CRLF management at Mindego Ranch.

Management Action	Upland Habitats	Mindego Lake	Knuedler Lake	Big Spring	Upper Lake
Upland Habitat Management					
Seasonal Cattle Grazing	High	-	-	-	-
Invasive Plant Control	High	-	-	-	-
Aquatic Habitat Management					
Predatory Fish Control	-	High	n/a	n/a	n/a
Bullfrog Control	-	High	Moderate	Moderate	Moderate
Wild Pig Control	-	Moderate	Moderate	Moderate	Moderate
Non-native Turtle Control	-	Monitor	Monitor	Monitor	Monitor
Pond Draining	-	High	n/a	n/a	n/a
Outlet Structure Repair	-	None	High	High	High
Livestock Exclusion Fencing	-	High	High	High	High
Sediment/Vegetation Removal	-	Low	Moderate	Moderate	High

7.0 BIOLOGICAL MONITORING

An effective monitoring program must have clear goals and consider a number of factors including funding constraints, required personnel and materials, and behavioral aspects of the target species. While SFGS is the primary focus of this program, it is important to monitor CRLF and bullfrogs as well, given their significance as predators, competitors, and/or prey for SFGS.

The overall goal of the biological monitoring program at Mindego Ranch is to collect baseline data, determine trends in numbers of SFGS, CRLF, WPT and bullfrogs, and to use this information to maintain a viable population of the native species over time. Baseline studies will identify critical areas that can be targeted for survey efforts in the future. The effectiveness of annual management must be evaluated and modified, if needed, using adaptive management strategies. If it is not possible to eradicate bullfrogs as a breeding species at Mindego Lake, for example, then control efforts should ensure that only CRLF breed at the other ponds onsite.

The relative abundance of SFGS at Mindego Ranch is unknown since all detections to date have relied on visual encounter surveys. Focused studies for this subspecies must be conducted during the Spring and Fall, since the species is typically inactive during the winter. In order to determine the relative size and demography of the SFGS population at Mindego Ranch, a mark/recapture study will be necessary at the two known reproductive sites (i.e., Mindego Lake and Knuedler Lake). This type of study could provide data regarding distribution, reproduction, population size, and habitat use that may be a significant research contribution on a Fully Protected species. This research effort should happen prior to the pond/lake improvements, so that a repeat study could help measure the success of management actions.

Monitoring for CRLF and bullfrog must include different life stages to determine where the species are breeding. Monitoring can typically begin in the mid- to late-winter and continue through the fall, until the onset of the rainy season. CRLF surveys should include searches for egg masses during the winter, larvae in the spring, and post-metamorphic juveniles (metamorphs) in the summer. Counts of egg masses and larvae document reproductive attempts and counts of metamorphs provide an index of reproductive success. Regular night surveys to census adults and control bullfrogs will also be required.

Monitoring biologists must be qualified and be able to quickly determine the differences between the life stages of CRLF and bullfrog, especially during efforts to eradicate the latter species. A variety of methods using different equipment may be necessary to dispatch bullfrogs. Positive identification of SFGS often requires handling. CDFG and USFWS will likely require permitted biologists to conduct annual monitoring, especially for studies that require handling.

7.1 Baseline SFGS Population Study

A mark-recapture study of SFGS at Mindego Lake and Knuedler Lake is recommended to establish a baseline population estimate. The study will require a minimum of 15–30 consecutive days of trapping between 15 April and 15 June, and a second, 15–30 day session between 1 September and 15 October. Although both sessions will be useful to estimate relative numbers of SFGS, the second session will also be used to determine if reproduction was successful, based on the presence of neonates. To appropriately sample Knuedler Lake, eight trap lines are recommended, equally spaced around the perimeter that run roughly perpendicular to the shoreline. Access to the entire perimeter of Knuedler Lake must be arranged with the adjacent landowner. Each trap-line should be 25 feet long and be fitted with two pairs of funnel-traps at each end (four total per line). Similarly, 10 trap lines should be placed around Mindego Lake. Finally, two additional trap lines should be situated between Mindego Lake and Big Spring, and between Mindego Lake and Upper Pond. An all-terrain vehicle will be necessary to transport supplies and efficiently check traps daily. Each captured SFGS should be weighed, measured, sexed with a cloacal probe (if needed), adult females palpated to determine if they are gravid, and individually marked by clipping scales.

Beginning two or more years after management actions have been completed, the study should be repeated and the results compared with baseline data. Since the methods are standardized, studies can be repeated in the future as considered necessary.

7.2 Long-term CRLF and Bullfrog Monitoring

CRLF should be monitored by conducting surveys for eggs, larvae, metamorphs and adults at each pond. One daytime survey for eggs should be conducted between 15 February and 15 March and one night survey for adults between 15 February and 15 March, and a second night survey performed when water levels are low between July and September. One aquatic sampling survey should be conducted for tadpoles in May or June. One daytime survey should be conducted for metamorphs, typically in August or September, and always before the first significant rain event ($\geq$ 0.25 inches). During every visit, time-constrained searches should be conducted and numbers of egg masses and/or individuals should be recorded by age class. Surveys at Upper Pond, Knuedler Lake and Big Spring can be conducted from shore. Mindego Lake will typically be surveyed by kayak or in another type of boat. During every visit, the biologist should be prepared to incidentally dispatch as many bullfrogs as possible without compromising the CRLF census.

Long-term frog monitoring will require five visits annually to monitor CRLF and bullfrog breeding success. Additional effort may be needed to control bullfrogs over and above monthly visits during Years 2 and 3, and a contingency budget should be available.

7.3 District Staff Training

For the long-term, it is desirable to develop a monitoring program that can be implemented by District staff. Development of a monitoring program and training of District biologists should be developed in conjunction with the first five years of management and monitoring actions as detailed in Section 6.0. Qualified biological contractors should perform tasks initially and train District biologists to monitor for SFGS, CRLF, WPT, and to control bullfrogs.

8.0 IMPLEMENTATION

8.1 Project Timeline

The management and monitoring tasks detailed above are intended to take place in a phased approach. Table 3 outlines the timing of the various elements of the Management Plan.

Table 3. Timing of recommended management and monitoring actions at Mindego Ranch.

Action	Year 1	Year 2	Year 3	Year 4	Year 5
Management Recommendations					
Wild Pig Control	X	X	X	X	X
Bullfrog Control Program		X	X	X	X
Sediment/vegetation removal at Upper Pond, Big Spring & Knuedler Lake		X			
Repair outlet structures at Upper Pond, Big Spring & Knuedler Lake		X			
Install livestock exclusion fencing at Upper Pond, Big Spring & Knuedler Lake		X			
Drain Mindego Lake to eliminate fish			X		
Install livestock exclusion fencing at Mindego Lake			X		
Enhance Mindego Lake for WPT				X	
Monitoring Recommendations					
Baseline SFGS, CRLF, WPT Study	X				
District Staff Training	X				
Annual SFGS, CRLF,WPT Monitoring		X	X	X	
Post-Activity SFGS, CRLF, WPT Study					X

9.0 CITATIONS

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Appendix A. San Francisco Garter Snake observations at Mindego Ranch, 2009-2012.

Date	Time	Location	# Obs	UTM N	UTM E	Source
2/2/09	11:30	Mindego Lake	1AD	4130192	568132	MROSD
4/16/09	?	Knuedler Lake	1AD	4128962	567207	CCC 2009; Alvarez pers comm
4/16/09	?	Knuedler Lake	1AD	4128965	567207	CCC 2009;Alvarez pers comm
4/17/09	13:00	Mindego Trail	1AD	4129845	569390	MROSD
5/15/09	?	Knuedler Lake	2AD	4128939	567219	Alvarez, pers comm.
5/26/09	?	Knuedler Lake	1 AD	4128989	567178	CCC 2009; Alvarez pers comm
6/11/09	?	Knuedler Lake	1 AD	4128924	567204	CCC 2009; Alvarez pers comm
6/11/09	?	Knuedler Lake	1 AD	4128987	567171	CCC 2009; Alvarez pers comm
6/11/09	?	Knuedler Lake	1AD	4128987	567166	CCC 2009; Alvarez pers comm
6/11/09	?	Mindego Lake	4 AD	4130010	568111	CCC 2009; Alvarez pers comm
6/16/09	?	Mindego Lake	3 AD	4130006	568090	Alvarez, pers com
7/29/09	9:00	Mindego Lake	1AD	4130121	567987	MROSD
7/30/09	9:30	Mindego Lake	1AD	4130107	567972	MROSD
11/3/09	10:04	Trail to POST Council Circle	1AD	4130235	568427	MROSD
5/2/10	?	Mindego Lake	1AD	4130089	568123	MROSD
5/5/10	12:30	Mindego Lake	1AD	4130255	568212	MROSD
5/5/10	12:00	Mindego Lake	1AD	4130264	568167	MROSD
5/14/10	11:00	Knuedler Lake	2AD	4128906	567213	MROSD
5/14/10	11:00	Knuedler Lake	2AD	4128960	567212	MROSD
5/14/10	15:15	Upper Lake	1AD	4130021	568365	MROSD
5/10/11	9:30	Mindego Lake	1AD	4130039	568017	MROSD
5/13/11	11:00	Mindego Lake	2AD	4130007	568101	MROSD
9/12/11	13:00	Mindego Lake	1AD	4130007	568091	This Study
9/12/11	13:15	Mindego Lake	1AD	4130023	568048	This Study
9/15/11	10:45	Mindego Lake	1AD	4130003	568093	MROSD
9/20/11	11:35	Mindego Lake	1AD	4130090	568131	This Study
9/20/11	11:40	Mindego Lake	1AD	4130040	568129	This Study
9/20/11	12:20	Mindego Lake	1AD	4130107	568132	This Study
9/20/11	12:30	Mindego Lake	1AD	4130110	567975	This Study
9/20/11	14:35	Mindego Lake	1AD	4130020	568074	This Study
9/20/11	15:15	Mindego Lake	1 NEO	4130117	568120	This Study
9/20/11	15:15	Mindego Lake	1 NEO	4130118	568148	This Study
9/29/11	12:48	Mindego Lake	1AD	4130117	567975	This Study
9/29/11	14:50	Mindego Lake	1 AD	4130174	568109	This Study
9/29/11	14:55	Mindego Lake	2 NEO	4130107	568132	This Study
3/5/12	?	Mindego Lake	?	4130049	568134	MROSD
4/19/12	11:30	Mindego Lake	1 AD	4130065	568003	This Study
4/19/12	15:45	Road west of Mindego Lake	1 AD	4130198	567545	This Study
5/17/12	?	Knuedler Lake	1 AD	4128945	567172	This Study
5/17/12	?	Knuedler Lake	1 AD	4158936	567219	This Study
5/17/12	14:00	Mindego Lake	1 SA	4130139	568116	This Study

Table 5.1. California red-legged frog key life history and preferred pond habitat characteristics.

CHARACTERISTIC	DESCRIPTION
Life History	
Mating and Egg-Laying	California red-legged frog (CRLF) mating and egg-laying typically occurs February-March but can occur from November-April. Eggs are attached to emergent vegetation such as cattails, bulrush, and spikerush (Hayes and Jennings 1994).
Egg Development	Eggs require approximately 20-22 days to develop into tadpoles.
Tadpole Development and Metamorphosis	Metamorphosis typically occurs July-September. Tadpoles require 10-20 weeks to mature and transform into metamorphs. CRLF tadpoles can overwinter and transform the following year in habitats with perennial water (Fellers et al. 2001).
Juvenile Development	Metamorphs (recently transformed frogs) are commonly found in warm, shallow-water habitats with floating or submersed vegetation (Hayes and Jennings 1994).
Seasonal and Annual Pond Use	CRLF spend most of their lives in or near sheltered waters. Population size in a pond can vary considerably from year to year. It is important for the long term survival and recovery of the species to protect those sites that appear to be currently unoccupied because they can still be re-colonized by dispersing individuals from nearby subpopulations (USFWS 2002).
Upland Habitat Use and Dispersal	CRLF use surrounding upland habitats for sheltering and dispersal. See discussion below.
Predator-Prey Relationships	
Tadpoles – Food Source	Tadpoles likely eat algae (Jennings et al. 1992).
Tadpoles/Eggs – Predators	Predators of CRLF tadpoles and eggs include crayfish, skunks, raccoons, birds, bullfrogs, and centrarchid fish (bass, perch, sunfish). Emergent vegetation, undercut banks, and semi-submerged rootballs can afford some shelter from these predators. CRLF generally requires an absence or near absence of bullfrogs or predatory fish including mosquito fish (*Gambusia* sp.) (USFWS 2002). Predatory aquatic invertebrates may preferentially feed on bullfrog eggs and not CRLF eggs (Adams et al 2003).
Juvenile/Adults – Prey	CRLF diet is highly variable. Invertebrates are generally the most common food item. Vertebrates, such as Pacific tree frogs (*Pseudacris regilla*) and California mice (*Peromyscus californicus*), can represent over half of the prey mass eaten by larger frogs (Hayes and Tennant 1985).
Juvenile/Adults – Predators	Predators of CRLF adults, subadults and metamorphs include skunks, raccoons, birds, and large bullfrogs.
Pond Physical Characteristics	
Size	CRLF can occur in ponds that range in size from less than 10 feet in width to large stock ponds and reservoirs. Ponds must pond long enough to support growth and transformation of tadpoles. Perennial ponds may support populations of non-native bullfrogs and fish which predate upon CRLF.
Pond Basin and Bank Structure	CRLF prefer ponds with deep water areas for escape cover and open shallow water benches around the margin used as rearing areas by tadpoles and metamorphs. Deep water escape areas should be at least 3 feet deep. Tadpole and metamorph rearing areas should be relatively unshaded and shallow enough to warm quickly in the winter sun (10-20 inches) (USFWS 2002).
Pond Water Quality and Hydrology	
Water Quality Characteristics	CRLF prefer minimal turbidity and siltation which in excess can cause asphyxiation of eggs and young tadpoles. CRLF sensitivity to pesticides, heavy metals, air pollutants, and other contaminants is largely unknown. Studies with other amphibians have indicated that these contaminants can negatively affect populations (USFWS 2002). CRLF are sensitive to high salinity levels, which are common in coastal lagoons (USFWS 2002).

CHARACTERISTIC	DESCRIPTION
Ponding Duration	Ponds must remain inundated long enough to support tadpole growth and transformation, typically at least into mid August. Occasional lack of sufficient ponding duration during drought years can be tolerated by CRLF since adult populations can survive without breeding every year. Although lack of sufficient water can eliminate the reproductive success for one year, it also can reduce the number of predators which would benefit the population in the long run (USFWS 2002). Year-round inundation is acceptable provided the pond does not become occupied by bullfrogs or predatory fish.
Pond Open Water/ Vegetation Characteristics	
Open Water	CRLF prefer ponds that have some open water areas that provide escape cover. Clogging of deep habitats with vegetation would still support escape. Though less common, all CRLF life stages can be found in ponds entirely clogged by emergent or woody riparian vegetation as well as open water ponds completely devoid of vegetation (Jennings and Hayes 1994). Areas of relatively unshaded shallow water that quickly warm benefit tadpoles. Metamorphs are commonly found in warm, shallow-water habitats with floating or submersed vegetation that provide good cover (Hayes and Jennings 1994).
Vegetation	Ponds with the highest recorded CRLF densities contain dense emergent or shoreline riparian vegetation associated with deep water (Hayes and Jennings 1994). Riparian vegetation that structurally seems most suitable includes willows (*Salix* spp.), cattails (*Typha* spp.), bur-reed (*Sparganium* spp.), spikerush (*Eleocharis macrostachya*), smartweed (*Polygonum* spp.), and bulrush (*Scirpus* spp.). In an ideal pond, the pond margin should support 10-50% cover of woody vegetation (e.g., willows), 25-75% cover of dense emergent vegetation (e.g. cattails, bur-reed, spikerush, smartweed, and bulrush), and at least 20% cover of relatively open shallow water benches that allow sunlight to penetrate and warm the water.
Watershed and Pond Network Characteristics	
Type and Distribution of Habitats	CRLF use surrounding upland habitats for sheltering and dispersal. Accessibility to sheltering habitat is essential for CRLF survival within a watershed, and can be a factor limiting frog population numbers. Sheltering habitat includes mammal burrows, damp leaf litter, downed wood, other cover objects, riparian vegetation, and dense shrubbery within several hundred meters of aquatic sites. CRLF may shelter further than 100 m (328 ft) from water in such places for weeks at a time in any season (USFWS 2002).
Movement Corridors	During winter rains, adult CRLF are known to wander up to 3 km (1.9 miles) from aquatic sites (USFWS 2002). They can disperse across grasslands, woodlands, coniferous forests, and chaparral. CRLF have been observed to make long distance migrations that are straight line movements, without apparent regard to topography, vegetation type, or riparian corridors (USFWS 2002). However, the moisture and cover of riparian habitat may facilitate dispersal.
Relationships Between Ponds	The healthiest California red-legged frog populations persist as a collection of subpopulations that exchange genetic material through dispersal events among a set of habitable ponds and other water bodies. Studies have shown that the probability of a habitat being occupied by CRLF is positively correlated with the distance to the nearest occupied habitat (USFWS 2002). Maximum practical dispersal distance between ponds is less than 1.6 km (1 mile) though CRLF can travel up to 3.2 km (2 miles).

Table 5.2. San Francisco garter snake key life history and preferred pond habitat characteristics.

CHARACTERISTIC	DESCRIPTION
Life History	
Mating	San Francisco garter snakes (SFGS) mate predominately in late winter and early spring depending on weather conditions. Observations of fall mating have been reported.
Birth	Females give live birth from June through September, with litters averaging 16 newborn.
Juvenile Development	Juveniles typically mature in three years but age of maturation is likely dependent on prey availability.
Adult/Juvenile Seasonal and Annual Pond Use	Female SFGS have site fidelity to a particular pond, but males do not (McGinnis et al. 1987, Keel et al. 1991). Female SFGS can be found daily at the entrance to their burrow, and travel to the wetland one to two times per day (Paul Keel, pers. comm.) The aestivation burrow is also where females are encountered emerging from hibernation. The mean measured distance of female hibernacula to Headquarters Pond at Año Nuevo was 459 feet (140 meters), with a maximum measured distance of 637 feet (194 meters) (Brown 2000). SFGS forage on a seasonal basis (late winter–early summer) at ponds that do not retain water long enough to support ranid prey when these foraging opportunities are available in proximity to more permanent ponds. At the West-of-Bayshore property west of the San Francisco Airport, SFGS emerged from hibernation during March and traveled to ephemeral marshes. Snake activity increased throughout the spring, reaching a peak in May. When the marshes dried up in June, the snakes returned to the permanent water sources. In September, activity again dropped and remained low throughout the fall with almost no activity during winter (Wharton 1989).
Adult/Juvenile Dispersal	Males and juveniles are known to disperse up to one mile from ponds, but may disperse much greater distances. Other species of garter snakes are known to disperse up to 10 miles in a season (Johnston pers. comm.). On the coast, snakes hibernate during the winter, but further inland, if the weather is suitable, snakes may be active year-round. Adult snakes sometimes aestivate (enter a dormant state) in upland small mammal burrows during summer months when ponds dry (Larsen, S. 1994.).
Predator-Prey Relationships	
Prey	SFGS forage extensively in aquatic habitats. Adult SFGS feed primarily on CRLF. Extirpation of this frog in SFGS habitat may cause localized extirpation of the snake (USFWS 1985). SFGS may also feed on bullfrog tadpoles, but they are unable to feed on the larger adults. SFGS also may rely upon Pacific treefrogs (*Pseudacris regilla*) as prey in early spring. If newly metamorphosed Pacific treefrogs are not available, the young may not survive (Allaback pers. comm.). SFGS are one of the few animals able to eat the toxic newts (*Taricha torosa* and *T. granulosa*) without suffering serious side effects.
Predators	Native predators include raptors, skunks, foxes and other snakes. Adult bullfrogs prey on smaller SFGS as well as CRLF, their primary prey, and may be a contributing factor in their decline where they co-exist (USFWS 1985).
Pond Physical Characteristics	
Size	SFGS primarily inhabit ponds that support CRLF. CRLF can occur in ponds that range in size from less than 10 feet across to large stock ponds and reservoirs. Ponds must pond long enough to support metamorphosis of tadpoles. Perennial ponds may support populations of non-native bullfrogs and fish which predate upon CRLF.
Pond Basin and Bank Structure	SFGS primarily inhabit ponds that support CRLF. While CRLF can be found in a range of pond types, they are most often found in ponds with deep water areas for escape and shallow water benches around the margin used as rearing areas by tadpoles and metamorphs (recently transformed juvenile frogs). Deep water escape areas should be at least 3 feet deep. Tadpole and metamorph rearing areas should be relatively unshaded and shallow enough to warm quickly in the winter sun (10-20 inches) (USFWS 2002).

CHARACTERISTIC	DESCRIPTION
Pond Water Quality and Hydrology	
Water Quality Characteristics	Pond water quality characteristics are tied to those preferred or required by CRLF since SFGS feed primarily on this frog. CRLF prefer minimal turbidity and siltation which in excess can cause asphyxiation of eggs and young tadpoles. CRLF sensitivity to pesticides, heavy metals, air pollutants, and other contaminants is largely unknown. Studies with other amphibians have indicated that these contaminants can negatively affect populations (USFWS 2002). CRLF are sensitive to high salinity levels, which are common in coastal lagoons (Hayes, M.P. and M.R. Jennings. 1986).
Ponding Duration	SFGS prefer semi-perennial to perennial ponds. Ponds must remain inundated long enough (generally into August) to support the growth and transformation of CRLF tadpoles since CRLF are the snake's primary prey. SFGS also forage on a seasonal basis (late winter–early summer) at ponds that do not retain water long enough to support ranid prey when these foraging opportunities are available in proximity to more permanent ponds.
Pond Open Water/ Vegetation Characteristics	
Open Water	SFGS prefer relatively open water areas within low-density riparian vegetation for foraging (USFWS 1985). Shallow areas with low density emergent marsh and scattered open water areas provide SFGS with prime foraging areas for fish and tadpoles.
Vegetation	SFGS prefer ponds with densely vegetated margins as well as more open shallow water benches that provide excellent foraging sites. Preferred emergent and bankside vegetation used for cover include cattails (*Typha* spp.), bur-reed (*Sparganium* spp.), bulrushes (*Scirpus* spp.), rush (*Juncus* spp.) and spikerush (*Eleocharis macrostachya*). Floating mats are utilized for basking sites (USFWS 1985).
Watershed and Pond Network Characteristics	
Type and Distribution of Habitats	SFGS use the interface between ponds and grasslands for basking, while nearby dense scrub vegetation provides escape cover (USFWS 1985). Grassy hillsides near ponds are also used for basking. SFGS also use the uplands for foraging, day and night cover, winter torpor, mating, and dispersal.
Movement Corridors	Drainages and watercourses between ponds provide movement corridors for SFGS. Little information is available on other types of movement corridors. At the property west of San Francisco Airport, SFGS used specific movement corridors leading to the marshes and traveled as far as 1.2 km (0.75 m) between aquatic sites (Wharton 1989). However, these movements were constrained by surrounding development. Frequency and distance of movement are probably closely related to seasonal rainfall and ponding conditions and associated food availability (Larsen pers. comm.). With favorable weather and available food, SFGS can continue feeding into October.
Relationships Between Ponds	The ideal situation for SFGS populations is to have multiple ponds in close proximity with preferably less than 0.8 km (0.5 m) and no more than 1.6 km (1.0 m) between ponds. SFGS are known to move between ponds to forage. This pond arrangement is also ideal for maintaining genetically healthy populations and prevents extirpation from an area if a catastrophic event makes a single pond unsuitable for SFGS .

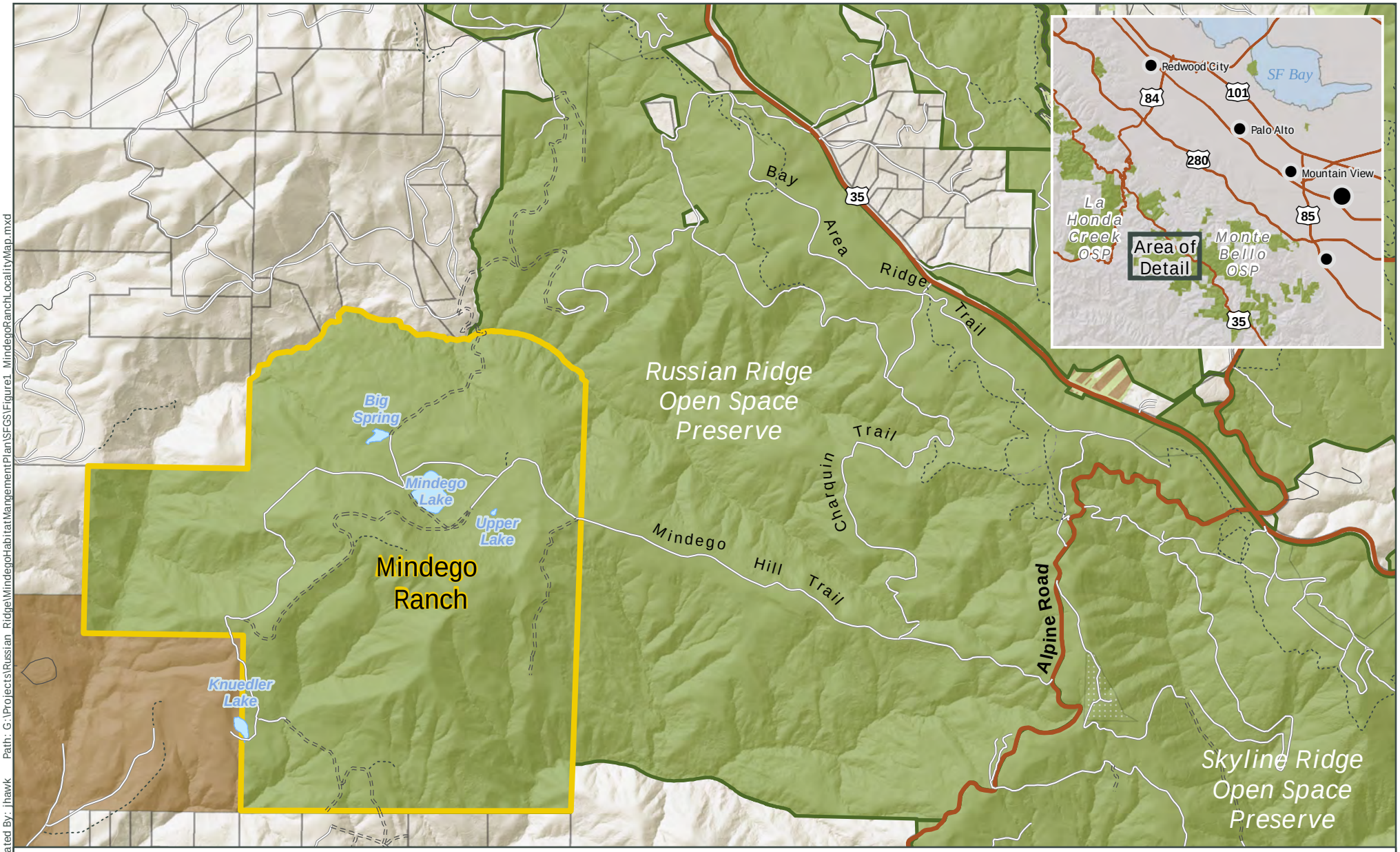

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Figure 1: Mindego Ranch Locality Map

- Mindego Ranch Property
- MROSD Preserves
- Other Public Agency
- Private Property

Midpeninsula Regional Open Space District *(MROSD)*

October, 2012

Miles 0 0.5 1

While the District strives to use the best available digital data, this data does not represent a legal survey and is merely a graphic illustration of geographic features.

Working at Mindego Ranch and La Honda Creek Open Space Preserves, 2015

General Information: The requirements and recommendations below come from the US Fish and Wildlife Service (USFWS) Recovery Permit and Biological Opinion and California Department of Fish and Wildlife (CDFW) Memorandum of Understanding (MOU) issued to the District and approved California Environmental Quality Act (CEQA) mitigations for working with San Francisco garter snake (SFGS) and California red-legged frog (CRLF) at both the Mindego Ranch (MR) portion of the Russian Ridge Open Space Preserve including the access road (Mindego Hill Trail), and the La Honda Creek Open Space Preserve (LHC); as well as a variety of scientific studies, other regulatory requirements and internal District natural resources guidance for protection of the target species.

When working in these areas, knowledge of the target species should be considered. For example SFGS are generally most active in the spring and fall and are generally inactive during winter in underground burrows or under other cover but may emerge during warm periods. Live young are born in the summer between July and August. Another example is CRLF, which deposit egg masses in water from as early as November to March, the larval (tadpole) stage occurs anywhere from December to generally August or September, after which young of the year frogs will disperse from ponds lakes and streams into the upland areas.

Knowing which phase of the animal and where it might be located during each season can help staff better plan work projects. Although these species generally occurs adjacent to standing water bodies, creeks and streams, they may also be found in the many seasonal wetlands and waterways and upland areas that exist throughout both MR and LHC.

Driving Access (for all Preserve users including staff, contractors, consultants, researchers, docents, volunteers, ranchers, etc.):

REQUIRED:

- *"Speed Limits.* Use of vehicles on Mindego Ranch should be strictly controlled by the District to reduce the potential for take of San Francisco garter snake (SFGS) and California red-legged frog (CRLF). Other than emergencies, access should be limited to necessary patrols and authorized persons that follow a 5-mph speed limit within 2,000 feet of Mindego Lake, Knuedler Lake, Upper Pond or Big Spring." See attached map for 2,000 ft buffer. *Source: CEQA mitigation for implementation of the Mindego Use and Management Plan adopted by the District Board of Directors on January 22, 2014.*

- If wildlife is observed, it should be allowed to leave the roadway on its own. Do not handle wildlife and report any observation of SFGS or CRLF using the District's electronic wildlife observation form. http://www.openspace.org/observe/ *Source: CEQA mitigation for implementation of the Mindego Use and Management Plan adopted by the District Board of Directors on January 22, 2014, and Annual Reporting requirements under the USFWS Recovery Permit and CDFW MOU issued to the District in 2014.*

- Stay on established roads, but if vehicles must travel to and from the work site off of established ranch roads, they must travel slowly (5 mph) and be preceded by a monitor to ensure that snakes or other animals will not be run over by the passing vehicle. Vehicle

monitors need not be trained biologists. *Source: USFWS Biological Opinion issued in support of the 2014 Recovery Permit issued to the District.*

- Worker Education Seminar. Prior to conducting any action that may negatively affect listed species [including driving], all staff, contractors and persons associated with the project must attended a worker-education seminar delivered by a qualified District biologist or other qualified biologist. The seminar will include written information regarding identification, natural history, legal status, onsite observations, and related information. Names and phone numbers of the biological monitors and CDFW and USFWS contacts should be included in the written information. The District should maintain a signature sheet to document compliance, which will be made available upon request. *Source: CEQA mitigation for implementation of the Mindego Use and Management Plan adopted by the District Board of Directors on January 22, 2014.*

RECOMMENDATIONS:

- Anyone accessing the site that has not attended a Worker Education Seminar should be escorted by someone who has attended and is responsible to monitor for and report any observations of the target species.

- If two or more persons are present, one trained in identification and reporting of the target species should be scanning for incidental wildlife and consider preceding the vehicle on foot, especially in areas with impaired visibility of the road bed.

- If only one person is present, reconsider if driving is necessary and/ or consider using a vehicle with better viewing capabilities, such as a mule.

- Consider the time of year, current weather conditions, and road visibility before driving. For example, it is much safer to drive mid day during a hot day in summer on a recently mowed road having good visibility than on a damp warm day in spring with tall grass obscuring the view of the road.

- If you are trained in identification of the species and must drive off road, and a biological or vehicle monitor is not available, consider using a vehicle with better viewing capabilities, such as a mule.

- Check under vehicles that have been parked for sheltering wildlife before driving away. This should be completed as part of your "golden circle" walk around parked vehicles.

  Source: –District Best Management Practices to protect SFGS

Visitor Access to Mindego Hill Trail and Council Circle and Docent let and POST tours elsewhere as permitted:

REQUIRED:

- "Access to Mindego Ranch should be controlled to minimize the potential for injuring or killing SFGS along roads or trails. A Conservation Management Unit (CMU) has been

established around each pond (Mindego Lake, Knuedler Lake, Upper Pond, and Big Spring) that extends 660 feet (200 meters) from the high water line in all directions. The CMU is closed to the general public and access shall be delineated with appropriate signage." See attached map for the 660 ft buffer zone.

- Hiking and Equestrian use are only permitted to the Council Circle via the existing ranch driveway and donor circle path and top of Mindego Hill by way of the Mindego Hill Trail within Mindego Ranch.

- Bicycles are not permitted beyond on Mindego Hill trail past the junction with the Charquin trail (well before you reach Mindego Ranch). No bike use is permitted on Mindego Ranch.

- No dogs are permitted within Russian Ridge OSP, including Mindego Ranch."

- Any docent or POST led tours requiring driving access to the site shall adhere to all driving requirements and recommendations as outlined above.

  Sources: – 2012 SFGS Habitat Management Plan, Mindego Ranch Use and Management Plan and District Best Management Practices to protect SFGS under the 1973 Endangered Species Act.

Herbicide Application:

REQUIRED:

- Any applicators requiring driving access to the site shall adhere to all driving requirements and recommendations as outlined above.

- Prior to conducting non-native plant removal (e.g., invasive thistles) or treatments (e.g., spraying with herbicide, cutting, pulling, digging out), the Permittee shall make every reasonable attempt to ensure that snakes and frogs are not hidden within the plant or the residual plant matter to be treated. *Source: USFWS Biological Opinion issued in support of the 2014 Recovery Permit issued to the District.*

- Any herbicide application at either MR or LHC shall be conducted under the requirements of the District's Integrated Pest Management (IPM) program. *Source: District IPM Program adopted by the Board on December 10, 2014.*

Other activities including grazing infrastructure improvements, demolition, routine maintenance, research, and other site work:

REQUIRED:

- Adhere to all driving requirements and recommendations as outlined above.

- *Pre-activity Surveys*- For most habitat management activities authorized in the management plans, a biological monitor will be present before and during the activity and will conduct surveys and species monitoring. Surveys and monitors will normally not be required for

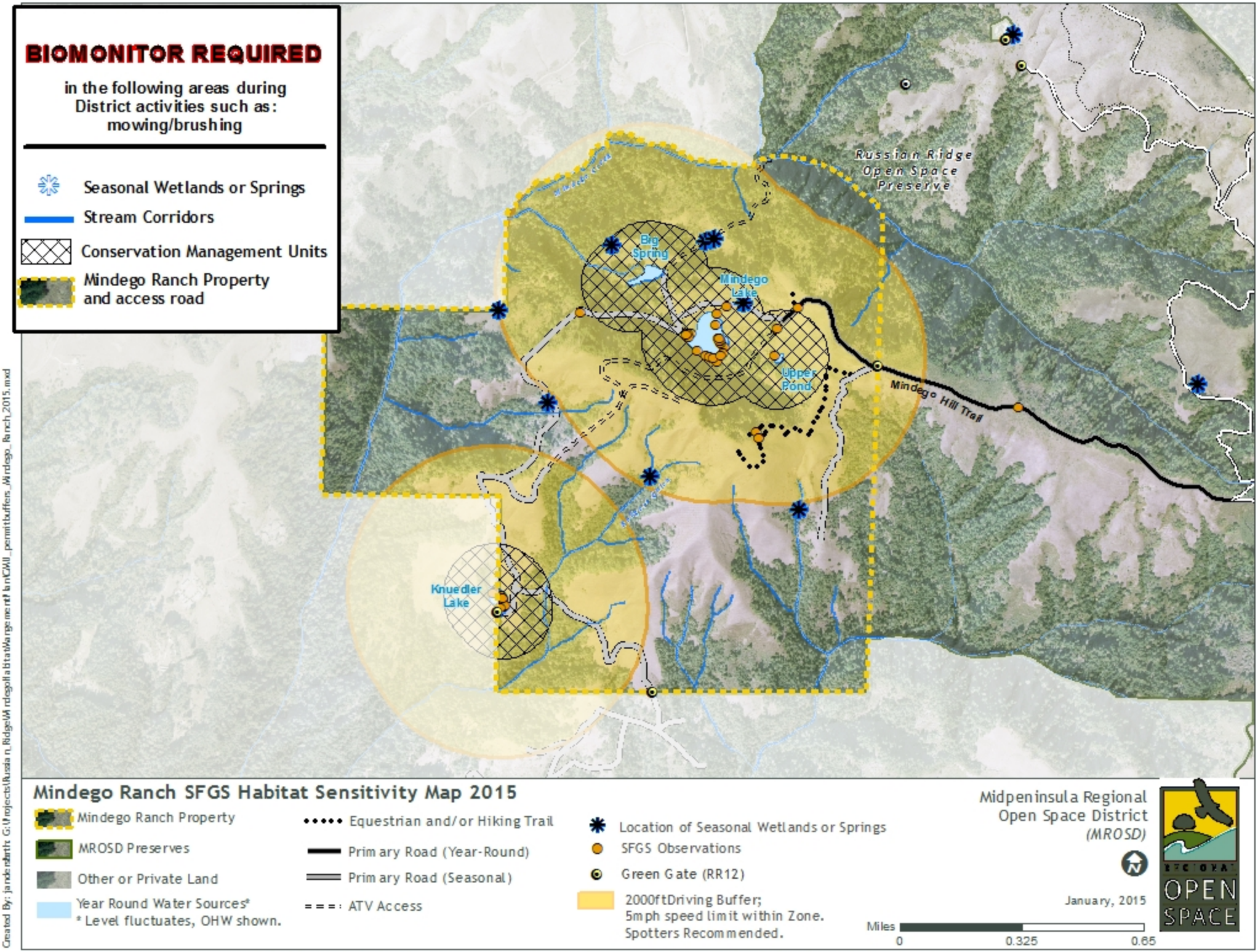
small scale maintenance activities using hand tools and fewer than five persons per one half acre.

- *Construction Monitoring*- Surveys and monitors during habitat maintenance activities will only be conducted by federal and state permitted biologists in accordance with their permits.

- *Worker Education Seminar*- Prior to the start of work, an educational program for the target species shall be attended by all workers.

- *Refueling*- Refueling of equipment will be conducted using heavy-gauge tarps made of chemically resistant polypropylene or other impervious material with vertical sides for spill containment. These containment tarps will be set up under the equipment prior to servicing or refueling. Once the work is completed, the tarp and its contents must be immediately removed from the property and all contaminants properly disposed of offsite. Standard operating procedures will be implemented immediately in case of fuel spillage.

  *Sources: CEQA mitigation for implementation of the Mindego Use and Management Plan adopted by the District Board of Directors on January 22, 2014.*and *USFWS Biological Opinion issued in support of the 2014 Recovery Permit issued to the District.*2012 SFGS



While the District strives to use the best available digital data, this data does not represent a legal survey and is merely a graphic illustration of geographic features.

Figure 13: Knuedler Lake Management Recommendations

Mindego Ranch Property
MROSD Preserves
Existing Fence
Proposed Cattle Exclusion Fence
Pond
Intermittent Stream

Midpeninsula Regional Open Space District *(MROSD)*

October, 2012

Feet 0 100 200

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Attachment 6

Safety Record

To satisfy the requirements of Section 5.3 **Safety Record** and Section 7.7 **Safety Record** all DBE's must complete this form.

The Design-Build Entity entitled _____ hereby certifies that its most recent three-year period average experience modification rate is an average of____ [1] and that its average total recordable injury or illness rate and average lost work rate for the most recent three-year period does not exceed the applicable statistical standards for its business category.

The Design-Build Entity certifies under penalty of perjury that the foregoing is true and correct.

_____
Name

_____
Title

_____
Date
Design-Build Entity Party #1

_____
Name

_____
Title

_____
Date
Design-Build Entity Party #2

_____
Name

_____
Title

_____
Date
Design-Build Entity Party #3

[1] This must be an average of 1.00 or less.

ATTACHMENT 7
DISTRICT INSURANCE REQUIREMENTS

Before beginning any of the services or work called for by any term of this Agreement, Consultant, at its own cost and expense, shall carry, maintain for the duration of the Agreement, and provide proof thereof that is acceptable to the District, the insurance specified herein.

Insurance Requirements.

- Statutory Worker's Compensation Insurance and Employer's Liability Insurance coverage: $1,000,000
- Commercial General Liability Insurance: $1,000,000 (Minimum), $2,000,000 Aggregate
- Business Automobile Liability Insurance-with coverage evidencing "any auto" and with limits of at least $1,000,000 per occurrence.
- Errors and Omissions Insurance (or Professional Liability): $1,000,000

Workers' Compensation. Statutory Workers' Compensation Insurance and Employer's Liability Insurance for any and all persons employed directly or indirectly by Consultant shall be provided if required under the California Labor Code.

Commercial General and Automobile Liability. Consultant, at Consultant's own cost and expense, shall maintain Commercial General and Business Automobile Liability insurance for the period covered by this Agreement in an amount not less than the amount set forth in this Attachment 7, combined single limit coverage for risks associated with the work contemplated by this Agreement. If a Commercial General Liability Insurance or an Automobile Liability form or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to the work to be performed under this Agreement or the general aggregate limit shall be at least twice the required occurrence limit. Such coverage shall include but shall not be limited to, protection against claims arising from bodily and personal injury, including death resulting there from, and damage to property resulting from activities contemplated under this Agreement, including the use of hired, owned and non-owned automobiles. Coverage shall be at least as broad as the latest edition of the Insurance Services Office Commercial General Liability occurrence form CG 0001 and Insurance Services Office Automobile Liability form CA 0001 (ed. 12/90) Code 1 (any auto). No endorsement shall be attached limiting the coverage.

a. A policy endorsement must be delivered to District demonstrating that District, its officers, employees, agents, and volunteers are to be covered as insured as respects each of the following: liability arising out of activities performed by or on behalf of Consultant, including the insured's general supervision of Consultant; products and completed operations of Consultant; premises owned, occupied or used by Consultant; or automobiles owned, leased, hired, or borrowed by Consultant. The coverage shall contain no special limitations on the scope of protection afforded to District, its officers, employees, agents, or volunteers.
b. The insurance shall cover on an occurrence or an accident basis, and not on a claims made basis.
c. An endorsement must state that coverage is primary insurance and that no other insurance affected by the District will be called upon to contribute to a loss under the coverage.
d. Any failure of Consultant to comply with reporting provisions of the policy shall not affect coverage provided to District and its officers, employees, agents, and volunteers.
e. Insurance is to be placed with California-admitted insurers.

Professional Liability. Where Consultant is a licensed professional, Consultant, at Consultant's own cost and expense, shall maintain for the period covered by this Agreement professional liability insurance for licensed professionals performing work pursuant to this Agreement in an amount set forth in this Attachment 7 covering the licensed professionals' errors and omissions, as follows:

a. The policy must contain a cross liability or severability of interest clause.
b. The following provisions shall apply if the professional liability coverages are written on a claims made form:
    1) The retroactive date of the policy must be shown and must be before the date of the Agreement.

    Insurance must be maintained, and evidence of insurance must be provided for at least five years after completion of the Agreement or the work.

    If coverage is canceled or not renewed and it is not replaced with another claim made policy form with a retroactive date that precedes the date of this Agreement, Consultant must provide extended reporting coverage for a minimum of five years after completion of the Agreement or the work. The District shall have the right to exercise at the Consultant's cost, any extended reporting provisions of the policy should the Consultant cancel or not renew the coverage.

    A copy of the claim reporting requirements must be submitted to the District prior to the commencement of any work under this Agreement.

Deductibles and Self-Insured Retentions. Consultant shall disclose the self-insured retentions and deductibles before beginning any of the services or work called for by any term of this Agreement. Any self-insured retention or deductible is subject to approval of District. During the period covered by this Agreement, upon express written authorization of District Legal Counsel, Consultant may increase such deductibles or self-insured retentions with respect to District, its officers, employees, agents, and volunteers. The District Legal Counsel may condition approval of an increase in deductible or self-insured retention levels upon a requirement that Consultant procure a bond guaranteeing payment of losses and related investigations, claim administration, and defense expenses that is satisfactory in all respects to each of them.

Notice of Reduction in Coverage. In the event that any coverage required under the Agreement is reduced, limited, or materially affected in any other manner, Consultant shall provide written notice to District at Consultant's earliest possible opportunity and in no case later than five days after Consultant is notified of the change in coverage.

Remedies. In addition to any other remedies District may have if Consultant fails to provide or maintain any insurance policies or policy endorsements to the extent and within the time herein required, District may, at its sole option:

Obtain such insurance and deduct and retain the amount of the premiums for such insurance from any sums due under the Agreement;

Order Consultant to stop work under this Agreement or withhold any payment which becomes due to Consultant hereunder, or both stop work and withhold any payment, until Consultant demonstrates compliance with the requirements hereof;

Terminate this Agreement.

Exercise of any of the above remedies, however, is an alternative to other remedies District may have and is not the exclusive remedy for Consultant's failure to maintain insurance or secure appropriate endorsements.

Attachment 8
Anticipated Project Schedule

April 18, 2018	RFQ issued to potential DBEs
April, 27, 2018	Deadline for submission of questions regarding RFQ [see 1.3]
May 4, 2018	Deadline for submission of SOQs
May 10, 2018	Notification of pre-qualification
May 10, 2018	RFP issued to Prequalified DBEs
May 17, 2018	Pre-proposal site tour (Backup date Mon. May 21, 2018)
May 25, 2018	Proposals due by 12:00 noon.
June 4, 2018	Telephone interviews of DBEs
Thur. June 28, 2018	Anticipated notice of award of contract.
Wed. July 5, 2018	Deadline to submit bonds, insurance certificates, and executed design-build contract
Mon. July 16, 2018	Anticipate issuance of Notice to Proceed
July 16- Aug 3, 2018	Complete geotechnical, topographic, and hydro fieldwork
Aug 31, 2018	Submit final drafts of all fieldwork survey reports
Sept 21, 2018	Submit 35% design with preliminary construction cost estimate
Oct 19, 2018	Submit 65% design, , Revegetation plan, Integrated Pest Management Plan individual work plan, and all permit applications
July 16, 2018- May 1, 2019	Permitting
Aug 1 - Oct 31, 2019	Construction
May 1 – Nov 15, 2019	Biological monitoring
Oct 19 – Nov 15, 2019	Site revegetation