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September 7th, 2016

Supervisory Mary Piepho
LAFCO Chair
651 Pine St., 6th Floor
Martinez, CA

RE: Comments on the Contra Costa Local Agency Formation Commission (LAFCO) Annexation Request for the Proposed Montreux Residential Subdivision

Dear Supervisor Piepho,

Save Mount Diablo (SMD) is a non-profit conservation organization founded in 1971 which acquires land for addition to parks on and around Mount Diablo and monitors land use planning which might affect protected lands. We build trails, restore habitat, and are involved in environmental education. In 1971 there was just one park on Mount Diablo totaling 6,778 acres; today there are almost 50 parks and preserves around Mount Diablo totaling 110,000 acres. We include more than 8,000 donors and supporters.

We are writing this letter to state our opposition to the Montreux Residential Subdivision (Project) annexation request. We believe that LAFCO should deny this application request due to the numerous reasons that we and our legal representation have cited in previous comment letters (attached here as appendices). These letters show in great detail that the Project violates California planning and zoning law as well as the Subdivision Map Act, and that the Project Environmental Impact Report (EIR) is inadequate under the California Environmental Quality Act.

However, if LAFCO does decide to approve the Project annexation, it should, at the least, withhold recordation of the annexation until after mitigation for Project impacts has been secured in the form of a binding easement that will permanently protect the 78.2 acres of open space detailed in the annexation application. The applicant currently proposes the permanent protection via deed restriction of only the 42 acre so-called "greenwall" portion of the Project site. Given that 77 acres of agricultural land used to graze cattle will be lost to development if this annexation request is approved, a larger mitigation requirement is appropriate.

There is an important inconsistency with regard to agricultural impacts between the Project EIR documents and the annexation application materials. The Project's final EIR states in the last sentence of the first paragraph on page 2.0-4 that, "As the project site is currently used for grazing, it does meet the definition of prime agricultural land under this definition." [Gov. Code section 56064]. However, there is no agricultural impact section in the EIR and the Project annexation application materials repeatedly state that there are no impacts to agricultural land.

Since both the EIR and annexation application materials recognize that the area proposed for annexation is currently grazed by cattle, and until very recently was protected under Williamson Act contract, we submit that this area qualifies as agricultural land and is worthy of mitigation from Project impacts.

The annexation application for the Project states that 351 single-family houses will be constructed on approximately 77 acres and that an additional 78.2 acres will be set aside for open space. However, no easement is proposed to protect these 78.2 acres. The only proposed protection is a recordation of a deed restriction over 42 acres of proposed open space on the southern side of the property, the proposed "greenwall." If 77 acres will be developed, the proposed protection of 42 acres on the south side of the main Project site is both weak and inadequate.

The Project proponent has proposed to protect areas as open space several times in the past, only to come back some time in the future and seek to develop these same areas. A clear example of this is the Pointe project in Antioch, since renamed Black Diamond Ranch Unit 4.

Given the proponent's record of developing areas formerly identified as protected or as "open space", the significant disparity between the acreage of the Project to be developed and the area currently proposed for protection, and the stated intention that 78.2 acres of the Project site serve as open space, it is appropriate and fully within LAFCO's power to require a binding conservation easement be placed over the entire 78.2 acres that would not be developed as part of the Project before recordation of the annexation, in order to ensure the permanent protection of this land.

We encourage LAFCO to deny this annexation request, but if LAFCO decides to approve, we strongly encourage it to withhold recordation of the annexation until after binding mitigation for Project impacts has been secured in the form of a permanent conservation easement over the 78.2 acres of the Project area that would not be developed.

Appendices:

Appendix A – SMD Comments on Montreux final EIR; August 14th 2015
Appendix B – Shute, Mihaly and Weinberger Comments on Montreux recirculated draft EIR; February 6th 2015
Appendix C – Shute, Mihaly and Weinberger Comments on Montreux draft EIR; January 10th 2014
Appendix D – SMD Comments on Montreux draft EIR; January 9th 2015
Appendix E – SMD Comments on Montreux Notice of Preparation; April 29th 2013

Sincerely,

Juan Pablo Galván
Save Mount Diablo

CC:
Meredith Hendricks, Save Mount Diablo
Seth Adams, Save Mount Diablo
Ted Clement, Save Mount Diablo
Joel Devalcourt, Greenbelt Alliance
Brian Holt, East Bay Regional Park District

Appendix A

August 14th, 2015

Kristin Pollot
Planning Manager
Community Development Department – Planning Division
65 Civic Av.
Pittsburg, CA 94565

RE: Comments on the Final Environmental Impact Report (fEIR) for the Proposed Montreux Residential Subdivision – SCH # 2013032079

Dear Ms. Pollot,

Save Mount Diablo (SMD) is a non-profit conservation organization founded in 1971 which acquires land for addition to parks on and around Mount Diablo and monitors land use planning which might affect protected lands. We build trails, restore habitat, and are involved in environmental education. In 1971 there was just one park on Mount Diablo totaling 6,778 acres; today there are almost 50 parks and preserves around Mount Diablo totaling 110,000 acres. We include more than 8,000 donors and supporters.

We appreciate the opportunity to submit comments on the fEIR for the Montreux Residential Subdivision (Project), proposed by Altec Homes Inc. and Seecon Financial Inc. (Applicants). The Project would entail, among other things, construction of 356 single-family houses, annexation of approximately 165 acres into the City of Pittsburg (City) and massive grading of a valley floor and the grading of two ridges.

Our review of the fEIR confirms that many of the inadequacies of the previous two EIR documents (the draft EIR (dEIR) and recirculated draft EIR (rdEIR) remain unresolved.

For example, visual simulations of the Project from Black Diamond Mines Regional Preserve that were requested in previous comment letters submitted by SMD and Shute, Mihaly and Weinberger on behalf of SMD were not included. Therefore, the aesthetic impacts of the Project that will be apparent from a highly popular recreation area remain unanalyzed.

In addition, throughout the fEIR's discussion of the supposed adherence of the Project to the goals and policies of the City's General Plan, the explanations provided resort to literal word-by-word interpretations of key policy elements in order to dismiss commenter's concerns over the Project's agreement with the General Plan.

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One clear example is the fEIR's assertion that the "encouragement" of certain project design elements in the General Plan, such as those related to clustering, shared driveways, and placement of houses in locations that would minimize the need for grading, does not conflict with the Project designs because the General Plan does not "require" such design elements.

If the General Plan only encourages Projects to follow certain guidelines, without stating such guidelines are formal requirements, then there is no conflict even if the Project runs entirely counter to what the General Plan encourages. Such reasoning is the definition of using the literal interpretation of the words in the City's "constitution for development" in order to escape its intent.

Another example which is repeatedly encouraged in the General Plan is the concept of "clustering". The fEIR correctly points out that no definition of clustering exists in the General Plan. Which is exactly why the comment letters submitted include visual graphics from the General Plan and Project site plan to allow a direct comparison of the type of development the Project proposes and what the General Plan aims for in development in the City's southern hills.

The fEIR maintains that mass grading of the valley in the Project site and placement of the housing units throughout the valley is clustering because the ridges to the north and south of the Project remain open space. This is like saying that the suburban development that characterizes the whole of east and central Contra Costa County is clustered because it is concentrated in valleys and leaves steep highlands intact. Such obfuscation of scale renders the intent of the policies of the General Plan meaningless.

With regard to biological impacts, mitigation, and the inadequacy of the analyses carried out for the Project thus far, we refer to the comments on the rdEIR that have previously been submitted.

The Project remains inconsistent with the City's General Plan and would lead to numerous significant and unmitigated environmental impacts. Despite the explanations provided in the fEIR, the City's environmental review remains deficient and inadequate under CEQA. As a result, we strongly encourage the City to deny certification of the Project fEIR.

Thank you for the opportunity to provide comments.

Sincerely,
Juan Pablo Galván
Land Use Planner

Cc: Meredith Hendricks, Save Mount Diablo
Seth Adams, Save Mount Diablo
Ron Brown, Save Mount Diablo
Joel Devalcourt, Greenbelt Alliance

Appendix B

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February 6, 2015

Via E-Mail and U.S. Mail

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Re: Montreux Residential Subdivision and Recirculated Draft Environmental Impact Report

Dear Ms. Pollot:

On behalf of Save Mount Diablo ("SMD"), we have reviewed the City of Pittsburg's December 2014 Recirculated Draft Environmental Impact Report ("RDEIR") for the proposed Montreux Residential Subdivision Project ("Project"). Our firm submitted extensive comments on the 2013 DEIR for the Project. The City subsequently revised the DEIR with respect to the Project's impacts on biological resources only. We submit this letter to reiterate our earlier, unaddressed comments and to provide additional, new comments on the revised portions of the RDEIR. The RDEIR continues to violate the California Environmental Quality Act ("CEQA") and the CEQA Guidelines for the reasons stated below.

BACKGROUND

After receiving new information on biological resources in response to its November 2013 DEIR, the City decided to revise and recirculate the document pursuant to the CEQA Guidelines. *See* CEQA Guidelines § 15088.5. The City made the RDEIR available for public comment in December 2014, and explicitly limited the scope of the RDEIR to "only those sections of the previously circulated Draft EIR that have been affected by the additional information related to biological resources." RDEIR at 1.0-2. The City also asked that reviewers submit new comments "related to the revised

information on biological resources . . . only." *Id.* Comments on the DEIR that were not addressed in the RDEIR would be responded to in the Final EIR, according to the City. *Id.*

It is unclear to us why the City took the time and energy to develop an RDEIR but failed to address most of the DEIR's inadequacies. As described in our previous comment letter (attached here), the DEIR lacked basic information regarding the Project description, elements of the development agreement, impacts to aesthetic, historic, and hydrologic resources, and the Project's public services, public safety, and growth inducing effects.

Even the revised portions of the EIR remain deficient. The Project's anticipated impacts to biological resources are a manifest violation of the City's General Plan, and the RDEIR takes a blinkered approach to its analysis of those resources. It plays down the Project area's recognized sensitivity and understates its importance as habitat for endangered, threatened, and sensitive species. The RDEIR fails to analyze the cumulative impacts of nearby and anticipated future development projects on these resources.

These flaws render the RDEIR inadequate. CEQA requires that an EIR provide the analysis and detail about environmental impacts that is necessary to enable decision-makers to make intelligent decisions in light of the environmental consequences of their actions. *See* CEQA Guidelines § 15151; *King County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692. The EIR is also the "primary means" of ensuring that public agencies "take all action necessary to protect, rehabilitate, and enhance" the environment. *Laurel Heights Improvement Ass'n v. Regents of the University of California* (1988) 47 Cal.3d 376, 392. Thus, CEQA incorporates a substantive requirement that the lead agency adopt feasible mitigation measures or alternatives that can substantially lessen the project's significant environmental impacts. Pub. Resources Code § 21002; CEQA Guidelines § 15002(a)(3). Finally, the EIR is a "document of accountability," intended to demonstrate to the public that the agency has considered the environmental implications of its action. *Laurel Heights*, 47 Cal.3d at 392. The RDEIR does not comply with CEQA's objectives because it fails to (1) provide sufficient information for informed decision-making; (2) provide substantive mitigation requirements; and (3) demonstrate that the City has fully grappled with the environmental implications of the Project. To comply with these requirements, the City must revise the RDEIR to address the issues raised below and in our prior comments.

I. The Recirculated DEIR Fails to Adequately Identify and Mitigate the Project's Inconsistencies with the Applicable General Plan.

As we noted in our previous letter, the City's General Plan calls for development that is compatible with the environment and sensitive habitats, "particularly habitats that support special status species." Resources Conservation Element Goals 9-G-1 and 9-G-2 and Policies 4-P-14, 4-P-15, 9-P-13. The City acknowledges the existence of some of these goals and policies in the RDEIR (*see* RDEIR at 5.3-45 and 46), but nonetheless presents a Project that would result in significant and unmitigated adverse impacts to sensitive habitats and species on and adjacent to the Project site. *See* section II below. Perhaps sensing that the Project's impacts are incompatible with the General Plan, the RDEIR begins by noting that the southern portion of the Project area will "provide a greenwall (defined as open space with no water or sewer services passing through) as required by General Plan Policy 2-P-73." RDEIR at 5.3-1. Policy 2-P-73 requires "[p]ermanent greenbelt buffers." General Plan Land Use Element, Woodlands, 2-P-73. No mention is made of whether the proposed "greenwall" is protected by a conservation easement or any other mechanism that could provide the "permanent" protection required by the General Plan. As a result, the land remains vulnerable to future development.

Not only do these unmitigated inconsistencies render the RDEIR inadequate, they also make the Project unapprovable. Under the Subdivision Map Act and the City's own code, the City cannot approve a tentative map unless it is consistent with the City's General Plan. *See* Gov't Code §§ 66473.5 & 66474 (prohibiting approval of tentative maps that are inconsistent with general plan policies); *see also Friends of "B" Street v. City of Hayward* (1980) 106 Cal.App.3d 988, 998 (Subdivision Map Act expressly requires consistency with general plan); City of Pittsburg Municipal Code § 17.20.060 (to approve a tentative map, the following findings must be made, among others: 1) the proposed map is consistent with the general plan and any applicable specific plan, or other applicable provisions of [the municipal] code; 2) the site is physically suitable for the proposed density of development; and 3) the design of the subdivision or the proposed improvements will not cause substantial environmental damage or substantially and avoidably injure fish or wildlife or their habitat). Because the City cannot make these required findings, it cannot approve the requested rezoning and tentative map.

II. The Recirculated DEIR Fails to Analyze and Mitigate the Project's Significant Impacts to Biological Resources.

The RDEIR's purported analysis of biological impacts achieves a result exactly opposite from what CEQA requires. Under CEQA, decision-makers and the public are to be given sufficient information about impacts and mitigation to come to their own judgments and decisions. *See* Pub. Res. Code § 21061 ("The purpose of an environmental impact report is to provide public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project."). Where, as here, the environmental review document fails to fully and accurately inform decision-makers, and the public, of the environmental consequences of proposed actions, it does not satisfy the basic goals of CEQA.

It appears this RDEIR's strategy is to withhold information and to encourage the public and decision makers to trust that the applicant will ultimately mitigate the Project's impacts. The Project's critical discussion of biological impacts must explain exactly what will happen on the Project site and the surrounding ecosystem if the Project goes forward. *See Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 568 ("[T]he EIR must contain facts and analysis, not the agency's bare conclusions . . . ."). The RDEIR must offer some specific information about the consequences of this Project. It cannot, as the RDEIR does over and over again, merely acknowledge that the Project will have consequences and then assert that those consequences will be mitigated without providing evidentiary support. Thus, this document, like its predecessor, remains inadequate under CEQA.

A. The Recirculated DEIR Continues to Employ a Faulty Methodology.

Despite the opportunity to correct previously identified deficiencies in the DEIR's methodology, the RDEIR continues to rely upon a flawed methodology and incorrect assumptions about the project setting. The RDEIR describes surveys that involved visiting "representative habitat locations" and "generally" mapping plant communities, suggesting that the City failed to perform thorough surveys for special status species despite the known presence of those species in the project area. RDEIR at 5.3-2. Moreover, much of the limited surveying took place between October and January during "the driest winter on record," conditions that would make it difficult to accurately identify plant species. RDEIR at 5.3-1 and 5.3-3. The likelihood of missing special status plants is particularly worrisome given the RDEIR's conclusion that a variety of

special status plants could occur in the project site but are unlikely to occur because they were not "observed during the surveys." RDEIR at 5.3-15. As the RDEIR notes, certain species may have been missed given that the "surveys were not conducted during the peak blooming period . . . ." RDEIR at 5.3-24.

Other conclusions appear flawed due to the timing of the surveys. For example, during the discussion of California Tiger Salamander habitat, the RDEIR concludes that the seasonal wetlands on the site do not pond for an adequate duration or depth to support the species. RDEIR at 5.3-36. The RDEIR never explains whether this conclusion remains true during a normal rainy season or if the conclusion is based on the present drought.

As a result, the survey information still fails to provide an accurate description of the environmental setting and thereby underestimates the Project's biological impacts. The EIR cannot be approved without properly timed surveys that accurately determine the presence of special status species rather than reliance on "general" mapping.

B. The Recirculated DEIR Continues to Present an Inaccurate Description of the Project's Biological Setting.

Our previous letter noted that an EIR "must include a description of the environment in the vicinity of the project, as it exists before the commencement of the project, from both a local and a regional perspective." Guidelines § 15125; *see also Environmental Planning and Info. Council v. County of El Dorado* (1982) 131 Cal.App.3d 350, 354. Special emphasis should be placed on rare or unique resources that will be affected by the Project. Guidelines § 15125(c). Curiously, the City undertook the additional time and effort to prepare an RDEIR, yet that document continues to present an inaccurate description of the environmental resources in the Project area. This failure makes it impossible for the public and decision-makers to accurately assess the Project's environmental effects.

The RDEIR characterizes the Project site as containing a "limited variety of wildlife species," (RDEIR at 5.3-11), but the data presented in the document undercut that characterization. For example, the RDEIR contains a long list of potentially occurring special status animal species. RDEIR at 5.3-25, 26. Aerial photographs in the RDEIR depict a project site within an regional open space area home to a panoply of special status species. RDEIR Figure 5.3-5. Yet as explained above, the RDEIR

employs a faulty methodology to measure the richness of this biodiversity, and the document never presents an accurate picture of the resources on the project site.

The RDEIR incorrectly characterizes the dispersal patterns of the California Red-legged Frog ("CRF"). The document refers to a study by Zeiner et al. for the proposition that the CRF might travel "up to 300 feet away" from breeding ponds during rainy nights. RDEIR at 5.3-34. The Zeiner study, however, reached no such conclusion about the maximum dispersal range of the CRF. According to a biologist familiar with the study, it concluded simply that CRF might travel 300 feet from breeding ponds on a nightly basis in order to forage. Other studies confirm that the maximum dispersal distance of the CRF is much higher. Gary M. Fellers and Patrick M Kleeman, *California Red-legged Frog (*Rana draytonii*) Movement and Habitat Use: Implications for Conservation*, 41 Journal of Herpetology 276, 283-84 (2007) (observing "a wide range of migration distances (30-1400 m[eters])" and concluding that average dispersal distances have limited value to land management decisions and that "[a] herpetologist familiar with [the species'] ecology needs to assess the local habitat requirements"). With a seasonal pond 100 feet from the project site and known breeding habitat 550 feet from the site, it is likely that there is non-temporary, terrestrial estivation habitat in the project area. At a minimum, a herpetologist familiar with the CRF should have examined this possibility.

The document reaches similarly unfounded conclusions regarding the movements of California Tiger Salamander ("CTS"). The RDEIR cites a U.S. Fish and Wildlife study finding CTS dispersal is generally less than 1.24 miles when suitable estivation habitat occurs in proximity to a pond, but it ignores newer research suggesting that larger numbers of CTS travel farther from breeding ponds than previously believed. *See, e.g.*, Susan G. Orloff, *Movement Patterns and Migration Distances in an Upland Population of California Tiger Salamander (*Ambystoma californiense*)*, 6 Herpetological Conservation Biology 266, 273 (2011) (noting that large numbers of CTS were captured at least 800 meters from a breeding pond in one study). In light of these studies, concluding that it is unlikely that a "large number of CTS" would disperse onto the project site when there are two confirmed breeding ponds within one mile of the site and a possible breeding pond within 100 feet of the site is pure conjecture. The RDEIR underlines its own deficiencies in this regard by imposing a mitigation measure that the project proponent should conduct additional biological surveys. RDEIR, MM BIO-1b. These surveys need to be included in the RDEIR's description of the existing setting, not postponed until after CEQA review.

C. The Recirculated DEIR Fails to Analyze the Extent and Severity of Impacts and to Mitigate Those Impacts to Less Than Significant Levels.

Despite acknowledging the Project's potentially adverse impacts to special status species, the RDEIR fails to disclose the extent of those adverse impacts. Compounding this deficiency, the RDEIR then relies on the payment of mitigation fees in many instances where more direct and effective mitigation could be employed. *See California Native Plant Society v. County of El Dorado* (2009) 170 Cal.App.4th 1026, 1055 (holding payment of fees into county habitat preserve program insufficient mitigation, and noting that "payment of the fee does not obviate the need for project-specific analysis of impacts"). While it is true that CEQA permits payment of fees as mitigation for *cumulative* impacts, *see Save Our Peninsula Committee v. Monterey County Bd. Of Supervisors* (2001) 87 Cal.App.4th 99, 140-41, that does not permit the RDEIR to rely on fees to mitigate direct impacts where more direct avoidance or mitigation is available. Ultimately the RDEIR depends on fees and other mitigation measures without providing evidence that those measures will actually mitigate impacts to less than significant levels. The RDEIR must quantify the Project's effects on biological resources rather than relying on programmatic analysis in the regional habitat conservation plan ("HCP") and must disclose the efficacy of the proposed mitigation so that the public and decision-makers may reach their own conclusions. *Id.* at 130.

For example, the RDEIR reveals that "most of the plants listed in Table 5.3-2 [i.e. special status species] as occurring within clay soils have potential to occur on Diablo clay soils." RDEIR at 5.3-7. This is the type of soil existing on the site on steep slopes that will be impacted by the Project. *Id.* The RDEIR does not discuss how the predominance of this soil type relates to the Project design and the foreseeable impacts associated with the Project. Given that the Project includes extensive grading and filling on these steep slopes, the RDEIR's oversight is particularly problematic.

Where the RDEIR identifies potentially significant impacts, the proposed mitigation measures do nothing to avoid or minimize those impacts. The proposed mitigation measure for impacts to wetlands, MM BIO-1a, relies on HCP fees alone. RDEIR at 5.3-50. The RDEIR never presents any evidence that this type of mitigation will reduce impacts to less than significant levels, and indeed admits that with respect to certain protected species the "HCP/NCCP does not include or recommend any avoidance or minimization measures . . . ." RDEIR at 5.3-54. Instead the fees compensate for expected loss to species and habitat by funding a "regional strategy." *Id.* This sort of mitigation does not address the site-specific impacts that must be analyzed and mitigated

pursuant to CEQA. The HCP itself expresses an expectation that future project-level analysis of biological resources will occur. East Contra Costa County HCP/NCCP at 6-6 (Oct. 2006) ("Some avoidance and minimization is still required at the project level . . . ."). Avoidance and minimization is a standard way to mitigate project-level impacts and is understood as best practice. The RDEIR itself incorporates avoidance and minimization in some of its mitigation measures. *See, e.g.*, RDEIR, MM BIO-2b and MM BIO-2c (applying avoidance and minimization measures for kit fox and fairy shrimp). This inconsistent approach to mitigation undermines the RDEIR's purpose as an informational document, making it difficult for the public to determine the efficacy of the mitigation measures that rely on fees alone. *Save Our Peninsula Committee*, 87 Cal.App.4th at 130.

Even assuming that HCP fees were adequate mitigation for project-specific impacts here, the Project proposes density in this area that exceeds the amount of density contemplated by the HCP. *Compare* RDEIR at 1.0-1 (assuming an average lot size of 7,668 square feet) *with* HCP/NCCP Signed Implementing Agreement, Exhibit B n.4 (basing development fees on an assumption of 4 units per acre, or lot sizes of roughly 10,890 square feet). Therefore, the Project appears to be inconsistent with the HCP, and fees established by the HCP might not provide adequate mitigation for the Project. CEQA requires site-specific analysis of impacts for precisely this type of situation.

Other mitigation measures are based on incomplete analyses of the Project site. As noted in our previous comment letter, the EIR neither includes nor references any hydrologic or hydraulic engineering reports regarding the Project's expected hydraulic and flood risks. *See* Letter from SWM to Kristin Pollot at 8 (January 10, 2014) (citing the Baseline Report at 1 and 2). Yet the RDEIR contains mitigation measures that are tied directly to potentially significant "hydrological interruption." RDEIR at 5.3-65. Without a proper hydrological analysis, whether the proposed mitigation (MM BIO-1a) will be effective is nothing more than a guess.

Finally, many of the mitigation measures in the RDEIR are unenforceable. For example, measures MM BIO-7a through 7d rely on deed disclosures and recommendations to future homeowners. Even if these measures were enforceable, the RDEIR provides no evidence to support its conclusion that they will reduce indirect impacts to nearby sensitive species to less than significant levels. RDEIR at 5.3-71 and 72.

D. The Recirculated DEIR Fails to Adequately Analyze Cumulative Impacts and Mitigate Them to Less Than Significant Levels.

According to the RDEIR, this Project "would extend suburban development into an area which is currently undeveloped and provides largely unrestricted access to wildlife, and could thus create a barrier to wildlife movement." RDEIR at 5.3-66. Incoherently, the RDEIR simultaneously concludes that the Project would contribute to the preservation of high quality habitat. *See* RDEIR at 5.3-72. It is absurd to suggest that by developing presently undeveloped land, the Project will actually enhance habitat. The Project does the opposite. While the payment of in-lieu fees may protect other areas, the Project area will be permanently disturbed. Moreover, development in this area will set a precedent for further urban and suburban sprawl into open space. Without providing an assessment of how this development will affect biological resources when considered alongside other proposed and approved developments in the region, the RDEIR continues to provide an impoverished and unhelpful analysis of the Project's cumulative impacts.

CONCLUSION

As currently designed, the Montreux Residential Subdivision Project remains inconsistent with the City's General Plan and would lead to numerous significant and unmitigated environmental impacts. The City's environmental review—even as presented in the RDEIR—remains deficient and inadequate under CEQA. Therefore Save Mount Diablo urges the City to delay further consideration of the Montreux Residential Subdivision until the City prepares and recirculates a revised draft EIR that fully complies with CEQA and the CEQA Guidelines.

Very truly yours,

SHUTE, MIHALY & WEINBERGER LLP

Winter King

Benjamin J. Brysacz

Attachments:
January 10, 2014 Letter re Montreux Residential Subdivision and DEIR

Bruce Abelli-Amen, Comments on Draft Environmental Impact Report and Initial Study, Baseline Environmental Consulting, Jan. 8, 2014

Gary M. Fellers and Patrick M Kleeman, *California Red-legged Frog (*Rana draytonii*) Movement and Habitat Use: Implications for Conservation*, 41 Journal of Herpetology 276 (2007)

Susan G. Orloff, *Movement Patterns and Migration Distances in an Upland Population of California Tiger Salamander (*Ambystoma californiense*)*, 6 Herpetological Conservation Biology 266 (2011)

655059.2

Attachment 1

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January 10, 2014

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Re: Montreux Residential Subdivision and Draft Environmental Impact Report

Dear Ms. Pollot:

This firm represents Save Mount Diablo ("SMD") with regard to the Montreux Residential Subdivision Project ("Project"). SMD is a non-profit organization dedicated to preserving Mount Diablo's peaks, surrounding foothills and watersheds through land acquisition and preservation strategies designed to protect the mountain's natural beauty, biological diversity and historic and agricultural heritage. To advance this goal, SMD regularly participates in land use planning processes for projects that could impact Mount Diablo and its surrounding foothills, such as the Montreux Project. We submit these comments on the Project and associated draft Environmental Impact Report ("DEIR") on SMD's behalf.

As described below, SMD has serious concerns about the impacts of the Project, which proposes to transform 77 acres of largely untouched open space lands in the Woodlands subarea, immediately adjacent to the open spaces of the South Hills subarea, into a residential subdivision with 356 estate homes, onsite access roadways, drainage basins, and a water storage tank. DEIR at 3.0-8 and 9. The urban-scale Project is currently outside the City limits, outside the service areas for the Delta Diablo Sanitation District and the Contra Costa Water District Service Area boundary, and therefore lacks a certain water supply. The Project is patently inconsistent with the City's general plan and requires rezoning to permit development at the proposed density. In short, the Project has all the hallmarks and adverse environmental impacts of leapfrog development. It is

therefore perhaps unsurprising that it directly conflicts with numerous general plan policies that discourage such development.

In addition, the DEIR for the Project fails to provide the public and decision makers with crucial information about the Project, its impacts, and feasible mitigation measures, in direct violation of the California Environmental Policy Act ("CEQA").[1] For example, the Project description lacks sufficient detail for the public to determine what the impacts of the Project will be. Although the City is apparently contemplating a development agreement as part of the Project, the agreement itself is not included as an attachment to the DEIR or otherwise made available to the public, and the description of the agreement's terms is cursory at best. Similarly, consultant reports on various impact areas are referred to in the DEIR but not provided for public review. At the very least, the DEIR must be revised and recirculated to include these documents and information.

The DEIR's analysis of specific environmental impacts is similarly lacking. As discussed in this letter and the attached report from consulting hydrologist Bruce Abelli-Amen of Baseline Environmental Consulting ("Baseline Report"), developing the Project on the area's the steep terrain will require extensive cut and fill, which, in turn, will drastically affect the hydrology of the area and could even damage downstream properties. Baseline Report attached as Exhibit 1. Yet the DEIR contains *no discussion whatsoever* of these potential impacts, relying solely on the Initial Study's cursory discussion of the issue. Similar flaws are found in other impact analysis, including aesthetics, biological resources, public services, and public safety. More is required of an adequate EIR.

In sum, after reviewing the DEIR and other Project documents, it is our opinion that the Project conflicts with the City of Pittsburg's General Plan and Municipal Code in violation of State Planning and Zoning Law, Gov't Code § 65000 et seq. For this and other reasons, the City cannot make the findings necessary to approve the Project's requested rezoning and tentative map. *See* Gov't Code §§ 66473.5 & 66474. In addition, the DEIR for the Project violates the minimum standards of adequacy under CEQA. As a result, the City cannot approve the Project as currently proposed and must, at a minimum, recirculate a revised DEIR that addresses the inadequacies identified in this letter.

[1] Public Resources Code § 21000 et seq. (hereinafter "CEQA"); Cal. Code of Regulations, tit. 14, § 15000 et seq. (hereinafter "Guidelines").

I. Approval of the Project Would Violate California Planning and Zoning Law and the Subdivision Map Act.

The State Planning and Zoning Law (Gov't Code § 65000 et seq.) requires that development decisions be consistent with the jurisdiction's general plan. *See* Gov't Code §§ 65860 (requiring consistency of zoning to general plan), 66473.5 & 66474 (requiring consistency of subdivision maps to general plan), and 65359 and 65454 (requiring consistency of specific plan and other development plan and amendments thereto to general plan). Thus, "[u]nder state law, the propriety of virtually any local decision affecting land use and development depends upon consistency with the applicable general plan and its elements." *Resource Defense Fund v. County of Santa Cruz* (1982) 133 Cal.App.3d 800, 806. Accordingly, "[t]he consistency doctrine [is] the linchpin of California's land use and development laws; it is the principle which infuses the concept of planned growth with the force of law." *Families Unafraid to Uphold Rural El Dorado County v. Board of Supervisors* (1998) 62 Cal.App.4th 1332, 1336.

It is an abuse of discretion to approve a project that "frustrate[s] the General Plan's goals and policies." *Napa Citizens for Honest Gov't v. Napa County* (2001) 91 Cal.App.4th 342, 379. The project need not present an "outright conflict" with a general plan provision to be considered inconsistent; the determining question is instead whether the project "is compatible with and will not frustrate the General Plan's goals and policies." *Napa Citizens*, 91 Cal.App.4th at 379.

Here, the proposed Project does more than just frustrate the General Plan's goals. It is directly inconsistent with numerous provisions in the General Plan. Consequently, the Project cannot be approved in its current form.

A. The Project Is Inconsistent with Numerous General Plan and Municipal Code Provisions.

The City's General Plan and Municipal Code contains several provisions intended to ensure that development occur in an environmentally sensitive manner. As discussed below, the Project is inconsistent with many important Plan and Code provisions.

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1. General Plan and Code Provisions Relating to the Preservation of Hillsides

The Project site is designated and pre-zoned for Hillside Plan Development. DEIR at 3.0-8. The General Plan requires that development in the hills be sensitive to the natural terrain, minimize cut-and-fill, and incorporate natural features (*e.g.*, topography and creeks) into the design of residential neighborhoods. General Plan Land Use Element Policies 2-P-21, 2-P-23, 2-P-24, 2-P-25, 4-P-9. General Plan Land Use Element Policy 2-P-21. The General Plan also indicates that the City must "ensure that all General Plan policies apply to hillside land irrespective of zoning –whether Planned Development or any other base district." General Plan Land Use Element Policy 2-P-22.

General Plan provisions specific to the Woodlands sub-area where the Project is located are even more protective. For example, the General Plan specifies a goal to support new residential development in locations that do not significantly impact the natural setting." General Plan Goal: Woodlands 2-G-27 and 2-G-28. As discussed below and throughout this letter, the Project proposes mass grading that fills a natural drainage and denudes the site of natural vegetation. Other Woodlands-area specific provisions require that the "natural topography be retained to the *maximum extent feasible*, and large-scale grading discouraged" and that development be minimally visible from Kirker Pass Road. General Plan Policy: Woodlands 2-P-73.

The Municipal Code accordingly establishes regulations for development in hillside areas that establish several goals to protect hillsides. For example, the Code establishes the goal "to protect natural topographic features, aesthetic view, vistas, and prominent ridges." It also calls for the City to "protect adjacent properties from potential adverse impacts of grading and drainage associated with hillside development," and "encourage the use of development techniques and alternatives that will be compatible to the terrain of the hillside areas." Municipal Code § 18.56.02.

The Municipal Code contains provisions requiring topographic maps indicating the steepness of the site's slopes. Municipal Code § 18.56.070.K. The Code also requires landscape plans indicating the location of existing and proposed trees and other plant materials, and before and after grading details. *Id.* But neither the DEIR nor technical appendix actually include these details.

Despite the lack of information in the DEIR, it is clear that the Project would be inconsistent with these provisions. The DEIR concludes that the Project is consistent with the General Plan because the Project proposes to preserve the southernmost portion of the site. DEIR at 4.0-2. However, the development plan

proposed for the remainder of the site would be anything but sensitive to the natural terrain. Rather than follow the natural topography and minimize grading, the Project site's steep slopes would be cut away to create unnaturally "flat" areas for building pads where steep slopes and drainage areas, including wetlands, previously existed. The Project requires a staggering 1.4 million cubic yards of excavation and fill material. DEIR at 3.0-12. Grading involving an estimated this level of excavation would result in the removal of trees and other natural vegetation throughout the development area and would also change much of the site's natural landform. Moreover, as made clear in the DEIR, the development would be very visible from Kirker Pass Road and would stand in stark contrast to the surrounding hillsides. DEIR at Figures 5.1-5 and 5.1-6.

2. General Plan Provisions Relating to the Protection of Natural Resources.

The General Plan encourages development that is compatible with the environment and sensitive habitats, "particularly habitats that support special status species" and calls for development that preserves significant ecological resources. Resources Conservation Element Goals 9-G-1 and 9-G-2 and Policies 4-P-14, 4-P-15, 9-P-13. The DEIR again concludes that the Project is consistent with the General Plan because the Project proposes to preserve the southernmost portion of the site and because the site's resources were "considered and documented." DEIR at 4.0-6. However, as discussed below, the DEIR's documentation of natural resources is seriously flawed. See section II.B.3 below. The Project is inconsistent with these provisions because, as discussed below, it will result in significant adverse impacts to sensitive habitats and species on and adjacent to the Project site. The DEIR has failed to provide a complete analysis of these impacts. *Id*. As a result, the Project will result in significant impacts related to direct and indirect impacts to special status species in contravention of the General Plan. *Id*.

3. General Plan Provisions Relating to the Protection of Drainages

The General Plan includes provisions that protect drainages and prevent erosion. Resources Conservation Element Policies 9-G-4 and 9-G-5. The General Plan also includes provisions to require evaluation and implementation of Best Management Practices to protect against creek bank destabilization and require assessments of downstream drainage impacts. Policies 9-P-15, 9-P-17, and 9-P-21. The DEIR fails to mention these General Plan provisions let alone analyze consistency with them. As discussed further below, and in the attached Baseline Report, the DEIR fails to evaluate these impacts. As a result, the Project is inconsistent with these General Plan provisions.

4. General Plan Provisions Relating to the Provision of Public Services.

The DEIR discloses that the Project would add school children to area schools that are already over capacity. DEIR at 5.6-8. The Project is inconsistent with General Plan provisions that specify the City is to "ensure that school facilities maintain adequate capacity to provide for current and projected enrollment." General Plan Policy 8-G-10. The Project is inconsistent with the General Plan in that it would approximately 277 new students to a school system already over-capacity.

The General Plan specifies that the City is to provide 1.8 *sworn officers* per each 1,000 residents. The DEIR discloses that the Project would add to the City's population so that additional police officers would be needed to serve the community. DEIR at 5.6-8. As the DEIR makes clear, there is "no guarantee that the General Fund revenues provided by the new development would fully fund the new positions." DEIR at 5.6-8. Thus, the Project conflicts with the General Plan requirements for police protection.

For all of these reasons, the Project is inconsistent with the General Plan and the Municipal Code. Because of the Project's inconsistencies with these planning documents, approval of this Project would violate State Planning and Zoning Law and the County's Development Code.

B. Approval of this Project Would Violate the Subdivision Map Act.

The proposed Project requires approval of a tentative subdivision map. *See* DEIR at 3.0-13. As a result, the City must comply with the Subdivision Map Act. This statute requires that a tentative map approval be consistent with the local general plan. *See* Gov't Code §§ 66473.5; 66474; *see also Friends of "B" Street v. City of Hayward* (1980) 106 Cal.App.3d 988, 998 (Subdivision Map Act expressly requires consistency with general plan). Approval of a project that is inconsistent with the general plan violates the Subdivision Map Act and may be enjoined on that basis. *See Friends of "B" Street*, 106 Cal.App.3d at 998 ("City approval of a proposed subdivision … may be enjoined for lack of consistency of the subdivision map with the general plan."); *see also* City of Pittsburg Municipal Code § 17.20.060 (to approve a tentative map, the following findings must be made, among others: 1) the proposed map is consistent with the general plan and any applicable specific plan, or other applicable provisions of [the municipal] code; 2) the site is physically suitable for the proposed density of development; and 3) the design of the subdivision or the proposed improvements will not cause substantial

environmental damage or substantially and avoidably injure fish or wildlife or their habitat).

As detailed throughout this letter, the Project is inconsistent with various goals and policies set forth in the City's General Plan. *See e.g.,* Section I(A), *supra*. Because approval of the Project would violate the general plan consistency requirements of the Subdivision Map Act and the City's own municipal code, the Project application must be denied.

II. The DEIR Is Inadequate Under CEQA.

The environmental impact report is "the heart of CEQA." *Laurel Heights Improvement Ass'n v. Regents of University of California* (1988) 47 Cal.3d 376, 392 (citations omitted) ("*Laurel Heights I*"). It "is an environmental 'alarm bell' whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return. The EIR is also intended 'to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action.' Because the EIR must be certified or rejected by public officials, it is a document of accountability." *Id.* (citations omitted). Where, as here, an EIR fails to fully and accurately inform decision makers, and the public, of the environmental consequences of proposed actions, it does not satisfy the basic goals of the statute. *See* CEQA § 21061("The purpose of an environmental impact report is to provide public agencies and the public in general with detailed information about the effect that a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project.").

As discussed in detail below and in the attached technical report, the DEIR is replete with serious flaws. *See* Baseline Report. It lacks a legally defensible description of the Project and contains so little information about the Project's potential environmental impacts that, in many instances, it is difficult to evaluate the accuracy of the environmental analysis. Nor does the DEIR provide the necessary evidence or analysis to support its conclusions that environmental impacts would be less than significant. Many of the so-called mitigation measures proposed in the DEIR are nothing more than general assertions that something will be done in the future about the Project's significant environmental impacts. Such deferral is prohibited by CEQA. Consequently, the City must prepare and recirculate a revised EIR if it chooses to proceed with the proposed Project.

A. The DEIR Fails to Adequately Describe the Project.

1. The DEIR's Project Description Omits Critical Information.

Under CEQA, the inclusion in the EIR of a clear and comprehensive description of the proposed project is critical to meaningful public review. *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 193. The court in *Inyo* explained why a thorough project description is necessary:

> "A curtailed or distorted project description may stultify objectives of the reporting process. Only through an accurate view of the project may affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal (i.e., the "no project" alternative) and weigh other alternatives in the balance." d. at 192-93. Thus, "[a]n accurate, stable and finite project description is the sine qua non of an informative and legally sufficient EIR." *Santiago County Water District v. County of Orange* (1981) 118 Cal.App.3d 818, 830.

Here, the description of the Project is inadequate. The DEIR fails to identify key components of the Project that have the potential to result in significant environmental impacts. For example, the DEIR entirely omits critical information about the improvements that would be needed to resolve the area's hydraulic and flood risks. *See* Baseline Report at 1 and 2. Additionally, the DEIR fails to adequately describe the Project's stormwater system and fails to include a Stormwater Control Plan. The proposed Project will result in a substantial increase in impermeable surfaces, which will, in turn, increase runoff from the site, yet the document does not include any detail about where drainage features (inlets, piping, culverts, etc.) would be located and how these systems, including the detention basins, would be operated. The DEIR does not appear to include, nor does it reference, any hydrologic or hydraulic engineering that supports the drainage plan. The reader of the DEIR has no idea how the detention basins were sized or how they would be operated. Without detailed information regarding the location and design of the drainage facilities, it is impossible for decision makers and the public to evaluate the accuracy of the DEIR's conclusions.

The DEIR also fails to include the following crucial information about the Project:

- Number and type of trees to be removed;
- Location of the Project staging areas;
- Location of spoils sites and haul routes;
- Construction-related activities (including timeline, location, number of construction employees, types of equipment, etc.);
- Other Project features such as fences, bridges, gates or other proposed improvements.

All of this information must be included in a revised EIR so that the impacts associated with these features and activities can be analyzed.

2. The Project Description Avoids Any Meaningful Discussion of the Proposed Development Agreement.

The DEIR notes that the Project will include a development agreement, and states that the agreement's primary purpose is to vest the applicant's entitlements. DEIR at 3.0-12. The DEIR also states that the development agreement will include provisions regarding integration of the project entrance with the future Donlon Boulevard extension, requirements for payment of fees related to open space and compliance with the City's inclusionary housing ordinance. *Id.* However, no information is provided about the conditions, terms, restrictions and requirements for subsequent actions. The text of this development agreement is not included anywhere in the DEIR. And the development agreement was not included among the publicly available environmental documents for the project. Without any more detailed information about the terms of the agreement, key elements of the project description are omitted and cannot be analyzed in the EIR, in direct violation of CEQA. *See, e.g., Laurel Heights Improvement Ass'n v. Regents of the University of California* (1993) 6 Cal.4th 1112, 1123 ("*Laurel Heights II*") (the purpose of CEQA "is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made").

This omission is particularly disturbing as development agreements typically seek to "lock in" development rights – including existing regulations and the density and intensity of development – over an extended period of time. As such, development agreements have the potential to greatly exacerbate the potential impacts of

a project by limiting the lead agency's permitting authority and ability to impose additional mitigation measures or reduce the intensity of development at later discretionary phases of the project. This problem is only compounded where, as here, the development of critical mitigation measures is deferred to the indefinite future.

The DEIR's failure to provide any specifics regarding the development agreement constitutes a fatal shortcoming in the Project Description and the subsequent analysis of Project impacts. To comply with CEQA, the DEIR must be recirculated with a more detailed description of the development agreement or with the draft agreement attached.

3. The DEIR Minimizes the Extent of the Project By Failing to Describe and Analyze Full Build-Out Conditions.

Courts have held that, when analyzing the environmental impacts of a general plan or other planning document, the lead agency must analyze "the future development *permitted* by the [plan]. . . . Only then can the ultimate effect of the [plan] upon the physical environment be addressed." *Christward Ministry v. Superior Court of San Diego County* (1986) 184 Cal.App.3d 180, 194 (emphasis added); *see also City of Redlands v. County of San Bernardino* (2002) 96 Cal.App.4th 398, 409 (quoting same).

Here, the Project proposes rezoning not only for the 77-acre portion of the site designated for residential development but for entire site. DEIR at 3.0-8. Nowhere does the DEIR analyze the impacts of a potential increase in density on the entire site. The DEIR proposes that the 71-acre area proposed for open space will be subject to "recordation of a deed restriction or some other appropriate mechanism, prior to the acceptance of the last Final Map for the site (should it be broken into phases)." DEIR at 2.0-21. This approach is not adequately protective of the open space. First, recording the deed restriction prior to the last Final Map (rather than prior to the *first* Final Map) leaves the open space area vulnerable to damaging uses during construction. Second, deferring recordation of the deed restriction to such a late date leaves the open space vulnerable to future proposals for alteration of the open space area to other uses.

Alternatively, the DEIR could have specified use of a conservation easement on the open space area, conveyed to a land trust capable of managing and enforcing it, to preserve and protect the area in perpetuity. Such an easement should be recorded prior to acceptance of the first Final Map. As proposed, the open space area is vulnerable to future proposals for alteration of the open space area to other uses, and therefore, the DEIR must analyze the potential impacts at full build-out should the City approve the change in zoning.

B. The DEIR Fails to Analyze and Mitigate the Project's Significant Environmental Impacts.

CEQA requires that an EIR be detailed, complete, and reflect a good faith effort at full disclosure. Guidelines § 15151. The document should provide a sufficient degree of analysis to inform the public about the proposed project's adverse environmental impacts and to allow decision-makers to make intelligent judgments. *Id.* Consistent with this requirement, information regarding the project's impacts must be "painstakingly ferreted out." *Environmental Planning & Info. Council v. County of El Dorado* (1982) 131 Cal.App.3d 350, 357 (finding an EIR for a general plan amendment inadequate where the document did not make clear the effect on the physical environment).

Meaningful analysis of impacts effectuates one of CEQA's fundamental purposes: to "inform the public and responsible officials of the environmental consequences of their decisions before they are made." *Laurel Heights II*, 6 Cal.4th at 1123. To accomplish this purpose, an EIR must contain facts and analysis, not just an agency's bare conclusions. *Citizens of Goleta Valley*, 52 Cal.3d at 568. Nor may an agency defer its assessment of important environmental impacts until after the project is approved. *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 306-07. An EIR's conclusions must be supported by substantial evidence. *Laurel Heights I*, 47 Cal.3d at 409.

As documented below, the DEIR fails to identify, analyze, or support with substantial evidence its conclusions regarding the Project's significant environmental impacts. These deficiencies render the DEIR inadequate under CEQA.

1. The DEIR Fails to Analyze and Disclose Significant Aesthetic Impacts of the Project.

The proposed Project will alter and adversely impact the visual landscape of the site and the surrounding area by completely transforming this scenic, hilly area into a dense, residential one. As discussed above, the Project will cut and fill large swaths of hillside and excavate an enormous amount of soil: 1.4 million cubic yards. DEIR at 3.0-12. (Assuming a dump truck holds 10 cubic yards, the proposed excavation equates to 140,000 truckloads of soil.) The DEIR acknowledges that the Project would result in significant and unavoidable impacts relating to a the degradation of the existing visual character of the area. DEIR 2.0-6. Despite this assessment, the DEIR concludes that the Project's other aesthetic impacts will be less than significant because of certain landscaping and design features. However, landscaping and design features cannot reduce

the significant topographic impacts of the Project to a level of insignificance. Furthermore, the DEIR's conclusion that aesthetic impacts will be insignificant flies in the face of established CEQA precedent.

Under CEQA, it is the state's policy to "[t]ake all action necessary to provide the people of this state with . . . enjoyment of *aesthetic*, natural, scenic, and historic environmental qualities." CEQA § 21001(b) (emphasis added). "A substantial negative effect of a project on view and other features of beauty could constitute a significant environmental impact under CEQA." *Ocean View Estates Homeowners Assn., Inc. v. Montecito Water District* (2004) 116 Cal.App.4th 396, 401. No special expertise is required to demonstrate that the Project will result in significant aesthetic impacts. *Ocean View Estates*, 116 Cal.App.4th at 402 ("Opinions that the [project] will not be aesthetically pleasing is not the special purview of experts."); *The Pocket Protectors v. City of Sacramento* (2005) 124 Cal.App.4th 903, 937 ("[N]o special expertise is required on this topic.").

As explained by the court in *Quail Botanical Gardens Foundation, Inc. v. City of Encinitas* (1994) 29 Cal.App.4th 1597, 1606 , it is "self-evident" that replacing open space with a subdivision will have an adverse effect upon "views and the beauty of the setting." Instead of addressing and analyzing the Project's visual effects, the DEIR employs contorted logic to mask its clear impacts. For example, the DEIR acknowledges that the General Plan identifies views of the "rolling, grassy hills to the south," which characterize the site, as important visual resources for the City and that the development will be visible from area parks. DEIR at 5.1-8. The DEIR also acknowledges that the Project site "could be considered an element of broad scenic vistas of hills and open space visible from Kirker Pass Road, a designated scenic route in the General Plan. *Id.* The DEIR even states that the Project could have a substantial adverse effect on a scenic vista. *Id.* Surprisingly, the DEIR then concludes that impacts to scenic vistas would be less than significant because design guidelines included in Mitigation Measure AES-1 would mitigate these significant impacts. DEIR at 5.1-9.

Such a conclusion is misguided and unsupported by evidence. The guidelines and standards that the DEIR relies on address the colors and materials to be used in the development but in reality they do nothing to reduce the height, mass, or location of structures or to ensure that the development is less visible from public viewpoints. The DEIR fails to provide any specific information or analysis, as to how the proposed measure would mitigate significant impacts to existing views from parks and other public viewpoints. A neutral color palette will not camouflage this large subdivision.

Moreover, the DEIR fails to provide evidence to support its conclusion that the Project's impacts to area scenic vistas would be less than significant. Specifically, the EIR fails to evaluate the Project's impacts to views from East Bay Regional Park District ("EBRPD") trails and from open space areas in Stoneman Park to the north. *See* DEIR Figure 5.1-3 indicating visual simulations performed only for views from Kirker Pass Road. The DEIR also fails to evaluate impacts to planned parklands to the south and southwest of the project site. As pointed out by during the scoping process, the EBRPD has acquired the "Thomas North" parcel to the south of the Project site and the "Land Waste Management" and "Affinito" parcels to the southwest. A revised EIR must be prepared to evaluate the Project's impacts to views from these parcels.

The Project will transform an undeveloped, rural area framed by rolling hills into a large residential subdivision. This change substantially degrades not only the existing visual character and quality of the site and its surroundings but the quality of scenic vistas enjoyed from area roadways, parks, and trails. These impacts are considered significant impact under CEQA. Guidelines, Appendix G(I)(c). Thus, the DEIR's conclusion that the Project's impact on scenic vistas would be less than significant cannot be sustained.

2. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Hydrology and Water Quantity.

The DEIR includes absolutely no discussion of the potential impacts to hydrology and water quality, having concluded in the Initial Study ("IS") that the Project's impacts in these areas would be less than significant. As explained in the attached Baseline Report, this conclusion is not supported by substantial evidence and, in fact, the Project would substantially alter site drainage and the stream channel that runs through the property. While the IS provides a general discussion of these potential impacts, it contains no supporting studies or data and relies entirely on future preparation of a Storm Water Pollution Prevention Plan ("SWPPP") and compliance with existing regulations to reduce the Projects impacts to a level of insignificance. As discussed in detail below, this approach does not comport with CEQA. In very steep terrain like this, it is virtually impossible for projects to comply with National Pollutant Discharge Elimination System ("NPDES") requirements, which is evidenced by the Project's proposed detention basins. Thus, relying on compliance with existing requirements is particularly unacceptable in this situation. In addition, steep terrain such as this makes remediation of unstable soils very challenging.

(a) The DEIR Fails to Adequately Describe the Existing Hydrological Setting.

The DEIR/IS provides no information on the hydrology and water quality setting. Without describing the hydrology of the on-site drainage and that of Kirker Creek downstream, the reader of the DEIR/IS has no context within which to evaluate potential project impacts. Perhaps most important, the DEIR/IS does not provide any discussion of the hydrology of Kirker Creek and its susceptibility to flooding. The DEIR must be revised to include a Hydrology and Water Quality section that adequately describes the hydrologic setting.

(b) The Project Does Not Comply with Applicable Requirements Under the NPDES

The IS states that the project would treat stormwater runoff "as required by provision C.3 of the Contra Costa County municipal stormwater NPDES permit by directing all site runoff into three detention basins." IS at 59. However, this statement appears to refer to an old (and superseded) NPDES permit. The current NPDES permit that the project would be required to comply with is the Municipal Regional Stormwater NPDES Permit, Order No. R2-2009-0074, NPDES Permit No. CAS612008, adopted October 14, 2009 and revised November 28, 2011 ("MRP"). Not only does the Initial Study refer to the wrong NPDES permit, it wrongly interprets what C.3 provisions would be required. Baseline Report at 3. The C.3 portion of the MRP, which refers to post-construction stormwater management for new development and redevelopment projects, requires Low Impact Development ("LID"). The Project as proposed includes centralized detention basins, which are not LID features.

The goal of LID is to reduce runoff and mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating stormwater runoff close to its source. Practices used to adhere to these LID principles include measures such as rain barrels and cisterns, green roofs, permeable pavement, preserving undeveloped open space, and biotreatment through rain gardens, bioretention units, bioswales, and planter/tree boxes. LID also limits disturbance of natural water bodies and drainage systems; minimizes compaction of highly permeable soils; protects slopes and channels; and minimizes impacts from stormwater and urban runoff on the biological integrity of natural drainage systems and water bodies. Baseline Report at 3 and 4.

Here, the Project would result in massive grading, moving approximately 1.4 million cubic yards of soil. DEIR at 3.0-12. No LID designs or feathers appear to be

incorporated or required. Instead, several large detention basins are proposed to collect the site's stormwater before discharging it into Kirker Creek. Incorporation of LID designs and features into the project would require extensive modifications to the grading plan and overall site plan. These design changes to the project should be made by the applicant and the revised project evaluated in a recirculated DEIR.

(c) The Project Would Result in Flooding and Erosion Impacts Downstream

Based on a review of available mapping and aerial photographs, the Baseline Report concludes that Kirker Creek appears to have reaches that are highly incised with oversteepened creek banks. Baseline Report at 4. This indicates that portions of the creek may be unstable. *Id*. There are areas in the City of Pittsburg (e.g., Brush Creek Drive, Canyon Way), where homes are located within 20 to 30 feet of the top of the creek bank. Any change to the hydrology of flows in Kirker Creek could result in hydromodification and cause increased erosion and creek bank failure, which may jeopardize existing structures. *Id*.

The DEIR/IS fails to provide any explanation as to how the detention basins would be operated to prevent "erosion of existing stream banks and flooding downstream along Kirker Creek," and it is not clear that they can be so operated. IS at 60. Simply delaying flows in detention basins is not an effective approach to preventing downstream hydromodification of Kirker Creek. Baseline Report at 4. The Project would result in a substantial amount of new impervious surfaces conveying increased flows to centralized basins. This would in turn increase total discharge volume to Kirker Creek. *Id*. Even moderate flows to the creek, if sustained for longer periods of time than would occur without the project, could cause significant downstream erosion. *Id*. This is a potentially significant impact that must be fully analyzed under CEQA.

In sum, the DEIR lacks sufficient evidentiary support for its conclusion that the Project's impacts on hydrology and water quality would be less than significant. A revised DEIR that comprehensively evaluates and mitigates the proposed Project's hydrology and water quality impacts must be prepared and recirculated.

3. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Biological Resources

The DEIR presents an incomplete—and hence inadequate—discussion of the Project's potential impacts to biological resources. As detailed below, the DEIR underestimates Project-related impacts to biological resources as a result of a series of

errors, including: (1) faulty methodology; (2) the failure to describe accurately the environmental setting; (3) the failure to analyze the extent and severity of impacts to sensitive species and habitats; and (4) the failure to analyze the Project's cumulative effects. The DEIR's treatment of biological impacts does not meet CEQA's well established legal standard for impacts analysis. Given that analysis and mitigation of such impacts are at the heart of CEQA, the DEIR will not comply with the Act until these serious deficiencies are remedied.

(a) The DEIR Appears to Employ Faulty Methodology.

The DEIR employs faulty methodology and incorrect assumptions in its analysis of Project impacts to biological resources. It appears that the DEIR's analysis is not based on focused surveys tailored to determine the likelihood that particular species would be present. In fact, the DEIR never describes the methodology employed for site surveys. Aside from one sentence that indicates the surveys consisted of "driving and walking around the site" (DEIR Appendix 5.3 at pdf page 4), the DEIR provides no description of the survey methods at all. The DEIR should have included focused surveys for all special status with the potential to occur on site. These surveys should have included surveys for grassland birds, rare plant surveys, and, as discussed below, appropriately timed protocol level surveys for species likely to occur on-site.

The survey information as it stands does not provide an adequate basis for determinations about the individual and cumulative impacts of this Project on either special-status species or rare habitats. The DEIR's inadequate analysis of the species and habitats on the site results in an understatement of the Project's biological impacts.

(b) The DEIR Fails to Adequately Describe the Project's Biological Setting.

An EIR also "must include a description of the environment in the vicinity of the project, as it exists before the commencement of the project, from both a local and a regional perspective." Guidelines § 15125; *see also Environmental Planning and Info. Council v. County of El Dorado* (1982) 131 Cal.App.3d 350, 354. CEQA requires that special emphasis be placed on environmental resources that are rare or unique to that region and that would be affected by the Project. Guidelines § 15125(c). Here, the DEIR's discussion of environmental setting is sorely deficient.

The DEIR fails to provide a complete description of the Project's biological setting and, in some cases, presents conflicting information. For example, the DEIR states that the Project site does not include alkali soils; an important distinction because some

special status plants occur solely in alkali soils. DEIR at 5.3-7. However, the DEIR also indicates that saltgrass (Distichlis spicata), a plant that is dependent on alkali soils, was observed on site. DEIR at Table 5.3-1.

In other cases, the DEIR simply presents erroneous information. For instance, the DEIR dismisses the potential occurrence of big tarplant stating that "the highly disturbed on-site grasslands do not provide suitable habitat . . . ." DEIR at Table 5.3-2. However, this species is found in annual grasslands, usually on slopes like the ones that characterize the Project site. Personal Communication, Malcolm Sproul, Senior Biologist, Bay Area consulting firm, January 8, 2014.

In other instances, the DEIR omits crucial information altogether. The DEIR fails to evaluate grassland birds likely to occur on site and entirely ignores the grasshopper sparrow, a California species of special concern. *Id.* and DEIR Table 5.3-2 (excludes grasshopper sparrow).

The DEIR also fails to analyze the presence and number of other special status species that it acknowledges may be present on the site and in the Project area. For example, although the DEIR acknowledges that California tiger salamander ("CTS"), a species protected by the federal Endangered Species Act, has been documented in the Project vicinity (DEIR at 5.3-18), the DEIR is dismissive of the potential for this species to occur on site. DEIR at 5.3-3 (lists species for which suitable habitat is found on the Project site but excludes CTS). The DEIR states that because there is no suitable breeding habitat for CTS within or near the project site and that the nearest occurrence is 0.5 miles away, the species is not likely to occur on the site. DEIR Table 5.3-2 at page 5.3-13.

However, the DEIR fails to evaluate potential upland habitat on site that may be used by CTS. As explained in the attached report, "Movement Patterns and Migration Distances in An Upland Population of California Tiger Salamander" (Orloff, 2011), CTS disperse over distances far greater than 0.50 miles. Orloff Report, attached as Exhibit 2. Thus, the Project site, which is within a half mile of a known breeding site, is very likely to provide aestivation habitat for CTS. Personal Communication, Malcolm Sproul, Senior Biologist, Bay Area consulting firm, January 8, 2014; biography attached as Exhibit 3. Moreover, it appears that other ponds providing potentially suitable habitat may be present in close proximity to the Project site. *See* map attached as Exhibit 4 and Personal Communication, Malcolm Sproul, Senior Biologist, Bay Area consulting firm, January 8, 2014. Accordingly, the DEIR's description of the biological setting (and the document's impact analysis) must be revised to include consideration of this species. *Id.*

Similarly, the DEIR acknowledges that burrowing owls are known to occur in the area, but dismisses their potential to occur onsite based on the fact that no owls were observed onsite and that the nearest occurrence of nesting burrowing owls is 2.5 miles west of the site. DEIR at Table 5.3-11. The DEIR's conclusion is not based on any evidence. In fact, burrowing owl have been observed nesting on the Thomas Home Ranch property located to the southwest of the Project site (between Nortonville Road and Kirker Pass Road) within the past year. Personal Communication, Malcolm Sproul, Senior Biologist, Bay Area consulting firm, January 8, 2014. Moreover, burrowing owl do not depend exclusively on ground squirrel burrows for nesting sites, as implied in the DEIR. DEIR at 5.3-11. Burrowing owls have been known to nest in shallow indentations such as those present in the rock outcroppings on site. DEIR at 5.3-1.

Moreover, the DEIR mischaracterizes the role of the Habitat Conservation Plan ("HCP") and its role in relation to environmental documentation for the project. First, the HCP is a conservation mechanism that includes a broad, programmatic review of resources throughout eastern Contra Costa County; it is not a project-specific, impact-analysis document. DEIR at 5.3-24. Thus, the information in the HCP cannot replace properly designed and implemented surveys of the project site to determine the biological resources there. Second, the DEIR states that the HCP's primary goal is to streamline review of development projects. DEIR at 5.3-24. This is incorrect. The HCP is intended to serve as a coordinated process for permitting and mitigating the incidental take of endangered species. It does not excuse the City from requiring site-specific analysis. Finally, the HCP is administered by the East Contra Costa County Habitat Conservancy ("Conservancy"). DEIR at 5.3-25. The Conservancy is not a land use agency and therefore is not tasked with making decisions about the appropriate location for siting land development. That responsibility falls to the City, which has the responsibility of completing site-specific analysis of the Project's significant impacts to special status species and habitat as part of the CEQA process. Therefore, the DEIR must be revised to include a thorough investigation of the site's existing biological setting and the Project's impacts on those resources.

The DEIR's perfunctory description of the sensitive species and habitats present in the Project area results in an incomplete description of the sensitive environmental setting of the Project. This failure to describe the Project setting violates CEQA. *See San Joaquin Raptor*, 27 Cal.App.4th at 724-25 (environmental document violates CEQA where it fails to completely describe wetlands on site and nearby wildlife preserve). The DEIR should have included surveys for these species as part of its assessment of biological resources. Accordingly, the DEIR's description of the biological setting must be revised to include consideration of these and other overlooked species.

(c) The DEIR Fails to Adequately Analyze the Project's Direct Impacts to Sensitive Species.

The DEIR's failure to describe the existing setting severely undermines its analysis of Project impacts. Despite the DEIR's acknowledgement that the Project would adversely affect potential habitat for several special status, the DEIR fails to adequately analyze adverse impacts to these species. For example, the DEIR acknowledges that the Project site includes potential habitat for burrowing owl, a California Species of Special Concern ("CSC"); San Joaquin kit fox, a federally endangered species and a California Threatened species; and vernal pool fairy shrimp, a federally Threatened species. DEIR at 5.3-26 and 27. Yet, rather than conduct appropriate surveys to evaluate the presence/absence of these species and analyze the extent and severity of the Project's impacts, the DEIR simply applies a laundry list of measures required by the Habitat Conservation Plan for the Project area and concludes that all impacts will be mitigated to less than significant levels. *See, e.g*., DEIR at 5.3-31 and 32. By failing to analyze the extent and severity of impacts to biological resources, the DEIR downplays the effects of the loss of open space on special status species. The end result is a document which is so crippled by its approach that decision makers and the public are left with no real idea as to the severity and extent of environmental impacts. *See, e.g., Berkeley Keep Jets Over the Bay Com. v. Bd. of Port Comrs*. (2001) 91 Cal.App.4th 1344, 1370-71; *Galante Vineyards v. Monterey Peninsula Water management Dist.* (1997) 60 Cal.App.4th 1109, 1123; *Santiago County Water Dist. v. County of Orange* (1981) 118 Cal.App.3d 818, 831 (a lead agency may not simply jump to the conclusion that impacts would be significant without disclosing to the public and decision makers information about how adverse the impacts would be).

Similarly the DEIR's analysis of impacts to raptors such as Swainson's hawk simply asserts that they would be affected by a reduction in nesting resources, ignoring altogether the impacts caused by loss of habitat. DEIR at 5.3-28. Urbanization has a profound effect on raptors because they require large areas to hunt and are disturbed by human activity near their nests. Moreover, the DEIR's sole mitigation proposal for raptors focuses exclusively on avoiding active nests. It ignores perch resources and the role that loss of habitat and urbanization have on raptors. In any event, the DEIR must quantify the Project's effects on raptors, and the efficacy of the proposed mitigation, so that the public and decision makers may reach their own conclusions. *Save Our Peninsula Committee v. Monterey County Board of Supervisors* (2001) 87 Cal.App.4th 99, 130.

(d) Indirect Impacts on Wildlife

The DEIR ignores altogether the Project's indirect impacts on wildlife. Indirect impacts from low density residential development can be as devastating to wildlife as the direct loss of habitat. (*See generally* Exhibit 5 [Hansen, et al., Land Use Change in Rural America: Effects Of Exurban Development On Biodiversity: Patterns, Mechanisms, And Research Needs]). For example, toxic compounds from the residential activities could adversely impact wildlife that rely on Kirker Creek. The use of common fertilizers and pesticides associated with routine yard maintenance and landscaping can generate concentrations of pollutants that degrade water quality and harm wildlife.

It is also well established that noise—and even low ambient noise levels—from typical residential activities adversely impacts wildlife species, causing them to flee their habitats and even abandon nests. Wildlife can also be quite sensitive to glare from ambient night lighting. Also, cats, unless they are kept indoors, are skilled predators on wildlife. Cats can radically decrease the potential for bird species and small reptiles to survive in sensitive habitats adjacent to project sites. *See* "Domestic Cat Predation on Birds and Other Wildlife" attached as Exhibit 6. These indirect impacts would be significant and therefore must be analyzed in an EIR.

In short, the DEIR's analysis of impacts to biological resources dramatically understates the Project's potential to significantly affect sensitive species and sensitive habitats. To comply with CEQA, the City must prepare a revised DEIR fully analyzing the Project's potential impacts to these resources and identifying effective mitigation measures. Given the substantial revisions that are necessary, the City must recirculate the revised DEIR. Guidelines 15088.5(a)(4).

4. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Cultural and Historic Resources.

The Project is located on the site of a former historic ranch complex considered a significant historic resource under CEQA (*i.e.*, Thomas Ranch complex). *See* DEIR Appendix 1.0; IS at 41. According to a historic resources survey performed in 1995, the complex consisted of a house and a number of small barns in a style typical of the period from the late 1800's through the turn of the century. *Id.* The IS indicates that the historic buildings were demolished and the area leveled, but that the ranch complex was never inventoried as recommended in the 1995 study. IS at 42. It also indicates that historic and/or prehistoric archaeological deposits may be present on the site. *Id.*

Nonetheless, while the DEIR acknowledges the likelihood of significant archaeological resources on the site, it fails to identify the extent of potential cultural resources, adequately analyze potential impacts to those resources, or adequately mitigate the project's potentially significant impacts to cultural resources. Instead, the DEIR relies on the IS analysis and incorporates the mitigation measures proposed in that document. DEIR at 2.0-19. These measures provide for monitoring during construction and data collection and recording should resources be discovered. Based on implementation of these measures, the DEIR concludes that resulting impacts would be less than significant.

However, the assertion that post-approval data collection will mitigate the project's impacts to known resources on the site to a less-than-significant level is not supported by substantial evidence, constitutes an inappropriate deferral of mitigation measures under *Sundstrom v. County of Mendocino*, 202 Cal.App.3d at 296, and is erroneous as a matter of law. In fact, "where a historic resource is to be demolished, documentation of the resources usually falls short of full mitigation."). *See* Discussion following Guidelines § 15126.4. Moreover, courts have explained that the mitigation of the effects of demolition of an historic resource (as defined by CEQA) through documentation of the resource and placement of commemorative markers is not adequate to reduce impacts to a level of insignificance. *League of Protection of Oakland's Architectural and Historic Resources v. City of Oakland* (1997) 52 Cal.App.4th 595.

Moreover, under CEQA, the preferred method of reducing impacts to cultural resources is avoidance. *See Madera Oversight Coalition, Inc. v. County of Madera* (2011) 199 Cal.App.4th 48, 86-87. The only feasible way to avoid cultural resources with a development project like this is to conduct surveys before final project design is approved; identify all known historic properties that will be affected by the project; and consider redesigning the project to avoid them.

Here, given that the site includes known significant historical resources, and especially given the fact that known historical resources were destroyed without proper evaluation or documentation, the City should require a third party consultant to perform trenching tests now, as part of the CEQA process, to assess whether the Project would impact significant resources and what Project modifications could be incorporated to avoid the resources. Until such additional investigation and analysis of potential impacts to cultural resources is prepared, the DEIR cannot be certified under CEQA and the Project must not be approved.

Finally, the cultural resources evaluations prepared by Holman and Associates (1995, 1999, and 2000) were not included as appendices to the DEIR. Although it is customary to exclude location maps and specific language related to the

location of resources to protect potential resources on site, the DEIR omitted the studies altogether. Without these studies, it is impossible for the public and decision makers to evaluate the impacts the proposed project would have on cultural resources. Accordingly, for this and the other reasons discussed above, the DEIR's analysis of impacts to cultural resources is inadequate under CEQA.

5. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Public Services.

As the DEIR acknowledges, several schools within the Pittsburg Unified School District are currently operating at or near capacity. DEIR at 5.6-3. The Project will generate up to 277 Kindergarten through Twelfth grade students. DEIR at 5.6-8. The DEIR discloses that the Project would generate the need for new school facilities to be constructed. The DEIR concludes that school impacts will be mitigated to a less-than-significant level, however, by payment of fees established by the school districts. DEIR at 5.6-9 (citing Gov't Code § 65996).

While it may be true that the payment of such fees is deemed mitigation under Government Code section 65996, this provision does not excuse the City from analyzing the impacts to the environment of sending 277 new students to schools that are already at or near capacity. Indeed, the DEIR's threshold of significance states that the Project could have a significant effect on the environment if it would: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios . . . for schools. DEIR at 5.6-7. With several schools already at capacity, the Project will necessarily require the construction of "new or physically altered" school facilities. Construction of these school facilities may have land use and planning impacts and, if sited on undeveloped open space lands, potential biological, agricultural, recreational, and other impacts as well. The DEIR must be revised to analyze these potential environmental impacts.

Moreover, the DEIR failed to consider cumulative impacts of school construction. The DEIR lists five Major Projects (DEIR at 5.0-4), most of which are residential projects, in its cumulative impacts analysis. In addition, the City of Pittsburg's Project Pipeline List includes at least a dozen residential projects. Considering that the Pittsburg Unified School District is already at or near capacity, the DEIR must analyze how this project, along with the related projects, will cumulatively affect school services in the District.

6. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Public Safety.

The Project site has an existing high-pressure petroleum pipeline within the area proposed as a buffer. DEIR at 3.0-9. The Project proposes to site residences within 1,000 feet of the pipeline, yet the DEIR provides no analysis of related safety impacts. *Id.* Although leaks, ruptures, and explosions may not be common for underground pipelines, the impacts from pipeline failures when they do occur can be catastrophic. *See* "Pipelines Explained: How Safe are America's 2.5 Million Miles of Pipelines?" attached as Exhibit 7. As explained in that article, pipelines are prone to failure as they age and corrode. Given the Project's proposal to locate housing in close proximity to the pipeline, the DEIR should have provided an analysis of the condition of the pipeline and the likelihood of failure or accidents.

Instead, the DEIR includes a mitigation measure (carried over from the IS) that only requires the developer to disclose the location of the pipeline to prospective homebuyers. DEIR at 2.0-2.0. However, this measure does nothing to minimize risks to homeowners. Indeed, the DEIR fails to provide any evidence to support its conclusion that risks associated with potential rupture of the pipeline would be reduced to a less-than-significant level with implementation of the measure.

7. The DEIR's Analysis of Growth Inducing Impacts Is Incomplete and Flawed.

CEQA requires that an EIR include a "detailed statement" setting forth the growth-inducing impacts of a proposed project. CEQA § 21100(b)(5); *City of Antioch v. City Council of Pittsburg* (1986) 187 Cal. App. 3d 1325, 1337. The statement must "[d]iscuss the ways in which the proposed project could foster economic growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." Guidelines §15126.2(d). It must also discuss how the project "may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively" or "remove obstacles to population growth." *Id.*

Here, the DEIR's analysis of growth-inducing impacts is legally inadequate. As with other issues, the document relies on speculation instead of evidence to support its conclusions. The DEIR's conclusion that the Project will have no growth-inducing impacts is not supported by substantial evidence.

The DEIR relies on the promise that the required facility upgrades necessary to serve the Project would only serve development on the main Project site to

conclude that there is little chance that the Project will cause adjacent, undeveloped land to be developed, and thus that the Project will not induce significant growth. DEIR at 7.0-5. With a growing population in the Bay Area, extending infrastructure to an area currently outside the City Limit will remove one barrier that currently keeps pressure for development in the area in check.

The City's General Plan specifies a goal of efficient land use patterns which reduce environmental impacts and minimize the potential for residential and commercial sprawl. Approval and development of the Montreux Project would expand development and extend utility infrastructure beyond the City's existing service area, effectively removing an obstacle to future development approvals in the area. That new development has yet to be approved does not excuse the requirement to analyze a project's environmental or growth inducing impacts. Guidelines § 15126.2(d); *City of Davis v. Coleman* (9th Circuit 1975) 521 F.2d 661,675-76.

The DEIR fails to conduct such an analysis. As the *City of Davis* court directed "the purpose of an EIS/EIR is to evaluate the possibilities in light of current and contemplated plans and to produce an informed estimate of the environmental consequences." *Id*. at 676. Accordingly, the DEIR must be revised to identify the extent and location of new development facilitated by removing the obstacle of limited existing infrastructure and to analyze the environmental impacts of the growth.

If the City has contrary data demonstrating that the Project will not induce growth – and there is no indication in the DEIR that it does – it must reference it in the document. However, it may not lawfully rely on unsupported assumptions to summarily conclude that no induced growth will occur. CEQA § 21080(e)(2) ("Substantial evidence is not argument, speculation, unsubstantiated opinion or narrative").

8. The DEIR Fails to Provide an Adequate Analysis of the Project's Potentially Significant Cumulative Impacts.

CEQA requires lead agencies to disclose and analyze a project's "cumulative impacts," defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." Guidelines § 15355. Cumulative impacts may result from a number of separate projects, and occur when "results from the incremental impact of the project [are] added to other closely related past, present, and reasonably foreseeable probable future projects," even if each project contributes only "individually minor" environmental effects. Guidelines §§ 15355(a)-(b). A lead agency must prepare an EIR if

a project's possible impacts, though "individually limited," prove "cumulatively considerable." CEQA § 21083(b); Guidelines § 15064(i).

Extensive case authority highlights the importance of a thorough cumulative impacts analysis. In *San Bernardino Valley Audubon Society v. Metropolitan Water Dist. of Southern Cal.* (1999) 71 Cal.App.4th 382, 386, 399, for example, the court invalidated a negative declaration and required an EIR for the adoption of a habitat conservation plan and natural community conservation plan. The court specifically held that the negative declaration's "summary discussion of cumulative impacts is inadequate," and that "it is at least potentially possible that there will be incremental impacts. . . that will have a cumulative effect." *See also Kings County Farm Bureau*, 221 Cal.App.3d at 728-729 (EIR's treatment of cumulative impacts on water resources was inadequate where the document contained "no list of the projects considered, no information regarding their expected impacts on groundwater resources and no analysis of the cumulative impacts").

In contravention of the above authorities, the DEIR provides no analysis of the Project's cumulative impacts on biological resources, but simply concludes that, because the applicant will pay permit fees under the Habitat Conservation Plan for the area, cumulative impacts are less than significant. DEIR at 5.3-37. The DEIR thus completely ignores the cumulative effects of recent development approvals and potential future approvals in the City. For example, as discussed earlier in this letter, the City's Project Pipeline List indicates that the City has approved, or is in the process of approving, at least a dozen residential development projects constructing thousands of residential units. *See* Exhibit 7. The DEIR lists only five projects considered in the cumulative analysis. DEIR at 5.0-4. Other projects that should have been considered in a cumulative analysis include projects that have been approved but not yet constructed (Alves Ranch (364 units); Bancroft Gardens II (28 units); the San Marco Development (1,588 units); and Vista del Mar (518 units). *See generally* Exhibit 8. These development projects, together with the present subdivision, would have a cumulatively significant impact on open space and natural resources in the Project area. Notwithstanding such evidence, the DEIR fails to provide any analysis of this potentially significant impact.

In another particularly glaring omission, the DEIR also neglects to analyze cumulative impacts on hydrological resources. Specifically, the DEIR contains no analysis of the Project's impacts together with the effects of other development projects proposed within the Project area that may contribute to changes in hydrology in Kirker Creek. Another major project, the James Donlon Boulevard Extension, which is currently under review by the City and would include massive grading and alteration of local drainage patterns and hydrology within the Kirker Creek watershed, is not considered in

the DEIR's hydrology analysis. The effects on water quality, flooding, and hydromofication from these two major projects, and others, on Kirker Creek must be analyzed in a revised DEIR.

9. The DEIR Fails to Adequately Analyze and Mitigate Alternatives to the Project.

The alternatives section, along with the mitigation section, is the core of an EIR. *Citizens of Goleta Valley*, 52 Cal.3d at 564. Every EIR must describe a range of alternatives to a proposed project, and to its location, that would feasibly attain the project's basic objectives while avoiding or substantially lessening the project's significant impacts. CEQA § 21100(b)(4); Guidelines § 15126(d). In preparing an EIR, the lead agency must ensure "that all reasonable alternatives to proposed projects are thoroughly assessed." *San Joaquin Raptor*, 27 Cal.App.4th at 717. An EIR's alternatives discussion must focus on alternatives that avoid or substantially lessen significant effects of the project. Guidelines § 15126.6(b); *Citizens of Goleta Valley*, 52 Cal.3d at 556 (EIR must consider alternatives that offer "substantial environmental advantages."). The range must be sufficient "to permit a reasonable choice of alternatives so far as environmental aspects are concerned." *San Bernardino Valley Audubon Soc'y v. County of San Bernardino* (1984) 155 Cal.App.3d 738, 750. The DEIR's discussion of alternatives fails to meet these standards.

Sound planning principles dictate that the City carefully consider alternatives in the present case because the proposed Project would require annexation of the Project site into the City limits and into service areas for water and sanitation districts and would result in admittedly significant impacts to air quality, visual resources, and public services. DEIR at 2.0-6, 2.0-8, 2.0-10, and 2.0-16. This DEIR's analysis of alternatives is insufficient under CEQA because the document fails to consider feasible alternatives that would reduce Project impacts. Guidelines § 15126.6(c); *Citizens of Goleta Valley*, 52 Cal.3d at 566.

As a preliminary matter, the DEIR's failure to disclose the extent and severity of the Project's broad-ranging impacts necessarily distorts the document's analysis of Project alternatives. As a result, the alternatives are evaluated against an inaccurate representation of the Project's impacts. Proper identification and analysis of alternatives is impossible until Project impacts are fully disclosed. Moreover, as discussed above, the document's analysis is incomplete and/or inaccurate so that it is simply not possible to conduct a comparative evaluation of the Project's and the alternatives' impacts.

The DEIR also fails to describe an alternative location for the Project, stating that because neither the developer nor the City owns or controls any other property in the vicinity of the site that is of sufficient size to accommodate the project, the ability of the developer to find and purchase an alternative site to develop the project is considered speculative. DEIR at 6.0-3. The DEIR goes on to state that "… the development of the same number of residential uses at a different location would result in similar visual character and construction air quality impacts. Thus, placing the proposed development at an alternative site would not avoid the significant impacts of the proposed project." *Id*.

This approach fails to meet CEQA's requirements for the analysis of alternatives. It provides no information on the alternative sites that might be available or event the criteria for such a site search. Without this information and, if possible, a further identification of alternative sites, the DEIR is inadequate and cannot be certified under CEQA. Moreover, even if it is true that no alternative sites exist that could accommodate all of the Project in one location, a feasible alternative could break the Project up into two or more locations. Such an alternative could involve in-fill sites and would likely disperse some of the significant project impacts associated with the proposed Project. An alternative that examines dividing the Project among two or more locations should be included in a revised DEIR.

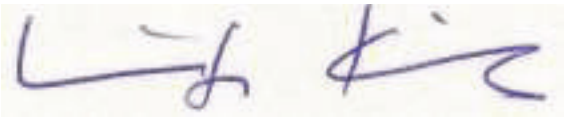
Contrary to CEQA, the DEIR also fails to explain why the proposed Project was selected over alternatives that are identified as environmentally superior. CEQA requires that the EIR explain why environmentally superior alternatives were rejected. Guidelines § 15126.6(d). As the California Supreme Court held in *Laurel Heights I*, 47 Cal.3d at 405, "[i]f the [lead agency] considered various alternatives and found them to be infeasible . . . those alternatives and the reasons they were rejected . . . must be discussed in the EIR with sufficient detail to enable meaningful participation and criticism by the public." The DEIR fails to include this analysis.

III. CONCLUSION

To cure the many defects identified in this letter, the DEIR must be revised and recirculated. These steps are necessary to provide the public and decision makers with an opportunity to gauge the true impacts of this significant, proposed development. Moreover, the Project itself must be revised to comply with the City's general plan. Only then could the City make the findings necessary to approve this subdivision.

Very truly yours,

SHUTE, MIHALY & WEINBERGER LLP



Winter King

Carmen J. Borg, AICP
Urban Planner

List of Exhibits

Exhibit 1: Bruce Abelli-Amen, Comments on Draft Environmental Impact Report and Initial Study, Baseline Environmental Consulting, Jan. 8, 2014.

Exhibit 2: Susan Orloff, Movement Patters and Migration Distances in an Upland Population of California Tiger Salamander (*Ambystoma Californiense)*, Ibis Environmental Inc., Apr. 1, 2011.

Exhibit 3: Malcolm Sproul Biography, Retrieved Jan. 8, 2014.

Exhibit 4: Potential Pond Site Image and Location, Retrieved on Jan. 8, 2014 from http://earth.google.com

Exhibit 5: Andrew J. Hansen, et al, Effects of Exurban Development on Biodiversity: Patterns, Mechanisms, and Research Needs, Ecological Society of America, Dec. 1, 2005.

Exhibit 6: Domestic Cat Predation on Birds and Other Wildlife, Cats Indoors and American Bird Conservancy.

Exhibit 7: Lena Groeger, Pipelines Explained: How Safe are America's 2.5 Million Miles of Pipelines?, ProPublica, Nov. 15, 2012.

Exhibit 8: City of Pittsburg, Project Pipeline List- Updated September 2013, Retrieved Jan. 8, 2014.

Attachment 2

8 January 2014
13316-00

Ms. Carmen Borg
Shute, Mihaly, and Weinberger
396 Hayes Street
San Francisco, CA 94102

Subject: Montreux Residential Subdivision Draft Environmental Impact Report

Dear Ms. Borg:

At your request, BASELINE Environmental Consulting ("BASELINE") has reviewed the CEQA analysis of the hydrology and water quality issues included in the November 2013 Montreux Residential Subdivision Draft Environmental Impact Report ("DEIR") and appended March 2013 Montreux Residential Subdivision Project Initial Study ("Initial Study"). Specifically, we reviewed the Hydrology and Water Quality section of the Initial Study only, because the DEIR does not include any analysis of hydrology or water quality (this topic was scoped out of the DEIR). In order to provide a meaningful context, we also reviewed the Project Descriptions included in the Initial Study and DEIR. Our comments are presented below.

COMMENTS ON DEIR AND INITIAL STUDY

Project Description

The Project Description does not include adequate details of the design and function of the stormwater drainage system to allow the reader of the DEIR to understand this important project element. The description of the stormwater drainage features is limited to the location of the detention basins and a mention that the stormwater system would use inlets and piping. As stated in the Project Description (DEIR page 3.0-9), the project would include grading to construct stormwater detention basins:

> *Three stormwater detention basins are included in the preliminary grading plan, with two large basins located on the east side of the main project site (Parcels C and D) along Kirker Pass Road, and a third small basin with a 12 foot access road located on the off-site parcel to the northwest of the main project site. Construction of these basins would require grading to re-contour the eastern end of the southern ridgeline on the main project site, and the north-facing slope above the proposed off-site basin located on the off-site parcel. While the entire off-site parcel totals approximately 72 acres, only 16.8 acres would be graded in order to accommodate the new off-site basin (which has an actual footprint of 0.83 acre).*

Based on information included on Figure 3.0-6 (DEIR page 3.0-10) the parcels containing the large detention basins would be 5.91 and 3.75 acres. The off-site detention basin would have a

bottom area of 0.83 acres and approximately 16.8 acres of grading would be required to construct the off-site basin. In total, more than 26 acres of land would be graded to construct these three basins.

The project would convey runoff to the detention basins using drainage inlets and piping (DEIR page 3.0-9):

> *New storm drainage infrastructure, including drainage inlets and piping, would be installed in the proposed roadways on the main project site to connect developed areas to the stormwater detention basins.*

The Project Description fails completely to describe where drainage features (inlets, piping, culverts, etc.) would be located and how these systems, including the detention basins, would be operated. The DEIR does not appear to include, nor does it reference, any hydrologic or hydraulic engineering that supports the drainage plan. The reader of the DEIR has no idea how the detention basins were sized or how they would be operated. The DEIR Project Description should be revised to include this information and appropriate hydrologic/hydraulic studies should be appended to the DEIR.

Hydrology and Water Quality Analysis

Hydrologic Setting. The DEIR/Initial Study provides no information on the hydrology and water quality setting. Without describing the hydrology of the on-site drainage and that of Kirker Creek downstream, the reader of the DEIR has no context within which to evaluate potential project impacts. The DEIR should be revised to include a Hydrology and Water Quality section that includes a detailed hydrologic setting.

Stormwater Quality and NPDES Compliance. The Hydrology and Water Quality section of the Initial Study indicates that (Initial Study page 59):

> *Postconstruction, the project would treat stormwater runoff from the new impervious surfaces created onsite, as required by provision C.3 of the Contra Costa County municipal stormwater NPDES permit by directing all site runoff into three detention basins where the runoff would be detained and released at a rate that does not exceed the current rate at which site runoff is discharged into receiving waters. The detention and slow release would allow pollutants, especially sediment to settle in the detention basins and not be discharged into the receiving waters. Therefore the site runoff would not exceed any water quality standards. This impact is considered less than significant.*

The paragraph above represents the sum total of the Initial Study/DEIR analysis and discussion of post-construction stormwater management issues. This paragraph not only fails to convey the scope of post-construction stormwater management issues and potential impacts related to the proposed project, it misrepresents NPDES requirements.

The Initial Study states that the project would treat stormwater runoff "as required by provision C.3 of the Contra Costa County municipal stormwater NPDES permit by directing all site runoff into three detention basins." The actual NPDES permit that the project would be required to comply with is the Municipal Regional Stormwater NPDES Permit, Order No. R2-2009-0074, NPDES Permit No. CAS612008, adopted October 14, 2009 and revised November 28, 2011 ("MRP"). Not only does the Initial Study refer to the wrong NPDES permit, it wrongly interprets what C.3 provisions would be required. The C.3 portion of the MRP, which refers to post-construction stormwater management for new development and redevelopment projects, requires Low Impact Development ("LID").[1]

The goal of LID is to reduce runoff and mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating stormwater runoff close to its source. Practices used to adhere to these LID principles include measures such as rain barrels and cisterns, green roofs, permeable pavement, preserving undeveloped open space, and biotreatment through rain gardens, bioretention units, bioswales, and planter/tree boxes. LID also limits disturbance of natural water bodies and drainage systems; minimizes compaction of highly permeable soils; protects slopes and channels; and minimizes impacts from stormwater and urban runoff on the biological integrity of natural drainage systems and water bodies. The project would include the following (Initial Study page 60):

> *The project includes alteration of site drainage and the alteration of the unnamed intermittent and ephemeral stream channel that runs through the project site.*

Under the project, the existing "unnamed intermittent and ephemeral stream channel" would be eliminated and placed in an underground pipe (contrary to LID principles and MRP requirements).

The basic design of the project, which includes mass grading, destruction of natural drainages, extensive new impervious surfaces, no small-scale distributed stormwater treatment features, conventional gutter and pipe collections systems, and centralized detentions basins is completely contrary to LID principles and therefore would be in violation of the MRP. The Initial Study/DEIR fails completely to identify and mitigate the flaws in project design related to post-construction stormwater management.

Incorporation of LID designs and features into the project would require extensive modifications to the grading plan and overall site plan. These design changes to the project

[1] A stormwater management strategy aimed at maintaining or restoring the natural hydrologic functions of a site. LID design detains, treats, and infiltrates runoff by minimizing impervious area, using pervious pavements and green roofs, dispersing runoff to landscaped areas, and routing runoff to rain gardens, cisterns, swales, and other small-scale facilities distributed throughout a site (source: Contra Costa County C.3 Guidebook).

should be made by the applicant and the revised project should be subject to CEQA review (which should include an EIR-level analysis of Hydrology and Water Quality).

Centralized detention basins are not LID features and should be eliminated from the stormwater quality management plan for the project. However, it is possible that some sort of detention may be required to mitigate the potential for downstream flooding of Kirker Creek.

Downstream Flooding and Erosion. The following paragraph is the only Initial Study/DEIR discussion provided related to potential downstream flooding (Initial Study page 60):

> *A majority of stormwater runoff on the site would be channeled to two detentions basins located along Kirker Pass Road, which would delay the flow of water downstream in the event of a storm, thus preventing erosion of existing stream banks and flooding downstream along Kirker Creek.*

The Initial Study/DEIR does not provide any discussion of the hydrology of Kirker Creek and its susceptibility to flooding, and therefore it is impossible for the reader to know if downstream flooding is an important issue. Based on review of available mapping and aerial photographs, Kirker Creek appears to have reaches that are highly incised with oversteepened creek banks. This indicates that portions of the creek may be unstable. There are areas in the City of Pittsburg (e.g., Brush Creek Drive, Canyon Way), where homes are located within 20 to 30 feet of the top of the creek bank. Any change to the hydrology of flows in Kirker Creek could cause increased erosion and creek bank failure, which may jeopardize existing structures. This is a potentially significant impact which must be fully analyzed under CEQA.

The Initial Study fails to provide any explanation as to how the detention basins would be operated so that "erosion of existing stream banks and flooding downstream along Kirker Creek" would be prevented. The concept of "hydromodification"[2] is not even mentioned in the Initial Study/DEIR. Simply delaying flows in detention basins is not an effective approach to preventing downstream hydromodification of Kirker Creek. By introducing widespread new impervious surfaces and conveying the increased flows to centralized basins (which tend to become sealed and do not infiltrate much water), the project would increase total discharge volume to Kirker Creek (i.e., with an increased volume of runoff, the detention basins may be able to limit increases in peak discharges, but the duration of flows would almost certainly increase). Even moderate flows to the creek, if sustained for longer periods of time than would occur without the project, could cause significant downstream erosion. The Initial Study/DEIR fails completely to analyze and mitigate this potential impact.

In summary, the project proposes mass grading, elimination of existing natural drainage channels, and drastic changes to site hydrology and flow discharge characteristics. The Initial

[2] Hydromodification is generally defined as changes in channel form associated with alterations in flow and sediment due to past or proposed future land use alteration.

Study/DEIR includes no description of the hydrologic setting, provides no substantive analysis of the hydrology or water quality effects of the project, and provides no substantial evidence for the findings of less than significant for all hydrology and water quality impacts. For a project of this magnitude, located just upstream from a potentially unstable creek system, a full EIR-level analysis of hydrology and water quality issues must be completed.

Cumulative Impacts. The Initial Study/DEIR completely fails to evaluate (or even mention) cumulative impacts related to hydrology and water quality. For example, another major project, the James Donlon Boulevard Extension, which would include massive grading and alteration of local drainage patterns and hydrology within the Kirker Creek watershed is not mentioned in the DEIR analysis. The effects and water quality, flooding, and hydromofication of these two major projects on Kirker Creek should be analyzed in the DEIR.

Should you have any questions or comments, please contact us at your convenience.

Sincerely,

Bruce Abelli-Amen
Senior Hydrogeologist
Cert. Hydrogeologist No. 96

BAA:km

556803.1

Attachment 3

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California Red-Legged Frog (*Rana draytonii*) Movement and Habitat Use: Implications for Conservation

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ABSTRACT.—**Nonbreeding habitats are critically important for *Rana draytonii*, especially for individuals that breed in temporary bodies of water. We radiotracked 123 frogs to evaluate seasonal habitat use. Individual frogs were continuously tracked for up to 16 months. Some individuals remained at breeding ponds all year, but 66% of female and 25% of male frogs moved to nonbreeding areas, even when the breeding site retained water. Frogs at our main study site moved 150 m (median), roughly the distance to the nearest suitable nonbreeding area. The greatest straight-line distance traveled was 1.4 km, although the presumed distance traveled was 2.8 km. Females were more likely than males to move from permanent ponds (38% of females, 16% of males), but among dispersing frogs, males and females did not differ in distance moved. Some frogs left breeding sites shortly after oviposition (median = 12 days for females, 42.5 days for males), but many individuals remained until the site was nearly dry. Fog provided moisture for dispersal or migration throughout the summer. Our data demonstrate that maintaining populations of pond-breeding amphibians requires that all essential habitat components be protected; these include (1) breeding habitat, (2) nonbreeding habitat, and (3) migration corridors. In addition, a buffer is needed around all three areas to ensure that outside activities do not degrade any of the three habitat components.**

Rana draytonii (California Red-Legged Frog) was once an abundant frog throughout much of central and southern California and is believed to have inspired Mark Twain's fabled story ''The Celebrated Jumping Frog of Calaveras County.'' Now this frog is rare in both the Sierra Nevada foothills and the southern portion of its range (Jennings and Hayes, 1994). In parts of the central Coast Range, there are still large, vigorous populations, some of which probably rival those present 200 years ago (Fellers, 2005). *Rana draytonii* was federally listed as a Threatened species on 24 June 1996, and the recovery plan states that it ''. . . has been extirpated from 70 percent of its former range . . . Potential threats to the species include elimination or degradation of habitat from land development and land use activities and habitat invasion by non-native aquatic species'' (U.S. Fish and Wildlife Service, 2002:iv).

Rana draytonii use ponds or pools for breeding during the wet season (December through March) and ponds, riparian areas, or other aquatic habitats during the rest of the year. In Marin County, stock ponds are the most commonly used breeding sites. There is only one published report on migration or nonbreeding habitat requirements for this frog. Bulger et al. (2003) described movements of 56 *R. draytonii* in a coastal area about 100 km south of San Francisco. They found that 80–90% of the frogs remained at one breeding site all year. Frogs radiotagged at nonbreeding sites often moved in a straight-line between breeding and upland habitats without apparent regard to intervening vegetation or topography. Frogs traveled overland up to 2,800 m, and Bulger et al. (2003) recommended a 100 m buffer zone around breeding sites.

The California Red-Legged Frog recovery plan outlines the necessary actions for recovery. One task is to ''conduct research to better understand the ecology of the California Red-Legged Frog including the use of uplands, dispersal habits, and overland movements'' (U.S. Fish and Wildlife Service, 2002:84). This is a concern not only for *R. draytonii*, but also for many endangered and nonendangered vertebrates that migrate between breeding and nonbreeding areas. This includes salamanders (*Ambystoma*; Madison, 1997; *Triturus*; Joly et al., 2001), frogs (*Rana*; Richtor et al., 2001; Pope et al., 2000), snakes (*Farancia*; Gibbons et al., 1977), turtles (Burke and Gibbons, 1995; Bodie, 2001), and many species of passerine birds (Keast and Morton, 1980). Lamoureux and Madison (1999) made the point that studies need to examine amphibian habitat requirements at all times of the year not just during the breeding season. We designed our study to address this concern for *R. draytonii*.

MATERIALS AND METHODS

Study area.—Our study was conducted in Marin County, California, 45 km northwest of

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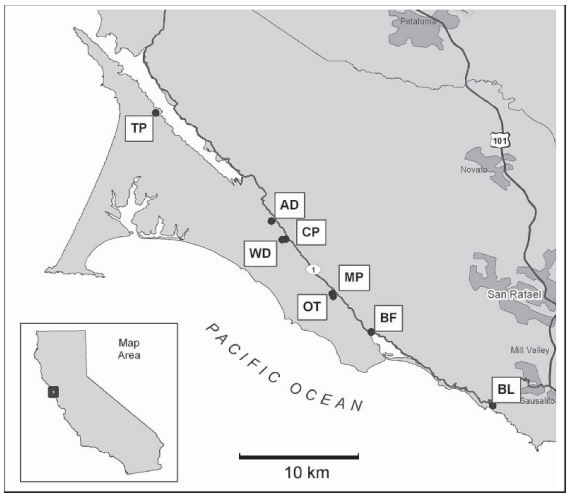

FIG. 1. Sites where California Red-Legged Frogs (*Rana draytonii*) were radiotagged at Point Reyes National Seashore and Golden Gate National Recreation Area, Marin County, California. Site descriptions are listed in Table 1.

San Francisco. All sites were within 6 km of the ocean and located at either Point Reyes National Seashore or Golden Gate National Recreation Area (Fig. 1). The local climate is Mediterranean, with an average annual rainfall of 100 cm that largely occurs between November and March. Mean monthly temperatures range from 8.6°C (December) to 16.6°C (August/September) at the headquarters of Point Reyes National Seashore in Olema Valley (National Park Service weather records). Most frogs ($N = 112$) were tagged in the Greater Olema Valley (Olema Valley and Pine Gulch Valley; 38°01′41″N, 122°46′50″E). To evaluate movement and habitat use in areas with contrasting habitats, nine frogs were tagged at Big Lagoon (37°51′36″N, 122°34′29″E), and two were tagged at Tomales Point (38°09′19″N, 122°54′43″E; Fig. 1).

Most of the Greater Olema Valley was characterized by a mixture of grazed and ungrazed grasslands interspersed with seasonal drainages with California bay (*Umbellularia californica*) and coast live oak (*Quercus agrifolia*). The west side of the valley was predominantly a Douglas fir forest (*Pseudotsuga menziesii*). Olema and Pine Gulch Creeks had well-defined riparian zones composed of California bay, red alder (*Alnus rubra*), willow (*Salix* spp.), big-leaf maple (*Acer macrophyllum*), and Douglas fir, with an understory dominated by blackberry (*Rubus discolor*), poison oak (*Toxicodendron diversilobum*), stinging nettles (*Urtica dioica*), and western sword fern (*Polystichum munitum*). Within the valley, there were 24 *R. draytonii* breeding sites. Fourteen of these were artificial stock ponds, and the others were naturally occurring ponds or marshes. Aquatic vegetation was predominantly cattails (*Typha* spp.), pennywort (*Hydrocotyle verticillata*), and rushes (*Juncus* spp.). About half of the ponds were seasonal, whereas the others usually held water all year. Study sites within the Olema Valley were selected to represent a range of habitats and because there was a sufficiently large *R. draytonii* population at each of the study sites.

The Big Lagoon study site consisted of a cattail marsh with a seasonal creek (Green Gulch Creek) that flowed into it. The marsh had several small areas where water depth was 1.0–1.5 m during the winter, but most of the marsh was covered by < 0.25 m of water, even during the wet season. A levee on the north side separated the marsh from a permanent creek (Redwood Creek), but a set of culverts allowed water to enter the marsh during higher winter flows. Water retention in the marsh varied with rainfall but was also influenced by how much water the National Park Service allowed to pass through flood gates on the culverts. The Tomales Point study site was a nonbreeding site at a seasonal seep. The dominant vegetation was coyote brush (*Baccharis pilularis*), with a few wax myrtle (*Myrica californica*). The nearest breeding pond was 650 m away.

Field methods.—Frogs were caught at night either with a dip net or by hand. We marked each frog with a passive integrated transponder (PIT) tag (TX1400L, Biomark, Meridian, ID; www.biomark.com) for individual identification and recorded sex, snout–vent length (SVL), and mass. Each frog was radiotagged by attaching a transmitter (model BD-2G, Holohil Systems Ltd., Carp, Ontario, Canada; www.holohil.com) to a belt of aluminum beaded chain that was slipped over the frog's extended rear legs and up onto the waist (Rathbun and Murphey, 1996). The transmitters were either a dull green or light brown color. The aluminum belt was painted flat black to eliminate reflections. The smallest frog we radiotagged was 32 g, and the mass of the transmitter and belt was approximately 2.1 g (6% of the frog's mass). When possible, we recaptured frogs before the battery died (20-week life) and fitted a new transmitter. We tagged frogs during all months of the year except August, with most being tagged just prior to, or during, the December to March breeding season.

A total of 123 individual frogs was radiotagged (47 females, 76 males) between 5 November 1997 and 1 May 2003 at eight sites (Table 1). Twenty-three frogs were consecutively fitted with two transmitters, six frogs with three transmitters, and one frog wore six

TABLE 1. Sites where California Red-Legged Frogs (*Rana draytonii*) were fitted with radiotransmitters in Marin County, California. Figure 1 shows the geographic distribution of the sites.

Site name	Habitat	Number of frogs tagged		Days tracked	
		M	F	Median $\bar{x} \pm$ SD	Range
Greater Olema Valley					
CP	Permanent pond	44	31	86 89.6 ± 56.0	2–229
MP	Seasonal pond	19	9	76 80.5 ± 47.3	12–191
AD	Seasonal pond	2	4	127 139.0 ± 75.0	63–253
BF	Seasonal pond	2	2	112 109 ± 74.9	28–184
WD	Permanent pond	0	1	134	134
OT	Permanent pond	1	0	121	121
All sites	–	68	47	83 91.3 ± 56.1	5–253
Big Lagoon					
BL	Permanent marsh	9	0	68 66.8 ± 36.8	16–130
Tomales Point					
TP	Seasonal seep and ditch	0	2	283	68–498

consecutive transmitters. Seventy-eight percent of all transmitters ($N = 166$) were recovered. Three frogs (two females, one male) lost their transmitters but were subsequently recaptured and outfitted with new transmitters 54, 244, and 493 days later. This yielded 126 telemetry histories. We generally located radiotagged frogs twice weekly; more often when the frogs were making regular movements. We recaptured frogs every 3–4 weeks to check for injuries and ensure proper fit of the transmitter belt. Frogs were radiotagged for 91 days (median) at the Olema Valley study sites and for 67 and 283 days at the Big Lagoon and Tomales Point sites, respectively.

Frogs were located using a TR-2 receiver (Telonics, Mesa, AZ; www.telonics.com) or an R-1000 receiver (Communication Specialists, Inc., Orange, CA; www.com-spec.com) with a directional ''H'' or three-element yagi antenna. Fine scale location of transmitters was accomplished with a partially stripped coaxial cable inserted into a length of PVC pipe that was used as a probe (Fellers and Kleeman, 2003). Radio locations were only determined during the day.

Frog locations were plotted on a 7.5′ USGS topographic map by noting proximity to a mapped feature or permanent local landmark (e.g., dead snag, fence corner). On a few occasions, locations were initially determined using a Garmin 12XL GPS unit (Garmin International Inc., Olathe, Kansas, www.garmin.com), but these locations were later visited and mapped on a topographic map using local landmarks. Telemetry data were analyzed by plotting coordinates on digitized USGS topographic maps (1:24,000 scale) using Topo! software (National Geographic TOPO! Maps, San Francisco, California; maps.nationalgeographic.com/topo). Unless otherwise noted, movements represent straight-line distances between successive locations. For some frogs, we also calculated a longer distance moved based on locations between breeding and nonbreeding sites. For example, frogs found at several successively further distances along a riparian corridor were presumed to have followed the creek between sites. This typically resulted in a longer distance moved than would be obtained using a straight-line distance and is referred to as presumed distance. Statistical analysis was conducted using Statistix (Version 7, Analytical Software, Tallahassee, Florida; www.statistix.com/home.html). We used $\alpha = 0.05$ to evaluate statistical significance.

Olema Creek passed within 110 m of our main study site (CP) in Olema Valley (Fig. 1). To evaluate use of nonbreeding habitat, we conducted nocturnal surveys along all or part of a 4.8-km segment of Olema Creek where it flowed past our study area. One or two observers walked the creek while carefully searching both pools and stream banks for frogs. Observers used a combination of spotlights and binoculars to locate animals (Corben and Fellers, 2001). Radiotelemetry was not used as part of these nocturnal surveys. We believe that most of the frogs we located used the adjacent pond (CP) for breeding because (1) it

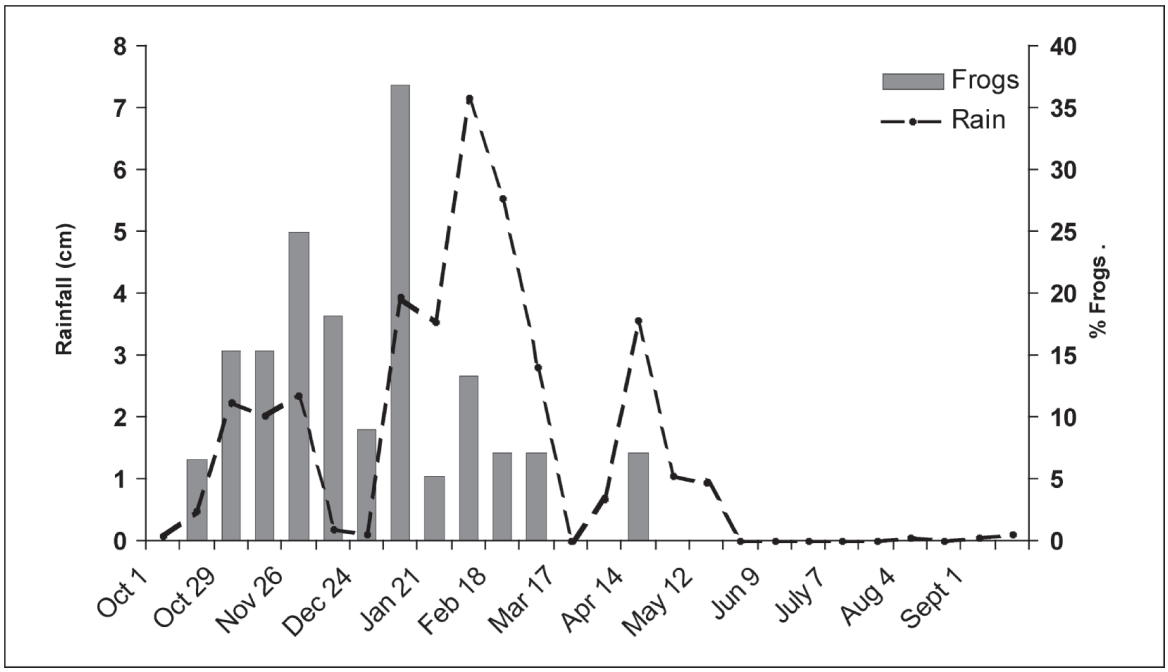

FIG. 2. Biweekly rainfall and the percent of radiotagged *Rana draytonii* that moved ≥30 m between October 1999 and September 2000.

was the closest breeding site and (2) some of the frogs found along the creek had been fitted with radiotransmitters at the pond.

RESULTS

Frogs made small-scale movements (<30 m) throughout the year. Movements of <30 m could be made without leaving the breeding sites; hence, they were considered local, nondispersal. Movements ≥30 m generally coincided with winter rains, although some frogs did not move until their seasonal habitat was on the verge of completely drying. In general, frogs moved toward breeding ponds with the onset of heavy winter rains. Frogs departed from breeding ponds at varying times throughout the rainy season, with some frogs remaining at permanent ponds all year. Some frogs made large-scale movements during the dry season (May through October), as seasonal breeding sites dried. A regression of the percent of frogs that moved ≥30 m versus rain showed that more frogs moved with higher amounts of rain ($P = 0.006$). We show rainfall and movements for the 1999–2000 season (Fig. 2), the year we had the most frogs simultaneously radiotagged.

Frog movements in the greater Olema Valley.—One hundred fifteen frogs were tracked for a mean of 91 days each (range = 5–253, Table 1). Median distance moved from the breeding site was 0 m, but for the 36 frogs that moved ≥30 m, the median was 150 m (range = 30–1400 m, Table 2, Fig. 3). In many cases, frogs almost certainly moved more than the straight-line distance between sites. This was confirmed with individuals that were located in transit. Presumed distance moved for those frogs that moved ≥30 m was 185 m (median, range = 30–1400 m).

A higher proportion of radiotagged females moved ≥30 m than males (13 of 68 males, 23 of 47 females, $\chi^2 = 11.49$, df = 1, $P < 0.01$). For frogs that moved ≥30 m, distance traveled was not significantly different for males ($N = 13$) and females ($N = 23$; median = 210 vs. 140 m, respectively; Wilcoxon rank sum $T = 1.22$, $P = 0.22$). Because some frogs lost their transmitters or were killed by predators (see below), the median distance moved might be greater than what we measured. Of the 36 frogs that moved ≥30 m, 22 (11 males, 11 females) reached a destination where they remained for at least two weeks. For these frogs, median distance traveled was 175 m. The median for these males and females was not significantly different (210 vs. 120 m; Wilcoxon rank sum $T = 0.56$, $P = 0.58$), in part because of the large variability in distance traveled.

A higher proportion of females left breeding sites than males. At our main study site (CP), nine of 21 (43%) females left the breeding site, whereas only four of 25 (16%) males departed. Females left the breeding site sooner than males (1, 5, 5, 5, 12, 55, 60, 76, 92 days for females [median = 12]; 31, 38, 47, 69 days for males

TABLE 2. Distance moved for 110 California Red-Legged Frogs (*Rana draytonii*) with radiotransmitters at three study sites in Marin County, California. Sixteen frogs radiotagged at nonbreeding sites are not included in this tabulation.

		Distance moved for frogs that moved ≥30 m						Frogs that moved <30 m
	Sex	Minimum	Median	Maximum	Mean	SD	*N*	*N*
Olema Valley								
CP	Males	200	240	490	293	135	4	31
CP	Females	100	320	1400	421	416	10	14
MP	Males	270	270	270	270	–	1	18
MP	Females	150	150	150	150	0	2	7
AD	Males	–	–	–	–	–	0	2
AD	Females	30	80	90	70	28	4	0
BF	Males	80	80	80	80	–	1	1
BF	Females	40	95	150	95	78	2	0
WD	Males	–	–	–	–	–	0	0
WD	Females	–	–	–	–	–	0	1
OT	Males	560	560	560	560	–	1	0
OT	Females	–	–	–	–	–	0	0
Big Lagoon								
BL	Males	30	105	390	158	136	6	3
	Females	–	–	–	–	–	0	0
Tomales Point								
TP	Males	–	–	–	–	–	0	0
TP	Females	30	40	50	40	14	2	0

[median = 42.5]), but the sample size was small, and the difference was not significant ($T = 0.61$, df = 11, $P = 0.55$).

Some of the dispersing frogs moved well away from the breeding site. One female (10.7 cm SVL) left the pond at our main study area (CP), crossed Olema Creek (the primary nonbreeding area) and stopped at a pond 320 m from the breeding pond. Two females (10.9 and 10.1 cm SVL) moved from CP, across Olema Creek and eventually resided in marshes, 0.88 and 1.02 km from the breeding site. Another female (10.6 cm SVL) moved down Olema Creek and up a small tributary for a total distance of 2.8 km (see individual case histories below).

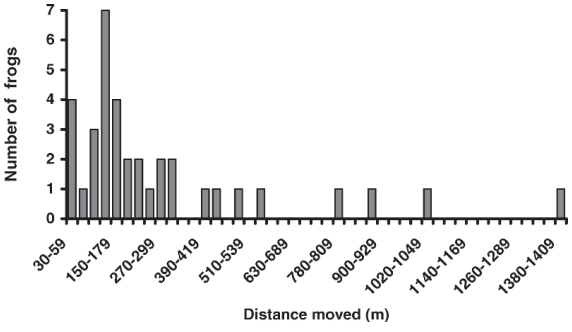

FIG. 3. Straight-line distance moved for all radiotagged Greater Olema Valley frogs that traveled ≥30 m. Median = 185 m, $N = 36$.

Fourteen of the breeding sites in the Greater Olema Valley were stock ponds surrounded by pastures. At these sites, all frogs that left the breeding site had to cross heavily grazed grassland to reach another pond or the riparian area. Frogs moved directly across these fields, typically traveling the most direct route to their destination. Movements of 100–200 m across open grasslands were common. With one exception, movements taking more than one night were along riparian corridors. One frog, however, spent five days sitting in a small clump of rushes in an open grassland (45 m from the breeding pond) before moving another 100 m to a small riparian area where it spent the next 50 days.

In two instances, we radiotagged females that appeared to have recently laid eggs (i.e., gaunt sides, conspicuously loose skin). Both frogs left the breeding pond within two days and moved to a seasonal marsh 800 m away. One frog took 32 days (5 December 1997 to 5 January 1998), whereas the other took five days (14–19 January 2000). A gravid female was fitted with a transmitter at a seasonal pond on 29 January 2001. By 8 February 2001, she had moved to an adjoining swale dominated by rushes. When captured on 28 February 2001, she had laid her eggs, as indicated by a sudden drop in mass. By 3 April 2001, she had moved 150 m to a riparian area where she remained until the transmitter was removed on 1 August 2001.

Frog movements at Big Lagoon.—The nine male frogs at this site moved a median distance of 70 m (0–390 m, Table 2). Frogs made small-scale movements (<30 m) throughout the time they were radiotagged (26 December 2002 through 3 June 2003). Most movements were between three of the deeper parts of the marsh, but one frog moved 390 m up Green Gulch Creek (when part of the marsh dried), to a seasonal creek that flowed into the marsh system. The other frogs moved to the only remaining pool at the west edge of the marsh, 50–75 m away. Most frogs did not use the riparian zone along the adjacent Redwood Creek. One individual spent four weeks there, and another frog moved to the riparian zone just before it lost its transmitter. We found frogs in the riparian area during only one nocturnal survey, although we regularly found them in the marsh or adjacent cattails.

Frog movements at Tomales Point.—The two female frogs radiotagged at this site (6.7 and 10.6 cm SVL) were relatively sedentary and apparently did not move to a breeding site. They had transmitters for an average of 283 days (68 and 498 days). Both frogs moved >30 m, with a mean of 65 m (Table 2). Although it might have been possible for the female that we tracked for 498 days to have moved to a breeding pond, laid eggs, and returned to her nonbreeding site without our noticing her absence, the gradual increase in mass throughout the time we tracked her indicated that this did not happen, and she apparently did not breed during the time we radiotracked her.

Use of riparian habitat.—On six of the 21 nocturnal stream surveys, there were ≥4 frogs per 100 m of stream, and one survey located seven frogs per 100 m (2 September 1999). Because radiotagged frogs known to be present (i.e., located during the same day by telemetry and also found along the creek on subsequent days) were frequently not seen during nocturnal surveys, the number of frogs along the creek was greater than what we observed, but it is not possible to determine by how much. For example, during a nocturnal survey on 5 July 2000, we observed one of the radiotagged frogs known to be along the creek, but we did not find two other radiotagged frogs whose presence had been confirmed earlier that day. Similarly, a nocturnal survey on 3 August 2000 did not detect either of two radiotagged frogs known to be present earlier that day; however, two untagged adults and nine subadults (<5.5 cm SVL) were observed. Nocturnal surveys also suggested that frogs tended to concentrate along portions of the creek nearest the breeding sites (Fig. 4).

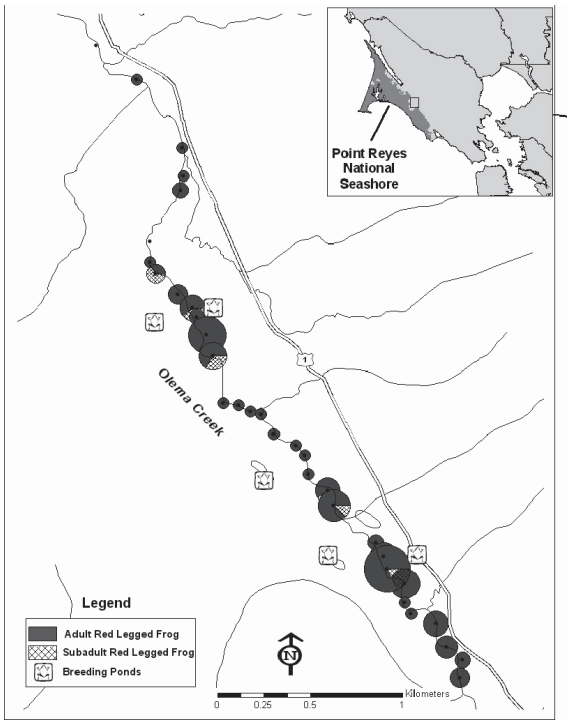

FIG. 4. Distribution of *Rana draytonii* along Olema Creek as detected during nocturnal surveys 4–6 October 1999. The distribution of frogs was similar during other surveys. Circles represent frogs, and size of each circle indicates relative number of frogs.

Diurnal behavior.—We conducted our radiotracking during the day and were frequently able to confirm visually the exact location of frogs with transmitters. This allowed us to evaluate diurnal microhabitat use. It was not unusual to find California Red-Legged Frogs basking in full sun, immediately adjacent to the water. Although we observed this behavior primarily at breeding ponds, occasionally frogs were found in similar situations in nonbreeding riparian areas.

Frogs that were not basking used a variety of cover. In permanent ponds, they sat entirely underwater in the deeper portions of the pond (>0.75 m), usually in association with the emergent vegetation. At sites with deeper water, *R. draytonii* sat on the bank in close proximity to the water. In shallow, seasonal ponds (<0.4 m deep), frogs were usually under vegetation (e.g., rushes, blackberries, hedge nettles [*Stachys ajugoides*]) at the edge of the pond. In seeps or seasonal streams, frogs were found under blackberry thickets interspersed with poison oak, coyote brush, hedge nettles, stinging nettles, and mats of rushes. Along permanent streams, frogs were found in or near pools with a depth of >0.5 m and associated with structurally complex cover (e.g., root mass, logjam, or overhanging bank). When on stream

banks, frogs sat under dense vegetation as far as 2 m from the water's edge. Vegetation was predominantly western swordfern, blackberry, hedge nettle, and giant horsetail (*Equisetum telmateia*).

Predation.—We documented two predation events and had circumstantial evidence for three others. A Great Blue Heron (*Ardea herodia*) ate two radiotagged frogs sometime between 4 and 18 January 2000 (Fellers and Wood, 2004). Three other frogs appeared to have been killed by predators. The skin, bones, and transmitter of one frog were found at the base of a guano-stained fence post, along with a number of raptor pellets. Two frogs appeared to have been killed by mammalian predators, although we have no definitive proof. We found the skin, internal organs, PIT tag, and transmitter of a frog in a riparian corridor, and we found pieces of skin, internal organs, and the transmitter of another frog. One frog appeared to have been stepped on by a large, hoofed animal, probably one of the cows that grazed in the pasture. We found the anterior two-thirds of the frog in a pasture; the posterior portion of the frog had been crushed into the ground. Although we did not observe any predation during our nocturnal surveys along Olema Creek, we regularly observed raccoons (*Procyon lotor*), Black-Crowned Night Herons (*Nycticorax nycticorax*), river otters (*Lutra canadensis*), and nonnative rats (*Rattus* spp.). At breeding sites, we observed Great Blue Herons, but other potential predators probably visited the ponds and marshes at times.

Injuries from transmitters.—Twenty frogs had injuries from transmitter belts (17% of radiotagged frogs). The most common injury consisted of small abrasions on the dorsum or, less frequently, a midventral abrasion. The wounds generally healed within two weeks if frogs were fitted with transmitter belts with one additional bead. Eleven of the injured frogs were reweighed at the time the wound was noticed, and all frogs had gained mass since their initial capture. We reweighed 23 uninjured frogs with transmitters; 18 (78%) gained mass after initial capture, two (9%) had no change, and three (13%) lost mass. The mean mass gain for these frogs was 21%, and mean mass loss was 8.5%. Overall, we do not believe that the minor injuries caused by the transmitter belt interfered with frog behavior.

Individual case histories.—The frog that was radiotagged for the longest time had a transmitter for 16 months. When first caught on 12 May 1999, the female frog weighed 42.5 g and was 7.3 cm SVL. It grew steadily and was 77.7 g and 8.9 cm when last captured on 14 June 2000.

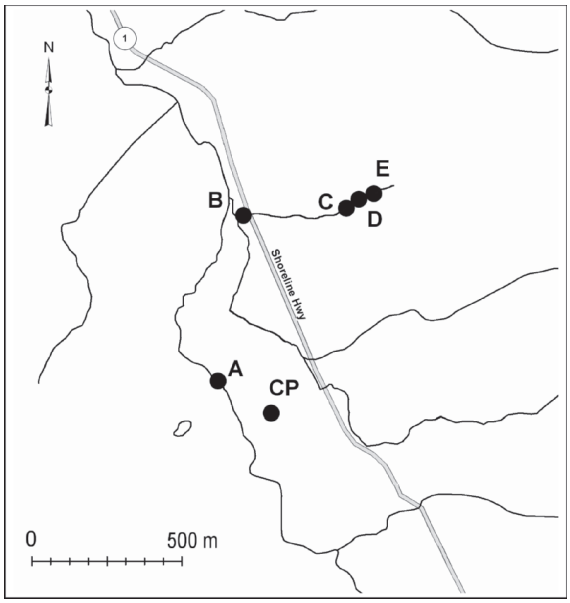

FIG. 5. Movements of a female radiotagged *Rana draytonii* that was captured at a breeding pond (CP) and subsequently moved to sites A–E. The frog was 10.5 cm (SVL) and was tagged during the breeding season (19 January 1999). The straight-line distance from CP to E was 1.4 km, but the presumed distance moved was 2.8 km.

The frog was caught in a puddle (1.0 × 0.3 m, 15 cm deep) that had formed in a rut created by a roadside seep along an abandoned dirt road on Tomales Point (site TP, Fig. 1). For 16 months, this frog made frequent, small (2–10 m) movements, within a 200-m^2 area surrounding the seep. The furthest the frog moved was 110 m. It used a variety of microhabitats: underwater in the puddle, underground in small mammal burrows, partially buried in duff beneath wax myrtle and coyote brush, and sitting in small clumps of grass. Although this frog was an adult female, it did not move to the nearest known breeding pond (650 m away) during the winter of 1999–2000. On 1 September 2000, the transmitter was found in the grass beneath a coyote brush, 6 m from where the frog had last been found. We could not determine whether the transmitter had fallen off or whether the frog had met a predator.

One frog moved at least 1.4 km. This was a female (10.5 cm SVL) tagged at a breeding pond (CP) during the breeding season (19 January 1999). On 23 January 1999, she was located under a fallen tree, 240 m away in Olema Creek. On 30 January 1999, she had moved a minimum of 650 m to a pool in a small tributary of Olema Creek (Fig. 5). It is quite likely that the frog followed Olema Creek to the tributary, which would have required a move-

ment of 1.0 km to reach that point. By 14 February 1999, the frog had moved either across a two-lane, paved country road or under the road through a culvert. She then moved up a small, seasonal drainage, 430 m from her previous location. The presumed distance traveled by this frog was 2.8 km. The frog stayed in this drainage and was often found under blackberry brambles and thickets of poison oak along the stream. The transmitter and remains of the frog were found on 14 June 1999, apparently the victim of avian predation (see Predation above).

Discussion

The California Red-Legged Frog recovery plan emphasizes protection and recovery of breeding habitat (U.S. Fish and Wildlife Service, 2002), and most protection efforts have focused on breeding sites. One challenge in managing *R. draytonii* has been the paucity of data on habitat use beyond the breeding site, thus making it difficult to evaluate requirements for nonbreeding habitat and connecting migration corridors. Our study provides insights into *R. draytonii* movement and habitat use in a coastal environment and establishes a basis for making decisions about habitat protection.

Migration of *R. draytonii* from the breeding sites we studied was highly variable. Some frogs remained at breeding ponds all year, whereas others spent only a few days. Two-thirds of female frogs and 25% of male frogs moved from breeding areas. Bulger et al. (2003) found that 80–90% of *R. draytonii* remained at one breeding site all year. In our study, frogs at sites that held water only seasonally often lingered until the site was on the verge of drying completely. Because all our study sites were in an area where summer fog is the norm (E. J. Null, NOAA Technical Memorandum, NWS WR-126, 1995; Lundquist and Bourcy, 2000), frogs could move throughout much of the summer with little risk of desiccation. Once along the riparian corridor, frogs used a range of microhabitats that provided both cover and moisture, especially blackberry thickets, log-jams, and root tangles at the base of standing or fallen trees. Regular summer dispersal across open grassland is in contrast to what Rothermel and Semlitsch (2002) reported for juvenile *Ambystoma* and *Bufo* in Missouri where desiccation appeared to be a significant factor affecting amphibian dispersal across fields adjacent to their artificial pools.

There was a wide range of migration distances (30–1400 m, straight-line). Our main study pond was 110 m from a riparian zone that provided suitable nonbreeding habitat (CP, Fig. 1). For frogs that moved at least 30 m from the pond, the median movement was 150 m. Relatively short movements from breeding sites was also suggested by the nocturnal surveys of riparian vegetation along Olema Creek (Fig. 4) where we found more frogs in areas adjacent to breeding sites. At Big Lagoon, where nonbreeding habitat was immediately adjacent to breeding sites in the marsh, the median distance moved was 68 m, and none of the frogs went more than 390 m. These short movements were similar to Columbia Spotted Frogs (*Rana luteiventris*); Pilliod et al. (2002) found no significant difference between males ($\bar{x}$ = 367 m moved) and females ($\bar{x}$ = 354 m). Bartelt et al. (2004) reported that male Western Toads (*Bufo boreas*) traveled shorter distances from breeding ponds than females (581 m ± 98 and 1105 m ± 272, respectively). Because there is relatively little data on these species, it is not possible to determine whether the differences are species-specific or dependent on the local landscape.

When frogs moved beyond the minimum distance to reach a suitable nonbreeding area, some followed riparian corridors, whereas others moved directly toward sites where they stayed through the nonbreeding season. Because most frogs moved from a breeding pond, across a grazed pasture, to a riparian area, they did not have the option of following a waterway during their initial movement. This is similar to Bulger et al. (2003), where frogs mostly moved in a straight line without apparent regard to intervening vegetation or topography. However, there were a few individuals in each study that moved primarily along a creek.

During our nocturnal surveys of Olema Creek, some frogs were well hidden by cover, whereas others sat fully exposed on top of logs or even on the sandy edge of the creek, places where California Red-Legged Frogs were rarely seen during the day. It is unclear why some individuals spent hours exposed to predation when good cover was only 1–2 m away. A frog in the open would have a wider field of view to detect and capture prey, perhaps partially mitigating the risk of predation. We documented predation by a Great Blue Heron, had evidence of predation by a raptor, and suspect that two other frogs succumbed to mammal predators. Additionally, we occasionally observed predators along Olema Creek including raccoons, Black-Crowned Night Herons, river otters, and nonnative rats (*Rattus* spp.). At a marsh that was not part of this study, we regularly observed night herons, and *R. draytonii* were so skittish that we have never been able to capture a single individual.

Based on their findings that 60% of the radiotagged frogs stayed within 30 m of their

breeding sites, Bulger et al. (2003) recommend a 100-m buffer with an array of suitable habitat elements around breeding sites. Although that might work well at their study area, we do not believe that a simple, symmetrical buffer is typically adequate. At our main study site, a 100-m buffer would not include any suitable nonbreeding habitat. Because the pond completely dries every 4–5 years, such a buffer would result in the elimination of the local population. By contrast, the Big Lagoon site has suitable nonbreeding habitat immediately adjacent to the marsh. At that site, maintaining the marsh habitat and the natural water levels would likely be adequate for long-term survival.

Three important conclusions from our study are that (1) most frogs move away from breeding sites, but only a few move farther than the nearest suitable nonbreeding habitat; (2) the distance moved is highly site-dependent, as influenced by the local landscape; and (3) land managers should not use average dispersal or migration distances (from our study, or any other) to make decisions about habitat requirements. A herpetologist familiar with *R. draytonii* ecology needs to assess the local habitat requirements.

Recommendations.—Maintaining populations of pond-breeding amphibians, such as *R. draytonii*, requires that all essential habitat components be protected. These include (1) breeding habitat, (2) nonbreeding habitat, and (3) migration corridors. In addition, a buffer is needed around all three areas to ensure that outside activities do not degrade any of the three habitat components.

For *R. draytonii*, nonbreeding habitats must have several characteristics: (1) sufficient moisture to allow amphibians to survive throughout the nonbreeding season (up to 11 months), (2) sufficient cover to moderate temperatures during the warmest and coldest times of the year, and (3) protection (e.g., deep pools in a stream or complex cover such as root masses or thick vegetation) from predators such as raptors (hawks and owls), herons, and small carnivores.

Breeding habitat has been well described (U.S. Fish and Wildlife Service, 2002; Stebbins 2003) and receives most of the management attention (US Fish and Wildlife Service, 2002). However, nonbreeding areas are equally important because some *R. draytonii* spend only a week or two at breeding sites, yet nonbreeding habitat is frequently ignored and is generally not well understood. Aside from our study, Bulger et al. (2003) are the only ones to publish details on the use of nonbreeding habitat by *R. draytonii*. Additional research on nonbreeding habitat is needed, especially in other parts of range where *R. draytonii* occupy a diversity of ecotypes.

Migration corridors are frequently not considered in management planning for California Red-Legged Frogs. Our work and that of Bulger et al. (2003) indicate that *R. draytonii* migration corridors can be less ''pristine'' (e.g., closely grazed fields, plowed agricultural land) than the other two habitat components. Bulger et al. (2003) observed that *R. draytonii* did not avoid or prefer any landscape feature or vegetation type. They tracked frogs that crossed agricultural land, including recently tilled fields and areas with maturing crops. Our study site did not encompass such a diversity of habitats, but frogs readily traversed pastureland that surrounded the breeding sites. While conducting other research, we observed five frogs crossing a recently burned field as they moved toward a breeding pond during the first rain of the season (25 October 2004). Both our study and that of Bulger et al. were conducted at study sites near the Pacific Ocean where summer fog and high relatively humidity reduce the risk of desiccation for dispersing amphibians (E. J. Null, NOAA Technical Memorandum, NSW, WR-126, 1995; Lundquist and Bourcy, 2000). Though desiccation was probably not a problem for frogs in our study, amphibians are often faced with a variety of hazards including roads (Gibbs, 1998; Vos and Chardon, 1998), degradation of habitat (Vos and Stumpel, 1995; Findlay and Houlahan, 1997; Gibbs, 1998), and predation (Gibbs, 1998), as well as desiccation (Rothermel and Semlitsch, 2002; Mazerolle and Desrochers, 2005).

Buffers are often described as the area that frogs use near breeding sites. Such usage combines migration corridors and nonbreeding habitat, as well as the adjacent area necessary to protect these areas. We believe that it is important to identify each habitat component separately and then include a buffer that is sufficiently large to maintain the integrity of each habitat type. Such a buffer cannot be defined as a standard distance but rather as an area sufficient to maintain the essential features of the amphibian habitat. Hence, a riparian area adjacent to a forest undergoing clear-cut logging would need a relatively large buffer to protect it from increased sedimentation and the increased temperature fluctuations that occur after logging. Less severe habitat modifications adjacent to amphibian habitat could be accommodated with a narrower buffer (deMaynadier and Hunter, 1995, 1999; Gibbs, 1998).

Buffers are typically described as a fixed-width boundary around breeding sites (Semlitsch and Bodie, 2003). However, the distribution of habitat components is rarely symmetrical

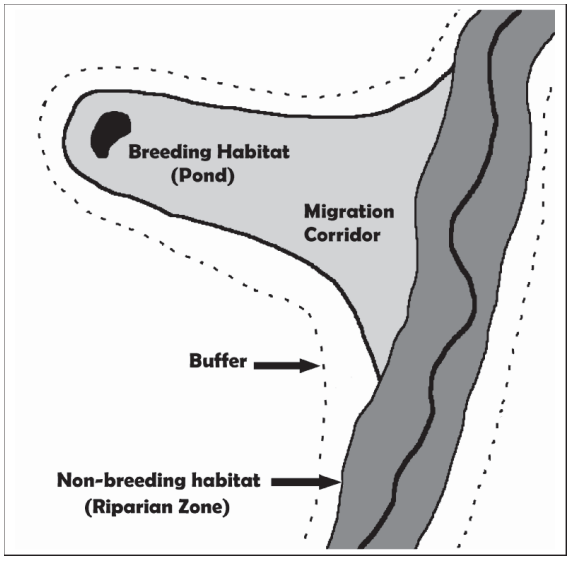

FIG. 6. Stylized diagram of typical *Rana draytonii* habitat showing the critical habitat components and the required asymmetrical buffer.

(e.g., a pond with frogs dispersing in all directions to surrounding nonbreeding area). At all of our study sites, frogs moved primarily in one direction, often toward the nearest riparian area, similar to what Rothermel and Semlitsch (2002) reported. As suggested by Regosin et al. (2005), protecting frog habitat in these situations requires an asymmetrical conservation area (Fig. 6). Because it is often not obvious from casual inspection what areas frogs are relying upon, delineating each habitat component and determining the size of a suitable buffer requires either an expert opinion from a field biologist with extensive experience with the species of interest or a field study to monitor radiotagged frogs.

The design of protected areas is often developed with the unstated assumption that only the most sedentary frogs can or need to be protected. The resulting systematic loss of individuals that move the farthest can have unexpected and unwanted effects (Gill, 1978; Berven and Grundzien, 1990). Long-distance dispersers are the individuals most likely to reach distant breeding sites and, hence, provide the genetic diversity that is important for survival of small populations. Additionally, those same dispersers are the individuals that would colonize sites where frogs have been lost because of random events that periodically extirpate local populations. By consistently selecting against frogs that disperse the greatest distances, the effective size of a metapopulation is reduced and the size of the effective breeding population is smaller; smaller breeding populations have a greater likelihood of extirpation (Gill, 1978; Sjogren, 1991).

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Attachment 4

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MOVEMENT PATTERNS AND MIGRATION DISTANCES IN AN UPLAND POPULATION OF CALIFORNIA TIGER SALAMANDER (*AMBYSTOMA CALIFORNIENSE*)

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***Abstract.*—During five winter breeding seasons (October-April, 2000–2005), I investigated the migratory movements of an upland population of California Tiger Salamander (*Ambystoma californiense*) in Contra Costa County, California. I used a drift fence and pitfall trap array to partially enclose a proposed 27 ha housing project and capture migrating adult and juvenile salamanders. The study objective was to assess movement patterns and migration distances for upland life stages during an effort to translocate all captured salamanders and reduce their mortality from future development at the study site. I recorded substantial numbers of adult and juvenile *A. californiense* (90–417 annually) farther from breeding ponds than previously reported. The majority of salamanders were captured at least 800 m from the nearest breeding pond while a smaller number of salamanders were captured as far as 2.2 km from the nearest breeding pond. The study indicates that recent recommendations to protect 630 m of upland habitat adjacent to breeding ponds may leave large portions of upland life stages at risk. Adults appeared to exhibit fidelity to upland habitat, returning close to the initial point of capture. In situations where translocation is used to remove salamanders from upland habitats subject to development, results suggest it may take several years to successfully relocate a high proportion of individuals in the population.**

Key Words.—Ambystoma californiense; buffer zones; California Tiger Salamander; conservation; pitfall trap; migration distance; terrestrial movements; upland ecology.

INTRODUCTION

Conserving terrestrial habitat surrounding wetlands is essential for maintaining populations of many pond-breeding amphibians (Semlitsch and Jensen 2001; Semlitsch 2002; Semlitsch and Bodie 2003). Upland habitat is critical for feeding, refuge, and migratory movements of juvenile and adult life stages (Semlitsch 1998; Semlitsch and Jensen 2001). Recent studies emphasize that amphibian population viability can be extremely sensitive to survivorship of upland life stages (Biek et al. 2002; Trenham and Shaffer 2005). Further, the importance of specific areas of upland habitat and preferences for a particular migratory route have been reported for several species of ambystomatid salamanders (Shoop 1968; Stenhouse 1985; Trenham and Cook 2008).

Despite research documenting the biological importance of terrestrial habitat for amphibians, the extent and location of appropriate areas required to sustain viable populations are poorly understood. Several recent studies estimated the area of terrestrial habitat needed to adequately protect amphibian populations, based on migration distances from multiple studies and species. Semlitsch (1998) estimated that a 164 m "buffer zone" would encompass 95% of most ambystomatid salamander populations (based on six species). Semlitsch and Bodie (2003) estimated that "core terrestrial habitat" for 13 species of salamanders ranged from 117 to 218 m from the wetland. Rittenhouse and Semlitsch (2007) found that 95% of the adult breeding population for six species of salamanders occurs within 245 m of the wetland boundaries. However, because these studies were primarily of eastern species that typically inhabit forest or woodlands, the resulting recommendations may not be well suited to western *Ambystoma* species associated with grasslands. Although much remains to be learned regarding the appropriate size of buffer zones, it is clear that identifying and protecting upland habitat should be a management priority, especially for rare and endangered species (Marsh and Trenham 2001; Semlitsch 2007; Harper et al. 2008).

The California Tiger Salamander, *Ambystoma californiense*, is listed as a threatened species by the U.S. Fish and Wildlife Service (2004) and the state of California (California Fish and Game Commission 2010). The range of this species is restricted to grasslands and foothills of central California (Storer 1925). Adults spend the majority of their life cycle in small-mammal burrows in upland habitat (Loredo et al. 1996). With the onset of winter rains, adults emerge from underground terrestrial retreats and migrate to ponds for reproduction (Loredo and Van Vuren 1996). The importance of maintaining upland habitat adjacent to breeding ponds for *A. californiense* has only recently been emphasized (Trenham 2001; Trenham and Shaffer 2005). A more detailed under-

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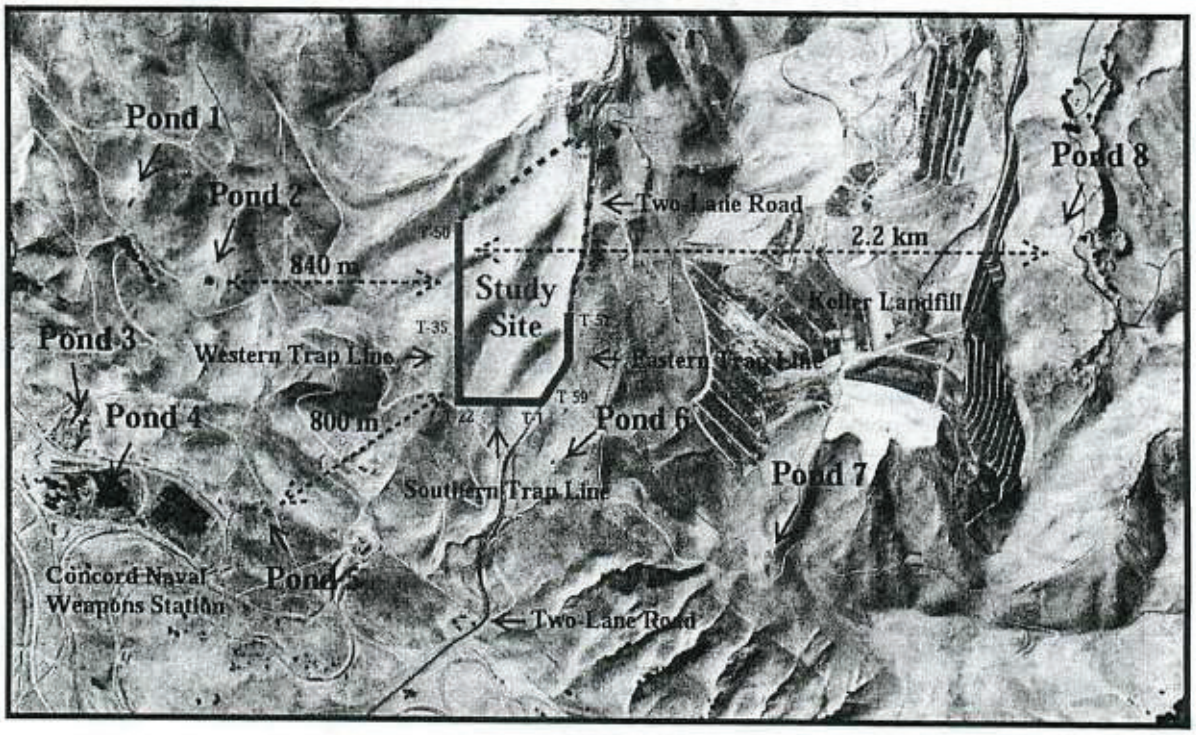

FIGURE 1. Aerial photograph showing the closest breeding ponds to the study site in Contra Costa County, California, USA (from http://www.terraserver.com; [Accessed 1 August 2002]). Bold red solid lines indicate trap line segments (western, southern, and eastern) along boundaries of the study site, T represents trap number, and dashed lines with arrows at both ends indicate distances from the western trap line to nearest breeding ponds. Ponds 1–5 are located on Concord Naval Weapons Station (CNWS) and Ponds 6–8 are located on a landfill adjacent to the study site

standing of migratory movements and activity patterns in upland habitats is fundamental to managing this species (Trenham and Shaffer 2005).

This paper presents findings of a five-year study investigating the migratory movements of upland life stages of a population of *A. californiense* at a proposed housing development. The primary objectives of the study were (1) to characterize movement patterns and timing of movements during the breeding season, (2) to measure distances from capture locations to closest known breeding ponds, and (3) to test for relationships between the timing of migratory movements and environmental parameters. An additional objective of the study was to reduce direct mortality from future development at the study site by translocating all captured salamanders outside the study site and restricting reentry. Conservation strategies involving translocations are a common wildlife management tool (Griffith et al. 1989; Fischer and Lindenmayer 2000; Dodd 2005). Although the effectiveness of translocation strategies has been subject to controversy (e.g., Dodd and Seigel 1991; Seigel and Dodd 2002; Trenham and Marsh 2002), a recent review has shown improved success rates for some species of amphibians when a critical minimum number of individuals are translocated (Germano and Bishop 2008). Relatively few translocation studies have been conducted on amphibians (Germano and Bishop 2008) or addressed human and wildlife conflicts (e.g., Cooke and Oldham 1995; Rathbun and Schneider 2001), and none have assessed the efficacy of translocating adult amphibians within upland habitat.

MATERIALS AND METHODS

Study site.—The proposed housing development is located on the northern edge of the San Joaquin Valley in northeastern Contra Costa County, California. The 27-ha area consists of grazed annual grasslands on rolling to steep hills (elevation range = 213–274 m; Fig. 1). Two primary drainages traverse the site but amphibian breeding ponds are not present. Lands surrounding the site are primarily grazed grasslands. The Concord Naval Weapons Station (CNWS) is located to the west and south of the site and a privately owned, active landfill is located to the east and southeast.

Eight breeding ponds are known to occur near the study site (Fig. 1). To the west and southwest, the closest ponds are on CNWS (Ponds 1–5) and are the primary breeding ponds on CNWS lands (Stitt and Downard 2000; Shawn Smallwood, pers. comm.). To

the east and southeast, the closest ponds are located on the adjacent landfill (Ponds 6–8). To the north, no known breeding ponds occur within 2.5 km. I examined aerial photographs from several years (1999, 2000, 2004, and 2005) and USGS topographic maps, and found no other potential breeding ponds closer to the study site. Before the trapping study began, I conducted four night surveys during winter rain events to determine if *A. californiense* was present at the study site. During these initial surveys, I observed four adults at burrow entrances of California Ground Squirrels (*Spermophilus beecheyi*) and thus commenced an intensive translocation effort.

Trapping techniques.—My field team and I (hereafter we) installed a drift fence and pitfall trap array along a partial perimeter (1.3 km) of the study site. The drift fence bordered the boundaries most likely to be used as movement corridors, and included the western, southern, and a portion of the eastern border of the study site (Fig. 1). We installed 118 pitfall traps (59 pairs of 7.5 L plastic buckets) located every 15 to 30 m along the inside and outside of the drift fence. We used a 0.9 m tall commercial quality silt fence buried 0.3 m underground, stretched taut, and secured by both wooden and steel fence posts. We placed elevated covers over the traps to provide shading and minimize predation, and placed a damp non-cellulose sponge in each trap to maintain moisture for captured salamanders. We replaced the drift fence and pitfall traps (i.e., trap line) each year of the study and repaired the fence line as needed to maintain its integrity as a barrier to movement.

Our surveys encompassed five winter breeding seasons, from October 2000 to April 2005 (hereafter, years 2000 to 2004). In 2001 and 2002, we increased the length of the trap line by installing nine pairs of pitfall traps along the eastern border of the study site. While the trap line encompassed over half the total perimeter of the proposed development, the entire area was not completely enclosed due to the large area of the site. We opened all traps at dusk on nights when the chance of rain was predicted to be 40% or greater and checked at dawn the following morning. Because amphibians are often active on the night after a heavy rain (Gibbons and Bennett 1974), we left the traps open on nights after a rain event that exceeded 0.6 cm, even when no rain was predicted for that night. At all other times the traps were closed. We immediately translocated individuals captured inside the trap line to small mammal burrows 15 to 100 m outside the development. We kept individuals captured outside the trap line outside and translocated them in the same manner.

For each capture, we recorded date, trap number, trap line side (inside or outside), sex (adults only), reproductive condition (reproductive or non-reproductive), snout-vent length (SVL), total length, and age class (adult or juvenile). We identified individuals as adults if they had at least one of the following characteristics: keeled tail, swollen vent (reproductive males), gravid condition (reproductive females), or large body length (≥ 75 mm SVL; Trenham et al. 2000). We identified juveniles based on small body length (usually < 75 mm SVL; Loredo and Van Vuren 1996) and the absence of adult characteristics. Males were distinguished from females by the presence of a keeled tail, swollen vent, or proportionally longer tail (Petranka 1998; Searcy and Shaffer 2008). We recorded adult-sized salamanders without other distinguishing characteristics as adults; these salamanders may have been subadults (≥ 1 year of age but not sexually mature) or salamanders returning from the ponds post breeding (i.e., non-reproductive). Because juvenile body lengths vary considerably (46–114 mm; Loredo and Van Vuren 1996) and can overlap adult sizes, we may have mistakenly classified some larger juveniles as adults in non-reproductive condition. In addition, we acquired two photographs of the dorsal surfaces of each captured salamander for individual identification.

Environmental variables.—In 2000 and 2001, I measured precipitation using a manual rain gauge located on site; the gauge was read and emptied when traps were opened at dusk and checked again at dawn the next morning. For the remainder of the study years, I used an automatic rain gauge (Hobo event logger, Onset Inc., Pocasset, MA., USA) to record hourly rain events (2.5 mm intervals). Air temperature was manually recorded on each morning traps were checked. I used additional data on hourly and yearly rainfall near the study site from California Department of Water Resources, California Data Exchange Center (available from http://www. cdec.water.ca.gov [last accessed 21 September 2006]).

Analyses.—I pooled daily capture data by week, year, sex, age class, and location (inside/outside trap line and trap line segment) as measures of salamander activity. I used the location of captures to infer likely movement patterns (i.e., attempting to leave or enter the study site, and directionality). To evaluate movement patterns within a breeding season, I divided capture data into early season (presumably migrating to breed) and late season (presumably returning from breeding) based on the temporal distribution of captures for all five study years combined.

To standardize for the variability in trapping effort (i.e., different number of traps per line segment and nights of trapping each year), I calculated capture rates (number of captures per 100 trap nights) for analyses. Distance calculations were measured as presumed straight line travel. Within each study year, I compared dorsal patterns in photographs to determine the number of intra-annual recaptures. Individual identification

using photography has been employed successfully with amphibians that have unique patterns of coloration; unlike invasive marking techniques, this causes no harm to the animal (e.g., Donnelly et al. 1994; Doody 1995; Bailey 2004).

I used parametric statistics when data were normally distributed and non-parametric tests when data were not. To determine if recaptured individuals returned to a similar point from which they were initially trapped, the observed mean number of traps between initial and returning trap locations was compared with the expected mean number of traps under a uniformly random scenario (Shoop and Doty 1972). For this analysis, I pooled data from all five study years to obtain an adequate sample size and used only those individuals that were initially trapped early in the breeding season on the inside of the western trap line and then recaptured later in the season outside that same trap line segment (i.e., presumably returning to the study site after breeding). I used the western trap line data because it had the majority of returns and traps along this segment were evenly spaced providing the most accurate distance measurements between initial and returning trap locations.

I tested for annual and seasonal variation in capture numbers among all five study years. I used chi-square tests to determine if annual sex ratios differed significantly from an expected 1:1 ratio. I evaluated the association between seasonal rainfall (both early and late season) and the proportion of males and females captured both inside and outside the trap line using Pearson's correlation coefficient. I used the sign test to compare annual adult capture rates early in the season on the inside of the western trap line and capture rates later in the season outside that same trap line segment, and to compare annual rainfall between early and late seasons. I used Pearson's correlation coefficient to assess whether there was a negative association between translocation efforts and annual capture rates over time based on the proportions of inside versus outside captures, and to test for a relationship between annual on-site rainfall and annual capture rates.

I also analyzed within-year associations between environmental parameters and the number of *A. californiense* captured. To assess the influence of precipitation and temperature prior to capture, I used Spearman's rank correlation. This analysis used rainfall amounts 12 h prior to opening traps (i.e., day prior to capture), 12 h prior to checking traps (i.e., night of capture), and within 24 h prior to checking traps (total of day and night). In addition, I used Wilcoxon two-sample rank sum test to assess if rain at dusk on the night of capture or the night prior to opening the traps was associated with the number of captures. Precise measurements of rain using the automatic rain recorder (which allowed for analysis of rain amounts in intervals less than a 24-h period) were available only in 2002, 2003 and 2004. Of these three years, I chose 2002 for analysis because it was least affected by translocation efforts and barrier fencing.

TABLE 1. Adult and juvenile *Ambystoma californiense* captured inside and outside the trap line during five winter breeding seasons at the study site in Contra Costa County, California. Totals include recaptured individuals. Unique captures exclude recaptured individuals and are shown in parentheses.

Year	Adult Total No. (Unique No.)	Juvenile Total No. (Unique No.)	Adult & Juvenile Total No. (Unique No.)
2000–2001			
Inside trap line	59 (58)	3 (3)	62 (61)
Outside trap line	76 (37)	62 (47)	138 (84)
Totals	135 (95)	65 (50)	200 (145)
2001–2002			
Inside trap line	184 (182)	4 (3)	188 (185)
Outside trap line	215 (158)	14 (13)	229 (171)
Totals	399 (340)	18 (16)	417 (356)
2002–2003			
Inside trap line	63 (61)	3 (3)	66 (64)
Outside trap line	120 (96)	34 (33)	154 (129)
Totals	183 (157)	37 (36)	220 (193)
2003–2004			
Inside trap line	37 (36)	0 (0)	37 (36)
Outside trap line	52 (37)	1 (1)	53 (38)
Totals	89 (73)	1 (1)	90 (74)
2004–2005			
Inside trap line	23 (22)	0 (0)	23 (22)
Outside trap line	72 (61)	86 (81)	158 (142)
Totals	95 (83)	86 (81)	181 (164)

I excluded recaptures from the analysis of some data sets (i.e., capture distribution, movement patterns, sex ratios, and annual reductions). However, except for sex ratios, these analyses did include those individuals first captured during the early season inside the trap line and then later recaptured outside the same trap line during the late season. For annual comparisons of capture numbers, I deleted data on additional traps installed in 2001 and 2002 from the analyses. For all statistical tests, results were considered significant at $\alpha = 0.05$.

RESULTS

Capture numbers and movement patterns.—The annual number of *A. californiense* captured varied from 90 to 417 salamanders over the five year study period (Table 1). Recaptured individuals represented between 9–28% of annual totals, with 96% of these individuals captured on the outside of the trap line. Eight recaptured individuals were captured on or translocated to the outside of the trap line and then later captured on the inside, but these eight represented less than 1% of the total captures. Adult recaptures returning to the study site (presumably after breeding) were found

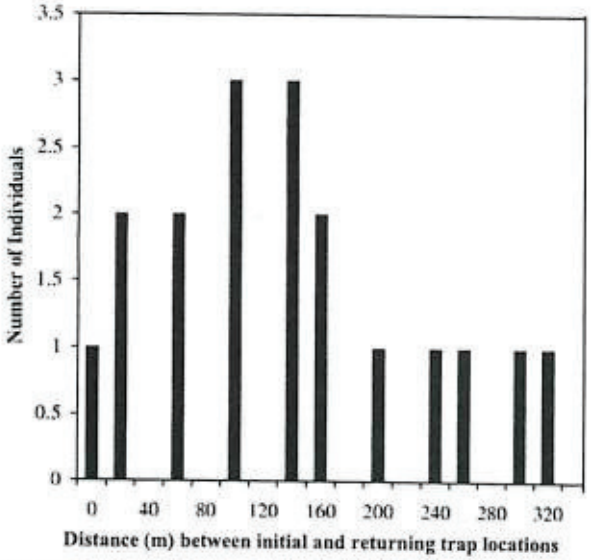

FIGURE 2. Frequency distribution of the distance between initial and returning trap locations for individual *Ambystoma californiense* for all five study years combined (2000–2005). Results include only those salamanders first trapped early during the breeding season inside the trap line and then recaptured outside the same trap line later in the season. Early season = late October to December 31; Late season = January 1 to end of March. Zero on the x-axis represents individuals that returned to the same trap location where they were initially captured.

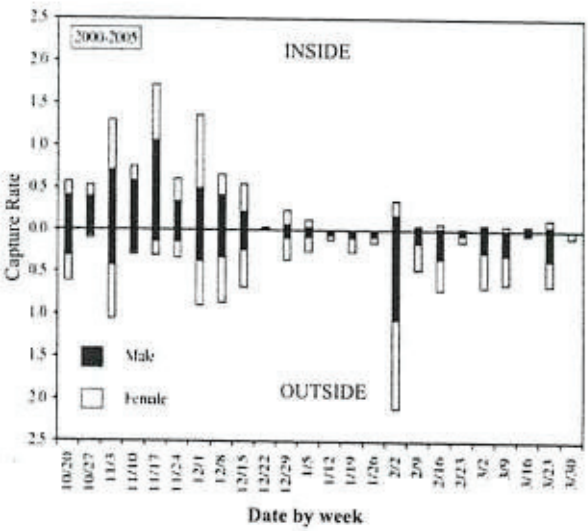

FIGURE 3. Weekly capture rates (no. per 100 trap nights) of male and female *Ambystoma californiense* inside and outside the trap line for all five study years combined (2000–2005). Early season = late October to December 31; Late season = January 1 to end of March. Dates on x-axis represent the beginning of each week. Recaptured individuals were excluded except for salamanders first captured during the early season inside the trap line and then recaptured outside the same trap line later in the season.

significantly closer to where they were initially captured inside the trap line than would be expected by random (Z = -2.92, P = 0.003). Forty-four percent of adult recapture locations were within five traps (≤ 100 m) of the initial inside trap location (Fig. 2). Several individuals were recaptured more than once outside the western trap line, presumably attempting to reenter the site. One male returned to the site five times.

Capture rates from all five study years combined indicate that males and females migrated to the breeding ponds from late October to the end of December (early season) and returned to their upland habitat from the beginning of January to the end of March (late season) (Fig. 3). Annual sex ratios differed significantly from 1:1 in 2002, with females outnumbering males by 2:1 (χ^2 = 20.46, df = 1, P < 0.001). By contrast males outnumbered females by 1.5:1 in 2000 (χ^2 = 3.80, df = 1, P = 0.051). Sex ratios were near 1:1 in the other three study years (2001: χ^2 = 0.02; 2003: χ^2 = 0.00; and 2004: χ^2 = 0.11; all df = 1, all P > 0.70). Among all study years, the proportion of each sex in the population captured early in the season on the inside of the trap line (Table 2) was associated with early season rainfall (negatively associated for males: r = -0.808; positively associated for females: r = 0.808; P = 0.049 for both). However, there was no significant association between the proportion of each sex captured early in the season outside the trap line and early rainfall (males: r = -0.340; females: r = 0.340; P = 0.288 for both) or captured late in the season outside the trap line and late rainfall (males: r = -0.494; females: r = 0.494; P = 0.198 for both).

Within each survey year, the capture rates of adults and juveniles were generally highest along the western trap line (Fig. 4). Analysis of early season capture data, when most salamanders presumably migrated to the ponds, indicated highest adult capture rates on the inside of the western trap line (Table 3). By contrast, analysis of late season data, presumably when most salamanders returned from the ponds, indicated highest adult capture rates outside the western trap line (Table 3). Capture rates for juveniles were highest outside the western trap line primarily in the early season (Table 4). Among all study years, more adults were captured early in the season inside the western trap line than were captured later in the season outside that same trap line segment (sign test, P = 0.031). Early and late rainfall was not significantly different among years (sign test, P = 0.50).

Migration distances.—The shortest distances from inside the western trap line, where the majority of adults were captured in the early season, to the closest breeding ponds to the west were 800 to 840 m (Ponds 5 and 2 on CNWS, respectively; Fig. 1). A smaller number of adults captured early in the season on the outside of the western trap line may be migrating east (Table 3). The closest breeding pond from the western trap line to the east is Pond 8 at 2.2 km. A few adults captured early in

TABLE 2. Proportions of male and female *Ambystoma californiense* captured during the early and late winter breeding seasons on the inside and outside of the trap line. Parentheses indicate the number of each sex captured and N = the total number of adults captured. Early season = late October to December 31; Late season = January 1 to end of March. Results exclude all recaptured individuals.

Season/ Trap Line Side	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005
Early/Inside					
Male	0.76 (41)	0.50 (86)	0.39 (23)	0.68 (23)	0.52 (11)
Female	0.24 (13)	0.50 (87)	0.61 (36)	0.32 (11)	0.48 (10)
N =	54	173	59	34	21
Early/Outside					
Male	0.42 (8)	0.55 (46)	0.28 (23)	0.43 (13)	0.41 (15)
Female	0.58 (11)	0.45 (38)	0.72 (58)	0.57 (17)	0.59 (22)
N =	19	84	81	30	37
Late/Outside					
Male	0.33 (6)	0.45 (52)	0.33 (11)	0.36 (5)	0.43 (12)
Female	0.66 (12)	0.55 (64)	0.66 (22)	0.64 (9)	0.57 (16)
N=	18	116	33	14	28

the season along the inside of the eastern trap line may have been traveling east as well. The closest known breeding pond is only 225 m from the southeast corner the study site (Pond 6). I captured relatively few adults along the inside of either the southern or eastern segments of the trap line in the early season.

Migratory movements and environmental parameters.—Based on trapping data adults began moving with the first night of substantial rain of the season (≥ 1 cm). Smaller amounts of nightly rain (≤ 0.5 cm) at the beginning of the breeding season did not appear to initiate movement. In all survey years, the earliest dates adults were captured ranged from 20 October (2004) to 11 November (2001). Most adult captures occurred between early November and mid-December with fewer more temporally dispersed captures later in the season. Juveniles began arriving at the boundaries of the study site each year within six nights of measurable rain. The earliest dates juveniles were captured ranged from 29 October (2000) to 22 November (2001).

Both the amount of rain within 12 h (night of capture) and 24 h prior to checking traps were positively correlated with number of *A. californiense* captured (r = 0.626 for night rain; r = 0.603 for 24 h; $P < 0.001$ for both). Rain 12 h prior to opening traps was also correlated with captures (r = 0.375, P = 0.012). In addition, rain at dusk (Wilcoxon Z = 2.66, $P < 0.005$) and temperature (r = 0.363, $P < 0.015$) were positively associated with number of captures. Rain the night prior to opening traps was not associated with number of captures (Wilcoxon Z = 0.31, P = 0.378).

TABLE 3. Capture rates of adult *Ambystoma californiense* (no. per 100 trap nights) along the western, southern, and eastern trap lines during the early and late winter breeding seasons of the five study years. Early season = late October to December 31; Late season = January 1 to end of March. Data represent captures inside/outside each trap line. Recaptured individuals were excluded except for salamanders first captured during the early season inside the trap line and then later recaptured outside the same trap line during the late season. Total number of adults captured is indicated by N.

Season/Trap Line	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005
Early Season, N =	71	251	136	65	59
Western	8.6/2.5	28.4/6.7	9.8/12.3	4.4/2.1	3.5/4.5
Southern	1.0/1.0	4.8/5.9	1.9/3.4	1.0/3.1	0.5/2.7
Eastern	—	4.2/22.7	1.4/6.3	2.9/3.5	1.3/2.6
Late Season, N =	34	146	46	21	29
Western	0.8/4.8	1.9/19.7	0.5/4.6	1.5/3.3	0.4/3.2
Southern	0.0/1.9	0.7/2.6	0.7/2.2	0.4/1.7	0.0/0.6
Eastern	—	5.3/1.5	0.0/2.9	0.0/0.0	0.0/0.0

Annual reduction in captures.—Over the five study years, the proportion of adults captured inside the trap line decreased (r = -0.845, P = 0.036) and adult capture rates were not associated with on-site rainfall for those five years (Fig. 5, r = -0.753, P = 0.071). In 2000 and 2001, the capture rate of adults was higher inside than outside the trap line (Fig. 5). However, during 2002–2004 the capture rate was higher outside than inside. By 2004 the ratio of adult captures inside the trap line (versus outside) was much lower (0.35) than in previous years (0.62–1.2).

DISCUSSION

Successful conservation for *Ambystoma californiense* requires protection of both breeding sites and adequate surrounding uplands (Petranka 1998; Semlitsch 1998). Knowledge of terrestrial movement patterns and migration distances is essential to establishing appropriate upland protection zones adjacent to breeding ponds. My study expands the current understanding of upland habitat use for *A. californiense* and should better inform management for this species. The most important findings of my study are that *A. californiense* appeared to exhibit fidelity to upland habitat locations and occurred in relatively large numbers farther from breeding ponds than previously reported.

Study limitations.—The present study has certain limitations that should be taken into account when interpreting my findings. The partial drift fence may have affected my results in the following ways: 1) capture rates may have over- or under-estimated the actual number of salamanders entering or leaving the study site, 2) distribution of captures was limited to

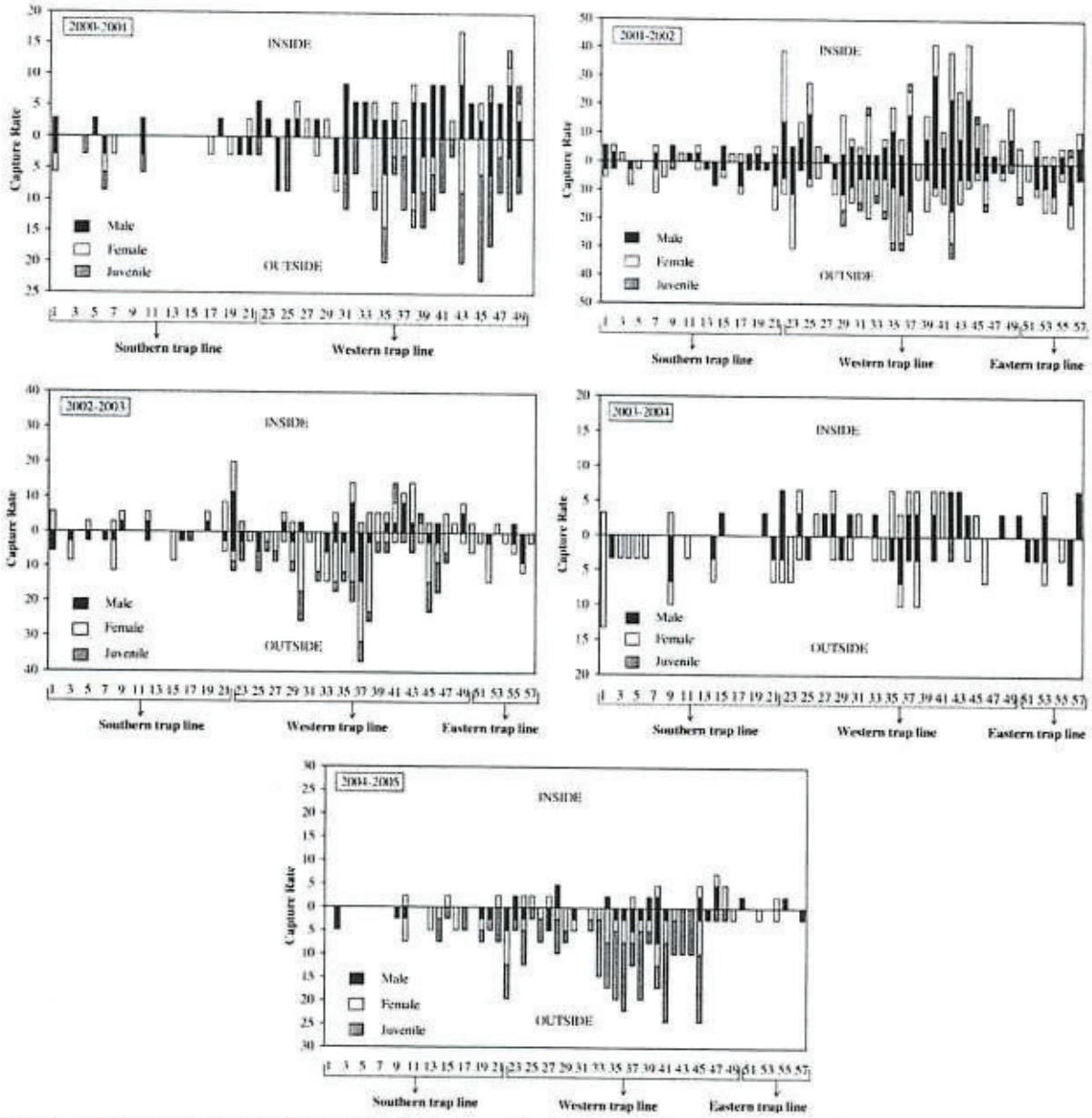

FIGURE 4. Capture rates (no. per 100 trap nights) of *Ambystoma californiense* inside and outside the trap line by sex, age class, and trap line for each of the five study years. Trap number for each trap line segment is indicated on the x-axis. Recaptured individuals were excluded except for salamanders first captured during the early season inside the trap line and then recaptured outside the same trap line later in the season.

certain sections of the study site, and 3) trespass rates for the study site could not be determined (i.e., when a salamander exits or enters a site without being captured). These limitations may have influenced my analysis of patterns of movement, sex ratios/proportions, and annual reductions in number of individuals captured.

In addition, translocating salamanders and restricting their entry into the study site may have altered the age class distribution for those remaining within the site. Studies of *A. californiense* and other *Ambystoma* species have shown that age classes may differ in their use of habitat (Rothermel 2004; Trenham and Shaffer 2005) and vary in activity in response to environmental cues (Semlitsch 1983). This may have influenced my analysis of patterns of movement, and migratory movements with applicable data sets. Lastly, my findings are also limited by having only one study location. Although my results are directly applicable to this site, it may not be representative of other grassland areas that support *A. californiense*.

TABLE 4. Capture rates of juvenile *A. californiense* (no. per 100 trap nights) along the western, southern, and eastern trap lines during the early and late winter breeding seasons of the five study years. Early season = late October to December 31; Late season = January 1 to end of March. Data represent captures inside/outside the trap lines. Recaptured individuals were excluded except for salamanders first captured during the early season inside the trap line and then later recaptured outside the same trap line during the late season. Total number of adults captured is indicated by N.

Season/Trap Line	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005
Early Season, N =	36	14	29	1	45
Western	0.5/5.3	0.2/2.4	0.6/5.2	0.2/0.0	0.0/8.0
Southern	0.0/0.7	0.0/0.0	0.0/0.3	0.0/0.0	0.0/1.1
Eastern	—	0.8/0.0	0.0/0.0	0.0/0.0	0.0/0.0
Late Season, N =	14	2	7	0	36
Western	0.0/2.7	0.2/0.0	0.0/1.1	0.0/0.0	0.0/3.8
Southern	0.0/0.3	0.0/0.2	0.0/0.2	0.0/0.0	0.0/1.7
Eastern	—	0.0/0.0	0.0/0.0	0.0/0.0	0.0/0.0

Capture numbers and movement patterns.—Adults tended to return to a location close to where they were initially captured, which suggests fidelity to specific areas of upland habitat. Although several other studies have indicated *Ambystoma* species tend to follow the same nonrandom pathways as they move toward and away from breeding ponds (Stenhouse 1985; Phillips and Sexton 1989; Trenham and Cook 2008), these results were typically inferred from the distribution of captures around ponds, not from distant upland habitat capture data.

In all study years more adults were captured early in the season (presumably going to breed) than were captured later in the season along the same trap line segment (presumably returning from breeding). Rainfall amounts during the early and late seasons did not appear to account for this decrease in captures. The lower number of returning animals may be partly due to mortality, or salamanders straying off path when returning from their natal ponds or dispersing to different ponds (Trenham et al. 2001; Trenham and Cook 2008).

A higher proportion of migrating males than females has been correlated with low rainfall years in other studies of *A. californiense* (Loredo and Van Vuren 1996; Cook et al. 2006). My findings are consistent with this pattern. Apparently more females forego breeding in dry years than males (Loredo and Van Vuren 1996; Trenham et al. 2000). My results contrast with previous studies of *A. californiense* and other *Ambystoma* species that suggest a female bias at greater distances from breeding ponds (Regosin et al. 2003; Trenham and Cook 2008). The distances from the nearest breeding ponds in my study were considerably greater than these previous studies, yet my annual sex ratios were only female biased in one of the five study years.

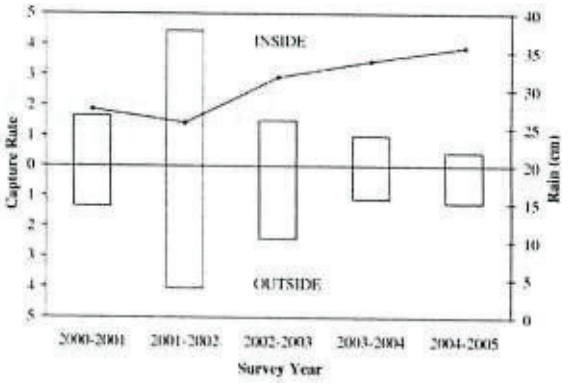

FIGURE 5. Annual capture rates (no. per 100 trap nights) of adult *Ambystoma californiense* inside and outside the trap line (bars) and on-site rainfall amounts (October–April; solid line) for the five study years. Recaptured individuals were excluded except for salamanders first captured during the early season inside the trap line and then recaptured outside the same trap line later in the season.

Migration distances.—I captured large numbers of *A. californiense* farther from breeding ponds than has been previously documented. In early studies of migration distances, maximum distance ranged from 130 m during one night of visually tracking (Loredo et al. 1996) to 248 m using radio tracking (Trenham 2001). However, these studies only examined movements during initial dispersal into the terrestrial habitat and thus may not be representative of the total distance adults may travel (Trenham and Shaffer 2005). In a more recent study using variable trap line distances from a pond, Trenham and Shaffer (2005) found that 50–95% of adults were trapped between 150 to 620 m from the pond, respectively. Continuing work at this site has documented a few individuals moving up to 1000 m from the most likely breeding pond (Peter Trenham, pers. comm.). *Ambystoma californiense* has also been observed up to 2.1 km from breeding ponds (U.S. Fish and Wildlife Service 2004); however, this was thought to be only a small number of individuals. Even in light of these studies showing a few individuals making longer distance movements, the large numbers of adults and juveniles I captured at least 800 m from the closest breeding ponds is noteworthy.

Current estimates that 95% of adult *A. californiense* occur within 620 m of the breeding pond (Trenham and Shaffer 2005) do not appear applicable to my study site. If this estimate were applied to my study site, which is greater than 620 m from the closest breeding ponds on CNWS, the large number of captures would represent less than 5% of the adult upland population. This would result in an exceedingly high extrapolated number of adults using the ponds on CNWS (~5,000 to 10,000 adults). However, Loredo and Van Vuren (1996) found an average of only 141 adults at their study pond on CNWS (Pond 5, Fig. 1), which is typical for other sites (Trenham et al. 2001; Cook et al. 2006). It is more likely that a greater percentage of the breeding population at

CNWS is moving farther away from the breeding ponds than previous research would have predicted.

Migratory movements and environmental parameters.—Movement patterns in my study area were influenced by the distribution of rainfall within the 24-h period prior to capture, with both rain at dusk and on the night of capture (12-h prior) strongly correlated to captures. Although several studies of *A. californiense* or other *Ambystoma* species also found adult migration to be positively associated with rainfall (Semlitsch 1983; Beneski et al. 1986; Trenham et al. 2000), these studies measured daily (24-h periods) or weekly rainfall, not rainfall within less than a 24-h period.

The majority of *A. californiense* adults were captured from early November to mid-December, which is earlier than other study sites where peak migration occurred in January in Monterey County (Trenham et al. 2000) or December and January in Sonoma and Contra Costa counties (Loredo and Van Vuren 1996; Cook et al. 2006). Unlike these other studies, which were conducted at study ponds and recorded only the date of arrival at those ponds, my data presumably represent the actual initiation of migration from upland emergence. Therefore, the discrepancy in peak migration periods may be because my study site was at least 800 m away from the closest probable breeding ponds, and it may have taken several rainy nights to reach the ponds.

Reduction in numbers.—My findings suggest that it takes multiple years of trapping and translocating animals to substantially reduce the number of adults within a project site. This is consistent with other research that has shown *A. californiense* typically spend up to four to five years in their upland burrows before they reach sexual maturity and migrate to breeding ponds for the first time (Trenham et al. 2000). The reduction in annual captures found over my five study years could have been affected by variables other than removal trapping. For example, rainfall has been shown to affect both the number of migrating adults and reproductive success among ambystomatids (e.g., Semlitsch 1983). However, my annual capture numbers were not correlated with on-site rainfall. In addition, I examined local annual rainfall data for the five years prior to my study and found no patterns that might have affected past reproductive success and subsequently influenced capture numbers during my study. It is important to note that because the drift fence was not a closed system, it was not possible to determine whether individuals captured inside or outside the trap line were resident to those sides of the study site.

The costs and benefits of amphibian translocation strategies have been debated and establishing criteria for success is difficult (Seigel and Dodd 2002; Trenham and Marsh 2002). Because my study only involved moving animals to adjacent grassland habitat a short distance from the capture point (≤ 100 m), some of the more critical problems typically associated with translocation projects were not applicable, including the availability of suitable habitats, disease transmission, and genetic considerations (Dodd and Seigel 1991). However, because a portion of my translocated animals were recaptured presumably trying to return to the study site, they could have been subject to additional stress which reduced their survival (Matthews 2003; Germano and Bishop 2008). In addition, I do not know if the resources of the adjacent area were adequate to sustain an increase in population size (Petranka 1989).

Other options for managers to reduce the number of salamanders in a proposed construction area include passive relocation using wooden ramps with barrier fencing or excavating salamanders from their burrows. Although I have observed *A. californiense* using ramps to exit a project site, there are no published reports on the success of this passive relocation technique. Excavation is time consuming (Pittman 2005), difficult due to the complexity of burrow systems, and potentially hazardous to the salamanders.

Management implications.—My findings have several implications for future conservation and management of this species. First, the current suggested buffer zone of 630 m around breeding ponds for long-term preservation of individual *A. californiense* populations (Trenham and Shaffer 2005) may not protect a substantial portion of some upland populations. Second, the method proposed by Searcy and Shaffer (2008) for calculating mitigation value for *A. californiense*, which is based on the exponential decrease in salamander density with increased distance from breeding ponds, may not be applicable in all cases. Other factors could be influencing the density distribution around ponds, such as uneven distribution of resources and presence of other species (Rittenhouse and Semlitsch 2007; Searcy and Shaffer 2008). The results of my study underscore the need to consider other relevant biological factors in establishing buffer zones or mitigation credits. Third, trapping may be the most reliable means of predicting habitat value or detecting occurrence in uplands. I found that the number of salamanders observed during winter night surveys was not a reliable indication of population size. The limited number of salamanders I observed was probably due to few being above ground at the burrow entrances during the night surveys. Fourth, efforts to remove *A. californiense*, via trapping or passive relocation, from a proposed project site for only one year (to reduce impacts from development) may miss a large portion of the population. My findings suggest that multiple years are required to substantially reduce the abundance of adult life stages in upland habitat.

Acknowledgments.—I am grateful for the biologists who assisted in the field work for this study, including Kathy Willet, Derek Jansen, and Jill Bennett. I appreciate Mark Allaback of Biosearch (Santa Cruz, CA) for helping to develop and design this study. I thank Dr. Pete Trenham and Mark Allaback who reviewed and improved the original manuscript. I also thank the U.S. Fish and Wildlife Service and California Department of Fish and Game for authorizing this study through issuance of a 10(a)(1)(A) permit (TE-075898–1) and Scientific Collectors Permit (801083–05).

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Appendix C

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Re: Montreux Residential Subdivision and Draft Environmental Impact Report

Dear Ms. Pollot:

This firm represents Save Mount Diablo ("SMD") with regard to the Montreux Residential Subdivision Project ("Project"). SMD is a non-profit organization dedicated to preserving Mount Diablo's peaks, surrounding foothills and watersheds through land acquisition and preservation strategies designed to protect the mountain's natural beauty, biological diversity and historic and agricultural heritage. To advance this goal, SMD regularly participates in land use planning processes for projects that could impact Mount Diablo and its surrounding foothills, such as the Montreux Project. We submit these comments on the Project and associated draft Environmental Impact Report ("DEIR") on SMD's behalf.

As described below, SMD has serious concerns about the impacts of the Project, which proposes to transform 77 acres of largely untouched open space lands in the Woodlands subarea, immediately adjacent to the open spaces of the South Hills subarea, into a residential subdivision with 356 estate homes, onsite access roadways, drainage basins, and a water storage tank. DEIR at 3.0-8 and 9. The urban-scale Project is currently outside the City limits, outside the service areas for the Delta Diablo Sanitation District and the Contra Costa Water District Service Area boundary, and therefore lacks a certain water supply. The Project is patently inconsistent with the City's general plan and requires rezoning to permit development at the proposed density. In short, the Project has all the hallmarks and adverse environmental impacts of leapfrog development. It is

therefore perhaps unsurprising that it directly conflicts with numerous general plan policies that discourage such development.

In addition, the DEIR for the Project fails to provide the public and decision makers with crucial information about the Project, its impacts, and feasible mitigation measures, in direct violation of the California Environmental Policy Act ("CEQA").[1] For example, the Project description lacks sufficient detail for the public to determine what the impacts of the Project will be. Although the City is apparently contemplating a development agreement as part of the Project, the agreement itself is not included as an attachment to the DEIR or otherwise made available to the public, and the description of the agreement's terms is cursory at best. Similarly, consultant reports on various impact areas are referred to in the DEIR but not provided for public review. At the very least, the DEIR must be revised and recirculated to include these documents and information.

The DEIR's analysis of specific environmental impacts is similarly lacking. As discussed in this letter and the attached report from consulting hydrologist Bruce Abelli-Amen of Baseline Environmental Consulting ("Baseline Report"), developing the Project on the area's the steep terrain will require extensive cut and fill, which, in turn, will drastically affect the hydrology of the area and could even damage downstream properties. Baseline Report attached as Exhibit 1. Yet the DEIR contains *no discussion whatsoever* of these potential impacts, relying solely on the Initial Study's cursory discussion of the issue. Similar flaws are found in other impact analysis, including aesthetics, biological resources, public services, and public safety. More is required of an adequate EIR.

In sum, after reviewing the DEIR and other Project documents, it is our opinion that the Project conflicts with the City of Pittsburg's General Plan and Municipal Code in violation of State Planning and Zoning Law, Gov't Code § 65000 et seq. For this and other reasons, the City cannot make the findings necessary to approve the Project's requested rezoning and tentative map. *See* Gov't Code §§ 66473.5 & 66474. In addition, the DEIR for the Project violates the minimum standards of adequacy under CEQA. As a result, the City cannot approve the Project as currently proposed and must, at a minimum, recirculate a revised DEIR that addresses the inadequacies identified in this letter.

[1] Public Resources Code § 21000 et seq. (hereinafter "CEQA"); Cal. Code of Regulations, tit. 14, § 15000 et seq. (hereinafter "Guidelines").

I. Approval of the Project Would Violate California Planning and Zoning Law and the Subdivision Map Act.

The State Planning and Zoning Law (Gov't Code § 65000 et seq.) requires that development decisions be consistent with the jurisdiction's general plan. *See* Gov't Code §§ 65860 (requiring consistency of zoning to general plan), 66473.5 & 66474 (requiring consistency of subdivision maps to general plan), and 65359 and 65454 (requiring consistency of specific plan and other development plan and amendments thereto to general plan). Thus, "[u]nder state law, the propriety of virtually any local decision affecting land use and development depends upon consistency with the applicable general plan and its elements." *Resource Defense Fund v. County of Santa Cruz* (1982) 133 Cal.App.3d 800, 806. Accordingly, "[t]he consistency doctrine [is] the linchpin of California's land use and development laws; it is the principle which infuses the concept of planned growth with the force of law." *Families Unafraid to Uphold Rural El Dorado County v. Board of Supervisors* (1998) 62 Cal.App.4th 1332, 1336.

It is an abuse of discretion to approve a project that "frustrate[s] the General Plan's goals and policies." *Napa Citizens for Honest Gov't v. Napa County* (2001) 91 Cal.App.4th 342, 379. The project need not present an "outright conflict" with a general plan provision to be considered inconsistent; the determining question is instead whether the project "is compatible with and will not frustrate the General Plan's goals and policies." *Napa Citizens*, 91 Cal.App.4th at 379.

Here, the proposed Project does more than just frustrate the General Plan's goals. It is directly inconsistent with numerous provisions in the General Plan. Consequently, the Project cannot be approved in its current form.

A. The Project Is Inconsistent with Numerous General Plan and Municipal Code Provisions.

The City's General Plan and Municipal Code contains several provisions intended to ensure that development occur in an environmentally sensitive manner. As discussed below, the Project is inconsistent with many important Plan and Code provisions.

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1. General Plan and Code Provisions Relating to the Preservation of Hillsides

The Project site is designated and pre-zoned for Hillside Plan Development. DEIR at 3.0-8. The General Plan requires that development in the hills be sensitive to the natural terrain, minimize cut-and-fill, and incorporate natural features (*e.g.*, topography and creeks) into the design of residential neighborhoods. General Plan Land Use Element Policies 2-P-21, 2-P-23, 2-P-24, 2-P-25, 4-P-9. General Plan Land Use Element Policy 2-P-21. The General Plan also indicates that the City must "ensure that all General Plan policies apply to hillside land irrespective of zoning –whether Planned Development or any other base district." General Plan Land Use Element Policy 2-P-22.

General Plan provisions specific to the Woodlands sub-area where the Project is located are even more protective. For example, the General Plan specifies a goal to support new residential development in locations that do not significantly impact the natural setting." General Plan Goal: Woodlands 2-G-27 and 2-G-28. As discussed below and throughout this letter, the Project proposes mass grading that fills a natural drainage and denudes the site of natural vegetation. Other Woodlands-area specific provisions require that the "natural topography be retained to the *maximum extent feasible*, and large-scale grading discouraged" and that development be minimally visible from Kirker Pass Road. General Plan Policy: Woodlands 2-P-73.

The Municipal Code accordingly establishes regulations for development in hillside areas that establish several goals to protect hillsides. For example, the Code establishes the goal "to protect natural topographic features, aesthetic view, vistas, and prominent ridges." It also calls for the City to "protect adjacent properties from potential adverse impacts of grading and drainage associated with hillside development," and "encourage the use of development techniques and alternatives that will be compatible to the terrain of the hillside areas." Municipal Code § 18.56.02.

The Municipal Code contains provisions requiring topographic maps indicating the steepness of the site's slopes. Municipal Code § 18.56.070.K. The Code also requires landscape plans indicating the location of existing and proposed trees and other plant materials, and before and after grading details. *Id.* But neither the DEIR nor technical appendix actually include these details.

Despite the lack of information in the DEIR, it is clear that the Project would be inconsistent with these provisions. The DEIR concludes that the Project is consistent with the General Plan because the Project proposes to preserve the southernmost portion of the site. DEIR at 4.0-2. However, the development plan

proposed for the remainder of the site would be anything but sensitive to the natural terrain. Rather than follow the natural topography and minimize grading, the Project site's steep slopes would be cut away to create unnaturally "flat" areas for building pads where steep slopes and drainage areas, including wetlands, previously existed. The Project requires a staggering 1.4 million cubic yards of excavation and fill material. DEIR at 3.0-12. Grading involving an estimated this level of excavation would result in the removal of trees and other natural vegetation throughout the development area and would also change much of the site's natural landform. Moreover, as made clear in the DEIR, the development would be very visible from Kirker Pass Road and would stand in stark contrast to the surrounding hillsides. DEIR at Figures 5.1-5 and 5.1-6.

2. General Plan Provisions Relating to the Protection of Natural Resources.

The General Plan encourages development that is compatible with the environment and sensitive habitats, "particularly habitats that support special status species" and calls for development that preserves significant ecological resources. Resources Conservation Element Goals 9-G-1 and 9-G-2 and Policies 4-P-14, 4-P-15, 9-P-13. The DEIR again concludes that the Project is consistent with the General Plan because the Project proposes to preserve the southernmost portion of the site and because the site's resources were "considered and documented." DEIR at 4.0-6. However, as discussed below, the DEIR's documentation of natural resources is seriously flawed. See section II.B.3 below. The Project is inconsistent with these provisions because, as discussed below, it will result in significant adverse impacts to sensitive habitats and species on and adjacent to the Project site. The DEIR has failed to provide a complete analysis of these impacts. *Id*. As a result, the Project will result in significant impacts related to direct and indirect impacts to special status species in contravention of the General Plan. *Id*.

3. General Plan Provisions Relating to the Protection of Drainages

The General Plan includes provisions that protect drainages and prevent erosion. Resources Conservation Element Policies 9-G-4 and 9-G-5. The General Plan also includes provisions to require evaluation and implementation of Best Management Practices to protect against creek bank destabilization and require assessments of downstream drainage impacts. Policies 9-P-15, 9-P-17, and 9-P-21. The DEIR fails to mention these General Plan provisions let alone analyze consistency with them. As discussed further below, and in the attached Baseline Report, the DEIR fails to evaluate these impacts. As a result, the Project is inconsistent with these General Plan provisions.

4. General Plan Provisions Relating to the Provision of Public Services.

The DEIR discloses that the Project would add school children to area schools that are already over capacity. DEIR at 5.6-8. The Project is inconsistent with General Plan provisions that specify the City is to "ensure that school facilities maintain adequate capacity to provide for current and projected enrollment." General Plan Policy 8-G-10. The Project is inconsistent with the General Plan in that it would approximately 277 new students to a school system already over-capacity.

The General Plan specifies that the City is to provide 1.8 *sworn officers* per each 1,000 residents. The DEIR discloses that the Project would add to the City's population so that additional police officers would be needed to serve the community. DEIR at 5.6-8. As the DEIR makes clear, there is "no guarantee that the General Fund revenues provided by the new development would fully fund the new positions." DEIR at 5.6-8. Thus, the Project conflicts with the General Plan requirements for police protection.

For all of these reasons, the Project is inconsistent with the General Plan and the Municipal Code. Because of the Project's inconsistencies with these planning documents, approval of this Project would violate State Planning and Zoning Law and the County's Development Code.

B. Approval of this Project Would Violate the Subdivision Map Act.

The proposed Project requires approval of a tentative subdivision map. *See* DEIR at 3.0-13. As a result, the City must comply with the Subdivision Map Act. This statute requires that a tentative map approval be consistent with the local general plan. *See* Gov't Code §§ 66473.5; 66474; *see also Friends of "B" Street v. City of Hayward* (1980) 106 Cal.App.3d 988, 998 (Subdivision Map Act expressly requires consistency with general plan). Approval of a project that is inconsistent with the general plan violates the Subdivision Map Act and may be enjoined on that basis. *See Friends of "B" Street*, 106 Cal.App.3d at 998 ("City approval of a proposed subdivision … may be enjoined for lack of consistency of the subdivision map with the general plan."); *see also* City of Pittsburg Municipal Code § 17.20.060 (to approve a tentative map, the following findings must be made, among others: 1) the proposed map is consistent with the general plan and any applicable specific plan, or other applicable provisions of [the municipal] code; 2) the site is physically suitable for the proposed density of development; and 3) the design of the subdivision or the proposed improvements will not cause substantial

environmental damage or substantially and avoidably injure fish or wildlife or their habitat).

As detailed throughout this letter, the Project is inconsistent with various goals and policies set forth in the City's General Plan. *See e.g.,* Section I(A), *supra*. Because approval of the Project would violate the general plan consistency requirements of the Subdivision Map Act and the City's own municipal code, the Project application must be denied.

II. The DEIR Is Inadequate Under CEQA.

The environmental impact report is "the heart of CEQA." *Laurel Heights Improvement Ass'n v. Regents of University of California* (1988) 47 Cal.3d 376, 392 (citations omitted) ("*Laurel Heights I*"). It "is an environmental 'alarm bell' whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return. The EIR is also intended 'to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action.' Because the EIR must be certified or rejected by public officials, it is a document of accountability." *Id.* (citations omitted). Where, as here, an EIR fails to fully and accurately inform decision makers, and the public, of the environmental consequences of proposed actions, it does not satisfy the basic goals of the statute. *See* CEQA § 21061("The purpose of an environmental impact report is to provide public agencies and the public in general with detailed information about the effect that a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project.").

As discussed in detail below and in the attached technical report, the DEIR is replete with serious flaws. *See* Baseline Report. It lacks a legally defensible description of the Project and contains so little information about the Project's potential environmental impacts that, in many instances, it is difficult to evaluate the accuracy of the environmental analysis. Nor does the DEIR provide the necessary evidence or analysis to support its conclusions that environmental impacts would be less than significant. Many of the so-called mitigation measures proposed in the DEIR are nothing more than general assertions that something will be done in the future about the Project's significant environmental impacts. Such deferral is prohibited by CEQA. Consequently, the City must prepare and recirculate a revised EIR if it chooses to proceed with the proposed Project.

A. The DEIR Fails to Adequately Describe the Project.

1. The DEIR's Project Description Omits Critical Information.

Under CEQA, the inclusion in the EIR of a clear and comprehensive description of the proposed project is critical to meaningful public review. *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 193. The court in *Inyo* explained why a thorough project description is necessary:

> "A curtailed or distorted project description may stultify objectives of the reporting process. Only through an accurate view of the project may affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal (i.e., the "no project" alternative) and weigh other alternatives in the balance." d. at 192-93. Thus, "[a]n accurate, stable and finite project description is the sine qua non of an informative and legally sufficient EIR." *Santiago County Water District v. County of Orange* (1981) 118 Cal.App.3d 818, 830.

Here, the description of the Project is inadequate. The DEIR fails to identify key components of the Project that have the potential to result in significant environmental impacts. For example, the DEIR entirely omits critical information about the improvements that would be needed to resolve the area's hydraulic and flood risks. *See* Baseline Report at 1 and 2. Additionally, the DEIR fails to adequately describe the Project's stormwater system and fails to include a Stormwater Control Plan. The proposed Project will result in a substantial increase in impermeable surfaces, which will, in turn, increase runoff from the site, yet the document does not include any detail about where drainage features (inlets, piping, culverts, etc.) would be located and how these systems, including the detention basins, would be operated. The DEIR does not appear to include, nor does it reference, any hydrologic or hydraulic engineering that supports the drainage plan. The reader of the DEIR has no idea how the detention basins were sized or how they would be operated. Without detailed information regarding the location and design of the drainage facilities, it is impossible for decision makers and the public to evaluate the accuracy of the DEIR's conclusions.

The DEIR also fails to include the following crucial information about the Project:

- Number and type of trees to be removed;
- Location of the Project staging areas;
- Location of spoils sites and haul routes;
- Construction-related activities (including timeline, location, number of construction employees, types of equipment, etc.);
- Other Project features such as fences, bridges, gates or other proposed improvements.

All of this information must be included in a revised EIR so that the impacts associated with these features and activities can be analyzed.

2. The Project Description Avoids Any Meaningful Discussion of the Proposed Development Agreement.

The DEIR notes that the Project will include a development agreement, and states that the agreement's primary purpose is to vest the applicant's entitlements. DEIR at 3.0-12. The DEIR also states that the development agreement will include provisions regarding integration of the project entrance with the future Donlon Boulevard extension, requirements for payment of fees related to open space and compliance with the City's inclusionary housing ordinance. *Id.* However, no information is provided about the conditions, terms, restrictions and requirements for subsequent actions. The text of this development agreement is not included anywhere in the DEIR. And the development agreement was not included among the publicly available environmental documents for the project. Without any more detailed information about the terms of the agreement, key elements of the project description are omitted and cannot be analyzed in the EIR, in direct violation of CEQA. *See, e.g., Laurel Heights Improvement Ass'n v. Regents of the University of California* (1993) 6 Cal.4th 1112, 1123 ("*Laurel Heights II*") (the purpose of CEQA "is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made").

This omission is particularly disturbing as development agreements typically seek to "lock in" development rights – including existing regulations and the density and intensity of development – over an extended period of time. As such, development agreements have the potential to greatly exacerbate the potential impacts of

a project by limiting the lead agency's permitting authority and ability to impose additional mitigation measures or reduce the intensity of development at later discretionary phases of the project. This problem is only compounded where, as here, the development of critical mitigation measures is deferred to the indefinite future.

The DEIR's failure to provide any specifics regarding the development agreement constitutes a fatal shortcoming in the Project Description and the subsequent analysis of Project impacts. To comply with CEQA, the DEIR must be recirculated with a more detailed description of the development agreement or with the draft agreement attached.

3. The DEIR Minimizes the Extent of the Project By Failing to Describe and Analyze Full Build-Out Conditions.

Courts have held that, when analyzing the environmental impacts of a general plan or other planning document, the lead agency must analyze "the future development *permitted* by the [plan]. . . . Only then can the ultimate effect of the [plan] upon the physical environment be addressed." *Christward Ministry v. Superior Court of San Diego County* (1986) 184 Cal.App.3d 180, 194 (emphasis added); *see also City of Redlands v. County of San Bernardino* (2002) 96 Cal.App.4th 398, 409 (quoting same).

Here, the Project proposes rezoning not only for the 77-acre portion of the site designated for residential development but for entire site. DEIR at 3.0-8. Nowhere does the DEIR analyze the impacts of a potential increase in density on the entire site. The DEIR proposes that the 71-acre area proposed for open space will be subject to "recordation of a deed restriction or some other appropriate mechanism, prior to the acceptance of the last Final Map for the site (should it be broken into phases)." DEIR at 2.0-21. This approach is not adequately protective of the open space. First, recording the deed restriction prior to the last Final Map (rather than prior to the *first* Final Map) leaves the open space area vulnerable to damaging uses during construction. Second, deferring recordation of the deed restriction to such a late date leaves the open space vulnerable to future proposals for alteration of the open space area to other uses.

Alternatively, the DEIR could have specified use of a conservation easement on the open space area, conveyed to a land trust capable of managing and enforcing it, to preserve and protect the area in perpetuity. Such an easement should be recorded prior to acceptance of the first Final Map. As proposed, the open space area is vulnerable to future proposals for alteration of the open space area to other uses, and therefore, the DEIR must analyze the potential impacts at full build-out should the City approve the change in zoning.

B. The DEIR Fails to Analyze and Mitigate the Project's Significant Environmental Impacts.

CEQA requires that an EIR be detailed, complete, and reflect a good faith effort at full disclosure. Guidelines § 15151. The document should provide a sufficient degree of analysis to inform the public about the proposed project's adverse environmental impacts and to allow decision-makers to make intelligent judgments. *Id.* Consistent with this requirement, information regarding the project's impacts must be "painstakingly ferreted out." *Environmental Planning & Info. Council v. County of El Dorado* (1982) 131 Cal.App.3d 350, 357 (finding an EIR for a general plan amendment inadequate where the document did not make clear the effect on the physical environment).

Meaningful analysis of impacts effectuates one of CEQA's fundamental purposes: to "inform the public and responsible officials of the environmental consequences of their decisions before they are made." *Laurel Heights II*, 6 Cal.4th at 1123. To accomplish this purpose, an EIR must contain facts and analysis, not just an agency's bare conclusions. *Citizens of Goleta Valley*, 52 Cal.3d at 568. Nor may an agency defer its assessment of important environmental impacts until after the project is approved. *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 306-07. An EIR's conclusions must be supported by substantial evidence. *Laurel Heights I*, 47 Cal.3d at 409.

As documented below, the DEIR fails to identify, analyze, or support with substantial evidence its conclusions regarding the Project's significant environmental impacts. These deficiencies render the DEIR inadequate under CEQA.

1. The DEIR Fails to Analyze and Disclose Significant Aesthetic Impacts of the Project.

The proposed Project will alter and adversely impact the visual landscape of the site and the surrounding area by completely transforming this scenic, hilly area into a dense, residential one. As discussed above, the Project will cut and fill large swaths of hillside and excavate an enormous amount of soil: 1.4 million cubic yards. DEIR at 3.0-12. (Assuming a dump truck holds 10 cubic yards, the proposed excavation equates to 140,000 truckloads of soil.) The DEIR acknowledges that the Project would result in significant and unavoidable impacts relating to a the degradation of the existing visual character of the area. DEIR 2.0-6. Despite this assessment, the DEIR concludes that the Project's other aesthetic impacts will be less than significant because of certain landscaping and design features. However, landscaping and design features cannot reduce

the significant topographic impacts of the Project to a level of insignificance. Furthermore, the DEIR's conclusion that aesthetic impacts will be insignificant flies in the face of established CEQA precedent.

Under CEQA, it is the state's policy to "[t]ake all action necessary to provide the people of this state with . . . enjoyment of *aesthetic*, natural, scenic, and historic environmental qualities." CEQA § 21001(b) (emphasis added). "A substantial negative effect of a project on view and other features of beauty could constitute a significant environmental impact under CEQA." *Ocean View Estates Homeowners Assn., Inc. v. Montecito Water District* (2004) 116 Cal.App.4th 396, 401. No special expertise is required to demonstrate that the Project will result in significant aesthetic impacts. *Ocean View Estates*, 116 Cal.App.4th at 402 ("Opinions that the [project] will not be aesthetically pleasing is not the special purview of experts."); *The Pocket Protectors v. City of Sacramento* (2005) 124 Cal.App.4th 903, 937 ("[N]o special expertise is required on this topic.").

As explained by the court in *Quail Botanical Gardens Foundation, Inc. v. City of Encinitas* (1994) 29 Cal.App.4th 1597, 1606 , it is "self-evident" that replacing open space with a subdivision will have an adverse effect upon "views and the beauty of the setting." Instead of addressing and analyzing the Project's visual effects, the DEIR employs contorted logic to mask its clear impacts. For example, the DEIR acknowledges that the General Plan identifies views of the "rolling, grassy hills to the south," which characterize the site, as important visual resources for the City and that the development will be visible from area parks. DEIR at 5.1-8. The DEIR also acknowledges that the Project site "could be considered an element of broad scenic vistas of hills and open space visible from Kirker Pass Road, a designated scenic route in the General Plan. *Id.* The DEIR even states that the Project could have a substantial adverse effect on a scenic vista. *Id*. Surprisingly, the DEIR then concludes that impacts to scenic vistas would be less than significant because design guidelines included in Mitigation Measure AES-1 would mitigate these significant impacts. DEIR at 5.1-9.

Such a conclusion is misguided and unsupported by evidence. The guidelines and standards that the DEIR relies on address the colors and materials to be used in the development but in reality they do nothing to reduce the height, mass, or location of structures or to ensure that the development is less visible from public viewpoints. The DEIR fails to provide any specific information or analysis, as to how the proposed measure would mitigate significant impacts to existing views from parks and other public viewpoints. A neutral color palette will not camouflage this large subdivision.

Moreover, the DEIR fails to provide evidence to support its conclusion that the Project's impacts to area scenic vistas would be less than significant. Specifically, the EIR fails to evaluate the Project's impacts to views from East Bay Regional Park District ("EBRPD") trails and from open space areas in Stoneman Park to the north. *See* DEIR Figure 5.1-3 indicating visual simulations performed only for views from Kirker Pass Road. The DEIR also fails to evaluate impacts to planned parklands to the south and southwest of the project site. As pointed out by during the scoping process, the EBRPD has acquired the "Thomas North" parcel to the south of the Project site and the "Land Waste Management" and "Affinito" parcels to the southwest. A revised EIR must be prepared to evaluate the Project's impacts to views from these parcels.

The Project will transform an undeveloped, rural area framed by rolling hills into a large residential subdivision. This change substantially degrades not only the existing visual character and quality of the site and its surroundings but the quality of scenic vistas enjoyed from area roadways, parks, and trails. These impacts are considered significant impact under CEQA. Guidelines, Appendix G(I)(c). Thus, the DEIR's conclusion that the Project's impact on scenic vistas would be less than significant cannot be sustained.

2. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Hydrology and Water Quantity.

The DEIR includes absolutely no discussion of the potential impacts to hydrology and water quality, having concluded in the Initial Study ("IS") that the Project's impacts in these areas would be less than significant. As explained in the attached Baseline Report, this conclusion is not supported by substantial evidence and, in fact, the Project would substantially alter site drainage and the stream channel that runs through the property. While the IS provides a general discussion of these potential impacts, it contains no supporting studies or data and relies entirely on future preparation of a Storm Water Pollution Prevention Plan ("SWPPP") and compliance with existing regulations to reduce the Projects impacts to a level of insignificance. As discussed in detail below, this approach does not comport with CEQA. In very steep terrain like this, it is virtually impossible for projects to comply with National Pollutant Discharge Elimination System ("NPDES") requirements, which is evidenced by the Project's proposed detention basins. Thus, relying on compliance with existing requirements is particularly unacceptable in this situation. In addition, steep terrain such as this makes remediation of unstable soils very challenging.

(a) The DEIR Fails to Adequately Describe the Existing Hydrological Setting.

The DEIR/IS provides no information on the hydrology and water quality setting. Without describing the hydrology of the on-site drainage and that of Kirker Creek downstream, the reader of the DEIR/IS has no context within which to evaluate potential project impacts. Perhaps most important, the DEIR/IS does not provide any discussion of the hydrology of Kirker Creek and its susceptibility to flooding. The DEIR must be revised to include a Hydrology and Water Quality section that adequately describes the hydrologic setting.

(b) The Project Does Not Comply with Applicable Requirements Under the NPDES

The IS states that the project would treat stormwater runoff "as required by provision C.3 of the Contra Costa County municipal stormwater NPDES permit by directing all site runoff into three detention basins." IS at 59. However, this statement appears to refer to an old (and superseded) NPDES permit. The current NPDES permit that the project would be required to comply with is the Municipal Regional Stormwater NPDES Permit, Order No. R2-2009-0074, NPDES Permit No. CAS612008, adopted October 14, 2009 and revised November 28, 2011 ("MRP"). Not only does the Initial Study refer to the wrong NPDES permit, it wrongly interprets what C.3 provisions would be required. Baseline Report at 3. The C.3 portion of the MRP, which refers to post-construction stormwater management for new development and redevelopment projects, requires Low Impact Development ("LID"). The Project as proposed includes centralized detention basins, which are not LID features.

The goal of LID is to reduce runoff and mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating stormwater runoff close to its source. Practices used to adhere to these LID principles include measures such as rain barrels and cisterns, green roofs, permeable pavement, preserving undeveloped open space, and biotreatment through rain gardens, bioretention units, bioswales, and planter/tree boxes. LID also limits disturbance of natural water bodies and drainage systems; minimizes compaction of highly permeable soils; protects slopes and channels; and minimizes impacts from stormwater and urban runoff on the biological integrity of natural drainage systems and water bodies. Baseline Report at 3 and 4.

Here, the Project would result in massive grading, moving approximately 1.4 million cubic yards of soil. DEIR at 3.0-12. No LID designs or feathers appear to be

incorporated or required. Instead, several large detention basins are proposed to collect the site's stormwater before discharging it into Kirker Creek. Incorporation of LID designs and features into the project would require extensive modifications to the grading plan and overall site plan. These design changes to the project should be made by the applicant and the revised project evaluated in a recirculated DEIR.

(c) The Project Would Result in Flooding and Erosion Impacts Downstream

Based on a review of available mapping and aerial photographs, the Baseline Report concludes that Kirker Creek appears to have reaches that are highly incised with oversteepened creek banks. Baseline Report at 4. This indicates that portions of the creek may be unstable. *Id*. There are areas in the City of Pittsburg (e.g., Brush Creek Drive, Canyon Way), where homes are located within 20 to 30 feet of the top of the creek bank. Any change to the hydrology of flows in Kirker Creek could result in hydromodification and cause increased erosion and creek bank failure, which may jeopardize existing structures. *Id*.

The DEIR/IS fails to provide any explanation as to how the detention basins would be operated to prevent "erosion of existing stream banks and flooding downstream along Kirker Creek," and it is not clear that they can be so operated. IS at 60. Simply delaying flows in detention basins is not an effective approach to preventing downstream hydromodification of Kirker Creek. Baseline Report at 4. The Project would result in a substantial amount of new impervious surfaces conveying increased flows to centralized basins. This would in turn increase total discharge volume to Kirker Creek. *Id*. Even moderate flows to the creek, if sustained for longer periods of time than would occur without the project, could cause significant downstream erosion. *Id*. This is a potentially significant impact that must be fully analyzed under CEQA.

In sum, the DEIR lacks sufficient evidentiary support for its conclusion that the Project's impacts on hydrology and water quality would be less than significant. A revised DEIR that comprehensively evaluates and mitigates the proposed Project's hydrology and water quality impacts must be prepared and recirculated.

3. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Biological Resources

The DEIR presents an incomplete—and hence inadequate—discussion of the Project's potential impacts to biological resources. As detailed below, the DEIR underestimates Project-related impacts to biological resources as a result of a series of

errors, including: (1) faulty methodology; (2) the failure to describe accurately the environmental setting; (3) the failure to analyze the extent and severity of impacts to sensitive species and habitats; and (4) the failure to analyze the Project's cumulative effects. The DEIR's treatment of biological impacts does not meet CEQA's well established legal standard for impacts analysis. Given that analysis and mitigation of such impacts are at the heart of CEQA, the DEIR will not comply with the Act until these serious deficiencies are remedied.

(a) The DEIR Appears to Employ Faulty Methodology.

The DEIR employs faulty methodology and incorrect assumptions in its analysis of Project impacts to biological resources. It appears that the DEIR's analysis is not based on focused surveys tailored to determine the likelihood that particular species would be present. In fact, the DEIR never describes the methodology employed for site surveys. Aside from one sentence that indicates the surveys consisted of "driving and walking around the site" (DEIR Appendix 5.3 at pdf page 4), the DEIR provides no description of the survey methods at all. The DEIR should have included focused surveys for all special status with the potential to occur on site. These surveys should have included surveys for grassland birds, rare plant surveys, and, as discussed below, appropriately timed protocol level surveys for species likely to occur on-site.

The survey information as it stands does not provide an adequate basis for determinations about the individual and cumulative impacts of this Project on either special-status species or rare habitats. The DEIR's inadequate analysis of the species and habitats on the site results in an understatement of the Project's biological impacts.

(b) The DEIR Fails to Adequately Describe the Project's Biological Setting.

An EIR also "must include a description of the environment in the vicinity of the project, as it exists before the commencement of the project, from both a local and a regional perspective." Guidelines § 15125; *see also Environmental Planning and Info. Council v. County of El Dorado* (1982) 131 Cal.App.3d 350, 354. CEQA requires that special emphasis be placed on environmental resources that are rare or unique to that region and that would be affected by the Project. Guidelines § 15125(c). Here, the DEIR's discussion of environmental setting is sorely deficient.

The DEIR fails to provide a complete description of the Project's biological setting and, in some cases, presents conflicting information. For example, the DEIR states that the Project site does not include alkali soils; an important distinction because some

special status plants occur solely in alkali soils. DEIR at 5.3-7. However, the DEIR also indicates that saltgrass (Distichlis spicata), a plant that is dependent on alkali soils, was observed on site. DEIR at Table 5.3-1.

In other cases, the DEIR simply presents erroneous information. For instance, the DEIR dismisses the potential occurrence of big tarplant stating that "the highly disturbed on-site grasslands do not provide suitable habitat . . . ." DEIR at Table 5.3-2. However, this species is found in annual grasslands, usually on slopes like the ones that characterize the Project site. Personal Communication, Malcolm Sproul, Senior Biologist, Bay Area consulting firm, January 8, 2014.

In other instances, the DEIR omits crucial information altogether. The DEIR fails to evaluate grassland birds likely to occur on site and entirely ignores the grasshopper sparrow, a California species of special concern. *Id.* and DEIR Table 5.3-2 (excludes grasshopper sparrow).

The DEIR also fails to analyze the presence and number of other special status species that it acknowledges may be present on the site and in the Project area. For example, although the DEIR acknowledges that California tiger salamander ("CTS"), a species protected by the federal Endangered Species Act, has been documented in the Project vicinity (DEIR at 5.3-18), the DEIR is dismissive of the potential for this species to occur on site. DEIR at 5.3-3 (lists species for which suitable habitat is found on the Project site but excludes CTS). The DEIR states that because there is no suitable breeding habitat for CTS within or near the project site and that the nearest occurrence is 0.5 miles away, the species is not likely to occur on the site. DEIR Table 5.3-2 at page 5.3-13.

However, the DEIR fails to evaluate potential upland habitat on site that may be used by CTS. As explained in the attached report, "Movement Patterns and Migration Distances in An Upland Population of California Tiger Salamander" (Orloff, 2011), CTS disperse over distances far greater than 0.50 miles. Orloff Report, attached as Exhibit 2. Thus, the Project site, which is within a half mile of a known breeding site, is very likely to provide aestivation habitat for CTS. Personal Communication, Malcolm Sproul, Senior Biologist, Bay Area consulting firm, January 8, 2014; biography attached as Exhibit 3. Moreover, it appears that other ponds providing potentially suitable habitat may be present in close proximity to the Project site. *See* map attached as Exhibit 4 and Personal Communication, Malcolm Sproul, Senior Biologist, Bay Area consulting firm, January 8, 2014. Accordingly, the DEIR's description of the biological setting (and the document's impact analysis) must be revised to include consideration of this species. *Id.*

Similarly, the DEIR acknowledges that burrowing owls are known to occur in the area, but dismisses their potential to occur onsite based on the fact that no owls were observed onsite and that the nearest occurrence of nesting burrowing owls is 2.5 miles west of the site. DEIR at Table 5.3-11. The DEIR's conclusion is not based on any evidence. In fact, burrowing owl have been observed nesting on the Thomas Home Ranch property located to the southwest of the Project site (between Nortonville Road and Kirker Pass Road) within the past year. Personal Communication, Malcolm Sproul, Senior Biologist, Bay Area consulting firm, January 8, 2014. Moreover, burrowing owl do not depend exclusively on ground squirrel burrows for nesting sites, as implied in the DEIR. DEIR at 5.3-11. Burrowing owls have been known to nest in shallow indentations such as those present in the rock outcroppings on site. DEIR at 5.3-1.

Moreover, the DEIR mischaracterizes the role of the Habitat Conservation Plan ("HCP") and its role in relation to environmental documentation for the project. First, the HCP is a conservation mechanism that includes a broad, programmatic review of resources throughout eastern Contra Costa County; it is not a project-specific, impact-analysis document. DEIR at 5.3-24. Thus, the information in the HCP cannot replace properly designed and implemented surveys of the project site to determine the biological resources there. Second, the DEIR states that the HCP's primary goal is to streamline review of development projects. DEIR at 5.3-24. This is incorrect. The HCP is intended to serve as a coordinated process for permitting and mitigating the incidental take of endangered species. It does not excuse the City from requiring site-specific analysis. Finally, the HCP is administered by the East Contra Costa County Habitat Conservancy ("Conservancy"). DEIR at 5.3-25. The Conservancy is not a land use agency and therefore is not tasked with making decisions about the appropriate location for siting land development. That responsibility falls to the City, which has the responsibility of completing site-specific analysis of the Project's significant impacts to special status species and habitat as part of the CEQA process. Therefore, the DEIR must be revised to include a thorough investigation of the site's existing biological setting and the Project's impacts on those resources.

The DEIR's perfunctory description of the sensitive species and habitats present in the Project area results in an incomplete description of the sensitive environmental setting of the Project. This failure to describe the Project setting violates CEQA. *See San Joaquin Raptor*, 27 Cal.App.4th at 724-25 (environmental document violates CEQA where it fails to completely describe wetlands on site and nearby wildlife preserve). The DEIR should have included surveys for these species as part of its assessment of biological resources. Accordingly, the DEIR's description of the biological setting must be revised to include consideration of these and other overlooked species.

(c) The DEIR Fails to Adequately Analyze the Project's Direct Impacts to Sensitive Species.

The DEIR's failure to describe the existing setting severely undermines its analysis of Project impacts. Despite the DEIR's acknowledgement that the Project would adversely affect potential habitat for several special status, the DEIR fails to adequately analyze adverse impacts to these species. For example, the DEIR acknowledges that the Project site includes potential habitat for burrowing owl, a California Species of Special Concern ("CSC"); San Joaquin kit fox, a federally endangered species and a California Threatened species; and vernal pool fairy shrimp, a federally Threatened species. DEIR at 5.3-26 and 27. Yet, rather than conduct appropriate surveys to evaluate the presence/absence of these species and analyze the extent and severity of the Project's impacts, the DEIR simply applies a laundry list of measures required by the Habitat Conservation Plan for the Project area and concludes that all impacts will be mitigated to less than significant levels. *See, e.g*., DEIR at 5.3-31 and 32. By failing to analyze the extent and severity of impacts to biological resources, the DEIR downplays the effects of the loss of open space on special status species. The end result is a document which is so crippled by its approach that decision makers and the public are left with no real idea as to the severity and extent of environmental impacts. *See, e.g., Berkeley Keep Jets Over the Bay Com. v. Bd. of Port Comrs*. (2001) 91 Cal.App.4th 1344, 1370-71; *Galante Vineyards v. Monterey Peninsula Water management Dist.* (1997) 60 Cal.App.4th 1109, 1123; *Santiago County Water Dist. v. County of Orange* (1981) 118 Cal.App.3d 818, 831 (a lead agency may not simply jump to the conclusion that impacts would be significant without disclosing to the public and decision makers information about how adverse the impacts would be).

Similarly the DEIR's analysis of impacts to raptors such as Swainson's hawk simply asserts that they would be affected by a reduction in nesting resources, ignoring altogether the impacts caused by loss of habitat. DEIR at 5.3-28. Urbanization has a profound effect on raptors because they require large areas to hunt and are disturbed by human activity near their nests. Moreover, the DEIR's sole mitigation proposal for raptors focuses exclusively on avoiding active nests. It ignores perch resources and the role that loss of habitat and urbanization have on raptors. In any event, the DEIR must quantify the Project's effects on raptors, and the efficacy of the proposed mitigation, so that the public and decision makers may reach their own conclusions. *Save Our Peninsula Committee v. Monterey County Board of Supervisors* (2001) 87 Cal.App.4th 99, 130.

(d) Indirect Impacts on Wildlife

The DEIR ignores altogether the Project's indirect impacts on wildlife. Indirect impacts from low density residential development can be as devastating to wildlife as the direct loss of habitat. (*See generally* Exhibit 5 [Hansen, et al., Land Use Change in Rural America: Effects Of Exurban Development On Biodiversity: Patterns, Mechanisms, And Research Needs]). For example, toxic compounds from the residential activities could adversely impact wildlife that rely on Kirker Creek. The use of common fertilizers and pesticides associated with routine yard maintenance and landscaping can generate concentrations of pollutants that degrade water quality and harm wildlife.

It is also well established that noise—and even low ambient noise levels—from typical residential activities adversely impacts wildlife species, causing them to flee their habitats and even abandon nests. Wildlife can also be quite sensitive to glare from ambient night lighting. Also, cats, unless they are kept indoors, are skilled predators on wildlife. Cats can radically decrease the potential for bird species and small reptiles to survive in sensitive habitats adjacent to project sites. *See* "Domestic Cat Predation on Birds and Other Wildlife" attached as Exhibit 6. These indirect impacts would be significant and therefore must be analyzed in an EIR.

In short, the DEIR's analysis of impacts to biological resources dramatically understates the Project's potential to significantly affect sensitive species and sensitive habitats. To comply with CEQA, the City must prepare a revised DEIR fully analyzing the Project's potential impacts to these resources and identifying effective mitigation measures. Given the substantial revisions that are necessary, the City must recirculate the revised DEIR. Guidelines 15088.5(a)(4).

4. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Cultural and Historic Resources.

The Project is located on the site of a former historic ranch complex considered a significant historic resource under CEQA (*i.e.*, Thomas Ranch complex). *See* DEIR Appendix 1.0; IS at 41. According to a historic resources survey performed in 1995, the complex consisted of a house and a number of small barns in a style typical of the period from the late 1800's through the turn of the century. *Id.* The IS indicates that the historic buildings were demolished and the area leveled, but that the ranch complex was never inventoried as recommended in the 1995 study. IS at 42. It also indicates that historic and/or prehistoric archaeological deposits may be present on the site. *Id.*

Nonetheless, while the DEIR acknowledges the likelihood of significant archaeological resources on the site, it fails to identify the extent of potential cultural resources, adequately analyze potential impacts to those resources, or adequately mitigate the project's potentially significant impacts to cultural resources. Instead, the DEIR relies on the IS analysis and incorporates the mitigation measures proposed in that document. DEIR at 2.0-19. These measures provide for monitoring during construction and data collection and recording should resources be discovered. Based on implementation of these measures, the DEIR concludes that resulting impacts would be less than significant.

However, the assertion that post-approval data collection will mitigate the project's impacts to known resources on the site to a less-than-significant level is not supported by substantial evidence, constitutes an inappropriate deferral of mitigation measures under *Sundstrom v. County of Mendocino*, 202 Cal.App.3d at 296, and is erroneous as a matter of law. In fact, "where a historic resource is to be demolished, documentation of the resources usually falls short of full mitigation."). *See* Discussion following Guidelines § 15126.4. Moreover, courts have explained that the mitigation of the effects of demolition of an historic resource (as defined by CEQA) through documentation of the resource and placement of commemorative markers is not adequate to reduce impacts to a level of insignificance. *League of Protection of Oakland's Architectural and Historic Resources v. City of Oakland* (1997) 52 Cal.App.4th 595.

Moreover, under CEQA, the preferred method of reducing impacts to cultural resources is avoidance. *See Madera Oversight Coalition, Inc. v. County of Madera* (2011) 199 Cal.App.4th 48, 86-87. The only feasible way to avoid cultural resources with a development project like this is to conduct surveys before final project design is approved; identify all known historic properties that will be affected by the project; and consider redesigning the project to avoid them.

Here, given that the site includes known significant historical resources, and especially given the fact that known historical resources were destroyed without proper evaluation or documentation, the City should require a third party consultant to perform trenching tests now, as part of the CEQA process, to assess whether the Project would impact significant resources and what Project modifications could be incorporated to avoid the resources. Until such additional investigation and analysis of potential impacts to cultural resources is prepared, the DEIR cannot be certified under CEQA and the Project must not be approved.

Finally, the cultural resources evaluations prepared by Holman and Associates (1995, 1999, and 2000) were not included as appendices to the DEIR. Although it is customary to exclude location maps and specific language related to the

location of resources to protect potential resources on site, the DEIR omitted the studies altogether. Without these studies, it is impossible for the public and decision makers to evaluate the impacts the proposed project would have on cultural resources. Accordingly, for this and the other reasons discussed above, the DEIR's analysis of impacts to cultural resources is inadequate under CEQA.

5. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Public Services.

As the DEIR acknowledges, several schools within the Pittsburg Unified School District are currently operating at or near capacity. DEIR at 5.6-3. The Project will generate up to 277 Kindergarten through Twelfth grade students. DEIR at 5.6-8. The DEIR discloses that the Project would generate the need for new school facilities to be constructed. The DEIR concludes that school impacts will be mitigated to a less-than-significant level, however, by payment of fees established by the school districts. DEIR at 5.6-9 (citing Gov't Code § 65996).

While it may be true that the payment of such fees is deemed mitigation under Government Code section 65996, this provision does not excuse the City from analyzing the impacts to the environment of sending 277 new students to schools that are already at or near capacity. Indeed, the DEIR's threshold of significance states that the Project could have a significant effect on the environment if it would: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios . . . for schools. DEIR at 5.6-7. With several schools already at capacity, the Project will necessarily require the construction of "new or physically altered" school facilities. Construction of these school facilities may have land use and planning impacts and, if sited on undeveloped open space lands, potential biological, agricultural, recreational, and other impacts as well. The DEIR must be revised to analyze these potential environmental impacts.

Moreover, the DEIR failed to consider cumulative impacts of school construction. The DEIR lists five Major Projects (DEIR at 5.0-4), most of which are residential projects, in its cumulative impacts analysis. In addition, the City of Pittsburg's Project Pipeline List includes at least a dozen residential projects. Considering that the Pittsburg Unified School District is already at or near capacity, the DEIR must analyze how this project, along with the related projects, will cumulatively affect school services in the District.

6. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Public Safety.

The Project site has an existing high-pressure petroleum pipeline within the area proposed as a buffer. DEIR at 3.0-9. The Project proposes to site residences within 1,000 feet of the pipeline, yet the DEIR provides no analysis of related safety impacts. *Id.* Although leaks, ruptures, and explosions may not be common for underground pipelines, the impacts from pipeline failures when they do occur can be catastrophic. *See* "Pipelines Explained: How Safe are America's 2.5 Million Miles of Pipelines?" attached as Exhibit 7. As explained in that article, pipelines are prone to failure as they age and corrode. Given the Project's proposal to locate housing in close proximity to the pipeline, the DEIR should have provided an analysis of the condition of the pipeline and the likelihood of failure or accidents.

Instead, the DEIR includes a mitigation measure (carried over from the IS) that only requires the developer to disclose the location of the pipeline to prospective homebuyers. DEIR at 2.0-2.0. However, this measure does nothing to minimize risks to homeowners. Indeed, the DEIR fails to provide any evidence to support its conclusion that risks associated with potential rupture of the pipeline would be reduced to a less-than-significant level with implementation of the measure.

7. The DEIR's Analysis of Growth Inducing Impacts Is Incomplete and Flawed.

CEQA requires that an EIR include a "detailed statement" setting forth the growth-inducing impacts of a proposed project. CEQA § 21100(b)(5); *City of Antioch v. City Council of Pittsburg* (1986) 187 Cal. App. 3d 1325, 1337. The statement must "[d]iscuss the ways in which the proposed project could foster economic growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." Guidelines §15126.2(d). It must also discuss how the project "may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively" or "remove obstacles to population growth." *Id.*

Here, the DEIR's analysis of growth-inducing impacts is legally inadequate. As with other issues, the document relies on speculation instead of evidence to support its conclusions. The DEIR's conclusion that the Project will have no growth-inducing impacts is not supported by substantial evidence.

The DEIR relies on the promise that the required facility upgrades necessary to serve the Project would only serve development on the main Project site to

conclude that there is little chance that the Project will cause adjacent, undeveloped land to be developed, and thus that the Project will not induce significant growth. DEIR at 7.0-5. With a growing population in the Bay Area, extending infrastructure to an area currently outside the City Limit will remove one barrier that currently keeps pressure for development in the area in check.

The City's General Plan specifies a goal of efficient land use patterns which reduce environmental impacts and minimize the potential for residential and commercial sprawl. Approval and development of the Montreux Project would expand development and extend utility infrastructure beyond the City's existing service area, effectively removing an obstacle to future development approvals in the area. That new development has yet to be approved does not excuse the requirement to analyze a project's environmental or growth inducing impacts. Guidelines § 15126.2(d); *City of Davis v. Coleman* (9th Circuit 1975) 521 F.2d 661,675-76.

The DEIR fails to conduct such an analysis. As the *City of Davis* court directed "the purpose of an EIS/EIR is to evaluate the possibilities in light of current and contemplated plans and to produce an informed estimate of the environmental consequences." *Id*. at 676. Accordingly, the DEIR must be revised to identify the extent and location of new development facilitated by removing the obstacle of limited existing infrastructure and to analyze the environmental impacts of the growth.

If the City has contrary data demonstrating that the Project will not induce growth – and there is no indication in the DEIR that it does – it must reference it in the document. However, it may not lawfully rely on unsupported assumptions to summarily conclude that no induced growth will occur. CEQA § 21080(e)(2) ("Substantial evidence is not argument, speculation, unsubstantiated opinion or narrative").

8. The DEIR Fails to Provide an Adequate Analysis of the Project's Potentially Significant Cumulative Impacts.

CEQA requires lead agencies to disclose and analyze a project's "cumulative impacts," defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." Guidelines § 15355. Cumulative impacts may result from a number of separate projects, and occur when "results from the incremental impact of the project [are] added to other closely related past, present, and reasonably foreseeable probable future projects," even if each project contributes only "individually minor" environmental effects. Guidelines §§ 15355(a)-(b). A lead agency must prepare an EIR if

a project's possible impacts, though "individually limited," prove "cumulatively considerable." CEQA § 21083(b); Guidelines § 15064(i).

Extensive case authority highlights the importance of a thorough cumulative impacts analysis. In *San Bernardino Valley Audubon Society v. Metropolitan Water Dist. of Southern Cal.* (1999) 71 Cal.App.4th 382, 386, 399, for example, the court invalidated a negative declaration and required an EIR for the adoption of a habitat conservation plan and natural community conservation plan. The court specifically held that the negative declaration's "summary discussion of cumulative impacts is inadequate," and that "it is at least potentially possible that there will be incremental impacts. . . that will have a cumulative effect." *See also Kings County Farm Bureau*, 221 Cal.App.3d at 728-729 (EIR's treatment of cumulative impacts on water resources was inadequate where the document contained "no list of the projects considered, no information regarding their expected impacts on groundwater resources and no analysis of the cumulative impacts").

In contravention of the above authorities, the DEIR provides no analysis of the Project's cumulative impacts on biological resources, but simply concludes that, because the applicant will pay permit fees under the Habitat Conservation Plan for the area, cumulative impacts are less than significant. DEIR at 5.3-37. The DEIR thus completely ignores the cumulative effects of recent development approvals and potential future approvals in the City. For example, as discussed earlier in this letter, the City's Project Pipeline List indicates that the City has approved, or is in the process of approving, at least a dozen residential development projects constructing thousands of residential units. *See* Exhibit 7. The DEIR lists only five projects considered in the cumulative analysis. DEIR at 5.0-4. Other projects that should have been considered in a cumulative analysis include projects that have been approved but not yet constructed (Alves Ranch (364 units); Bancroft Gardens II (28 units); the San Marco Development (1,588 units); and Vista del Mar (518 units). *See generally* Exhibit 8. These development projects, together with the present subdivision, would have a cumulatively significant impact on open space and natural resources in the Project area. Notwithstanding such evidence, the DEIR fails to provide any analysis of this potentially significant impact.

In another particularly glaring omission, the DEIR also neglects to analyze cumulative impacts on hydrological resources. Specifically, the DEIR contains no analysis of the Project's impacts together with the effects of other development projects proposed within the Project area that may contribute to changes in hydrology in Kirker Creek. Another major project, the James Donlon Boulevard Extension, which is currently under review by the City and would include massive grading and alteration of local drainage patterns and hydrology within the Kirker Creek watershed, is not considered in

the DEIR's hydrology analysis. The effects on water quality, flooding, and hydromofication from these two major projects, and others, on Kirker Creek must be analyzed in a revised DEIR.

9. The DEIR Fails to Adequately Analyze and Mitigate Alternatives to the Project.

The alternatives section, along with the mitigation section, is the core of an EIR. *Citizens of Goleta Valley*, 52 Cal.3d at 564. Every EIR must describe a range of alternatives to a proposed project, and to its location, that would feasibly attain the project's basic objectives while avoiding or substantially lessening the project's significant impacts. CEQA § 21100(b)(4); Guidelines § 15126(d). In preparing an EIR, the lead agency must ensure "that all reasonable alternatives to proposed projects are thoroughly assessed." *San Joaquin Raptor*, 27 Cal.App.4th at 717. An EIR's alternatives discussion must focus on alternatives that avoid or substantially lessen significant effects of the project. Guidelines § 15126.6(b); *Citizens of Goleta Valley*, 52 Cal.3d at 556 (EIR must consider alternatives that offer "substantial environmental advantages."). The range must be sufficient "to permit a reasonable choice of alternatives so far as environmental aspects are concerned." *San Bernardino Valley Audubon Soc'y v. County of San Bernardino* (1984) 155 Cal.App.3d 738, 750. The DEIR's discussion of alternatives fails to meet these standards.

Sound planning principles dictate that the City carefully consider alternatives in the present case because the proposed Project would require annexation of the Project site into the City limits and into service areas for water and sanitation districts and would result in admittedly significant impacts to air quality, visual resources, and public services. DEIR at 2.0-6, 2.0-8, 2.0-10, and 2.0-16. This DEIR's analysis of alternatives is insufficient under CEQA because the document fails to consider feasible alternatives that would reduce Project impacts. Guidelines § 15126.6(c); *Citizens of Goleta Valley*, 52 Cal.3d at 566.

As a preliminary matter, the DEIR's failure to disclose the extent and severity of the Project's broad-ranging impacts necessarily distorts the document's analysis of Project alternatives. As a result, the alternatives are evaluated against an inaccurate representation of the Project's impacts. Proper identification and analysis of alternatives is impossible until Project impacts are fully disclosed. Moreover, as discussed above, the document's analysis is incomplete and/or inaccurate so that it is simply not possible to conduct a comparative evaluation of the Project's and the alternatives' impacts.

The DEIR also fails to describe an alternative location for the Project, stating that because neither the developer nor the City owns or controls any other property in the vicinity of the site that is of sufficient size to accommodate the project, the ability of the developer to find and purchase an alternative site to develop the project is considered speculative. DEIR at 6.0-3. The DEIR goes on to state that "… the development of the same number of residential uses at a different location would result in similar visual character and construction air quality impacts. Thus, placing the proposed development at an alternative site would not avoid the significant impacts of the proposed project." *Id*.

This approach fails to meet CEQA's requirements for the analysis of alternatives. It provides no information on the alternative sites that might be available or event the criteria for such a site search. Without this information and, if possible, a further identification of alternative sites, the DEIR is inadequate and cannot be certified under CEQA. Moreover, even if it is true that no alternative sites exist that could accommodate all of the Project in one location, a feasible alternative could break the Project up into two or more locations. Such an alternative could involve in-fill sites and would likely disperse some of the significant project impacts associated with the proposed Project. An alternative that examines dividing the Project among two or more locations should be included in a revised DEIR.

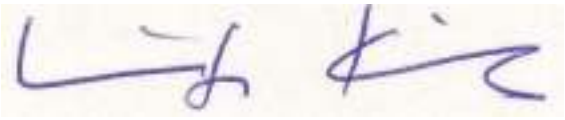
Contrary to CEQA, the DEIR also fails to explain why the proposed Project was selected over alternatives that are identified as environmentally superior. CEQA requires that the EIR explain why environmentally superior alternatives were rejected. Guidelines § 15126.6(d). As the California Supreme Court held in *Laurel Heights I*, 47 Cal.3d at 405, "[i]f the [lead agency] considered various alternatives and found them to be infeasible . . . those alternatives and the reasons they were rejected . . . must be discussed in the EIR with sufficient detail to enable meaningful participation and criticism by the public." The DEIR fails to include this analysis.

III. CONCLUSION

To cure the many defects identified in this letter, the DEIR must be revised and recirculated. These steps are necessary to provide the public and decision makers with an opportunity to gauge the true impacts of this significant, proposed development. Moreover, the Project itself must be revised to comply with the City's general plan. Only then could the City make the findings necessary to approve this subdivision.

Very truly yours,

SHUTE, MIHALY & WEINBERGER LLP



Winter King

Carmen J. Borg, AICP
Urban Planner

List of Exhibits

Exhibit 1: Bruce Abelli-Amen, Comments on Draft Environmental Impact Report and Initial Study, Baseline Environmental Consulting, Jan. 8, 2014.

Exhibit 2: Susan Orloff, Movement Patters and Migration Distances in an Upland Population of California Tiger Salamander (*Ambystoma Californiense)*, Ibis Environmental Inc., Apr. 1, 2011.

Exhibit 3: Malcolm Sproul Biography, Retrieved Jan. 8, 2014.

Exhibit 4: Potential Pond Site Image and Location, Retrieved on Jan. 8, 2014 from http://earth.google.com

Exhibit 5: Andrew J. Hansen, et al, Effects of Exurban Development on Biodiversity: Patterns, Mechanisms, and Research Needs, Ecological Society of America, Dec. 1, 2005.

Exhibit 6: Domestic Cat Predation on Birds and Other Wildlife, Cats Indoors and American Bird Conservancy.

Exhibit 7: Lena Groeger, Pipelines Explained: How Safe are America's 2.5 Million Miles of Pipelines?, ProPublica, Nov. 15, 2012.

Exhibit 8: City of Pittsburg, Project Pipeline List- Updated September 2013, Retrieved Jan. 8, 2014.

EXHIBIT 1

8 January 2014
13316-00

Ms. Carmen Borg
Shute, Mihaly, and Weinberger
396 Hayes Street
San Francisco, CA 94102

Subject: Montreux Residential Subdivision Draft Environmental Impact Report

Dear Ms. Borg:

At your request, BASELINE Environmental Consulting ("BASELINE") has reviewed the CEQA analysis of the hydrology and water quality issues included in the November 2013 Montreux Residential Subdivision Draft Environmental Impact Report ("DEIR") and appended March 2013 Montreux Residential Subdivision Project Initial Study ("Initial Study"). Specifically, we reviewed the Hydrology and Water Quality section of the Initial Study only, because the DEIR does not include any analysis of hydrology or water quality (this topic was scoped out of the DEIR). In order to provide a meaningful context, we also reviewed the Project Descriptions included in the Initial Study and DEIR. Our comments are presented below.

COMMENTS ON DEIR AND INITIAL STUDY

Project Description

The Project Description does not include adequate details of the design and function of the stormwater drainage system to allow the reader of the DEIR to understand this important project element. The description of the stormwater drainage features is limited to the location of the detention basins and a mention that the stormwater system would use inlets and piping. As stated in the Project Description (DEIR page 3.0-9), the project would include grading to construct stormwater detention basins:

> *Three stormwater detention basins are included in the preliminary grading plan, with two large basins located on the east side of the main project site (Parcels C and D) along Kirker Pass Road, and a third small basin with a 12 foot access road located on the off-site parcel to the northwest of the main project site. Construction of these basins would require grading to re-contour the eastern end of the southern ridgeline on the main project site, and the north-facing slope above the proposed off-site basin located on the off-site parcel. While the entire off-site parcel totals approximately 72 acres, only 16.8 acres would be graded in order to accommodate the new off-site basin (which has an actual footprint of 0.83 acre).*

Based on information included on Figure 3.0-6 (DEIR page 3.0-10) the parcels containing the large detention basins would be 5.91 and 3.75 acres. The off-site detention basin would have a

bottom area of 0.83 acres and approximately 16.8 acres of grading would be required to construct the off-site basin. In total, more than 26 acres of land would be graded to construct these three basins.

The project would convey runoff to the detention basins using drainage inlets and piping (DEIR page 3.0-9):

> *New storm drainage infrastructure, including drainage inlets and piping, would be installed in the proposed roadways on the main project site to connect developed areas to the stormwater detention basins.*

The Project Description fails completely to describe where drainage features (inlets, piping, culverts, etc.) would be located and how these systems, including the detention basins, would be operated. The DEIR does not appear to include, nor does it reference, any hydrologic or hydraulic engineering that supports the drainage plan. The reader of the DEIR has no idea how the detention basins were sized or how they would be operated. The DEIR Project Description should be revised to include this information and appropriate hydrologic/hydraulic studies should be appended to the DEIR.

Hydrology and Water Quality Analysis

Hydrologic Setting. The DEIR/Initial Study provides no information on the hydrology and water quality setting. Without describing the hydrology of the on-site drainage and that of Kirker Creek downstream, the reader of the DEIR has no context within which to evaluate potential project impacts. The DEIR should be revised to include a Hydrology and Water Quality section that includes a detailed hydrologic setting.

Stormwater Quality and NPDES Compliance. The Hydrology and Water Quality section of the Initial Study indicates that (Initial Study page 59):

> *Postconstruction, the project would treat stormwater runoff from the new impervious surfaces created onsite, as required by provision C.3 of the Contra Costa County municipal stormwater NPDES permit by directing all site runoff into three detention basins where the runoff would be detained and released at a rate that does not exceed the current rate at which site runoff is discharged into receiving waters. The detention and slow release would allow pollutants, especially sediment to settle in the detention basins and not be discharged into the receiving waters. Therefore the site runoff would not exceed any water quality standards. This impact is considered less than significant.*

The paragraph above represents the sum total of the Initial Study/DEIR analysis and discussion of post-construction stormwater management issues. This paragraph not only fails to convey the scope of post-construction stormwater management issues and potential impacts related to the proposed project, it misrepresents NPDES requirements.

The Initial Study states that the project would treat stormwater runoff "as required by provision C.3 of the Contra Costa County municipal stormwater NPDES permit by directing all site runoff into three detention basins." The actual NPDES permit that the project would be required to comply with is the Municipal Regional Stormwater NPDES Permit, Order No. R2-2009-0074, NPDES Permit No. CAS612008, adopted October 14, 2009 and revised November 28, 2011 ("MRP"). Not only does the Initial Study refer to the wrong NPDES permit, it wrongly interprets what C.3 provisions would be required. The C.3 portion of the MRP, which refers to post-construction stormwater management for new development and redevelopment projects, requires Low Impact Development ("LID").[1]

The goal of LID is to reduce runoff and mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating stormwater runoff close to its source. Practices used to adhere to these LID principles include measures such as rain barrels and cisterns, green roofs, permeable pavement, preserving undeveloped open space, and biotreatment through rain gardens, bioretention units, bioswales, and planter/tree boxes. LID also limits disturbance of natural water bodies and drainage systems; minimizes compaction of highly permeable soils; protects slopes and channels; and minimizes impacts from stormwater and urban runoff on the biological integrity of natural drainage systems and water bodies. The project would include the following (Initial Study page 60):

> *The project includes alteration of site drainage and the alteration of the unnamed intermittent and ephemeral stream channel that runs through the project site.*

Under the project, the existing "unnamed intermittent and ephemeral stream channel" would be eliminated and placed in an underground pipe (contrary to LID principles and MRP requirements).

The basic design of the project, which includes mass grading, destruction of natural drainages, extensive new impervious surfaces, no small-scale distributed stormwater treatment features, conventional gutter and pipe collections systems, and centralized detentions basins is completely contrary to LID principles and therefore would be in violation of the MRP. The Initial Study/DEIR fails completely to identify and mitigate the flaws in project design related to post-construction stormwater management.

Incorporation of LID designs and features into the project would require extensive modifications to the grading plan and overall site plan. These design changes to the project

[1] A stormwater management strategy aimed at maintaining or restoring the natural hydrologic functions of a site. LID design detains, treats, and infiltrates runoff by minimizing impervious area, using pervious pavements and green roofs, dispersing runoff to landscaped areas, and routing runoff to rain gardens, cisterns, swales, and other small-scale facilities distributed throughout a site (source: Contra Costa County C.3 Guidebook).

should be made by the applicant and the revised project should be subject to CEQA review (which should include an EIR-level analysis of Hydrology and Water Quality).

Centralized detention basins are not LID features and should be eliminated from the stormwater quality management plan for the project. However, it is possible that some sort of detention may be required to mitigate the potential for downstream flooding of Kirker Creek.

Downstream Flooding and Erosion. The following paragraph is the only Initial Study/DEIR discussion provided related to potential downstream flooding (Initial Study page 60):

> *A majority of stormwater runoff on the site would be channeled to two detentions basins located along Kirker Pass Road, which would delay the flow of water downstream in the event of a storm, thus preventing erosion of existing stream banks and flooding downstream along Kirker Creek.*

The Initial Study/DEIR does not provide any discussion of the hydrology of Kirker Creek and its susceptibility to flooding, and therefore it is impossible for the reader to know if downstream flooding is an important issue. Based on review of available mapping and aerial photographs, Kirker Creek appears to have reaches that are highly incised with oversteepened creek banks. This indicates that portions of the creek may be unstable. There are areas in the City of Pittsburg (e.g., Brush Creek Drive, Canyon Way), where homes are located within 20 to 30 feet of the top of the creek bank. Any change to the hydrology of flows in Kirker Creek could cause increased erosion and creek bank failure, which may jeopardize existing structures. This is a potentially significant impact which must be fully analyzed under CEQA.

The Initial Study fails to provide any explanation as to how the detention basins would be operated so that "erosion of existing stream banks and flooding downstream along Kirker Creek" would be prevented. The concept of "hydromodification"[2] is not even mentioned in the Initial Study/DEIR. Simply delaying flows in detention basins is not an effective approach to preventing downstream hydromodification of Kirker Creek. By introducing widespread new impervious surfaces and conveying the increased flows to centralized basins (which tend to become sealed and do not infiltrate much water), the project would increase total discharge volume to Kirker Creek (i.e., with an increased volume of runoff, the detention basins may be able to limit increases in peak discharges, but the duration of flows would almost certainly increase). Even moderate flows to the creek, if sustained for longer periods of time than would occur without the project, could cause significant downstream erosion. The Initial Study/DEIR fails completely to analyze and mitigate this potential impact.

In summary, the project proposes mass grading, elimination of existing natural drainage channels, and drastic changes to site hydrology and flow discharge characteristics. The Initial

[2] Hydromodification is generally defined as changes in channel form associated with alterations in flow and sediment due to past or proposed future land use alteration.

Study/DEIR includes no description of the hydrologic setting, provides no substantive analysis of the hydrology or water quality effects of the project, and provides no substantial evidence for the findings of less than significant for all hydrology and water quality impacts. For a project of this magnitude, located just upstream from a potentially unstable creek system, a full EIR-level analysis of hydrology and water quality issues must be completed.

Cumulative Impacts. The Initial Study/DEIR completely fails to evaluate (or even mention) cumulative impacts related to hydrology and water quality. For example, another major project, the James Donlon Boulevard Extension, which would include massive grading and alteration of local drainage patterns and hydrology within the Kirker Creek watershed is not mentioned in the DEIR analysis. The effects and water quality, flooding, and hydromofication of these two major projects on Kirker Creek should be analyzed in the DEIR.

Should you have any questions or comments, please contact us at your convenience.

Sincerely,

Bruce Abelli-Amen
Senior Hydrogeologist
Cert. Hydrogeologist No. 96

BAA:km

556803.1

EXHIBIT 2

Herpetological Conservation and Biology 6(2):266–276.
Submitted: 6 August 2009; Accepted: 1 April 2011.

MOVEMENT PATTERNS AND MIGRATION DISTANCES IN AN UPLAND POPULATION OF CALIFORNIA TIGER SALAMANDER (*AMBYSTOMA CALIFORNIENSE*)

SUSAN G. ORLOFF

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***Abstract.*—During five winter breeding seasons (October-April, 2000–2005), I investigated the migratory movements of an upland population of California Tiger Salamander (*Ambystoma californiense*) in Contra Costa County, California. I used a drift fence and pitfall trap array to partially enclose a proposed 27 ha housing project and capture migrating adult and juvenile salamanders. The study objective was to assess movement patterns and migration distances for upland life stages during an effort to translocate all captured salamanders and reduce their mortality from future development at the study site. I recorded substantial numbers of adult and juvenile *A. californiense* (90–417 annually) farther from breeding ponds than previously reported. The majority of salamanders were captured at least 800 m from the nearest breeding pond while a smaller number of salamanders were captured as far as 2.2 km from the nearest breeding pond. The study indicates that recent recommendations to protect 630 m of upland habitat adjacent to breeding ponds may leave large portions of upland life stages at risk. Adults appeared to exhibit fidelity to upland habitat, returning close to the initial point of capture. In situations where translocation is used to remove salamanders from upland habitats subject to development, results suggest it may take several years to successfully relocate a high proportion of individuals in the population.**

Key Words.—Ambystoma californiense; buffer zones; California Tiger Salamander; conservation; pitfall trap; migration distance; terrestrial movements; upland ecology.

INTRODUCTION

Conserving terrestrial habitat surrounding wetlands is essential for maintaining populations of many pond-breeding amphibians (Semlitsch and Jensen 2001; Semlitsch 2002; Semlitsch and Bodie 2003). Upland habitat is critical for feeding, refuge, and migratory movements of juvenile and adult life stages (Semlitsch 1998; Semlitsch and Jensen 2001). Recent studies emphasize that amphibian population viability can be extremely sensitive to survivorship of upland life stages (Biek et al. 2002; Trenham and Shaffer 2005). Further, the importance of specific areas of upland habitat and preferences for a particular migratory route have been reported for several species of ambystomatid salamanders (Shoop 1968; Stenhouse 1985; Trenham and Cook 2008).

Despite research documenting the biological importance of terrestrial habitat for amphibians, the extent and location of appropriate areas required to sustain viable populations are poorly understood. Several recent studies estimated the area of terrestrial habitat needed to adequately protect amphibian populations, based on migration distances from multiple studies and species. Semlitsch (1998) estimated that a 164 m "buffer zone" would encompass 95% of most ambystomatid salamander populations (based on six species). Semlitsch and Bodie (2003) estimated that "core terrestrial habitat" for 13 species of salamanders ranged from 117 to 218 m from the wetland. Rittenhouse and Semlitsch (2007) found that 95% of the adult breeding population for six species of salamanders occurs within 245 m of the wetland boundaries. However, because these studies were primarily of eastern species that typically inhabit forest or woodlands, the resulting recommendations may not be well suited to western *Ambystoma* species associated with grasslands. Although much remains to be learned regarding the appropriate size of buffer zones, it is clear that identifying and protecting upland habitat should be a management priority, especially for rare and endangered species (Marsh and Trenham 2001; Semlitsch 2007; Harper et al. 2008).

The California Tiger Salamander, *Ambystoma californiense*, is listed as a threatened species by the U.S. Fish and Wildlife Service (2004) and the state of California (California Fish and Game Commission 2010). The range of this species is restricted to grasslands and foothills of central California (Storer 1925). Adults spend the majority of their life cycle in small-mammal burrows in upland habitat (Loredo et al. 1996). With the onset of winter rains, adults emerge from underground terrestrial retreats and migrate to ponds for reproduction (Loredo and Van Vuren 1996). The importance of maintaining upland habitat adjacent to breeding ponds for *A. californiense* has only recently been emphasized (Trenham 2001; Trenham and Shaffer 2005). A more detailed under-

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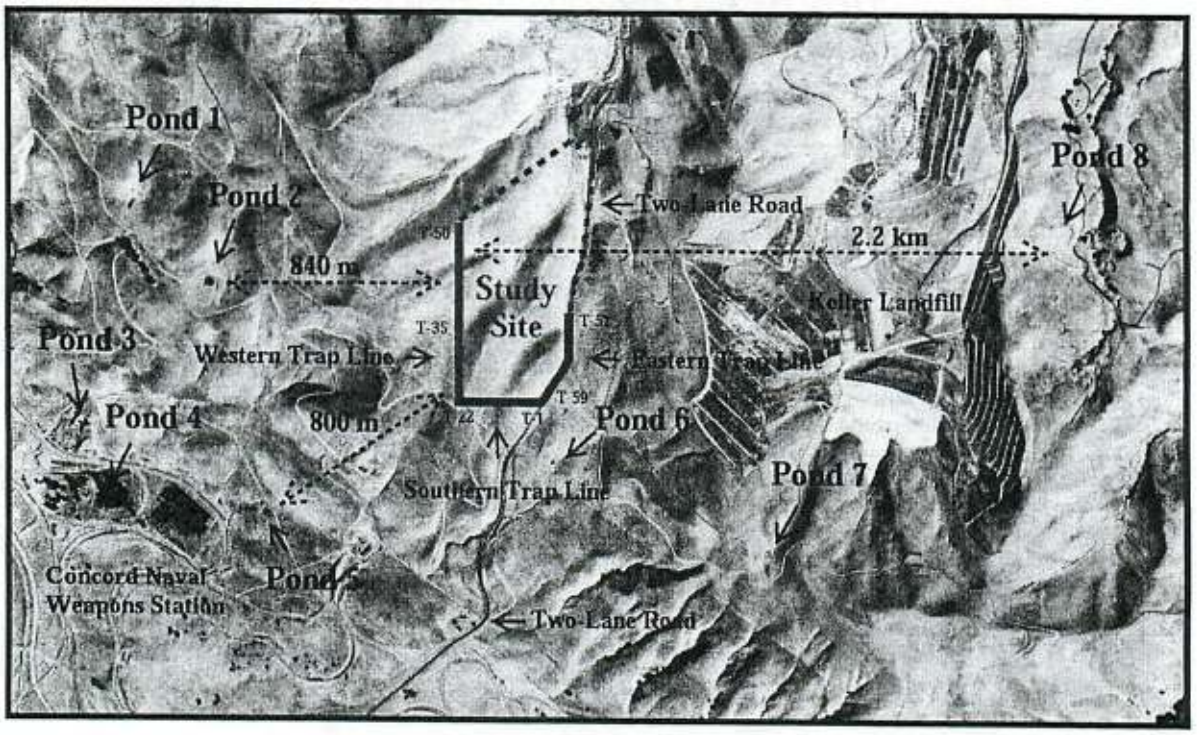

FIGURE 1. Aerial photograph showing the closest breeding ponds to the study site in Contra Costa County, California, USA (from http://www.terraserver.com; [Accessed 1 August 2002]). Bold red solid lines indicate trap line segments (western, southern, and eastern) along boundaries of the study site, T represents trap number, and dashed lines with arrows at both ends indicate distances from the western trap line to nearest breeding ponds. Ponds 1–5 are located on Concord Naval Weapons Station (CNWS) and Ponds 6–8 are located on a landfill adjacent to the study site

standing of migratory movements and activity patterns in upland habitats is fundamental to managing this species (Trenham and Shaffer 2005).

This paper presents findings of a five-year study investigating the migratory movements of upland life stages of a population of *A. californiense* at a proposed housing development. The primary objectives of the study were (1) to characterize movement patterns and timing of movements during the breeding season, (2) to measure distances from capture locations to closest known breeding ponds, and (3) to test for relationships between the timing of migratory movements and environmental parameters. An additional objective of the study was to reduce direct mortality from future development at the study site by translocating all captured salamanders outside the study site and restricting reentry. Conservation strategies involving translocations are a common wildlife management tool (Griffith et al. 1989; Fischer and Lindenmayer 2000; Dodd 2005). Although the effectiveness of translocation strategies has been subject to controversy (e.g., Dodd and Seigel 1991; Seigel and Dodd 2002; Trenham and Marsh 2002), a recent review has shown improved success rates for some species of amphibians when a critical minimum number of individuals are translocated (Germano and Bishop 2008). Relatively few translocation studies have been conducted on amphibians (Germano and Bishop 2008) or addressed human and wildlife conflicts (e.g., Cooke and Oldham 1995; Rathbun and Schneider 2001), and none have assessed the efficacy of translocating adult amphibians within upland habitat.

MATERIALS AND METHODS

Study site.—The proposed housing development is located on the northern edge of the San Joaquin Valley in northeastern Contra Costa County, California. The 27-ha area consists of grazed annual grasslands on rolling to steep hills (elevation range = 213–274 m; Fig. 1). Two primary drainages traverse the site but amphibian breeding ponds are not present. Lands surrounding the site are primarily grazed grasslands. The Concord Naval Weapons Station (CNWS) is located to the west and south of the site and a privately owned, active landfill is located to the east and southeast.

Eight breeding ponds are known to occur near the study site (Fig. 1). To the west and southwest, the closest ponds are on CNWS (Ponds 1–5) and are the primary breeding ponds on CNWS lands (Stitt and Downard 2000; Shawn Smallwood, pers. comm.). To

the east and southeast, the closest ponds are located on the adjacent landfill (Ponds 6–8). To the north, no known breeding ponds occur within 2.5 km. I examined aerial photographs from several years (1999, 2000, 2004, and 2005) and USGS topographic maps, and found no other potential breeding ponds closer to the study site. Before the trapping study began, I conducted four night surveys during winter rain events to determine if *A. californiense* was present at the study site. During these initial surveys, I observed four adults at burrow entrances of California Ground Squirrels (*Spermophilus beecheyi*) and thus commenced an intensive translocation effort.

Trapping techniques.—My field team and I (hereafter we) installed a drift fence and pitfall trap array along a partial perimeter (1.3 km) of the study site. The drift fence bordered the boundaries most likely to be used as movement corridors, and included the western, southern, and a portion of the eastern border of the study site (Fig. 1). We installed 118 pitfall traps (59 pairs of 7.5 L plastic buckets) located every 15 to 30 m along the inside and outside of the drift fence. We used a 0.9 m tall commercial quality silt fence buried 0.3 m underground, stretched taut, and secured by both wooden and steel fence posts. We placed elevated covers over the traps to provide shading and minimize predation, and placed a damp non-cellulose sponge in each trap to maintain moisture for captured salamanders. We replaced the drift fence and pitfall traps (i.e., trap line) each year of the study and repaired the fence line as needed to maintain its integrity as a barrier to movement.

Our surveys encompassed five winter breeding seasons, from October 2000 to April 2005 (hereafter, years 2000 to 2004). In 2001 and 2002, we increased the length of the trap line by installing nine pairs of pitfall traps along the eastern border of the study site. While the trap line encompassed over half the total perimeter of the proposed development, the entire area was not completely enclosed due to the large area of the site. We opened all traps at dusk on nights when the chance of rain was predicted to be 40% or greater and checked at dawn the following morning. Because amphibians are often active on the night after a heavy rain (Gibbons and Bennett 1974), we left the traps open on nights after a rain event that exceeded 0.6 cm, even when no rain was predicted for that night. At all other times the traps were closed. We immediately translocated individuals captured inside the trap line to small mammal burrows 15 to 100 m outside the development. We kept individuals captured outside the trap line outside and translocated them in the same manner.

For each capture, we recorded date, trap number, trap line side (inside or outside), sex (adults only), reproductive condition (reproductive or non-reproductive), snout-vent length (SVL), total length, and age class (adult or juvenile). We identified individuals as adults if they had at least one of the following characteristics: keeled tail, swollen vent (reproductive males), gravid condition (reproductive females), or large body length (≥ 75 mm SVL; Trenham et al. 2000). We identified juveniles based on small body length (usually < 75 mm SVL; Loredo and Van Vuren 1996) and the absence of adult characteristics. Males were distinguished from females by the presence of a keeled tail, swollen vent, or proportionally longer tail (Petranka 1998; Searcy and Shaffer 2008). We recorded adult-sized salamanders without other distinguishing characteristics as adults; these salamanders may have been subadults (≥ 1 year of age but not sexually mature) or salamanders returning from the ponds post breeding (i.e., non-reproductive). Because juvenile body lengths vary considerably (46–114 mm; Loredo and Van Vuren 1996) and can overlap adult sizes, we may have mistakenly classified some larger juveniles as adults in non-reproductive condition. In addition, we acquired two photographs of the dorsal surfaces of each captured salamander for individual identification.

Environmental variables.—In 2000 and 2001, I measured precipitation using a manual rain gauge located on site; the gauge was read and emptied when traps were opened at dusk and checked again at dawn the next morning. For the remainder of the study years, I used an automatic rain gauge (Hobo event logger, Onset Inc., Pocasset, MA., USA) to record hourly rain events (2.5 mm intervals). Air temperature was manually recorded on each morning traps were checked. I used additional data on hourly and yearly rainfall near the study site from California Department of Water Resources, California Data Exchange Center (available from http://www. cdec.water.ca.gov [last accessed 21 September 2006]).

Analyses.—I pooled daily capture data by week, year, sex, age class, and location (inside/outside trap line and trap line segment) as measures of salamander activity. I used the location of captures to infer likely movement patterns (i.e., attempting to leave or enter the study site, and directionality). To evaluate movement patterns within a breeding season, I divided capture data into early season (presumably migrating to breed) and late season (presumably returning from breeding) based on the temporal distribution of captures for all five study years combined.

To standardize for the variability in trapping effort (i.e., different number of traps per line segment and nights of trapping each year), I calculated capture rates (number of captures per 100 trap nights) for analyses. Distance calculations were measured as presumed straight line travel. Within each study year, I compared dorsal patterns in photographs to determine the number of intra-annual recaptures. Individual identification

using photography has been employed successfully with amphibians that have unique patterns of coloration; unlike invasive marking techniques, this causes no harm to the animal (e.g., Donnelly et al. 1994; Doody 1995; Bailey 2004).

I used parametric statistics when data were normally distributed and non-parametric tests when data were not. To determine if recaptured individuals returned to a similar point from which they were initially trapped, the observed mean number of traps between initial and returning trap locations was compared with the expected mean number of traps under a uniformly random scenario (Shoop and Doty 1972). For this analysis, I pooled data from all five study years to obtain an adequate sample size and used only those individuals that were initially trapped early in the breeding season on the inside of the western trap line and then recaptured later in the season outside that same trap line segment (i.e., presumably returning to the study site after breeding). I used the western trap line data because it had the majority of returns and traps along this segment were evenly spaced providing the most accurate distance measurements between initial and returning trap locations.

I tested for annual and seasonal variation in capture numbers among all five study years. I used chi-square tests to determine if annual sex ratios differed significantly from an expected 1:1 ratio. I evaluated the association between seasonal rainfall (both early and late season) and the proportion of males and females captured both inside and outside the trap line using Pearson's correlation coefficient. I used the sign test to compare annual adult capture rates early in the season on the inside of the western trap line and capture rates later in the season outside that same trap line segment, and to compare annual rainfall between early and late seasons. I used Pearson's correlation coefficient to assess whether there was a negative association between translocation efforts and annual capture rates over time based on the proportions of inside versus outside captures, and to test for a relationship between annual on-site rainfall and annual capture rates.

I also analyzed within-year associations between environmental parameters and the number of *A. californiense* captured. To assess the influence of precipitation and temperature prior to capture, I used Spearman's rank correlation. This analysis used rainfall amounts 12 h prior to opening traps (i.e., day prior to capture), 12 h prior to checking traps (i.e., night of capture), and within 24 h prior to checking traps (total of day and night). In addition, I used Wilcoxon two-sample rank sum test to assess if rain at dusk on the night of capture or the night prior to opening the traps was associated with the number of captures. Precise measurements of rain using the automatic rain recorder (which allowed for analysis of rain amounts in intervals less than a 24-h period) were available only in 2002, 2003 and 2004. Of these three years, I chose 2002 for analysis because it was least affected by translocation efforts and barrier fencing.

TABLE 1. Adult and juvenile *Ambystoma californiense* captured inside and outside the trap line during five winter breeding seasons at the study site in Contra Costa County, California. Totals include recaptured individuals. Unique captures exclude recaptured individuals and are shown in parentheses.

Year	Adult Total No. (Unique No.)	Juvenile Total No. (Unique No.)	Adult & Juvenile Total No. (Unique No.)
2000–2001			
Inside trap line	59 (58)	3 (3)	62 (61)
Outside trap line	76 (37)	62 (47)	138 (84)
Totals	135 (95)	65 (50)	200 (145)
2001–2002			
Inside trap line	184 (182)	4 (3)	188 (185)
Outside trap line	215 (158)	14 (13)	229 (171)
Totals	399 (340)	18 (16)	417 (356)
2002–2003			
Inside trap line	63 (61)	3 (3)	66 (64)
Outside trap line	120 (96)	34 (33)	154 (129)
Totals	183 (157)	37 (36)	220 (193)
2003–2004			
Inside trap line	37 (36)	0 (0)	37 (36)
Outside trap line	52 (37)	1 (1)	53 (38)
Totals	89 (73)	1 (1)	90 (74)
2004–2005			
Inside trap line	23 (22)	0 (0)	23 (22)
Outside trap line	72 (61)	86 (81)	158 (142)
Totals	95 (83)	86 (81)	181 (164)

I excluded recaptures from the analysis of some data sets (i.e., capture distribution, movement patterns, sex ratios, and annual reductions). However, except for sex ratios, these analyses did include those individuals first captured during the early season inside the trap line and then later recaptured outside the same trap line during the late season. For annual comparisons of capture numbers, I deleted data on additional traps installed in 2001 and 2002 from the analyses. For all statistical tests, results were considered significant at $\alpha = 0.05$.

RESULTS

Capture numbers and movement patterns.—The annual number of *A. californiense* captured varied from 90 to 417 salamanders over the five year study period (Table 1). Recaptured individuals represented between 9–28% of annual totals, with 96% of these individuals captured on the outside of the trap line. Eight recaptured individuals were captured on or translocated to the outside of the trap line and then later captured on the inside, but these eight represented less than 1% of the total captures. Adult recaptures returning to the study site (presumably after breeding) were found

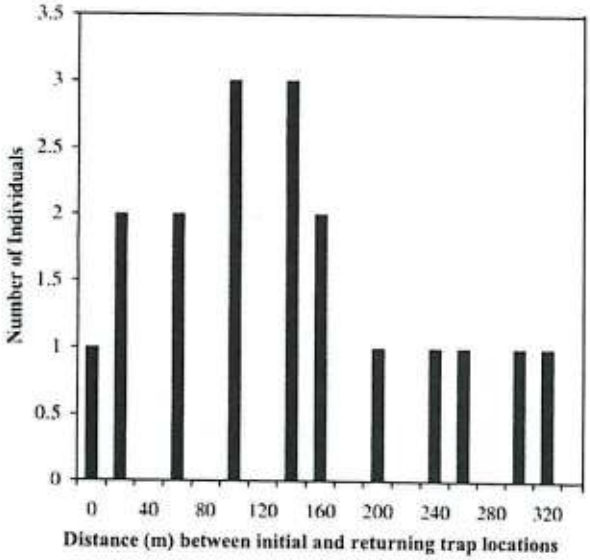

FIGURE 2. Frequency distribution of the distance between initial and returning trap locations for individual *Ambystoma californiense* for all five study years combined (2000–2005). Results include only those salamanders first trapped early during the breeding season inside the trap line and then recaptured outside the same trap line later in the season. Early season = late October to December 31; Late season = January 1 to end of March. Zero on the x-axis represents individuals that returned to the same trap location where they were initially captured.

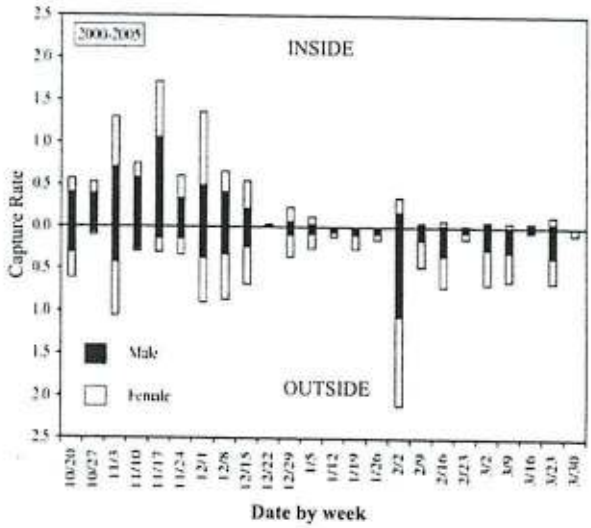

FIGURE 3. Weekly capture rates (no. per 100 trap nights) of male and female *Ambystoma californiense* inside and outside the trap line for all five study years combined (2000–2005). Early season = late October to December 31; Late season = January 1 to end of March. Dates on x-axis represent the beginning of each week. Recaptured individuals were excluded except for salamanders first captured during the early season inside the trap line and then recaptured outside the same trap line later in the season.

significantly closer to where they were initially captured inside the trap line than would be expected by random (Z = -2.92, P = 0.003). Forty-four percent of adult recapture locations were within five traps (≤ 100 m) of the initial inside trap location (Fig. 2). Several individuals were recaptured more than once outside the western trap line, presumably attempting to reenter the site. One male returned to the site five times.

Capture rates from all five study years combined indicate that males and females migrated to the breeding ponds from late October to the end of December (early season) and returned to their upland habitat from the beginning of January to the end of March (late season) (Fig. 3). Annual sex ratios differed significantly from 1:1 in 2002, with females outnumbering males by 2:1 (χ^2 = 20.46, df = 1, P < 0.001). By contrast males outnumbered females by 1.5:1 in 2000 (χ^2 = 3.80, df = 1, P = 0.051). Sex ratios were near 1:1 in the other three study years (2001: χ^2 = 0.02; 2003: χ^2 = 0.00; and 2004: χ^2 = 0.11; all df = 1, all P > 0.70). Among all study years, the proportion of each sex in the population captured early in the season on the inside of the trap line (Table 2) was associated with early season rainfall (negatively associated for males: r = -0.808; positively associated for females: r = 0.808; P = 0.049 for both). However, there was no significant association between the proportion of each sex captured early in the season outside the trap line and early rainfall (males: r = -0.340; females: r = 0.340; P = 0.288 for both) or captured late in the season outside the trap line and late rainfall (males: r = -0.494; females: r = 0.494; P = 0.198 for both).

Within each survey year, the capture rates of adults and juveniles were generally highest along the western trap line (Fig. 4). Analysis of early season capture data, when most salamanders presumably migrated to the ponds, indicated highest adult capture rates on the inside of the western trap line (Table 3). By contrast, analysis of late season data, presumably when most salamanders returned from the ponds, indicated highest adult capture rates outside the western trap line (Table 3). Capture rates for juveniles were highest outside the western trap line primarily in the early season (Table 4). Among all study years, more adults were captured early in the season inside the western trap line than were captured later in the season outside that same trap line segment (sign test, P = 0.031). Early and late rainfall was not significantly different among years (sign test, P = 0.50).

Migration distances.—The shortest distances from inside the western trap line, where the majority of adults were captured in the early season, to the closest breeding ponds to the west were 800 to 840 m (Ponds 5 and 2 on CNWS, respectively; Fig. 1). A smaller number of adults captured early in the season on the outside of the western trap line may be migrating east (Table 3). The closest breeding pond from the western trap line to the east is Pond 8 at 2.2 km. A few adults captured early in

TABLE 2. Proportions of male and female *Ambystoma californiense* captured during the early and late winter breeding seasons on the inside and outside of the trap line. Parentheses indicate the number of each sex captured and N = the total number of adults captured. Early season = late October to December 31; Late season = January 1 to end of March. Results exclude all recaptured individuals.

Season/ Trap Line Side	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005
Early/Inside					
Male	0.76 (41)	0.50 (86)	0.39 (23)	0.68 (23)	0.52 (11)
Female	0.24 (13)	0.50 (87)	0.61 (36)	0.32 (11)	0.48 (10)
N =	54	173	59	34	21
Early/Outside					
Male	0.42 (8)	0.55 (46)	0.28 (23)	0.43 (13)	0.41 (15)
Female	0.58 (11)	0.45 (38)	0.72 (58)	0.57 (17)	0.59 (22)
N =	19	84	81	30	37
Late/Outside					
Male	0.33 (6)	0.45 (52)	0.33 (11)	0.36 (5)	0.43 (12)
Female	0.66 (12)	0.55 (64)	0.66 (22)	0.64 (9)	0.57 (16)
N=	18	116	33	14	28

the season along the inside of the eastern trap line may have been traveling east as well. The closest known breeding pond is only 225 m from the southeast corner the study site (Pond 6). I captured relatively few adults along the inside of either the southern or eastern segments of the trap line in the early season.

Migratory movements and environmental parameters.—Based on trapping data adults began moving with the first night of substantial rain of the season (≥ 1 cm). Smaller amounts of nightly rain (≤ 0.5 cm) at the beginning of the breeding season did not appear to initiate movement. In all survey years, the earliest dates adults were captured ranged from 20 October (2004) to 11 November (2001). Most adult captures occurred between early November and mid-December with fewer more temporally dispersed captures later in the season. Juveniles began arriving at the boundaries of the study site each year within six nights of measurable rain. The earliest dates juveniles were captured ranged from 29 October (2000) to 22 November (2001).

Both the amount of rain within 12 h (night of capture) and 24 h prior to checking traps were positively correlated with number of *A. californiense* captured (r = 0.626 for night rain; r = 0.603 for 24 h; $P < 0.001$ for both). Rain 12 h prior to opening traps was also correlated with captures (r = 0.375, P = 0.012). In addition, rain at dusk (Wilcoxon Z = 2.66, $P < 0.005$) and temperature (r = 0.363, $P < 0.015$) were positively associated with number of captures. Rain the night prior to opening traps was not associated with number of captures (Wilcoxon Z = 0.31, P = 0.378).

TABLE 3. Capture rates of adult *Ambystoma californiense* (no. per 100 trap nights) along the western, southern, and eastern trap lines during the early and late winter breeding seasons of the five study years. Early season = late October to December 31; Late season = January 1 to end of March. Data represent captures inside/outside each trap line. Recaptured individuals were excluded except for salamanders first captured during the early season inside the trap line and then later recaptured outside the same trap line during the late season. Total number of adults captured is indicated by N.

Season/Trap Line	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005
Early Season, N =	71	251	136	65	59
Western	8.6/2.5	28.4/6.7	9.8/12.3	4.4/2.1	3.5/4.5
Southern	1.0/1.0	4.8/5.9	1.9/3.4	1.0/3.1	0.5/2.7
Eastern	—	4.2/22.7	1.4/6.3	2.9/3.5	1.3/2.6
Late Season, N =	34	146	46	21	29
Western	0.8/4.8	1.9/19.7	0.5/4.6	1.5/3.3	0.4/3.2
Southern	0.0/1.9	0.7/2.6	0.7/2.2	0.4/1.7	0.0/0.6
Eastern	—	5.3/1.5	0.0/2.9	0.0/0.0	0.0/0.0

Annual reduction in captures.—Over the five study years, the proportion of adults captured inside the trap line decreased (r = -0.845, P = 0.036) and adult capture rates were not associated with on-site rainfall for those five years (Fig. 5, r = -0.753, P = 0.071). In 2000 and 2001, the capture rate of adults was higher inside than outside the trap line (Fig. 5). However, during 2002–2004 the capture rate was higher outside than inside. By 2004 the ratio of adult captures inside the trap line (versus outside) was much lower (0.35) than in previous years (0.62–1.2).

DISCUSSION

Successful conservation for *Ambystoma californiense* requires protection of both breeding sites and adequate surrounding uplands (Petranka 1998; Semlitsch 1998). Knowledge of terrestrial movement patterns and migration distances is essential to establishing appropriate upland protection zones adjacent to breeding ponds. My study expands the current understanding of upland habitat use for *A. californiense* and should better inform management for this species. The most important findings of my study are that *A. californiense* appeared to exhibit fidelity to upland habitat locations and occurred in relatively large numbers farther from breeding ponds than previously reported.

Study limitations.—The present study has certain limitations that should be taken into account when interpreting my findings. The partial drift fence may have affected my results in the following ways: 1) capture rates may have over- or under-estimated the actual number of salamanders entering or leaving the study site, 2) distribution of captures was limited to

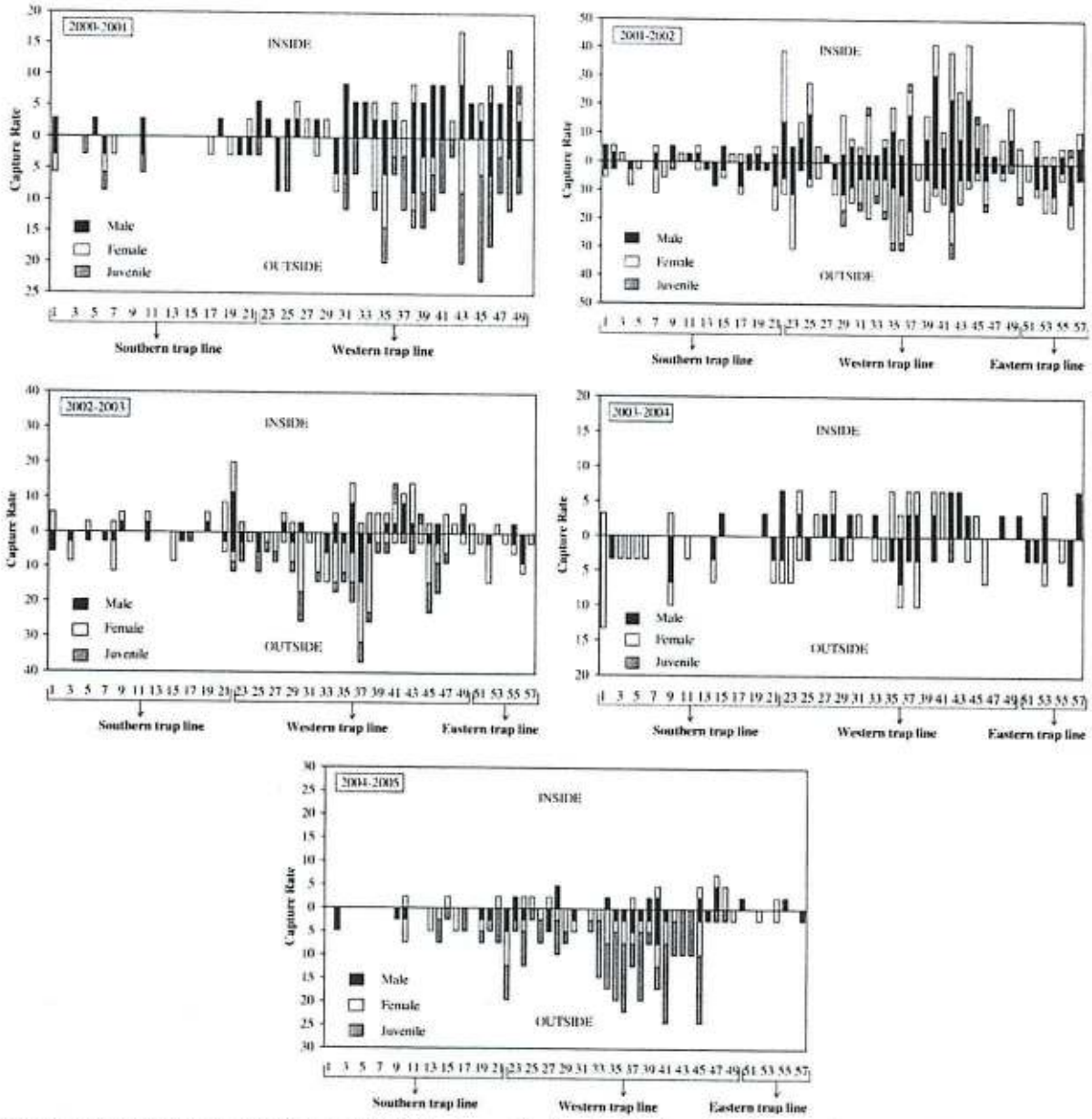

FIGURE 4. Capture rates (no. per 100 trap nights) of *Ambystoma californiense* inside and outside the trap line by sex, age class, and trap line for each of the five study years. Trap number for each trap line segment is indicated on the x-axis. Recaptured individuals were excluded except for salamanders first captured during the early season inside the trap line and then recaptured outside the same trap line later in the season.

certain sections of the study site, and 3) trespass rates for the study site could not be determined (i.e., when a salamander exits or enters a site without being captured). These limitations may have influenced my analysis of patterns of movement, sex ratios/proportions, and annual reductions in number of individuals captured.

In addition, translocating salamanders and restricting their entry into the study site may have altered the age class distribution for those remaining within the site. Studies of *A. californiense* and other *Ambystoma* species have shown that age classes may differ in their use of habitat (Rothermel 2004; Trenham and Shaffer 2005) and vary in activity in response to environmental cues (Semlitsch 1983). This may have influenced my analysis of patterns of movement, and migratory movements with applicable data sets. Lastly, my findings are also limited by having only one study location. Although my results are directly applicable to this site, it may not be representative of other grassland areas that support *A. californiense*.

TABLE 4. Capture rates of juvenile *A. californiense* (no. per 100 trap nights) along the western, southern, and eastern trap lines during the early and late winter breeding seasons of the five study years. Early season = late October to December 31; Late season = January 1 to end of March. Data represent captures inside/outside the trap lines. Recaptured individuals were excluded except for salamanders first captured during the early season inside the trap line and then later recaptured outside the same trap line during the late season. Total number of adults captured is indicated by N.

Season/Trap Line	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005
Early Season, N =	36	14	29	1	45
Western	0.5/5.3	0.2/2.4	0.6/5.2	0.2/0.0	0.0/8.0
Southern	0.0/0.7	0.0/0.0	0.0/0.3	0.0/0.0	0.0/1.1
Eastern	—	0.8/0.0	0.0/0.0	0.0/0.0	0.0/0.0
Late Season, N =	14	2	7	0	36
Western	0.0/2.7	0.2/0.0	0.0/1.1	0.0/0.0	0.0/3.8
Southern	0.0/0.3	0.0/0.2	0.0/0.2	0.0/0.0	0.0/1.7
Eastern	—	0.0/0.0	0.0/0.0	0.0/0.0	0.0/0.0

Capture numbers and movement patterns.—Adults tended to return to a location close to where they were initially captured, which suggests fidelity to specific areas of upland habitat. Although several other studies have indicated *Ambystoma* species tend to follow the same nonrandom pathways as they move toward and away from breeding ponds (Stenhouse 1985; Phillips and Sexton 1989; Trenham and Cook 2008), these results were typically inferred from the distribution of captures around ponds, not from distant upland habitat capture data.

In all study years more adults were captured early in the season (presumably going to breed) than were captured later in the season along the same trap line segment (presumably returning from breeding). Rainfall amounts during the early and late seasons did not appear to account for this decrease in captures. The lower number of returning animals may be partly due to mortality, or salamanders straying off path when returning from their natal ponds or dispersing to different ponds (Trenham et al. 2001; Trenham and Cook 2008).

A higher proportion of migrating males than females has been correlated with low rainfall years in other studies of *A. californiense* (Loredo and Van Vuren 1996; Cook et al. 2006). My findings are consistent with this pattern. Apparently more females forego breeding in dry years than males (Loredo and Van Vuren 1996; Trenham et al. 2000). My results contrast with previous studies of *A. californiense* and other *Ambystoma* species that suggest a female bias at greater distances from breeding ponds (Regosin et al. 2003; Trenham and Cook 2008). The distances from the nearest breeding ponds in my study were considerably greater than these previous studies, yet my annual sex ratios were only female biased in one of the five study years.

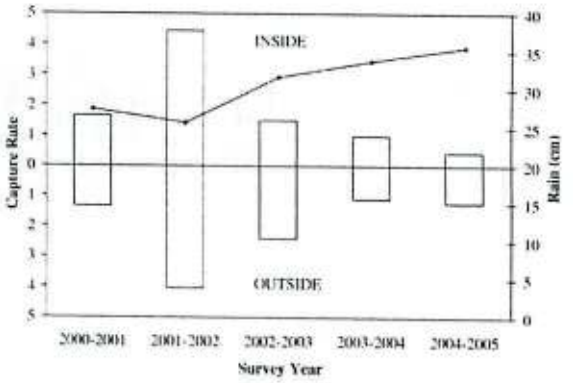

FIGURE 5. Annual capture rates (no. per 100 trap nights) of adult *Ambystoma californiense* inside and outside the trap line (bars) and on-site rainfall amounts (October–April; solid line) for the five study years. Recaptured individuals were excluded except for salamanders first captured during the early season inside the trap line and then recaptured outside the same trap line later in the season.

Migration distances.—I captured large numbers of *A. californiense* farther from breeding ponds than has been previously documented. In early studies of migration distances, maximum distance ranged from 130 m during one night of visually tracking (Loredo et al. 1996) to 248 m using radio tracking (Trenham 2001). However, these studies only examined movements during initial dispersal into the terrestrial habitat and thus may not be representative of the total distance adults may travel (Trenham and Shaffer 2005). In a more recent study using variable trap line distances from a pond, Trenham and Shaffer (2005) found that 50–95% of adults were trapped between 150 to 620 m from the pond, respectively. Continuing work at this site has documented a few individuals moving up to 1000 m from the most likely breeding pond (Peter Trenham, pers. comm.). *Ambystoma californiense* has also been observed up to 2.1 km from breeding ponds (U.S. Fish and Wildlife Service 2004); however, this was thought to be only a small number of individuals. Even in light of these studies showing a few individuals making longer distance movements, the large numbers of adults and juveniles I captured at least 800 m from the closest breeding ponds is noteworthy.

Current estimates that 95% of adult *A. californiense* occur within 620 m of the breeding pond (Trenham and Shaffer 2005) do not appear applicable to my study site. If this estimate were applied to my study site, which is greater than 620 m from the closest breeding ponds on CNWS, the large number of captures would represent less than 5% of the adult upland population. This would result in an exceedingly high extrapolated number of adults using the ponds on CNWS (~5,000 to 10,000 adults). However, Loredo and Van Vuren (1996) found an average of only 141 adults at their study pond on CNWS (Pond 5, Fig. 1), which is typical for other sites (Trenham et al. 2001; Cook et al. 2006). It is more likely that a greater percentage of the breeding population at

CNWS is moving farther away from the breeding ponds than previous research would have predicted.

Migratory movements and environmental parameters.—Movement patterns in my study area were influenced by the distribution of rainfall within the 24-h period prior to capture, with both rain at dusk and on the night of capture (12-h prior) strongly correlated to captures. Although several studies of *A. californiense* or other *Ambystoma* species also found adult migration to be positively associated with rainfall (Semlitsch 1983; Beneski et al. 1986; Trenham et al. 2000), these studies measured daily (24-h periods) or weekly rainfall, not rainfall within less than a 24-h period.

The majority of *A. californiense* adults were captured from early November to mid-December, which is earlier than other study sites where peak migration occurred in January in Monterey County (Trenham et al. 2000) or December and January in Sonoma and Contra Costa counties (Loredo and Van Vuren 1996; Cook et al. 2006). Unlike these other studies, which were conducted at study ponds and recorded only the date of arrival at those ponds, my data presumably represent the actual initiation of migration from upland emergence. Therefore, the discrepancy in peak migration periods may be because my study site was at least 800 m away from the closest probable breeding ponds, and it may have taken several rainy nights to reach the ponds.

Reduction in numbers.—My findings suggest that it takes multiple years of trapping and translocating animals to substantially reduce the number of adults within a project site. This is consistent with other research that has shown *A. californiense* typically spend up to four to five years in their upland burrows before they reach sexual maturity and migrate to breeding ponds for the first time (Trenham et al. 2000). The reduction in annual captures found over my five study years could have been affected by variables other than removal trapping. For example, rainfall has been shown to affect both the number of migrating adults and reproductive success among ambystomatids (e.g., Semlitsch 1983). However, my annual capture numbers were not correlated with on-site rainfall. In addition, I examined local annual rainfall data for the five years prior to my study and found no patterns that might have affected past reproductive success and subsequently influenced capture numbers during my study. It is important to note that because the drift fence was not a closed system, it was not possible to determine whether individuals captured inside or outside the trap line were resident to those sides of the study site.

The costs and benefits of amphibian translocation strategies have been debated and establishing criteria for success is difficult (Seigel and Dodd 2002; Trenham and Marsh 2002). Because my study only involved moving animals to adjacent grassland habitat a short distance from the capture point (≤ 100 m), some of the more critical problems typically associated with translocation projects were not applicable, including the availability of suitable habitats, disease transmission, and genetic considerations (Dodd and Seigel 1991). However, because a portion of my translocated animals were recaptured presumably trying to return to the study site, they could have been subject to additional stress which reduced their survival (Matthews 2003; Germano and Bishop 2008). In addition, I do not know if the resources of the adjacent area were adequate to sustain an increase in population size (Petranka 1989).

Other options for managers to reduce the number of salamanders in a proposed construction area include passive relocation using wooden ramps with barrier fencing or excavating salamanders from their burrows. Although I have observed *A. californiense* using ramps to exit a project site, there are no published reports on the success of this passive relocation technique. Excavation is time consuming (Pittman 2005), difficult due to the complexity of burrow systems, and potentially hazardous to the salamanders.

Management implications.—My findings have several implications for future conservation and management of this species. First, the current suggested buffer zone of 630 m around breeding ponds for long-term preservation of individual *A. californiense* populations (Trenham and Shaffer 2005) may not protect a substantial portion of some upland populations. Second, the method proposed by Searcy and Shaffer (2008) for calculating mitigation value for *A. californiense*, which is based on the exponential decrease in salamander density with increased distance from breeding ponds, may not be applicable in all cases. Other factors could be influencing the density distribution around ponds, such as uneven distribution of resources and presence of other species (Rittenhouse and Semlitsch 2007; Searcy and Shaffer 2008). The results of my study underscore the need to consider other relevant biological factors in establishing buffer zones or mitigation credits. Third, trapping may be the most reliable means of predicting habitat value or detecting occurrence in uplands. I found that the number of salamanders observed during winter night surveys was not a reliable indication of population size. The limited number of salamanders I observed was probably due to few being above ground at the burrow entrances during the night surveys. Fourth, efforts to remove *A. californiense*, via trapping or passive relocation, from a proposed project site for only one year (to reduce impacts from development) may miss a large portion of the population. My findings suggest that multiple years are required to substantially reduce the abundance of adult life stages in upland habitat.

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SUSAN ORLOFF is a Wildlife Biologist and principal of a consulting firm in the San Francisco Bay Area. She has degrees from San Francisco State University (B.A.) and Sonoma State University (M.A.). During the last 25 years, she has worked on a diversity of projects involving the status and conservation of sensitive wildlife species. Her early career focused on species of the Central Valley in California and she has authored several papers on the endangered San Joaquin Kit Fox (*Vulpes macrotis mutica*). Sue also has extensive experience assessing the impacts of windfarm development on raptor populations, which resulted in several publications. Her more recent research emphasizes sensitive amphibians and reptiles of California. This research includes a long-term population monitoring program for California Red-legged Frogs (*Rana* draytonii) and San Francisco Garter Snakes (*Thamnophis sirtalis tetrataenia*), a study on the impacts of variations in creek flow releases on California Red-legged Frogs, and a multiyear study on the effects of hydroelectric operations on the Foothill Yellow-legged Frog (Rana boylii). (Photographed by C.K. Cole)

EXHIBIT 3

MALCOM SPROUL, Board Member, Chair of the Land Committee, Member of the Land and Nominating Committees

Malcolm received his B.A. and M.L.S. in Environmental Planning, from UC Berkeley, and then worked for the Marin County Planning Dept. for four years. In 1979, he joined LSA Associates and is now a principal in natural resources management and environmental planning, managing their Point Richmond office. An avid outdoorsman, Malcolm feels that Mount Diablo is a wonderful visual resource, and that the open space we are protecting is not just for people, but is essential to the protection and stability of the greatest possible diversity of biological resources in the central California region.

557081.1

EXHIBIT 4

Potential Pond Site - Image taken from Google Earth 2014

EXHIBIT 5

Ecological Applications, 15(6), 2005, pp. 1893–1905
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EFFECTS OF EXURBAN DEVELOPMENT ON BIODIVERSITY: PATTERNS, MECHANISMS, AND RESEARCH NEEDS

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Abstract. Low-density rural home development is the fastest-growing form of land use in the United States since 1950. This ''exurban'' development (~6–25 homes/km^2) includes urban fringe development (UFD) on the periphery of cities and rural residential development (RRD) in rural areas attractive in natural amenities. This paper synthesizes current knowledge on the effects of UFD and RRD. We present two case studies and examine the patterns of biodiversity response and the ecological mechanisms that may underlie these responses. We found that many native species have reduced survival and reproduction near homes, and native species richness often drops with increased exurban densities. Exotic species, some human-adapted native species, and species from early successional stages often increase with exurban development. These relationships are sometimes nonlinear, with sharp thresholds in biodiversity response. These effects may be manifest for several decades following exurban development, so that biodiversity is likely still responding to the wave of exurban expansion that has occurred since 1950. The location of exurban development is often nonrandom relative to biodiversity because both are influenced by biophysical factors. Consequently, the effects on biodiversity may be disproportionately large relative to the area of exurban development. RRD is more likely than UFD to occur near public lands; hence it may have a larger influence on nature reserves and wilderness species. The ecological mechanisms that may underlie these responses involve alteration of habitat, ecological processes, biotic interactions, and increased human disturbance. Research on the patterns and mechanisms of biodiversity remains underdeveloped, and comparative and experimental studies are needed. Knowledge resulting from such studies will increase our ability to understand, manage, and mitigate negative impacts on biodiversity.

Key words: biodiversity; biotic interactions; ecological mechanisms; fire; habitat fragmentation; landscape management; land cover; land use; rural residential development; urban fringe development; weeds.

INTRODUCTION

Rural America is undergoing a dramatic transition. For the first time in more than a century, more people are moving to rural areas than from rural lands (Johnson 1998). Fleeing the cities, many retirees, entrepreneurs, and others are seeking the small-town lifestyles and natural amenities of rural landscapes (Rudzitis 1999). This rural in-migration is driving large changes in land use. The typical trajectory of land use change across the United States prior to 1950 was from wild land and resource extraction uses to agriculture and to suburban and urban uses. An entirely new land use has become prevalent in many parts of the United States since 1950. Many people are choosing to live ''out of town'' on small ''ranchettes'' and in rural subdivisions. Termed exurban development, low-density housing (~6–25 homes/km^2) within a landscape dominated by native vegetation is now the fastest growing form of land use in the United States (Brown et al. 2005). Land long used for forestry or ranching is now being converted to home sites. The effects of exurban development on native species and ecological communities have only recently been the topic of ecological studies.

Since 1950, there has been a five-fold increase in the area within the conterminous United States that is occupied at exurban densities (Brown et al. 2005). The

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PLATE 1. Rural residential development in the Greater Yellowstone Ecosystem near Red Lodge, Montana, USA. The rural homes are placed near low-elevation riparian forests that are especially important for biodiversity. Photo by A. Hansen.

exurban land use type currently covers nearly 25% of the area of the lower 48 states. The most rapid gains were in the eastern deciduous forest, the southwest, the western seaboard, the Rocky Mountains, and the upper Midwest.

This exurban development is manifest in two forms. Urban fringe development is the expansion of exurban densities on the periphery of cities. This urban fringe development (UFD) is largely driven by urban dwellers seeking more rural lifestyles while still having access to urban jobs and services (Ulmann 1954, Healy and Short 1987, Raish et al. 1997). Exurban development in counties adjacent to metropolitan counties increased six fold since 1950 (Brown et al. 2005). Over time, these exurban developments often transition to suburban and urban land uses.

A second form of exurban development is occurring distant from cities. It is focused on rural areas attractive in scenery, climate, outdoor recreation and other ''natural amenities'' (Rasker and Hansen 2000). Rural counties not adjacent to metropolitan counties increased fivefold in exurban area since 1950 (Brown et al. 2005). This rural residential development (RRD) is common in the rural counties of the Rocky Mountain West, the Pacific Northwest, the upper Midwest, and the southeastern United States (Gersh 1996). Rather than being randomly distributed, this development is often associated with the borders of national parks and other public lands; rivers, lakes, or coastal areas; areas of moderate climate and good outdoor recreational opportunities; and towns and small cities that offer national airports, high-speed internet access, and cultural amenities (Cromartie and Wardwell 1999, McGranahan 1999, Nelson 1999; see Plate 1).

The effects of both forms of exurban development on wildlife and biodiversity are poorly known. Relative to other types of land use, exurban development is substantially understudied. Miller and Hobbs (2002) found that only 6% of the papers on human landscapes published in *Conservation Biology* dealt with exurban and urban places. The majority of these consider the general gradient from rural to urban in and around cities. While these studies typically do not cleanly separate biodiversity in exurban places relative to suburban and urban places, they do provide a context for assessing general trends in biodiversity under land use intensification. RRD has been examined in only a few recent studies, with most of them being in the Rocky Mountain West.

Understanding the effects of exurban development on biodiversity is important to public policy. With a quarter of the nation's land area in this land use type, policies on exurban development may have a substantial effect on biodiversity nationwide. The general view among conservationists and the public is that exurban development alters ecological processes and biodiversity to a greater extent than forestry and agriculture (Marzluff and Ewing 2001). Hence, many initiatives have emerged to protect ''open space'' from exurban development through conservation easements and other approaches. There is also the view that the effects of exurban development are proportional to home density. Thus, zoning for lower density housing is often used to protect ecological resources.

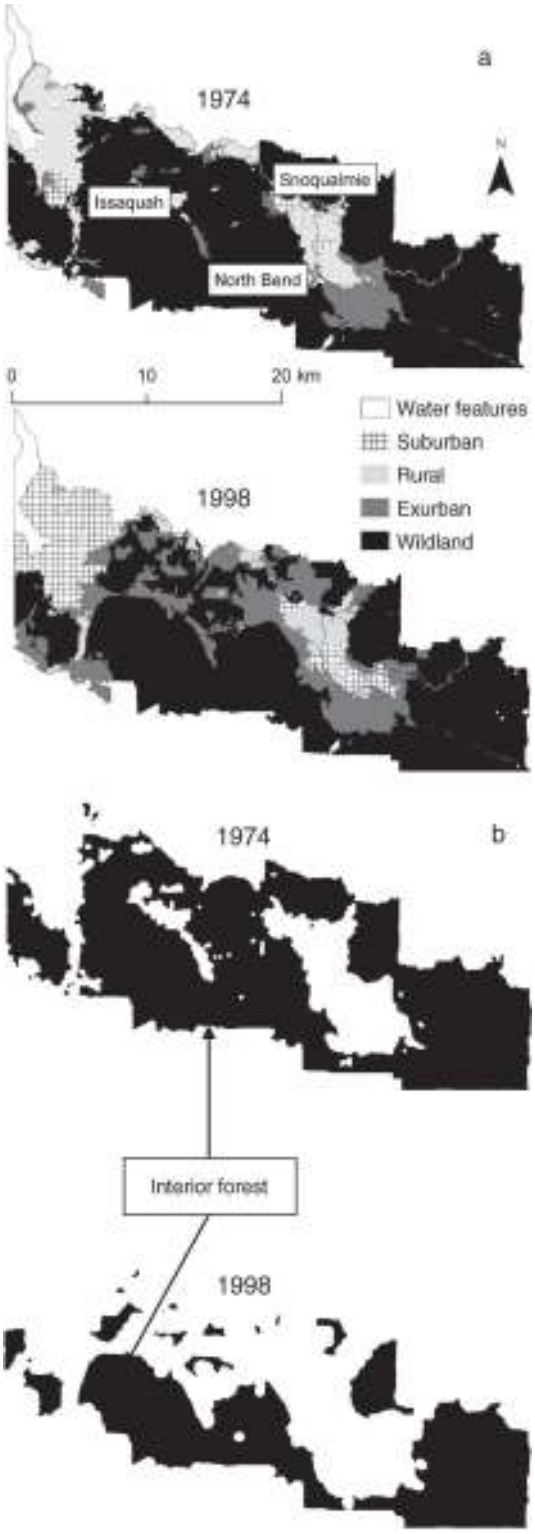

FIG. 1. (a) Change in land use in the urban fringe east of Seattle, Washington, USA. (b) Decline in interior forest resulting from changes in land use. The figure is from Robinson et al. (2005).

Several questions arise. How does exurban development change habitat and landscape patterns from those typical of lower intensity land uses? How do ecosystem, community, and population-level patterns vary as more natural habitats are converted to exurban? Are there thresholds in home density and spatial pattern where biodiversity is disproportionately affected? What ecological mechanisms underlie the response of biodiversity to exurban development? Can exurban development on private lands have consequences on adjacent or distant public lands? How do the effects of UFD and RRD compare?

In this paper, we synthesize current knowledge and attempt to answer these questions. We do so by first examining UFD and RRD and offer a case study of each. We then consider the ecological mechanisms linking both forms of exurban development to biodiversity. Where current research is insufficient to address the questions, we offer hypotheses in an effort to stimulate future research.

URBAN FRINGE DEVELOPMENT AND BIODIVERSITY

Case study: Seattle, Washington

The city of Seattle, in King County, Washington, lies between the Puget Sound and the Cascades Mountains. Like many metropolitan counties on the west coast, King County has been growing rapidly. The population size increased by 44% during 1970–2000 and the number of households grew by 72%. In an attempt to control sprawl around the city, the county instituted an urban growth policy aimed at confining high density development within urban growth boundaries while maintaining low-density housing in the surrounding rural lands. Robinson et al. (2005) quantified change in land use during 1974–1998 in a 474-km^2 study area extending east from Seattle towards the Cascade Mountains. The study area was a matrix of forest lands with dispersed agricultural, suburban, and urban, land uses.

The authors found that the primary trajectories of change were from wildlands to exurban and from exurban and agricultural to suburban. The area of exurban increased by 193%. Exurban and suburban covered 8% of the study area in 1974 and 33% in 1998 (Fig. 1a). The reduction of wildland and agricultural lands represents the conversion of 23% of the study area to development. These changes fragmented once contiguous forest and reduced interior forest area (>200 m from forest edge) by 60% (Fig. 1b). This land use change was largely driven by single-family housing. Despite the effort to concentrate growth within the urban growth boundary, 60% of the land committed to new residential development was outside urban growth boundaries.

This land conversion on Seattle's fringe changed plant, bird, and small mammal diversity. Native forb and tree diversity declined with loss of forest (Fig. 2a). A similar, but nonsignificant trend, was found for

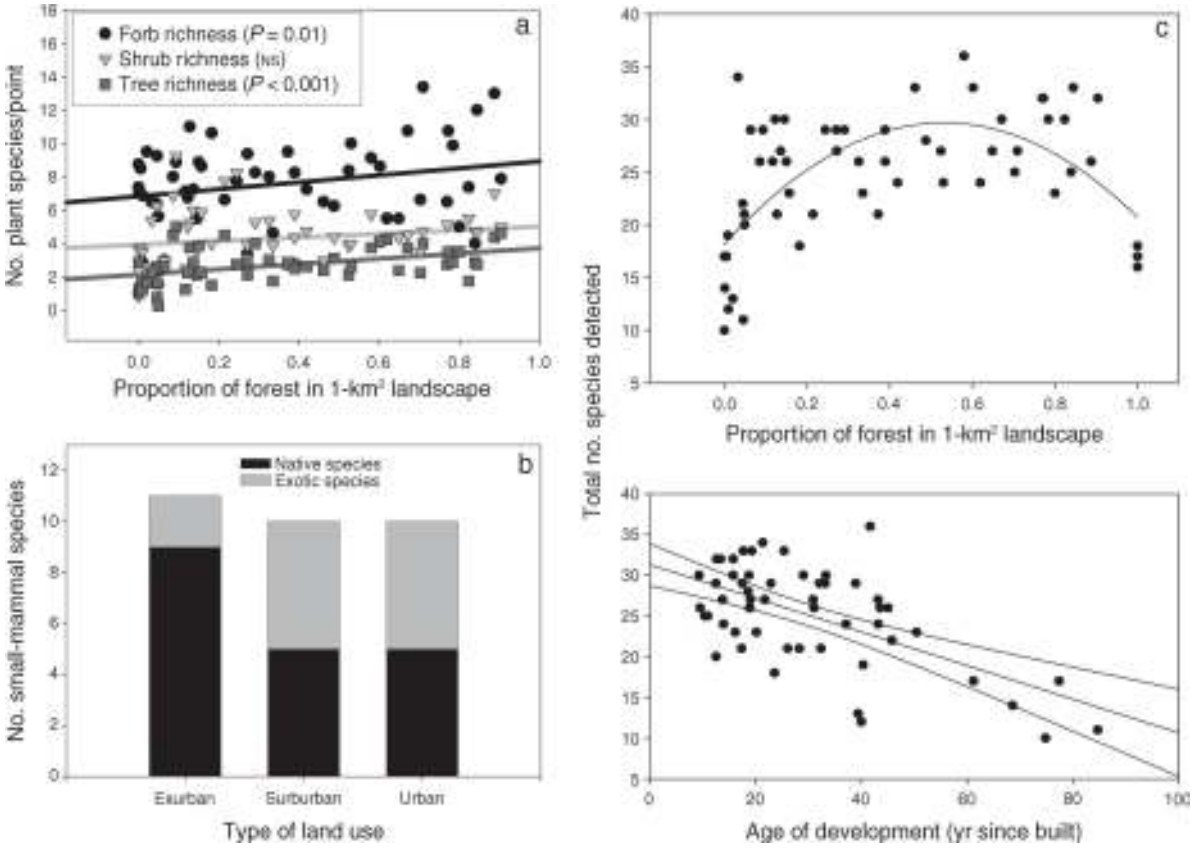

FIG. 2. Changes in biodiversity in response to urban sprawl in the Seattle metropolitan area. (a) Increases in plant species richness with increasing forest land cover. (b) Shifting composition of small mammal communities. (c) Correlation of bird species richness with amount of forest (upper panel) and age of development (lower panel). Bird data are from Donnelly (2002), Donnelly and Marzluff (2004), and Marzluff (*in press*).

shrubs. Alternatively, exotic ground cover increased significantly with development, especially with the interaction between age of development and interspersion of settled and forested remnants. The trends for plants were relatively linear. Small mammal communities changed abruptly from primarily native to mixtures of natives and exotics as landscapes were converted from exurban to suburban or urban (Fig. 2b). Bird species richness in combined samples of forest fragments and settled areas peaked at levels of settlement found in most single-family housing subdivisions (Fig. 2c). It dropped dramatically when development reached a threshold of approximately 80% developed, and when mature, second growth, coniferous forest cover occupied the entire 1-km² landscape (i.e., in relatively large forested reserves; Marzluff, *in press*). The peak in landscapes where forest and settlement are both abundant in the landscape occurs primarily because of colonization of early successional and deciduous forest species (Marzluff, *in press*). Native forest birds are predictably and linearly lost with increasing urbanization (Donnelly 2002, Donnelly and Marzluff 2004). Synanthropic birds, those ecologically associated with humans, predictably colonize landscapes as urban land cover increases. Species richness was also related to age of development, with bird species richness continuing to decrease more than 60 years after development. Average bird species richness dropped from about 35 at the time of development to below 15 by 80 years after development. This drop is accentuated by concomitant loss of forest cover with subdivision age in the sample, but additional research of similarly forested, but variously aged subdivisions confirms a general, but less extensive loss of species (Ianni 2004). Species diversity declines as subdivisions age because of losses in native mature forest birds and native birds not typically found in mature forests that colonized the openings, grasslands, ponds, and deciduous forest characteristic of new subdivisions. The loss of bird species was not explained by poor reproductive success. Nest success remained relatively high in developed study plots for all the bird guilds studied, but the numbers of active nests were greatly reduced in densely settled areas (Donnelly and Marzluff 2004). The authors concluded that the reduction in richness was primarily due to the loss of species dependent upon forest habitats,

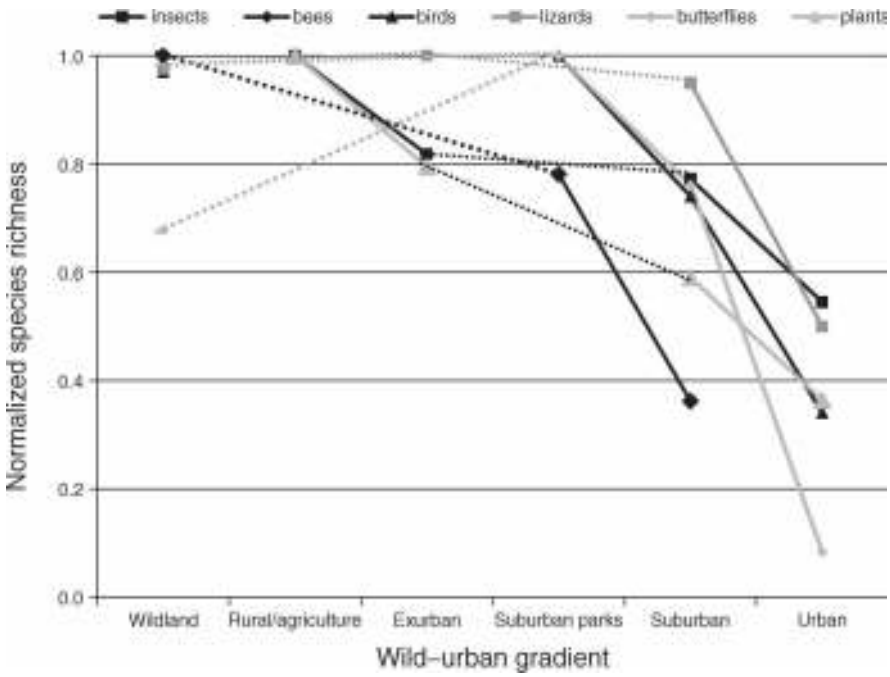

FIG. 3. Distribution of species richness across a gradient in land use for studies of various organisms. Normalized species richness is calculated as a function of the maximum number of recorded species at a point on the development gradient. Dashed lines represent unsampled portions of the gradient. Sources: insects, Denys and Schmidt (1998); bees, McIntyre and Hostetler (2001); birds, Blair (1996); lizards, Germaine et al. (1998); butterflies, Blair (1999); plants, Denys and Schmidt (1998).

rather than to increased predation levels. Reduced survival of adults and newly fledged birds is a potential factor currently being studied.

General biodiversity responses to land use intensification on the urban fringe

The results above are consistent with the growing body of literature finding that the quantity and pattern of urban fringe development strongly influence both native and nonnative flora and fauna. The responses at the community level are a function of species response patterns, which are in turn a function of the demographic responses of individual organisms (Marzluff and Ewing 2001).

Community patterns.—For many plant and animal communities, species richness decreases as housing density increases along the rural–urban gradient. The literature abounds with examples for arthropods (Miyashita 1998), insects (Denys and Schmidt 1998), and amphibians (Lehtinen et al. 1999) (Fig. 3). Along a gradient from wild and undeveloped parks around the outskirts of Phoenix, Arizona, to residential sites in the city, both richness and abundance of pollinator bees (*Hymenoptera: Apoidea*) decreased markedly (McIntyre and Hostetler 2001). Similar results were documented in Tucson, Arizona, for native bird guilds, as housing density best explained the decrease in species richness along the rural–urban gradient (Germaine et al.1998). For native rodents in protected grasslands in Boulder, Colorado, the capture rate exhibited a strong negative relationship with the percentage of surrounding suburbanization (Bock et al. 2002).

While native species often decrease in diversity and abundance along the rural–urban gradient, the opposite is often true for nonnative guilds. In the Tucson study, housing density best explained the increase in species richness for nonnative birds (Germaine et al. 1998). Within plant communities in Ohio, the percentage of nonnative species increased along the rural–urban gradient (Whitney 1985).

Because of these contrasting biodiversity response patterns along the rural–urban gradient, community richness sometimes exhibits a non-linear response in which richness peaks at intermediate levels of development (McKinney 2002). Avian and butterfly richness and diversity were both higher at moderate levels of development than in natural reserves in various sites in California and Ohio (Blair 1996, 1999). Lizard abundance, richness, and evenness all peaked at intermediate levels of development in Tucson, Arizona (Germaine and Wakeling 2001). In shoreline cottage development in central Ontario, moderate levels of development supported the highest levels of small mammal diversity (Racey and Euler 1982).

A recent meta-analysis of avian community response patterns to increasing urbanization (Marzluff 2001)

confirmed the patterns emerging from the individual studies summarized above. He found that richness decreased in 61% and evenness decreased in 56% of the studies (Marzluff 2001). Over 90% of the surveyed studies documented either an increase in exotic species or a decrease in interior habitat nesters with increasing settlement.

An important conclusion from the Seattle case study is that the biodiversity response to urbanization may continue to intensify for several decades after development (Donnelly 2002, Ianni 2004). Thus in the rapidly growing cities of the United States, the full effects of recent development are likely not yet fully manifest and native biodiversity will continue to erode for decades to come.

Species patterns.—The response patterns of individual species to the rural–urban gradient are complex and account for the variety of responses at the community level. Many species decline in abundance with increased intensity of land use. Of 21 species recorded at a nature reserve in Santa Clara County, California, only 14 of these species also occurred at a nearby recreation area, and only three of these species were also found at the most urbanized site (Blair 1996). The species found only in the nature reserves were all natives including Western Wood-pewee (*Contopus sordidulus*), Hutton's Vireo (*Vireo huttoni*), and Ash-throated Flycatcher (*Myiarchus cinerascens*). Other examples of species that are negatively correlated with development levels come from central Ontario where the masked shrew (*Sorex cinereus*), deer mouse (*Peromyscus maniculatus*), red-backed vole (*Clethrionomys gapperi*), and woodland jumping mouse (*Napeozapus insignis*) all decreased in abundance with increasing shoreline cottage development (Racey and Euler 1981).

Other species are able to tolerate and even increase under higher levels of development (Hoffman and Gottschang 1997). Higher densities of nesting Cooper's Hawks (*Accipiter cooperii*) were recorded in urban settings compared to rural settings in and around Tucson, Arizona (Boal and Mannan 1998). Schneider and Wasel (2000) found that the density of moose (*Alces alces*) in northern Alberta, Canada, increased near human settlement. Similarly, Racey and Euler (1982) observed increased capture success with increasing development level for eastern chipmunk (*Tamias striatus*), red squirrel (*Tamiasciurus hudsonicus*), and meadow vole (*Microtus pennsylvanicus*). Several other studies have documented a suite of common bird and mammal species that increase in abundance along the rural to urban gradient. Examples include the House Sparrow (*Passer domesticus*), European Starling (*Sturnus vulgaris*), American Crow (*Corvus brachyrhyncos*), Brown-headed Cowbird (*Molothrus ater*), skunk (*Mephitis mephitus*), raccoon (*Procyon lotor*), and opossum (*Didelphis virginiana*) (Odell and Knight 2001).

The relationship between species abundance and urbanization is often not linear; many species are most abundant at intermediate levels of development, as demonstrated by Blair (1996). Gray foxes (*Urocyon cinereoargenteus*) in several rural communities in New Mexico were found to be tolerant of RRD up to a threshold of 50–125 homes/km^2 (Harrison 1997). A similar nonlinear response was also documented for abundance of mule deer (*Odocoileus* spp.) in an urbanizing valley in southwest Montana (Vogel 1989). Short-tailed shrews (*Blarina brevicauda*) were documented to peak at intermediate lakeshore cottage development levels in central Ontario (Racey and Euler 1982).

The life history attributes of species that avoid or expand with urbanization are not well studied. McKinney (2002) suggested that many human-sensitive species include large mammals with low reproductive rates, birds specializing on natural habitats, and late successional plants. Species most abundant in suburbs may be edge-adapted generalists able to exploit the wider variety of habitat configurations and resources available at intermediate levels of development. Species associated with urban areas may be preadapated to human structures or able to use human-derived food or water supplies (McKinney 2002). However, more study is needed to evaluate these hypotheses.

Demographic patterns.—Patterns of reproduction, survival, and dispersal are drivers for species and community responses to exurban development, yet relatively few studies have quantified population vitality rates across the development gradient. Marzluff (2001) reviewed the literature for results of urbanization on avian breeding success. He found that most studies dealt with species that were most abundant in cities. For these species, breeding success improved with increased settlement. For other species however, research on bird nesting success indicated a negative relationship with increasing development. The abundance of human development was found to be the strongest predictor of brood parasitism by brown-headed cowbirds and reduced nest success of several species such as Yellow Warbler (*Dendroica petchia*) (Tewksbury et al. 1998).

In sum, three general patterns of species abundances emerge along the gradient from rural to urban: decreases, increases, and nonlinear responses (McKinney 2002). Species that decrease in abundance along the development gradient are termed ''human sensitive'' (Odell and Knight 2001) or ''urban avoiders'' (McKinney 2002). Species that increase are termed ''human adapted'' (Odell and Knight 2001) or ''urban adapted'' and ''urban exploiters'' (McKinney 2002). ''Suburban adaptables'' (Blair 1996) reach peak abundance at intermediate levels of development. At the community level, richness for native species generally decreases with increasing development while richness

for nonnative species generally increases with increasing development. As a result, total community diversity often peaks at intermediate levels of development, because both native and nonnative species are present in the community (Marzluff, *in press*). The life history traits of individual species, native and nonnative, likely contribute to the variety of responses at the population and community levels.

Rural Residential Development and Biodiversity

Case study: Colorado

Colorado is representative of much of the new West. Growing at three times the nation's average, it was the sixth-fastest growing state in the United States in the 1990s (Knight 1998). Importantly, this population growth is occurring on rural landscapes as well as within urban areas. Indeed, from 1990 to 1998, population in rural areas grew faster than in urban areas in over 60% of the counties in the Rocky Mountain states (Theobald 2001, Odell et al. 2003).

In much of the Mountain West, there are three principal land uses beyond city limits: protected areas, ranches, and ranchettes. Maestas et al. (2003) examined songbirds, carnivores, and plant communities on these three land uses in Larimer County, Colorado. Importantly, their data came from sites that were similar in elevation, soil type, and plant community type. They found that the density of songbirds and carnivores were more similar between ranches and protected areas (without livestock grazing) than on the ranchettes. The songbirds and carnivores that were most abundant on the ranchettes included dogs, cats, Black-billed Magpies, European Starlings, and other human-adapted species. Songbirds and carnivores that occurred on ranches and protected areas were uncommon or did not occur on land in ranchettes. Importantly, many of these songbirds are of conservation concern, whereas the birds that did best on ranchettes are common and increasing across the West (Maestas et al. 2003).

The plant communities across these three land uses were even more distinct. Native plant species were more prevalent and nonnative species were less prevalent on ranches than in either protected areas or ranchettes (Maestas et al. 2002). The greatest number of nonnative species was found on the ranchettes, with eight of 23 nonnative species being found only on the ranchette developments. In addition, percent cover of nonnative plants was highest on the ranchettes and protected areas and was significantly lower on ranches.

The effects of RRD are often manifest as a function of distance from home site and roads. In Pitkin County, Colorado, the biodiversity responses to ranchettes extended out as far as 330 m into undeveloped areas, although most effects diminished at approximately 100 m from the homes (Odell and Knight 2001). Human-adapted species, such as Brown-headed Cowbirds, Black-billed Magpies (*Pica pica*), and American Robins (*Turdus migratorius*), all occurred at higher densities near homes and at lower densities away from homes. Similarly, domestic dogs (*Canis familiaris*) and house cats (*Felis domesticus*) were more likely to be detected near homes than away from homes, while coyotes (*Canis latrans*) and red foxes (*Vulpes vulpes*) showed the reverse pattern (Odell and Knight 2001).

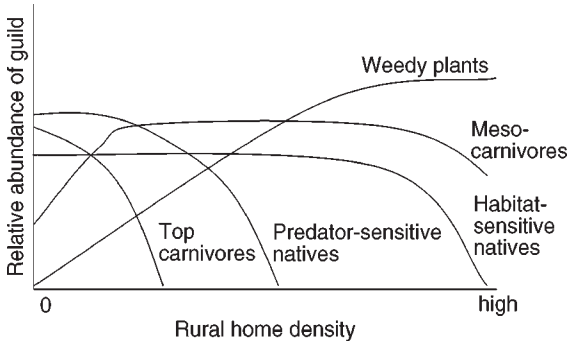

FIG. 4. Hypothesized responses of various guilds of species to rural home density.

Such findings help elucidate the true ecological costs associated with RRD. Rather than simply acknowledging that rural residences perforate the landscape, one can begin to calculate the magnitude of land affected beyond the building site (Theobald et al. 1997). Assuming the depth of the house-edge effect is 100 m, and including a similar depth of road-effect (Forman 2000), Odell and Knight (2001) found that approximately one-fifth of the land area of the subdivided ranches they studied was affected by houses and roads.

General effects of RRD on biodiversity

Compared with the urban fringe, development in rural areas distant from cities generally involves the lower intensity land uses of exurban home development. The Colorado case study suggests that this low-density housing can have effects on biodiversity that are more extreme than traditional rural land uses such as such as protected areas or ranching. The relative impacts of RRD on biodiversity compared to other rural land uses such as logging, grazing, crop agriculture, and backcountry recreation, however, are little studied. We can speculate that each has unique influences on biodiversity that are related to the nature of the land use. The plowing associated with crop agriculture likely alters soil communities to a greater extent than does RRD, but has fewer impacts associated with roads or with human disturbance. Similarly, logging may more greatly change forest structure and composition and disrupt soil layers. There may sometimes also be considerable overlap in impacts among these land use types. A study in south western Montana found that density of cowbirds and parasitism of native bird species were significantly associated with density of homes, area in

crops, and livestock densities within 6 km of riparian habitats (Hansen et al. 1999). Presumably this results because all three of these land use types provide supplemental foods that attract cowbirds. One way that RRD differs from the other rural land uses is its longevity. While logging and recovery typically occur in cycles, and livestock grazing and crop agriculture often have rest rotations, RRD is permanent on the order of decades or longer and its effects may intensify over this time.

The effect of land use is a function not only of land use type but also its intensity. In the case of RRD, home density is likely an important measure of intensity. A common perception is that homes scattered at low densities have little influence on biodiversity, while dense subdivisions have a large effect. Again, however, little research has examined how impacts on biodiversity vary with rural home density and development pattern.

As is the case with development intensity under UFD, we speculate that the relationship with rural home density under RRD varies among the different elements of biodiversity (Fig. 4). Top carnivores may be reduced even at low home densities as the expanding network of roads allows increased human access, hunting, and human disturbance. This may allow for an expansion of native or exotic meso predators and brood parasites. Consequently, native species vulnerable to predation and nest parasitism may undergo reduced survival and reproduction at low to medium densities of homes. Weedy plant diversity may increase at low home densities in association with roads, increase somewhat linearly with home density, then drop at high home densities as most of the land area is converted to lawns and ornamental plants. Suburban adaptables that benefit from human food sources and habitats may increase in proportion to home density. Finally, species richness of native species that require native habitats may decline only at higher home densities as the area of remaining habitat fall below key thresholds. Future research is needed to test these hypotheses and to identify key thresholds.

The effects of rural home density undoubtedly interact with the spatial distribution of homes and the behaviors of home owners. If homes are clustered, total road density is reduced and the ecological effects of each home overlap, allowing a larger proportion of the landscape to be free of these effects. Consequently, local planners often recommend clustered development to reduce ecological impacts and to reduce costs of government services (Daniels 1999). Also, home owners may reduce impacts on biodiversity by controlling weeds along roads, landscaping with native plant species, confining pets, covering compost, and managing livestock, pet foods, trash, and other artificial food sources including bird feeders to prevent access to wildlife.

A unique aspect of RRD compared with UFD is that rural homes are more likely to be placed in landscapes that include public lands with natural habitats and wilderness conditions. Typically, the sites productive for agriculture were claimed for private ownership, while less-productive mountain and desert settings remained under public control (Huston 2005). This has resulted in a high level of interspersion among private and public lands (Theobald 2000). An increasing number of people are now building homes on the edges of public lands for increased access to outdoor recreation, scenery, and solitude (Knight and Clark 1998). Consequently, the aura of impacts radiating from each home may extend hundreds of meters to kilometers within the public land boundary and alter biodiversity within this zone. Homes on the periphery of public lands may also attract wilderness species such as bears from the public lands, leading to increased mortality and declines in population sizes within the public lands (Mace and Waller 2002).

In the Greater Yellowstone Ecosystem, for example, national parks, national forests, and other public lands cover the majority (71.6%) of the land area. The private lands are largely in river valleys. These private lands have a longer growing season, better soils, and higher primary productivity than the public lands (Hansen et al. 2000). These same attributes make these settings attractive for native species. Consequently, the distribution of rural homes overlaps significantly with hotspots for birds (Hansen et al. 2002). The rural homes, livestock, and agriculture near the bird hotspots attract nest parasites and predators and result in reduced nest success of several native species (Hansen and Rotella 2002). P. H. Gude, A. J. Hansen, and D. A. Jones (*unpublished manuscript*) found that 49% of deciduous woodlands (the richest bird habitat in the area) across Greater Yellowstone are within 1 km of a home. Hence, even in this large, wilderness system, which is dominated by public lands, the effects of rural homes may extend over a substantial portion of key habitats.

We conclude that like exurban development on the urban fringe, exurban expansion in rural landscapes may have substantial negative impacts on native biodiversity. Considerable research is needed to better understand the effects of rural home density, spatial distribution, and homeowner behavior on biodiversity impacts. A particular concern about exurban development in rural areas is that it is more likely to be in close proximity to public lands and associated wilderness species.

Mechanisms Linking Exurban Development and Biodiversity

The mechanisms underlying these responses to land use are generally less well studied than the patterns described above. Case studies provide insights for some mechanisms, but adequate comparative study and ex-

perimentation is generally not available to allow for derivation of general predictive principles. Below we describe the suite of factors that have been suggested to explain biodiversity responses to exurban and urban development. These involve changes in habitats, ecological processes, interactions among species, and human-related disturbance of native species. Our goal is to encourage additional research on these mechanisms. Beyond improving scientific understanding, knowledge of these mechanisms may provide the basis for management strategies to reduce the effects of exurban development on biodiversity.

Habitat alteration

As human settlement progresses, conversion of native habitat to roads, yards, and structures tend to fragment the landscape (Soulé et al. 1998, Marzluff and Ewing 2001). Fragmentation influences biodiversity through reduction of habitat area, creation of dispersal barriers (Trombulak and Frissell 2000, Marzluff and Ewing 2001), disruption of nutrient cycling, and increases in predation, parasitism, and competition (Marzluff and Ewing 2001). In the Seattle case study, reduction in the area of forest patches was thought to explain the loss of forest-dwelling bird species. Isolation of small canyons in California by subdivisions lessened the dispersal capabilities of and resulted in decreased species diversity for chaparral-requiring birds (Soulé et al. 1988).

In addition to habitat fragmentation, residential development may change microhabitat features. For example, decreasing abundance of native plant cover with increasing urbanization was correlated with decreasing bee, bird, and lizard species richness in Arizona (Germaine et al. 1998, Germaine and Wakeling 2001, McIntyre and Hostetler 2001). In Illinois, replacement of natural sandy patches with grassy patches in a residential area resulted in decreased snapping turtle (*Chelydra serpentina*) nesting success (Kolbe and Janzen 2002). Reduced course woody debris input (Christensen et al. 1996) tied to exurban development in Wisconsin and Michigan lakes reduced growth rates of bluegill sunfish (*Lepomis macrohirus*) but did not significantly affect largemouth bass (*Micropterus salmoides*) (Schindler et al. 2000).

The nonrandom location of land use relative to biophysical gradients and biodiversity may cause the resulting habitat fragmentation resulting from human settlement to have disproportionately large effects. We described above the concentration of rural residences in productive valley bottoms in mountainous landscapes (Riebsame et al. 1996, Theobald et al. 1996, Soulé et al. 1998, Hansen et al. 2002, Seabloom et al. 2002). Other favored settings for RRD include lakeshores in the upper Midwest (Beale and Johnson 1998), coastal areas (Seabloom et al. 2002), and wetlands in the coastal states (Brady and Flather 1994). Because both humans and native species tend to concentrate in such locations (Hansen et al. 2002, Seabloom et al. 2002), the impacts of exurban development may be focused on the most critical habitats (see also Huston 2005).

Alteration of ecological processes

Less visible than habitat destruction, ecological processes such as disturbance regimes may be altered by exurban development and in turn influence habitats and biotic assemblages. In many parts of the arid west, humans have excluded fires from urbanizing landscapes to protect human property and lives. In Oklahoma, for example, such fire exclusion has led to increased juniper (*Juniperus* spp.) encroachment in suburban and rural habitats since 1950, as human population density increased (Coppedge et al. 2001). Correlated with the increase in juniper, the passerine community has also been altered. American Robin and Eastern Bluebird (*Sialia sialis*) abundance showed a unimodal trend with highest abundance at intermediate levels of juniper encroachment. Three species of potential juniper-feeders, Cedar Waxwing (*Bombycilla cedrorum*), Ruby-crowned Kinglet (*Regulus celendula*), and Yellow-rumped Warbler (*Dendroica coronata*), increased with juniper encroachment levels. Four species, Song Sparrow (*Melospiza melodia*), White-crowned Sparrow (*Zonotricha querula*), House Sparrow, and American Goldfinch (*Carduelis tristis*), declined with increased levels of juniper encroachment. In other urbanizing environments, in contrast, increased human ignitions have accelerated fire frequency and decreased later seral habitats (Keeley 2002).

Flood regimes may also be altered with urbanization with consequences for riparian communities. For example, plains cottonwood (*Populus deltoides*) establishment on the floodplain and terrace of Boulder Creek in Boulder, Colorado declined from 1937 to 1992 as stream diversion, straightening, stabilization, and clearing led to decreased channel movement, decreased peak flow and a decreased flooding frequency in the floodplain. Concurrently, species less tolerant to flooding events—including the exotics crack willow (*Salix rubens*) and Russian-olive (*Elaeagnus angustifolia*)—have encroached upon the floodplain (Auble et al. 1997).

Changes to nutrient cycles are also likely with conversion to exurban land uses. Along an urban–rural gradient in New York, nitrogen and phosphorous levels in oak forest soils increased with increasing urbanization (Pouyet et al. 1995). Increased nitrogen availability tends to simplify biotic communities and favor exotic species (Vitousek et al. 1997). Nutrient effects may be particularly manifest in aquatic systems. Natural-amenity exurban development around four Wisconsin lakes has affected water quality and altered diatom communities (Garrison and Wakeman 2000). As

once-seasonal homes along these lakeshores were converted to year-long use, the amount of impervious surface increased and consequently run-off and sediment load to the lakes also increased. Increased levels of phosphorous, iron, and aluminum were tied to a shift from benthic to mainly planktonic diatoms and an increase in diatom taxa indicative of eutrophic conditions. Water quality in the higher alkalinity lakes showed improvement as construction slowed, but the lower alkalinity lakes appeared to be more sensitive to shoreline development, and water quality did not improve in these lower alkalinity lakes.

Alteration of biotic interactions

As human settlement alters species distributions, interactions among species may be changed with consequences for species viability and ecosystem function (Daszak et al. 2000, Marzluff 2001). Best studied among these changes in biotic interactions are predator–prey relationships. As illustrated by the Colorado case study, both native and nonnative predators may become abundant near human development and inflict heavy prey heavily upon other native species. Similarly, Wilcove (1985) found that suburban woodlots in Maryland experienced significantly higher rates of nest predation than did rural woodlots, likely as a result of higher densities of nest predators such as the Blue Jay (*Cyanocitta cristata*), Common Grackle (*Quiscalus quiscula*), gray squirrel (*Sciurus carolinensis*), and raccoon. Some predators may become abundant near human dwellings due to human subsidized food supplies (Marzluff 2001). This may also result from the loss of large carnivores that are intolerant to urbanizing landscapes, and the consequential release of mesopredators that are tolerant to human influences (Soulé et al. 1988, Crooks and Soulé 1999). Herbivores are also released by the elimination of large predators in developed areas, and the increased herbivory by deer and rabbits can have a major effect on plant diversity, both in urban parks and the surrounding landscapes.

Because predator occurrence and tolerance vary geographically, biodiversity response to urbanization may vary among regions of the United States. As described above, native songbird nest success declined in Montana as cowbird density in creased with rural home density (Tewksbury et al. 1998, Hansen and Rotella 2002). In contrast, the absence of Brown-headed Cowbirds in King County, Washington, may be a factor in the lack of nest parasitism in the Seattle case study (Donnelly and Marzluff 2004).

Changes in competitive interactions induced by development are well illustrated by invasive plant interactions with native species. English Ivy (*Hedera helix*) was introduced as an ornamental plant and kills native trees through competition for light (Reichard 2000) in much of the continental United States. Similarly, Norway maple (*Acer platanoides*), a shade tree introduced to eastern deciduous forests, out-competes native maples and beeches (Webb et al. 2001).

Many examples of the spread of infectious diseases related to human settlement exist. These can be classified as (1) human facilitated dispersal or translocation of hosts and parasites, (2) supplemental feeding, and (3) disease ''spill-over'' from domestic to wild populations (Daszak et al. 2000). Supplemental feeding of white-tailed deer at rural home sites was found to be directly related to the maintenance of bovine tuberculosis in Michigan deer populations (Michigan Department of Natural Resources 1999). Similarly, birdfeeders were found to increase the concentration of House Finches (*Carpdacus mexicanus*) and other bird species, enhancing the spread of mycoplasmal conjunctivitis (Fisher et al. 1997, Nolan et al. 1998). Last, many examples of ''spill-over'' of infectious diseases to wildlife involve domestic dogs. Canine distemper virus, canine parvovirus, and sarcoptic mange (*Sarcoptes scabiei*) are three pathogens known to have spread due to domestic dog–wildlife interactions, and are suspected to have caused population declines in the endangered gray wolf (*Canis lupus*) and black-footed ferret (*Mustela nigripes*) (Daszak et al. 2000).

Human disturbance

Finally, the presence of humans and their pets around home sites can directly influence biodiversity. Human presence in yards or on trails near homes may displace some species of wildlife. Bald Eagles (*Haliaeetus leucocephalus*), for example, may decline in number in areas with increasing human recreation (Brown and Stevens 1997, Stalmaster and Kaiser 1998). Pronghorn antelope (*Antilocapra Americana*) on Antelope Island State Park in Utah retreated further from trails once they were opened for recreational use (Fairbanks and Tullous 2002). Likewise, elk (*Cervus Canadensis*) approached by humans during calving season, were repeatedly displaced resulting in elevated calf mortality (Phillips and Alldredge 2000).

Pets may also displace, injure, or kill wildlife. Pet cats are responsible for the deaths of millions of birds in the United States every year, and in Wisconsin alone, an estimated 39 million birds per year are lost to domestic cats (Coleman and Temple 1996). Pet dogs also act as predators in many ecosystems. In Florida, pet dogs have effected the distribution of the endangered key deer (*O. virginianus clavium*), and are suspected to have eliminated them from several islands in the Florida Keys. In Colorado, the flushing distance of ungulates to human hikers was increased if a pet dog was present (Miller et al. 2001). Because rural pets kill more than their suburban and urban counterparts, adverse effects on native species are potentially greatest in the undisturbed habitat near new rural residential developments (Barratt 1998).

Another direct consequence of suburban and exurban residential growth in the United States has been an increase in vehicle miles traveled per person and per household, escalating the potential for roadkill. Between 1980 and 2000, overall per capita vehicular travel in the United States increased by 48.7%, of which the fastest growing component was ''home-based'' travel, including shopping, recreation, and driving to school. Although mortality of animals from collision with vehicles is best documented in large mammals, few terrestrial species are immune (Trombulak and Frissell 2000). Roadkill has affected the demographics and migrations of birds, snakes, invertebrates, and amphibians, and is a major cause of mortality for moose, lynx (*Felis pardina*), wolves, and American crocodile (*Crocodilus acutus*) in various regions of the United States (Trombulak and Frissell 2000).

Conclusion

Our major conclusion is that exurban development is a pervasive and fast-growing form of land use that is substantially understudied by ecologists and has large potential to alter biodiversity. Covering about 25% of the land area of the conterminous United States in 2000 (Brown et al. 2005), area in exurban land use increased since 1974 at rates in excess of area in urban or agricultural land uses. Ecologists have traditionally focused research on wild or semi-wild lands (Miller and Hobbs 2002). The relatively few studies on exurban development are mostly done as contrasts to urban land use. Consequently, knowledge of the effects of exurban density, spatial configuration, and homeowner behavior on biodiversity, and specific mechanisms for response is poorly developed.

The relatively few studies on exurban development suggest that its impacts on biodiversity may be substantial, both in the immediate vicinity of homes and even on adjacent or even distant public lands. These impacts are summarized as follows.

1) Many native species incur reduced survival and reproduction near homes and consequently native species richness generally drops with increased exurban densities. At the same time, some exotic species and some human-adapted native species generally increase with intensity of exurban development.

2) The relationship between these elements of biodiversity and intensity of exurban development are sometimes nonlinear, with sharp thresholds were biodiversity changes abruptly with incremental increases in exurban intensity. Knowledge of these thresholds is important for managing exurban development to achieve biodiversity objectives.

3) These affects may be manifest for several decades following exurban development, so that biodiversity is likely still responding to the wave of exurban expansion that has occurred since 1950.

4) The location of exurban development is often nonrandom relative to biodiversity because both are influenced by biophysical factors such that they are concentrated in more equitable landscape settings. Consequently, the effects on biodiversity may be disproportionately large relative to the area of exurban development.

5) The effects of exurban development on biodiversity likely differ among ecosystem types. Additional research is needed to derive generalities on the types of ecosystems that are relatively vulnerable to exurban development.

6) An identifiable set of ecological mechanisms link exurban development and biodiversity. More research is needed on these mechanisms and the resulting knowledge can help with understanding, managing, and mitigating these impacts.

7) In addition to local effects, exurban development may alter ecological processes and biodiversity on adjacent and distant public lands. Consequently, exurban development in rural areas may have even more important impacts than in the urban fringe because of the elevated influence on lands dedicated to conservation and on wilderness species that are rare in human-dominated landscapes.

It is our hope that this review inspires the additional research that is needed to better understand and manage the impacts of this important type of land use.

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EXHIBIT 6

CATS INDOORS!
THE CAMPAIGN FOR SAFER BIRDS & CATS

DOMESTIC CAT PREDATION ON BIRDS AND OTHER WILDLIFE

AMERICAN BIRD CONSERVANCY

How many birds and other wildlife do domestic cats kill each year in the U.S.?

Exact numbers are unknown, but scientists estimate that nationwide, cats kill hundreds of millions of birds, and more than a billion small mammals, such as rabbits, squirrels, and chipmunks, each year. Cats kill common species such as Cardinal, Blue Jay, and House Wren, as well as rare and endangered species such as Piping Plover, Florida Scrub-Jay, and California Least Tern.

There are more than 77 million pet cats in the United States. A 1997 nationwide poll showed that only 35% are kept exclusively indoors, leaving the majority of owned cats free to kill birds and other wildlife at least some of the time. In addition, millions of stray and feral cats roam our cities, suburbs, farmlands and natural areas. Abandoned by their owners or lost (stray), or descendants of strays and living in the wild (feral), these cats are victims of human irresponsibility due to abandonment and failure to spay or neuter pets. No one knows how many homeless cats there are in the U.S., but estimates range from 60 to 100 million. These cats lead short, miserable lives.

Loss of wildlife habitat and fragmentation due to human development are the leading causes of declining bird populations. However, scientists now list invasive species, including cats, as the second most serious threat to bird populations worldwide. Habitat fragmentation provides cats and other predators easier access to wildlife forced to live on smaller tracts of land. Rather than havens for wildlife, these areas can be death traps.

Cats Are *Not* a Natural Part of Ecosystems

The domestic cat, *Felis catus*, is a descendant of the European and African wild cats. Domesticated in Egypt more than 4,000 years ago, cats may be the most widespread predator in the world. In the U.S., cats were not abundant until the late 1800s when they were brought to help control burgeoning rodent populations associated with agriculture. Some people view cat predation of rodents as beneficial, but native small mammals are important to maintaining biologically diverse ecosystems. Field mice and shrews are also important prey for birds such as Great Horned Owl and Red-tailed Hawk.

Photo: Clipart.com

Great Horned Owl

Cats Compete With Native Predators

Owned cats have huge advantages over native predators. They receive protection from disease, predation, competition, and starvation—factors which control native predators such as owls, bobcats, and foxes. Cats with dependable food sources are not as vulnerable to changes in prey populations. Unlike many native predators, cats are not strictly territorial. As a result, cats can exist at much higher densities and may out-compete native predators for food. Unaltered cats are also prolific breeders. In warmer climates, a female cat can have 3 litters per year, with 4 to 6 kittens per litter.

Cats Transmit Disease to Wildlife

Unvaccinated cats can transmit diseases, such as rabies, to other cats, native wildlife and humans. Cats are the domestic animal most frequently reported to be rabid to the Centers for Disease Control and Prevention. Cats are also suspected of spreading fatal feline diseases to native wild cats such as mountain lion, the endangered Florida panther, and bobcat. For more information, see the fact sheet, **The Great Outdoors Is No Place For Cats at** www.abcbirds.org/cats.

Cat Predation Studies

Extensive studies of the feeding habits of free-roaming domestic cats have been conducted over the last 55 years in Europe, North America, Australia, Africa, and on many islands. These studies show that the number and types of animals killed by cats varies greatly, depending on the individual cats, the time of year, and availability of prey. Roughly 60% to 70% of the wildlife cats kill are small mammals; 20% to 30% are birds; and up to 10 are amphibians, reptiles, and insects. However, birds can be up to 100% of a cat's prey on some islands.

Photo: Alan Hopkins

California Quail

Some free-roaming domestic cats kill more than 100 animals each year. One well-fed cat that roamed a wildlife experiment station was recorded to have killed more than 1,600 animals (mostly small mammals) over 18 months. Rural cats take more prey than suburban or urban cats. Birds that nest or feed on the ground, such as California Quail, are the most susceptible to cat predation, as are nestlings and fledglings of many other bird species.

The following are summaries of specific studies:

East Bay Regional Park District, CA: A two-year study was conducted in two parks with grassland habitat. One park had no cats, but more than 25 cats were being fed daily in the other park. There were almost twice as many birds seen in the park with *no* cats as in the park *with* cats. California Thrasher and California Quail, both ground-nesting birds, were seen during surveys in the no-cat area, whereas they were *never* seen in the cat area. In addition, more than 85% of the native deer mice and harvest mice trapped were in the no-cat area, whereas 79% of the house mice, an exotic pest species, were trapped in the cat area. The researchers concluded, "Cats at artificially high densities, sustained by supplemental feeding, reduce abundance of native rodent and bird populations, change the rodent species composition, and may facilitate the expansion of the house mouse into new areas." (Hawkins, C.C., W.E. Grant, and M.T. Longnecker. 1999. Effect of subsidized house cats on California birds and rodents. *Transactions of the Western Section of The Wildlife Society* 35:29-33).

San Diego, CA: In a study of the relationships between coyote, mid-sized predators such as cats, and scrub-dwelling birds, cat owners living along the rims of canyons collected the prey their cats brought home. These canyons are isolated pockets of habitat with species that may not occur elsewhere. On average, each outdoor cat that hunted returned 24 rodents, 15 birds, and 17 lizards to the residence per year. Birds were 26.7% of the prey killed by cats. The researchers estimated that cats surrounding mid-sized canyons return 840 rodents, 525 birds, and 595 lizards to residences each year. This level of predation appears to be unsustainable. The study also found that in small canyons where the coyote was absent, there was an increase in mid-sized predators such as cats, and a drastic decline in diversity or elimination of scrub-breeding birds. But in the larger canyons where coyotes were still present, the scrub-breeding birds were also present. (Crooks, K.R. and M.E. Soule. 1999. Mesopredator release and avifaunal extinctions in a fragmented system. *Nature* 400:563-566).

Photo: Dr. Gil Ewing

Cat catching Yellow-rumped Warbler

England: The Mammal Society conducted a survey of animals brought home by domestic cats. During a five-month period in 1997, 964 cats killed more than 14,000 animals. The mean number of catches or kills per cat was 16.7, and birds were 24% of the prey. The mean kill rates for belled cats was 19 and for no-bells 15. In other words, cats wearing bells killed more. Only 162 rats were killed by the cats, making them very poor ratters. The researchers concluded, "Although it is unlikely that cats alone will cause any species to become endangered in Britain, for those which are already under pressure for other reasons, such as thrushes, harvest mice, grass snakes, and slow worms, cats could become significant."(The Mammal Society. 1998. Look what the cat's brought in! www.abdn.ac.uk/mammal/catkills).

Wichita, KS: In a study of cat predation in an urban area, 83% of the 41 study cats killed birds. In all but one case, when feathers were found in scat, the owner was unaware that their cat had ingested a bird. In fact, the majority of cat owners reported their cats did not bring prey to them. Instead, the owners observed the cats with the bird or found remains in the house or in other locations. A de-clawed cat killed more animals than any other cat in the study. (Fiore, C. and K. B. Sullivan. Domestic cat (*Felis catus*) predation of birds in an urban environment. www.geocities.com/the_srco/Article.html).

Wisconsin: Researchers at the University of Wisconsin coupled their four-year cat predation study with data from other studies, and estimated that *rural* free-roaming cats kill at least 7.8 million and perhaps as many as 217 million birds a year in Wisconsin. Suburban and urban cats add to that toll. In some parts of the state, free-roaming cat densities reach 114 cats per square mile, outnumbering all similar-sized native predators. (Coleman, J.S., S.A. Temple, and S.R. Craven. 1997. Cats and Wildlife: A

Conservation Dilemma. 6 pp. www.wisc.edu/extension/catfly3.htm). In an ongoing, but unpublished, study of cat prey items including stomach contents, scat analysis, observations of kills, and prey remains, birds were 19.6% of 1,976 prey captured by 78 outdoor cats (Temple, S.A, Univ. of WI, personal communication, 1/22/04).

Virginia: Researchers compared a free-roaming domestic pet cat in a rural area with 4 urban cats. The rural cat captured a total of 27 native species (8 bird, 2 amphibian, 9 reptile, and 8 mammal, including the star-nosed mole, a species of special state concern). The 4 urban cats captured 21 native species (6 bird, 7 reptile, and 8 mammal). Between January and November 1990 each cat caught, on average, 26 native individuals in the urban area, and 83 in the rural area. The study did not count prey killed and completely consumed, prey killed and left elsewhere, prey that escaped but died later from infection or injury, or non-native prey. (Mitchell, J. and R.A.Beck. 1992. Free-ranging domestic cat predation on native vertebrates in rural and urban Virginia. *Virginia Journal of Science* 43:197-206).

Cats on Islands: Because some island bird populations evolved in the absence of mammalian predators, they have no defense mechanisms against them. When cats are introduced or abandoned on an island, elimination of entire bird populations can result. Domestic cats are considered primarily responsible for the extinction of 8 island bird species, including Stephens Island Wren, Chatham Island Fernbird, and Auckland Island Merganser, and the eradication of 41 bird species from New Zealand islands alone. On Marion Island in the Sub-Antarctic Indian Ocean, cats were estimated to kill 450,000 seabirds annually prior to cat eradication efforts. (Veitch, C.R. 1985. Methods of eradicating feral cats from offshore islands in New Zealand. *ICBP Technical Publication* 3: 125-141).

Photo: David G. Smith

Wedge-tailed Shearwater

Cats in Habitat Islands: Cats can have significant impacts on local wildlife populations, especially in habitat "islands" such as suburban and urban parks, wildlife refuges, and other areas surrounded by human development. The loss of bird species from habitat islands is well documented, and nest predation is an important cause of the decline of neotropical migrants. (Wilcove, D.S. 1985. Nest predation in forest tracts and the decline of migratory songbirds. *Ecology* 66: 1211- 1214). The endangered Point Arena mountain beaver, Stephen's kangaroo rat, and Pacific pocket mouse now live on habitat islands created by destruction and fragmentation of their habitat in California. Predation by pet and feral cats on these species is a serious threat to their future existence. (Thelander, C.G. and M. Crabtree. 1994. Life on the Edge. A Guide to California's Endangered Natural Resources: Wildlife. BioSystems Books, Santa Cruz, California).

Cat Predation of Federally-Protected Wildlife

The Migratory Bird Treaty Act (MBTA) prohibits the hunting, taking, capturing, or killing of any migratory bird. In seeming violation of this landmark law, owners of free-roaming cats permit their pets to kill birds protected by the MBTA. As noted above, domestic cats are also killing birds and other wildlife protected under the Endangered Species Act (ESA). Through the ESA, the federal government protects and restores wildlife at risk of extinction. Although cats may not be responsible for the perilous status of endangered wildlife, the loss of even a single animal can be a setback to the survival of some species.

Photo: Lou Cohen

Cat with Blackpoll Warbler

The Truth About Cats and Birds:

Well-fed Cats Do Kill Birds. Well-fed cats kill birds and other wildlife because the hunting instinct is independent of the urge to eat. In one study, six cats were presented with a live small rat while eating their preferred food. All six cats stopped eating the food, killed the rat, and then resumed eating the food. (Adamec, R.E. 1976. The interaction of hunger and preying in the domestic cat (*Felis catus*): an adaptive hierarchy? *Behavioral Biology* 18: 263-272).

Cats With Bells on Their Collars Do Kill Birds. Studies have shown that bells on collars are not effective in preventing cats from killing birds or other wildlife. Birds do not necessarily associate the sound of a bell with danger, and cats with bells can learn to silently stalk their prey. Even if the bell on the collar rings, it may ring too late, and bells offer no protection for helpless nestlings and fledglings.

Most Birds That Seem to Escape Don't Survive Wildlife rehabilitation centers report that most small animals injured by cats die. Cats carry many types of bacteria and viruses in their mouths, some of which can be transmitted to their victims. Even if treatment is administered immediately, only about 20% of these patients survive the ordeal. A victim that looks perfectly healthy may die from internal hemorrhaging or injury to vital organs.

A large percentage of patients at wildlife rehabilitation centers are cat attack victims and animals orphaned by cats. At Wildlife Rescue, Inc. in Palo Alto, California, approximately 25% of their patients between May and June 1994 were native cat-caught birds, and almost half were fledglings. Thirty percent of birds, and 20% of mammals at the Lindsay Wildlife Museum in California were caught by cats. Cat predation of wildlife is especially frustrating to wildlife rehabilitators. These losses are totally unnecessary because unlike other predators, pet cats do not need to kill these animals to survive.

Photo: Lindsay Wildlife Museum

Cat attacked Western Scrub-Jay

Cat Colonies Are a Problem for Birds and Other Wildlife: Domestic cats are solitary animals, but groups often form around an artificial feeding source, such as garbage dumps or food specifically put out for them. These populations can grow very quickly, can have significant impacts on wildlife populations, and can cause significant health risks to other cats, wildlife, and humans. Feeding these cats does not prevent the predation of birds and other wildlife.

Conclusion: Cats are not ultimately responsible for killing our native wildlife—people are. The only way to prevent domestic cat predation on wildlife is for owners to keep their cats indoors!

For more information, contact:

AMERICAN BIRD CONSERVANCY

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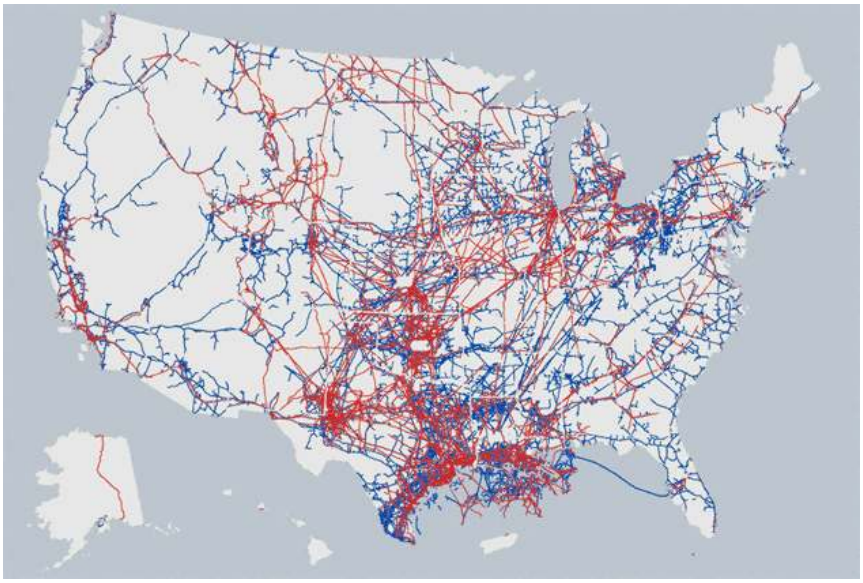
EXHIBIT 7

Pipelines Explained: How Safe are America's 2.5 Million Miles of Pipelines?



Map of major natural gas and oil pipelines in the United States. Hazardous liquid lines in red, gas transmission lines in blue. Source: Pipeline and Hazardous Materials Safety Administration.

by Lena Groeger
ProPublica, Nov. 15, 2012, 1:27 p.m.

At 6:11 p.m. on September 6, 2010, San Bruno, Calif. 911 received an urgent call. A gas station had just exploded and a fire with flames reaching 300 feet was raging through the neighborhood. The explosion was so large that residents suspected an airplane crash. But the real culprit was found underground: a ruptured pipeline spewing natural gas caused a blast that left behind a 72 foot long crater, killed eight people, and injured more than fifty.

Over 2,000 miles away in Michigan, workers were still cleaning up another pipeline accident, which spilled 840,000 gallons of crude oil into the Kalamazoo River in 2010. Estimated to cost $800 million, the accident is the most expensive pipeline spill in U.S. history.

Over the last few years a series of incidents have brought pipeline safety to national – and presidential – attention. As Obama begins his second term he will likely make a key decision on the controversial Keystone XL pipeline [1], a proposed pipeline extension to transport crude from Canada to the Gulf of Mexico.

The administration first delayed the permit for the pipeline on environmental grounds [2], but has left the door open to future proposals for Keystone's northern route. Construction on the southern route is already underway [3], sparking fierce opposition [4] from some landowners and environmentalists.

The problem, protesters say, is that any route will pose hazards to the public. While pipeline operator TransCanada has declared that Keystone will be the safest pipeline ever built [5] in North America, critics are skeptical.

"It's inevitable that as pipelines age, as they are exposed to the elements, eventually they are going to spill," said Tony Iallonardo of the National Wildlife Federation. [6] "They're ticking time bombs."

Critics of the Keystone proposal point to the hundreds of pipeline accidents that occur every year. They charge that system wide, antiquated pipes, minimal oversight and inadequate precautions put the public and the environment at increasing risk. Pipeline operators point to billions of dollars spent on new technologies and a gradual improvement over the last two decades as proof of their commitment to safety.

Pipelines are generally regarded as a safe way to transport fuel, a far better alternative to tanker trucks or freight trains. The risks inherent in transporting fuel through pipelines are analogous to the risks inherent in traveling by airplane. Airplanes are safer than cars, which kill

about 70 times as many people a year (highway accidents killed about 33,000 people in 2010 [7], while aviation accidents killed 472). But when an airplane crashes, it is much more deadly than any single car accident, demands much more attention, and initiates large investigations to determine precisely what went wrong.

The same holds true for pipelines. Based on fatality statistics from 2005 through 2009 [8], oil pipelines are roughly 70 times as safe as trucks, which killed four times as many people during those years, despite transporting only a tiny fraction of fuel shipments. But when a pipeline does fail, the consequences can be catastrophic (though typically less so than airplane accidents), with the very deadliest accidents garnering media attention and sometimes leading to a federal investigation.

While both air travel and pipelines are safer than their road alternatives, the analogy only extends so far. Airplanes are replaced routinely and older equipment is monitored regularly for airworthiness and replaced when it reaches its safety limits. Pipelines, on the other hand, can stay underground, carrying highly pressurized gas and oil for decades – even up to a century and beyond. And while airplanes have strict and uniform regulations and safety protocols put forth by the Federal Aviation Administration, such a uniform set of standards does not exist for pipelines.

Critics maintain that while they're relatively safe, pipelines should be safer. In many cases, critics argue, pipeline accidents could have been prevented with proper regulation from the government and increased safety measures by the industry. The 2.5 million miles of America's pipelines suffer hundreds of leaks and ruptures every year, costing lives and money. As existing lines grow older, critics warn that the risk of accidents on those lines will only increase.

While states with the most pipeline mileage – like Texas, California, and Louisiana – also have the most incidents, breaks occur throughout the far-flung network of pipelines. Winding under city streets and countryside, these lines stay invisible most of the time. Until they fail.

Since 1986, pipeline accidents have killed more than 500 people, injured over 4,000, and cost nearly seven billion dollars in property damages. Using government data, ProPublica has mapped thousands of these incidents in a new interactive news application [9], which provides detailed information about the cause and costs of reported incidents going back nearly three decades.

Pipelines break for many reasons – from the slow deterioration of corrosion to equipment or weld failures to construction workers hitting pipes [10] with their excavation equipment. Unforeseen natural disasters also lead to dozens of incidents a year. This year Hurricane Sandy wreaked havoc [11] on the natural gas pipelines on New Jersey's barrier islands. From Bay Head to Long Beach Island, falling trees, dislodged homes and flooding caused more than 1,600 pipeline leaks. All leaks have been brought under control [12] and no one was harmed, according to a New Jersey Natural Gas spokeswoman. But the company was forced to shut down service to the region, leaving 28,000 people without gas, and it may be months before they get it back.

One of the biggest problems contributing to leaks and ruptures is pretty simple: pipelines are getting older. More than half of the nation's pipelines are at least 50 years old [13]. Last year in Allentown Pa., a natural gas pipeline exploded underneath a city street, killing five people who lived in the houses above and igniting a fire that damaged 50 buildings. The pipeline – made of cast iron – had been installed in 1928.

A fire rages through Allentown, PA, after a gas line explosion in Feb. 2011

Not all old pipelines are doomed to fail, but time is a big contributor to corrosion, a leading cause of pipeline failure. Corrosion has caused between 15 and 20 percent of all reported "significant incidents" [14],which is bureaucratic parlance for an incident that resulted in a death, injury or extensive property damage. That's over 1,400 incidents since 1986.

Corrosion is also cited as a chief concern of opponents of the Keystone XL extension. The new pipeline would transport a type of crude called diluted bitumen [15], or "dilbit." Keystone's critics make the case [16]that the chemical makeup of this heavier type of oil is much more corrosive than conventional oil, and over time could weaken the pipeline.

Operator TransCanada says that the Keystone XL pipeline will transport crude similar [15] to what's been piped into the U.S. for more than a decade, and that the new section of pipeline will be built and tested to meet all federal safety requirements. And in fact, none of the 14 spills that happened in the existing Keystone pipeline since 2010 were caused by corrosion, according to an investigation by the U.S. Department of State [17].

The specific effects of dilbit on pipelines – and whether the heavy crude would actually lead to more accidents – is not definitively understood by scientists. The National Academies of Science is currently in the middle of study on dilbit and pipeline corrosion [18], due out by next year. In the meantime, TransCanada has already begun construction of the southern portion of the line, but has no assurance it will get a permit from the Obama administration to build the northern section. (NPR has a detailed map of the existing and proposed routes [1].)

Little Government Regulation for Thousands of Miles

While a slew of federal and state agencies oversee some aspect of America's pipelines, the bulk of government monitoring and enforcement falls to a small agency within the Department of Transportation called the Pipeline and Hazardous Materials Safety Administration – [19] pronounced"FIM-sa" by insiders. The agency only requires that seven percent of natural gas lines and 44 percent of all hazardous liquid lines be subject to their rigorous inspection criteria and inspected regularly. The rest of the regulated pipelines are still inspected, according to a PHMSA official, but less often.

The inconsistent rules and inspection regime come in part from a historical accident. In the 60's and 70's, two laws established a federal role in pipeline safety [20] and set national rules for new pipelines. For example, operators were required to conduct more stringent testing to see whether pipes could withstand high pressures, and had to meet new specifications for how deep underground pipelines must be installed.

But the then-new rules mostly didn't apply to pipelines already built – such as the pipeline that exploded in San Bruno. That pipeline, which burst open along a defective seam weld, would never have passed modern high-pressure requirements according to a federal investigation [21]. But because it was installed in 1956, it was never required to.

"No one wanted all the companies to dig up and retest their pipelines," explained Carl Weimer, executive director of the Pipeline Safety Trust [22], a public charity that promotes fuel transportation safety. So older pipes were essentially grandfathered into less testing, he said.

A burned out car and charred remains of a home in San Bruno, C.A. after a pipeline explosion in Sept. 2010

Later reforms in the 1990's mandated more testing for oil pipelines, and today PHMSA requires operators to test pipelines in "high consequence" areas, which include population centers or areas near drinking water. But many old pipelines in rural areas aren't covered by the same strict regulations.

Some types of pipelines – such as the "gathering" lines that connect wells to process facilities or larger transmission lines – lack any PHMSA regulation at all. A GAO report [23] estimates that of the roughly 230,000 miles of gathering lines, only 24,000 are federally

regulated. Because many of these lines operate at lower pressures and generally go through remote areas, says the GAO, the government collects no data on ruptures or spills, and has no enforced standards for pipeline strength, welds, or underground depth on the vast majority of these pipes.

The problem, critics argue [24], is that today's gathering lines no longer match their old description. Driven in part by the rising demands of hydraulic fracturing, operators have built thousands of miles of new lines to transport gas from fracked wells. Despite the fact that these lines are often just as wide as transmission lines (some up to 2 feet in diameter) and can operate under the same high pressures, they receive little oversight.

Operators use a risk-based system to maintain their pipelines – instead of treating all pipelines equally, they focus safety efforts on the lines deemed most risky, and those that would cause the most harm if they failed. The problem is that each company use different criteria, so "it's a nightmare for regulators," Weimer said.

However, Andrew Black, the president of the Association of Oil Pipe Lines, a trade group whose members include pipeline operators, said that a one-size-fits-all approach would actually make pipelines less safe, because operators (not to mention pipelines) differ so widely.

"Different operators use different pipe components, using different construction techniques, carrying different materials over different terrains," he said. Allowing operators to develop their own strategies for each pipeline is critical to properly maintaining its safety, he contended.

Limited Resources Leave Inspections to Industry

Critics say that PHMSA lacks the resources to adequately monitor [25] the millions of miles of pipelines over which it *does* have authority. The agency has funding for only 137 inspectors, and often employs even less than that (in 2010 the agency had 110 inspectors on staff). A Congressional Research Service report [26] found a "long-term pattern of understaffing" in the agency's pipeline safety program. According to the report, between 2001 and 2009 the agency reported a staffing shortfall of an average of 24 employees a year.

A New York Times investigation last year found that the agency is chronically short of inspectors because it just doesn't have enough money to hire more [27], possibly due to competition from the pipeline companies themselves, who often hire away PHMSA inspectors for their corporate safety programs, according to the CRS.

Given the limitations of government money and personnel, it is often the industry that inspects its own pipelines. Although federal and state inspectors review paperwork and conduct audits, most on-site pipeline inspections are done by inspectors on the company's dime.

The industry's relationship with PHMSA may go further than inspections, critics say. The agency has adopted, at least in part, dozens of safety standards written by the oil and natural gas industry. [28]

"This isn't like the fox guarding the hen house," said Weimer. "It's like the fox designing the hen house."

Operators point out that defining their own standards allows the inspection system to tap into real-world expertise. Adopted standards go through a rulemaking process that gives stakeholders and the public a chance to comment and suggest changes, according to the agency.

Questions have also been raised about the ties between agency officials and the companies they regulate [29]. Before joining the agency in 2009, PHMSA administrator Cynthia Quarterman worked as a legal counsel for Enbridge Energy, the operator involved in the Kalamazoo River accident. But under her leadership, the agency has also brought a record number of enforcement cases against operators [30], and imposed the highest civil penalty in the agency's history [31] on the company she once represented.

Proposed Solutions Spark Debate

How to adequately maintain the diversity of pipelines has proved to be a divisive issue – critics arguing for more automatic tests and safety measures and companies pointing to the high cost of such additions.

One such measure is the widespread installation of automatic or remote-controlled shutoff valves, which can quickly stop the flow of gas or oil in an emergency. These valves could help avoid a situation like that after the Kalamazoo River spill, which took operators 17 hours from the initial rupture to find and manually shut off. Operators use these valves already on most new pipelines, but argue that replacing all valves would not be cost-effective and false alarms would unnecessarily shut down fuel supplies. The CRS estimates that even if automatic valves were only required on pipelines in highly populated areas, replacing manual valves with automatic ones could cost the industry hundreds of millions of dollars.

A worker on the Kalamazoo river, helping to clean up an oil spill of almost a million gallons from a ruptured pipeline in July 2010

Other measures focus on preventing leaks and ruptures in the first place. The industry already uses robotic devices called "smart pigs" [32] to crawl through a pipeline, clearing debris and taking measurements to detect any problems [33]. But not all pipelines can accommodate smart pigs, and operators don't routinely run the devices through every line.

Just last month, a smart pig detected a "small anomaly" in the existing Keystone pipeline, prompting TransCanada to shut down the entire line. Environmentalists pointed out that this is not the first time TransCananda has called for a shut down, and won't be the last.

"The reason TransCanada needs to keep shutting down Keystone," the director of the National Wildlife Federation contended in a statement [34],"is because pipelines are inherently dangerous."

Last January, Obama signed a bill [35] that commissioned several new studies [36] to evaluate some of these proposed safety measures, although his decision on extending the Keystone pipeline may come long before those studies are completed.

Image credits: The Associated Press, Thomas Hawk [37]*, Kevin Martini* [38]

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EXHIBIT 8

CITY OF PITTSBURG
DEVELOPMENT SERVICES DEPARTMENT
PLANNING DIVISION
65 CIVIC AVENUE
PITTSBURG, CA 94565

PROJECT PIPELINE LIST

SINGLE-FAMILY RESIDENTIAL

PROJECT	APPLICATION NO(S).	DEVELOPER	NO. UNITS	SITE ACREAGE	LOCATION	STATUS	MEETING(S)
Alves Ranch	AP-08-516 (SUB, DR, MP)	Alves Ranch, LLC (925) 831-1854	167 (SFD)	40.42	North of West Leland Road at Alves Ranch Road	Approved	01-20-09 (CC) 02-10-09 (PC)
Bancroft Gardens II	AP-03-78 (SUB 8805, DR); AP-11-730 (DR)	Discovery Builders (925) 682-6419	28	5.79	Western terminus Birchwood Drive	Subdivision Approved; DR application pending	10-26-04 (PC)
Lawlor Estates	GP-02-03, RZ-02-14; SUB 8112; AP-05-268 (DR); AP-06-391 (DA)	Discovery Builders (925) 682-6419	50	10.8	West Leland Road, east of Bailey Road	49 of 50 units - Built	05-27-03 (PC); 07-07-03 (CC); 02-14-06 (PC); 12-12-06 (PC); 01-29-07 (CC)

PROJECT	APPLICATION NO(S).	DEVELOPER	NO. UNITS	SITE ACREAGE	LOCATION	STATUS	MEETING(S)
Mariner Walk	AP-04-126 (GP, PD/RZ, SUB 8869, DR)	Mariner Pittsburg Holdings, LLC (925) 753-4007	123	15	West of Herb White Way	Under Construction	08-23-05 (PC); 10-03-05 (CC); 10-11-05 (PC)
Montreux	AP-10-684 (RZ, SUB 8279, Annexation)	Louis Parsons, Altec Homes/ Seecon Financial (925) 671-7711	368	148.3	West of Kirker Pass, just south of city limits	Pending	
San Marco Development	SUB 7362; DR-00-26; VA-00-01; DR-01-10; DR-02-23; DR-02-24; AP-05-199 (DR); AP-06-336 (DR); AP-06-346 (RZ, SUB); AP-11-779 (RZ, SUB,DR)	Discovery Builders (925) 682-6419	1,412	421	South of Hwy 4 at Willow Pass Road	Under Construction	01-19-93 (PC); 11-28-00 (PC); 02-13-01 (PC); 08-28-01 (PC); 09-10-02 (PC); 04-08-03 (PC); 03-25-05 (ZA); 07-11-06 (PC); 08-21-06 (CC) 12-07-06 (ZA) 10-15-12 (PC) 12-11-12 (PC)
Sky Ranch	RZ-02-21, SUB 8475, DR-02-48	Discovery Builders (925) 682-6419	415	163	Buchanan Road, west of Somersville Road	Approved	05-08-07 (PC); 06-04-07 (CC) 05-14-08 (LAFCO)
Sunnyside Estates	AP-11-810 (GP, RZ, SUBD)	Jackie Seeno 925-682-6419	33	4.4	Carion Court	Pending	
Tuscany Meadows	AP-12-843 (SUBD)	Discovery Builders (925) 682-6419	917	135.6	Buchanan Road at Somersville	Pending	
Vista del Mar	AP-03-33 (GP, RZ, SUB, DR); AP-06-379 (SR) AP-12-857 (AD)	William Lyon Homes (925) 543-5500	518	104	South of West Leland Road at Alves Ranch Road	Under Construction	11-23-04 (PC); 12-06-04 (CC); 06-28-05 (PC) 08-30-12 (ZA)

APARTMENTS/CONDOMINIUMS

PROJECT	APPLICATION NO(S).	DEVELOPER	NO. UNITS	SITE ACREAGE	LOCATION	STATUS	MEETING(S)
Almenara Condominiums	AP-10-670 (DR, SUB)	Meridian Modular Homes (858) 490-3624	20	.75	NE corner of Beacon and W. 10th Streets	Built	04-13-10 (PC)
Almenara – Phase II	AP-11-777 (DR)	Domus Development (415) 856-0010	44	1.9	SW corner of W.10th & Beacon	Pending	
Alves Ranch	AP-08-516 (SUB, DR, MP)	Alves Ranch, LLC (925) 682-9862	364 to 393	40.42	North of West Leland Road at Alves Ranch Road	Approved (DR approval for 98 units only)	01-20-09 (CC) 02-10-09 (PC)
Los Medanos Apartments	AP-11-742 (DR)	Domus Development (415) 856-0010	30	.49	SE Corner of Los Medanos & E. 9th Street	Approved	06-28-11 (PC); 08-15-11 (CC)
Oak Hills Apartments – Clubhouse Remodel	AP-08-567 (AD)	Sierra Pacific (925) 427-3700	264	17.2	2201 Oak Hills Circle	Approved	01-15-09 (ZA) 02-02-12 (ZA)
Peppertree Apartments – Clubhouse Remodel	AP-09-598 (AD)	Discovery Builders, Inc. (925) 682-6419	429	45	300 Peppertree Way	Approved	04-16-09 (ZA) 05-29-12 (ZA)
San Marco Development	SUB 7362; AP-06-346 (RZ, SUB)	SEECON (925) 671-7711	1,526	141	South of Hwy 4 at Willow Pass Road	Approved; 330 Units Built	01-24-95 (PC); 07-11-06 (PC); 08-21-06 (CC)
Stoneman Village Rooftop Railing	AP-12-844 (AD)	Donovan Rittenbach, Allied Construction Service	148	2.67	390 East Leland Rd	Built	05-29-12 (ZA)
Woodland Hills Apartments – Clubhouse Remodel	AP-09-599 (AD)	Discovery Builders (925) 682-6419	220	10.28	241 West Buchanan Rd.	Approved	04-16-09 (ZA) 05-31-12 (ZA)
Woods Manor Apartments Remodel	AP-08-530 (DR)	BRIDGE Housing Corp. (415) 989-1111	82	5.8	850 East Leland Rd.	Under Construction	07-08-08 (PC) 07-14-09 (PC)

MIXED USE PROJECTS

PROJECT	APPLICATION NO(S).	DEVELOPER	RES. UNITS	NONRES. SQ. FT.	SITE ACREAGE	LOCATION	STATUS	MEETING(S)
Siena Court Senior Apartments	AP-09-583 (DR)	Domus Development (415) 856-0010	111	10,300	1.98	Western side of the 700 block of Railroad Ave	Built	03-10-09 (PC)
Vidrio – Block B	AP-05-225 (DR)	Pittsburg RDA	75	11,558 sq. ft.	2.41	Western side of 600 block of Railroad Avenue	Built	01-24-06 (PC)

COMMERCIAL

PROJECT	APPLICATION NO(S).	DEVELOPER/ APPLICANT	BLDG. SQ. FT.	SITE ACREAGE	LOCATION	STATUS	MEETING(S)
2110 Railroad Avenue Retail Shell Building	AP-12-888 (DR)	DCI (916) 934-0106	8,250	062	2110 Railroad Avenue	Pending	
3811 Railroad Building Remodel	AP-11-751 (AD)	Richard Mao (510) 552-1687	5,700	1.92	3811 Railroad Avenue	Under Construction	04-13-11 (ZA)
All Star Ford	AP-12-882 (UP)	Brian Nokes	44,027	7	3800 Century Ct.	Approved	12-27-12 (PC)
Burger King Remodel	AP-12-894 (AD)	Anthony Sacca (707) 486-2771	3,405	.92	2162 Railroad Ave.	Pending	
Burlington Coat Factory Addition	AP-10-738 (DR)	Discovery Builders (925) 682-6419	6,360 (add'n)		4105 Century Blvd.	Built	02-08-11 (PC)
California Theater Remodel	AP-08-533 (DR)	City of Pittsburg, Attn: Dick Abono (925) 252-4044	16,000	.23	351 Railroad Ave.	Under Construction	10-14-08 (PC)
Century Plaza Remodel	AP-06-353 (DR)	Sierra Pacific (925) 427-3700	439,830	50.0	Century Blvd at Somersville Road	Approved (expires 9/26/14)	09-26-06 (PC); 09-22-09 (PC) 10-25-11 (PC)
Chili's Remodel	AP -12-816 (DR)	Robert Montgomery, Brinker International (972) 770-7227	5,897	1.68	4330 Century Blvd	Built	02-07-12 (ZA)
Clear Channel Digital Sign	AP-12-825 (SR)	Robert Hatton 510-446-7216	n/a	2.79	Frontage Road at Dover Way	Pending	

PROJECT	APPLICATION NO(S).	DEVELOPER/ APPLICANT	BLDG. SQ. FT.	SITE ACREAGE	LOCATION	STATUS	MEETING(S)
Continental Tow	AP-12-818 (UP)	Chris Rockenbaugh (925_ 250-5465	n/a	1.43	2731 Pittsburg / Antioch Highway	Pending	
Contra Costa County Fire Prevention Bureau Office Building	AP-09-642 (DR) AP-11-744 (SR) AP-11-745 (SR)	Ron Guelden CCC Fire Protection District (925) 941-3300	6,227	1.91	2331 Loveridge Road	Built	12-08-09 (PC)
Delta Gateway Pad 12	AP-12-889 (DR)	Discovery Builders (925) 682-6419	10,623	1.04	Western Terminus of Delta Gateway Boulevard	Pending	
EJ Phair	AP-07-496 (DR)	John Phair (925) 595-1687	13,331	0.16	200 Cumberland Street	Built	05-13-08 (PC)
EJ Phair	AP-10-691 (UP)	John Phair (925) 595-1687	13,331	0.16	200 Cumberland Street	Approved	07-27-10 (PC)
El's Smog Shop	AP-12-881 (UP)	Aristotle Ramiro 925-252-0707	7,000	0.48	2172 Piedmont Way	Pending	01-08-13
Fermin's Autobody	AP-08-546	Fermin Ruiz	3,213	7,500 sq.ft.	437 W. 10th Street	Under Construction	10-01-09 (ZA) 01-25-12 (ZA)
Ford Relocation Remodel	AP-12-883 (AD)	Brian Nokes	44,027	7	3800 Century Ct.	Under Construction	12-06-12 (ZA)
Granite Expo Outlet	AP-12-823 (VA)	Jacky Li 510-507-0999	50200	4.66	3033 Harbor Street	Approved	3/29/2012 (ZA)
Island Pacific Supermarket	AP-12-812 (UP, AD)	Island Pacific Enterprises	15,026	3.18	2100 North Park Blvd.	Under Construction	02-28-12 (UP, AD)
La Marina Laundromat	AP-09-659 (AD)	Mercedes Grandez (925) 938-8019	4,500	11,415	301 East 10th St.	Built	04-29-10 (ZA)
Lumpy's Diner Rear Outdoor Patio Cover	AP-12-828 (AD)	City of Pittsburg, Attn: Kolette Simonton	535 (new structure)	.08	615 Railroad Ave.	Built	03-27-12 (PC)
Marina Commercial Center	AP-07-461 (VA, DR)	Palm Plaza Development (925) 392-6611	22,861	9.73	Northeast side of Marina Blvd	Built	09-25-07 (PC) 04-22-08 (PC)
Maya Cinemas	AP-12-832 (AD)	Doug Messner, Sierra Pacific Propeties	60,836	1.039	4085 Century Blvd.	Built	04-30-12 (PC)
McDonalds Remodel	AP-11-773 (DR)	Ware Malcomb Architects (925) 244-9620	3,907	.55	460 Atlantic Ave.	Built	07-26-11 (PC)
My Beauty Salon and Supply Company,	AP-12-837 (AD)	Bobby White (925) 522-1687	8,321	13,500	777 Railroad	Approved	9-7-2012 (ZA)
New Bethel Missionary Baptist Church	AP-08-543 (DR) AP-09-624 (UP, DR)	Frances Greene (925) 432-4566	20,600	2.41	360 Central Ave	Under Construction	10-14-08 (PC) 11-17-09 (PC)

PROJECT	APPLICATION NO(S).	DEVELOPER/ APPLICANT	BLDG. SQ. FT.	SITE ACREAGE	LOCATION	STATUS	MEETING(S)
New Mecca Restaurant Expansion	AP-08-582 (DR, OD, SE)	Redevelopment Agency of the City of Pittsburg; Guillermo & Teresa Muniz	7225	0.23	306 & 324 Railroad Ave.	Built	02-10-09 (PC)
MoMo Restaurant	AP-812-817 (UP,OD)	Philip Yang (510) 334-2577	3,360	.47	610 Railroad Ave.	Under Construction	03-27-12 (PC)
North Park Commercial Center Expansion	AP-12-890 (UP, DR, VA); AP-12-891 (UP, DR, VA); AP-12-892 (UP, DR); AP-12-893 (DR, VA)	Discovery Builders (925) 682-6419	63,151	10.5	North Park Boulevard	Pending	
PBA Chapel Project	AP-12-867 (AD)	Elden Limmeo (925) 439-3660	28,517	1.46	310 Central Ave	Pending	
Pittsburg Library Café (1,280 square foot addition)	AP-10-707 (ADR)	City of Pittsburg 925-252-4015	7,000	1.75	80 Power Avenue	Under Construction	08-10-10 (PC)
Pittsburg Library Addition (2,050 square foot addition)	AP-11-746 (ADR)	City of Pittsburg 925-252-4105	7,000	1.75	80 Power Avenue	Under Construction	05-09-11 (ZA)
Red Lobster Remodel	AP-12-813 (ADR)	GHA Architecture and Development 972-239-8884	8,493	0.395	4095 Century Boulevard	Built	01-31-12 (ZA)
San Marco Gas Station & Convenience Store	AP-09-588 (RZ, UP, DR)	Discovery Builders (925) 682-6419	6,000	1.44	Northwest corner, San Marco Blvd. & West Leland Road	Approved	07-19-10 (CC) 07-27-10 (PC)
St. Claire Cigars	AP-12-878	Aaron Turner 707-290-2121	880	0.18	64 E. 4th Street	Pending	
Synergy Charter School	AP-12-848 (UP)	Margie DiGiorgio	6,800	.38	355 East Leland Rd.	Built	07-10-12 (PC)
The Post	AP-12-885 (UP)	Eric Huber 925-852-9740	4,550	0.33	501 Railroad Avenue	Pending	
Tow Workx	AP-12-851 (ZA)	Robert Porter	4,600	7.38	100A Bliss Ave.	Approved	08-14-12 (ZA)
Trench Plate Above Ground Fuel Storage Tank	AP-12-814 (UP)	Caspar Busalacchi 415-990-116	2,400	3.25	530 Garcia Avenue	Built	02-28-12 (PC)
Wilson's Dance Studio	AP-12-886	Hannah Wilson 925-207-6097	2,574	0.143	1187 Railroad Lane	Pending	1-08-13

INDUSTRIAL

PROJECT	APPLICATION NO(S).	DEVELOPER	BLDG. SQ. FT.	SITE ACREAGE	LOCATION	STATUS	PC MEETING
All Bay Vehicle Donations	AP-09-615 (UP)	Robert Knox (925) 427-4483	900	1.56	1225 Loveridge Road	Approved; Appeal Pending	11-09-10 (PC)
Avila Road RV Storage Yard and Caretaker's Quarters	AP-12-863 (UP) and AP-12-880 (AD)	Legacy Framers 925-427-1011	1,198	12.5	101 Avila Road	Approved	12-11-12 (UP, AD)
Columbia Solar Energy	AP-12-879 (DR, RZ, DA)					Pending	
DDSD Solar Carport Canopies	AP-11-776 (AD)	DDSD - Irene O'Sullivan (925) 756-1917	23,735	.69	2500 Pittsburg-Antioch Hwy	Approved	08-19-11 (ZA)
DDSD Fueling Station Replacement	AP-12-859 (UP)	Patricia Chapman	n/a	14.69	2500 Loveridge Road	Approved	9-13-12 (PC)
Dow Alpha MRU and T-3	AP-12-831 (AD)	Phil McAllister, DOW Chemical Company		248.27	900 Loveridge Road	Approved	04-09-12 (ZA)
Family Medical Transport	AP-12-871 (UP)	Amelia Younis	13,680	1.15	2250 Freed Ave	Approved	11-13-12 (PC)
Gelateria Naia	AP-12-872 (UP)	Trevor Morris	5,500		671 Willow Pass Road #7	Approved	11-13-12 (PC)
Irish Construction	AP-11-769 (UP, DR)	Irish Construction (626) 288-8530	7,770	2.45	2141/2151 Piedmont Way	Built	07-26-11 (PC
K 2 Pure	AP-08-573 (UP, DR)	Tim Morris (715) 421-2814	40,000+	15	950 Loveridge Road	Under Construction	10-19-09 (PC)
K2 Pure Fuel Cells	AP-11-792 (AD)	Peter Ellefson			950 Loveridge Road	Built	11-17-11 (ZA)
K 2 Pure, Phase III – HCl Skid Project	AP-11-793 (DR)	Tim Morris (715) 421-2814			950 Loveridge Road	Built	01-24-12 (PC)
LA-SRDC, LLC/ Scrap Metal Loading Project	AP-12-815 (UP, DR)	JinHo (David) Huh (773) 329-0598	320	1	900 Loveridge Road	Approved	02-28-12 (PC)
Lara's Concrete	AP-07-430 (UP)	Luis Lara (925) 458-6304	4,800	5	104 Avilla Road	Pending	
Marine Express Site Improvements	AP-12-864 (DR)	Randy Esch	168	2.86	695 East 3rd Street	Pending	
MDR, Inc. Contractor Yard	AP-12-846 (UP, DR)				2139 Harbor St.	Pending	
Mount Diablo Recycling Center – Expansion of Use Permit	AP-09-654 (UP)	Dave Adler 925-682-7492	82,611	11.05	1300 Loveridge Road	Approved	01-12-10 (PC)

PROJECT	APPLICATION NO(S).	DEVELOPER	BLDG. SQ. FT.	SITE ACREAGE	LOCATION	STATUS	PC MEETING
Mount Diablo Resource Recovery Park – Modification of Transfer Station/Recycling Center Permits	AP-10-712 (UP)	Dave Adler 925-682-7492	82,611	17.5	1300 Loveridge Road	Pending	
PraxAir Temporary Modular Office Trailer	AP-12-869	Lee Sahagan, PraxAir	1,200	31.5	2000 Loveridge Rd.	Approved	09-27-12 (ZA)
Ramar Foods Solar Panels	AP-10-681 (DR)	Primo Quesada (925) 439-9009	31,230	2.27	355 Central Ave	Approved	05-08-10 (PC)
Ramar Foods Fuel Cell Installation	AP-12-839 (AD)	Primo Quesada (925) 439-9009	31,230	2.27	355 Central Ave	Approved	06-18-12 (ZA)
Rege Yard	AP-11-775 (UP)	David Rege (510) 599-9076	Portion of 217,800	5	111 Avila Road	Pending	
Trans Bay Cable	AP-04-157 (DA); AP-07-500 (DR)	Trans Bay Cable, LLC (415) 618-3301	25,150	5.6	570-610 West Tenth Street	Built	10-24-06 (PC); 11-06-06 (CC); 11-27-06 (CC); 01-29-07 (CC)
United Spiral Pipe Manufacturing Plant	AP-07-445 (UP, VA, DR, MS-676-07)	United Spiral Pipe, LLC (925) 439-6442	352,000	44.8	900 East Third Street	Built	09-25-07 (PC); 10-23-07 (PC)
Walmart Limited Remodel	AP-11-8907 (AD, SR)	Shade Lawrence O'Quinn (214) 749-0626	125,999	12.475	2203 Loveridge Road	Built	02-10-12 (ZA)
WesPac Energy – Pittsburg Terminal	AP-11-761 (UP, DR)	Art Deifenbach, WesPac Energy (949) 478-3158		164	696 West 10th Street	Pending	

LONG RANGE PLANNING PROJECTS

PROJECT	APPLICATION NO(S).	SITE ACREAGE	LOCATION	STATUS	MEETING(S)
Hillside Development Standards & Design Guidelines	n/a	TBD		On Hold (indefinitely)	

James Donlon Blvd. Extension (Buchanan Bypass) & Southeast Hills Annexation, including General Plan Amendment and Rezoning	n/a	TBD	South of the existing city limits and east of Kirker Pass Road.	Pending; Environmental review (Draft EIR) underway	
Pittsburg Bay Point BART Master Plan	n/a	Approx. 55 acres	Vacant land and parking lots surrounding the existing BART Station	Approved	7-26-11 (PC) 8-15-11 (CC) 10-17-11 (CC)
Pittsburg Housing Element	Click Here for More Information	City-wide	City-wide`	Approved; and certified by the State Department of Housing and Community Development.	5-12-09 (PC); 6-1-09 (CC); Amendments Adopted 7-6-10 (CC)
Railroad Avenue Specific Plan (eBART)	Click Here for More Information	1,076	Area within ½-mile of future eBART Station at State Route 4 and Railroad Avenue	Approved	07-06-09 (CC); 08-11-09 (PC); 09-21-09 (CC); 10-19-09 (CC); 11-02-09 (CC)
Southwest Hills/Faria Annexation	AP-10-717 (Annexation, RZ) Applicant: Faria Land Investors, LLC. (925) 682-6419	606	Southwest Hills	Pending; Environmental review underway	

List of Abbreviations of Permits:

AD (AD)	Administrative Design Review (Approval or Denial by Planning Staff)
DR (DR)	Design/Architectural Review (Approval or Denial by Planning Commission)
DA	Development Agreement
GP	General Plan Amendment
MS	Minor Subdivision
MP	Master Plan
PR	Preliminary Plan Review
RZ	Zoning Amendment
SR	Sign Review
SUB	Major Subdivision
UP	Conditional Use Permit
VA	Variance

Other Abbreviations:

CC	City Council review and/or action
PC	Planning Commission review and/or action
ZA	Zoning Administrator review and/or action
EIR	Environmental Impact Report
CEQA	California Environmental Quality Act

Appendix D

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Bay Area Open Space Council

January 9, 2013

Kristin Pollot
Associate Planner
City of Pittsburg, Planning Department
65 Civic Av.
Pittsburg, CA 94565

RE: Comments on the Montreux Residential Subdivision Draft Environmental Impact Report State Clearinghouse #2013032079

Dear Ms. Pollot,

Thank you for the opportunity to comment on the draft Environmental Impact Report (dEIR) for the Montreux Residential Subdivision (Project) as proposed by Altec Homes, Inc. and Seecon Financial, Inc. (Applicants). We appreciate the chance to provide input on this Project. Save Mount Diablo and several other organizations own protected open space in the vicinity of the Project. As an organization dedicated to the preservation, defense, restoration, and enjoyment of open space, we are very interested in the effects this Project will have on surrounding areas. Our core concerns of open space scenic value, recreational opportunity, and wildlife habitat, are all relevant to the Project. We have strong concerns about the Project's inconsistency with Pittsburg's General Plan policies and the Project's effect on the aesthetic quality of the southern hills, as well as inadequacies in the dEIR.

Summary of Main Concerns

One of our main concerns is that the project is fundamentally inconsistent with policy guidance provided in the General Plan[1], especially with regard to development on hillsides and viewshed aesthetics. No fewer than 16 specific policies contained in the General Plan would be violated if the Project is carried out in its current form.

The project would significantly degrade the aesthetic quality of the hills to the south of Pittsburg that form a scenic backdrop of open space for the entire city. The "leap-frog" development proposed by the Applicants would require mass grading of most of the site and substantial reconfiguration of the northern ridgeline, which

[1] http://www.ci.pittsburg.ca.us/index.aspx?page=228

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is visible from SR-4 and many parts of Pittsburg. While the northern ridgeline will not be entirely removed, visual simulation figures 5.1-4 through 5.1-7 in the dEIR clearly show that instead of clustering development so that it fits with the natural landscape, the knolls and hills in the lower portions of the site, and a large part of the northern ridgeline and a portion of the southern ridgeline, will be graded. Additional visual simulations taken from north of the Project should be included in the dEIR. In addition, the Project does not follow a number of General Plan policies meant to safeguard the visual character of Pittsburg's southern hills.

The cumulative impacts of the Project and other projects currently being constructed or proposed by the Applicants and affiliated-companies in the vicinity of the Project have not been adequately analyzed. Impacts of the Major Projects listed in dEIR section 5.0 have only been cursorily analyzed. Another project that is being proposed by a company linked to the Applicants (Discovery Builders), the Pointe project in Antioch, was not even included in the list of Major Projects and if approved, will be located at the eastern end of the proposed James Donlon Boulevard Extension. The EIR should include the Pointe as a Major Project and the cumulative impacts analysis should be revised to include the impacts of the Pointe.

The public services that the dEIR describes as servicing the Project seem to be overwhelmed by existing development, as the dEIR itself recognizes. Fire and police response times both currently do not meet established guidelines, and the schools identified as the ones that will service the Project already operate at over-capacity. The Project should not be considered until it is proved that public services can adequately service the residential areas that currently exist and can also service additional developments like the Project.

Project Location and Description

The approximately 165 acre project site, which includes a 148.3 acre main project site and a 16.8 acre off-site parcel, lies south of Pittsburg on the west side of Kirker Pass Rd. and approximately one mile south of Buchanan Rd. The off-site parcel lies just to the north on the west side of the main project site. The main project site is currently undeveloped grazing land and consists of a broad Y-shaped valley framed by hills and ridges to the north, south, and west (see Figure 1). The northern ridge lies in the Railroad Av./SR-4 viewshed while the southern ridge contains designated Major and Minor Ridgelines and is part of the Kirker Pass Rd. viewshed (see Figure 4-1). The main project site is located outside the City Limits but the off-site parcel is within City Limits. Residential units border the project site to the north, while open space surrounds the project in all other directions. To the west is the protected Keller Canyon open space area, to the south are East Bay Regional Park District protected areas covering the Concord Naval Weapons Station to Black Diamond Mines Regional Park corridor and the Thomas Home Ranch property protected and owned by Save Mount Diablo (across Kirker Pass Rd.), and to the east across Kirker Pass Rd. is unprotected open space (see Figure 2).

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Figure 1. Photo of Montreux main project site looking west toward Kirker Pass Rd. Note the small hills and other terrain features of the valley and the rock outcroppings of the ridgeline on the right. Such natural elements would be destroyed under the current Montreux site plan. Photo courtesy of Scott Hein.

Figure 2. Map showing the location of the Montreux residential subdivision relative to open space in the area. The Montreux main project site and off-site parcel are colored pink (note that most of the area shaded pink consists of the main project site and off-site parcel, but not all of it. The pink shading denotes the property owned by Seeno companies). Protected open space is colored green, light-green, and green hash marks. East Bay Regional Parks and Save Mount Diablo own the protected open space immediately south of Montreux (the box outlined in red). Black Diamond Mines Regional Park is visible in the lower-right corner of the figure. The Thomas Ranch, which is unprotected open space, is colored yellow and red. The red color is the location of the proposed James Donlon Boulevard Extension passing through the ranch.

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The Project calls for: the construction of 356 single family homes with average lot sizes of 7,668 sq. ft., construction of three stormwater retention basins (one of which would be constructed on the off-site parcel), placement of a partially buried water tank at the top of the hill at the northern boundary of the main project site, rezoning of the main project site from its current pre-zoning designation of Hillside Planned Development (HPD) to Single-Family Residential 6,000 sq. ft. minimum lots sizes (RS-6) pre-zoning (to allow for a greater density of homes), and annexation of the main project site into the City of Pittsburg, Contra Costa Water District (CCWD) Service Area, and the Delta Diablo Sanitation District (DDSD) Service Area.

Most of the existing topography would be graded and re-contoured, except for most of the southern portion of the main project site which might remain in its natural state—if it's not affected by grading, and if the applicant doesn't attempt to develop it later as he has tried in other locations—such as the offsite area on the existing project just to the north. Approximately 77 acres of the main project site would be devoted to residential uses and 71 acres would be set aside for open space, including approximately 42 acres of undeveloped land along the southern portion of the main project site to provide a required "greenwall." The valley and northern ridgeline would be substantially reconfigured for residential construction and placement of a water tank, respectively. Grading would include cuts to the hillslopes of approximately 75 ft. in some locations and fills of 10-85 ft. of graded soil in the low portions of the site.

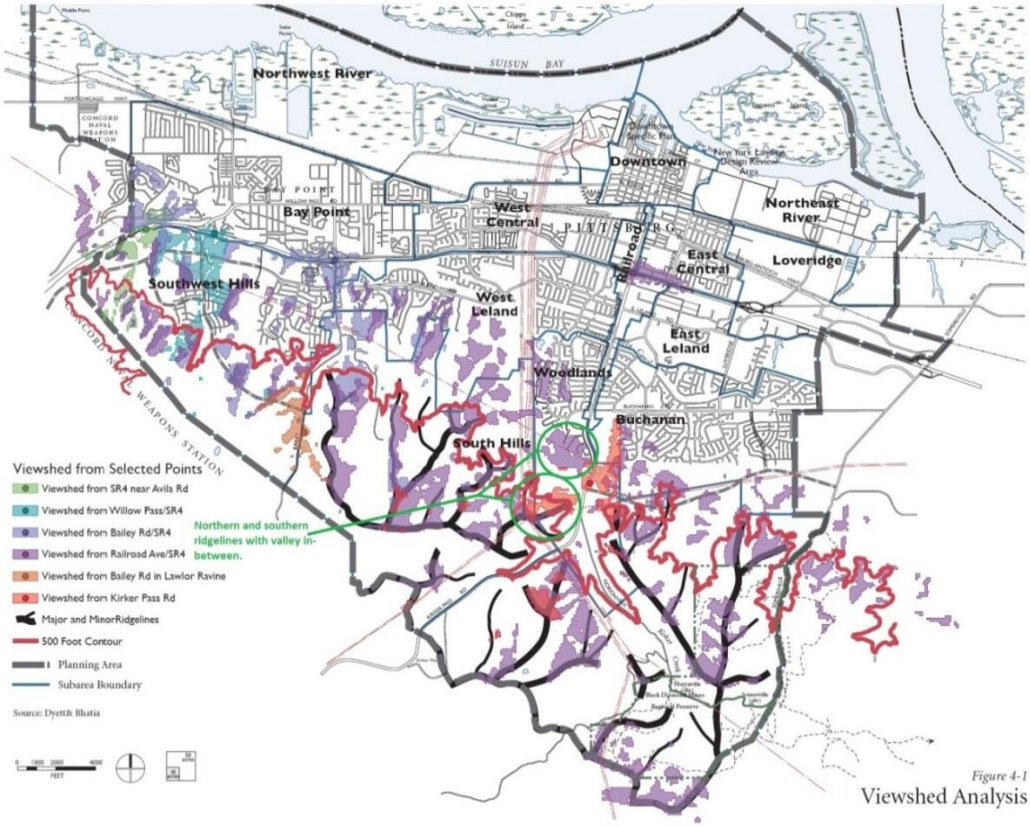

Figure 4-1. Viewshed analysis figure from Urban Design chapter of the Pittsburg General Plan. Modified to highlight the location of the ridgelines the Project would affect.

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Comments on Project's Inconsistency with the General Plan

The Project conflicts with 16 specific policies in the Pittsburg General Plan. These policies relate to the Land Use, Urban Design, and Resource Conservation chapters of the General Plan. Here we provide a list of these policies, and after each, a brief discussion of how the Project conflicts with the specific policy (bolding has been added to highlight particular text):

- 2-P-21: Revise the City's Hillside Preservation Ordinance to reflect General Plan policy direction. Revisions may include, but are not limited to:
    - Designating protected ridgelines, creeks, and other significant resource areas, along with daylight plane or setback standards;
    - Defining protected viewsheds;
    - Designating location and density of low-density hillside residential development based on slope stability and visual impact;
    - **Provision of well-designed hillside projects that provide larger, family-oriented lots**; and
    - Protection of significant ridgelines and **incorporation of hill forms into project design.**

The City of Pittsburg has not yet finalized the Hillside Preservation Ordinance, which was started several years ago and then apparently put on hold. It would be worthwhile to finalize the Ordinance before the Project is considered given that the Project consists of development on a hillside and massive grading of the northern ridgeline and its effects on viewsheds and significant ridgelines. In addition, hill forms have not been incorporated into Project design given the massive amount of grading called for on the northern ridgeline, in clear opposition to potential revisions called for in 2-P-21. By the same token, the Applicants are seeking to rezone the main project site for smaller lots to increase the number of houses they can construct, instead of providing larger, family-oriented lots as called for in the above policy 2-P-21.

- 2-P-23: **Restrict development on minor and major ridgelines** (as identified in Figure 4-2). Encourage residential construction on flatter natural slopes or non-sensitive graded areas that reduce environmental and visual impacts. **Minimize cut-and-fill of natural hillsides.**

While the Project will not develop the Major and Minor ridgelines on the southern ridgeline on the south end of the main project site, construction of stormwater detention basins would require grading on the eastern end of the southern ridgeline to recontour the ridge. This is inconsistent with the intent of policy 2-P-23. In addition, the Project calls for cuts to hillslopes of approximately 75 ft. in some locations and fills of 10-85 ft. of graded soil in the low portions of the site. This massive cutting and filling clearly contradicts the minimization of such activities called for in this policy.

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- 2-P-24: Prohibit new development on designated ridgelines. **Ensure that residential developers cluster housing units** to reduce both environmental and visual impact of hillside development.

The delay in developing the Hillside Ordinance means there are no designated ridgelines at this time, yet the Project would develop and substantially alter the northern ridgeline and recontour the east side of the southern ridgeline, which consists of Major and Minor ridgelines. However, there is no doubt that housing units will not be clustered under the Project (see Figure 3.0-6 below), it is a standard residential subdivision that will result in denser housing than originally intended under the current pre-zoning designation. Examining the density of housing planned under the Project and their uniform distribution in the lower valley and the southern-facing slopes of the northern ridgeline make it clear that the Project does not even attempt to cluster development.

- 2-P-27: Minimize single-access residential neighborhoods in the hills; **maximize access for fire and emergency response personnel**.

The Project is located outside the 1.5 mile response radius of existing or planned fire stations and would not meet the response time guideline of six minutes 90% of the time. According to Figure 3.0-6 (below) in the dEIR, the majority of residential units will use only one street to enter and exit the subdivision. One third of the subdivision would likely use a smaller street entrance/exit, but since this street would lack a traffic signal, it could be even less than that.

- 2-P-28: During development review, **ensure that the design of new hillside neighborhoods minimizes potential land use incompatibilities with any grazing/agricultural activities in the southern hills.**

Construction of the Project as is currently envisioned would terminate the current use of the property as grazing land. The number and density of houses would eliminate most ranching. In addition, the dEIR assumes that the James Donlon Extension (formerly the Buchanan Road Bypass) would be constructed and be able to service the Project. The James Donlon Extension would bisect the Wayne Thomas Ranch property, likely eliminating grazing activities and a livelihood for the Thomas family as well. So grazing activities would end on not just one, but two properties due to this Project and another associated with it.

- 2-P-73: Allow Low Density Residential development in selected areas along Kirker Pass Road and other valley floors as appropriate, under the following criteria:
    - Permanent greenbelt buffers be established to encompass: 1) the southerly 1/5 (approximately) of the Montreux property; and 2) the area south of the existing PG&E transmission corridor and south of the final alignment of the Buchanan Road Bypass, just east of Kirker Pass Road.

      The City will consider, in conjunction with subdivision applications on these properties and related environmental analysis, general plan and/or the transfer of lost development rights as a result of the these greenbelts to other portions of

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these properties, while not increasing the overall number of units permitted on these properties

- **Natural topography be retained to the maximum extent feasible, and large-scale grading discouraged**;
- **No development on minor and major ridgelines** (as identified in Figure 4-2), with residential construction on flatter natural slopes encouraged;
- **Development designed and clustered so as to be minimally visible from Kirker Pass Road**;
- Creeks and adjacent riparian habitat protected;
- An assessment of biological resources completed; and
- Be limited to a maximum density of 3.0 du/ac.

The Project as it is currently proposed would require a massive amount of grading--1.4 million cubic yards—that would recontour both north and south ridgelines and place development on a substantial portion of the south facing slope of the northern ridgeline. A portion of the southern ridgeline, which contains Major and Minor Ridgelines, would be graded and recontoured to accommodate stormwater detention basins. As the visual simulations in Chapter 5 of the dEIR make clear, the Project would be extremely visible from Kirker Pass Road and require the flattening of a large part of the northern ridge. The Applicants characterize their Project as being "clustered" in Section 4.0 *Plans and Policies* because they say they largely limit their development to the valley floor of the main project site. In fact, a significant portion of the southern slopes of the northern ridgeline would be developed. Far from being placed in a clustered fashion like that shown in Figure 4-4 (below), houses would be uniformly spaced without any accommodation for natural terrain features in the lower portions of the main project site.

- 2-P-75: **Cluster new residential development within the hills to maximize preservation of open space resources and viewsheds.**

As already discussed above with respect to policy 2-P-73, the Project is a standard residential subdivision that proposes no clustering and massive grading (see Figure 3.0-6 below). The Project would develop and grade what is currently designated as open space, and severely degrade the northern ridgeline which is visible from a large portion of Pittsburg and lies in the Railroad Av./SR-4 viewshed (see Figure 4-1). The eastern portion of the southern ridgeline, which lies in the Kirker Pass Rd. viewshed and contains designated Major and Minor Ridgelines, would be graded and recontoured.

- 2-P-105: **Preserve all designated hillsides as open space**, according to the General Plan Land Use Diagram (Figure 2-2).

As discussed above, there are no designated ridgelines due to the delay in development of the Pittsburg Hillside Ordinance. However, Fig. 2-2 in the General Plan designates the northern and southern ridgelines of the main project site as open space. The Project proposes to substantially grade and recontour the northern ridgeline and place residential units on its lower south facing

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slopes, while recontouring the eastern end of the southern ridgeline. This is most definitely not preservation of open space as called for in the above policy.

- 4-P-10: **Minimize grading of the hillsides**. Amend the City's Zoning Ordinance to allow density bonuses of 10 percent (maximum) for new hillside development that preserves 40 percent of natural hill contours.

As discussed above, the Project calls for massive grading of most of the main project site and a smaller portion of the off-site parcel. A large part of the northern ridgeline would be graded and the natural contours of the valley bottom would be completely lost. In addition, a portion of the southern ridgeline would be graded.

- 4-P-15: **Minimize the visual prominence of hillside development by taking advantage of existing site features for screening**, such as tree clusters, **depressions in topography**, setback hillside plateau areas, and **other natural features**.

Instead of taking advantage of site features to screen development and reduce their visual impact as this policy mandates, the Project would flatten the knolls and hills in the lower portion of the site and grade and reshape most of the northern ridgeline. No effort would be made to preserve existing topography except at the southern ridgeline, and even then part of the ridgeline will be graded.

- 4-P-16: **Allow flag lots with common driveways** within hillside neighborhoods, in order **to encourage terracing of buildings while minimizing roadway cut-and-fill** (see Figure 4-4 below).

The Project proposes a standard residential subdivision without common driveways or flag lots. Such non-uniform spacing and placement of residential units (see Figure 4-4 below) would better preserve the knolls and hills below the ridgelines and reduce the amount of grading that would be required. As far as cut-and-fill, the Project currently calls for cuts to the hill slopes of approximately 75 ft. in some locations and fills of 10-85 ft. of graded soil in the low portions of the site. This is a massive amount of cut-and-fill that will obliterate terrain features in much of the main project site.

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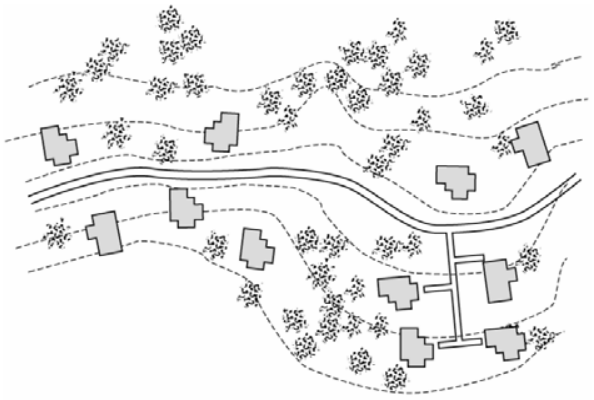

Figure 4-4: Flag Lots

Figure 4-4 from the Pittsburg General Plan.

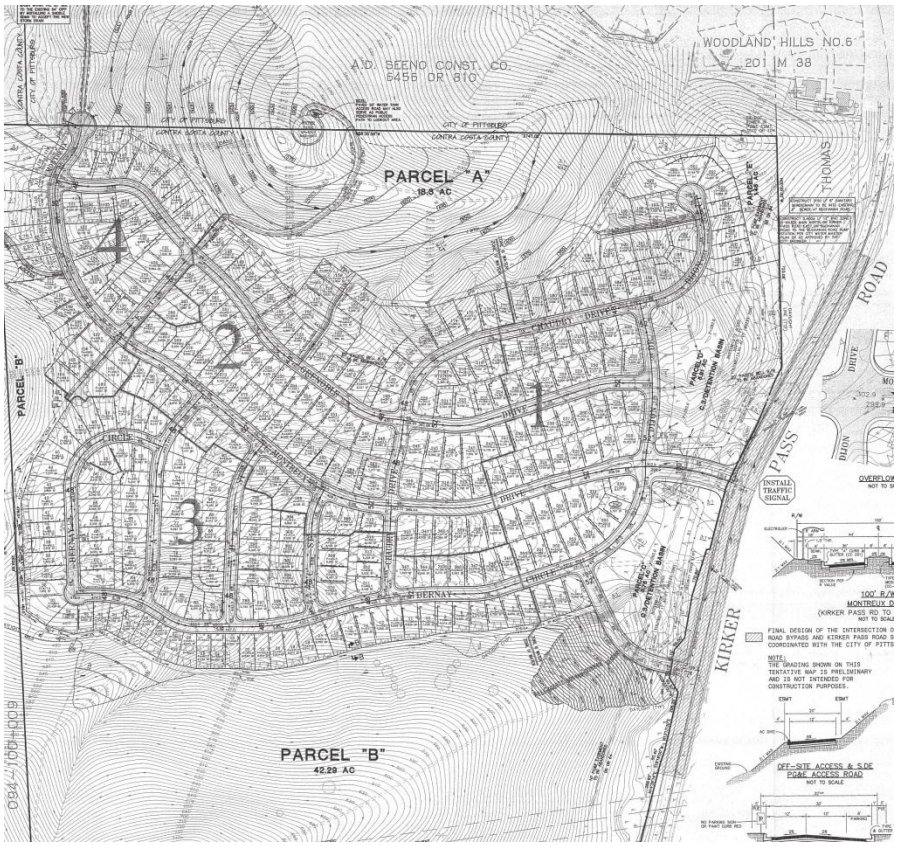

Figure 3.0-6. Conceptual Site Plan for the Project. Portion of original Figure 3.0-6 in dEIR.

- 4-P-17: **Encourage clustering of Hillside Low-Density units in the southern hills**, with resulting pockets of open space adjacent to major ridgelines and hillside slopes. Allow density bonuses of 10 percent (maximum) for preservation of 60 percent or more of a project's site area as open space.

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As discussed above, the Project does not propose clustering of housing units, but a standard "cookie-cutter" residential subdivision that does not accommodate terrain on the lower levels of the site or the northern ridgeline. Contrast the housing configurations in Figure 4-4 with those in Figure 3.0-6 (above) to get a sense of the difference between clustered development, and the dense "cookie-cutter" residential subdivision proposed by the Project.

- 4-P-61: **Retain views of the southern hills from the State Route 4 corridor, through implementation of ridgeline preservation policies** (as described in Section 4.1).

The eastern edge of the southern ridgeline at the main project site, which consists of designated Major and Minor Ridgelines, would be graded and recontoured if the Project goes forward. The northern ridgeline, which lies in the Railroad Av./SR-4 viewshed, would be substantially altered. Massive grading on the south-side slopes for development would dramatically degrade views of this area from Kirker Pass Rd., while recontouring the ridge itself would alter the natural appearance of the ridgeline from northern viewpoints.

- 9-P-6: In order **to preserve viewsheds of the southern hills**, **preserve major ridgelines** (shown in Figure 9-1) **throughout the Planning Area**. Revise the Municipal Code per Policy 4-P-1: building pads and structural elements shall be located at least 150 feet away from (horizontally) the crest of a major ridgeline.

The southern ridgeline contains Major and Minor Ridgelines, and under the current Project plan its eastern end would be graded and recontoured.

- 9-P-7: During the design of hillside residential projects, **encourage clustering of housing to preserve large, unbroken blocks of open space**, particularly within sensitive habitat areas. **Encourage the provision of wildlife corridors to ensure the integrity of habitat linkages.**

As has been previously discussed, the Project calls for massive grading to construct a "cookie-cutter" residential development that does not use clustering as a method to preserve terrain features such as knolls and small hills. The Project would fragment open space since a portion of open space would remain adjacent to existing development to the north, but would be cut off from the proposed "greenwall" at the southern ridgeline by development in the valley and southern slope of the northern ridge at the main project site.

- 9-P-8 **As a condition of approval of new development, ensure revegetation of cut-and-fill slopes with native plant species.**

The massive grading that would occur under the Project would require a large amount of revegetation to the valley, slopes of ridges, and even the higher portions of ridges that have been recontoured, as well as the off-site parcel. Mitigation Measure AES-2 as described in Section 5.1 *Aesthetics*, says "the developer shall hydro-seed all disturbed, yet undeveloped, slopes…in order to encourage growth of new vegetation on disturbed hillsides." However, the dEIR does not specify if the Applicants would revegetate disturbed areas with only native species, a native-

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introduced species, mix, or just introduced species. The EIR should identify a list of native species that would be used to revegetate disturbed areas, and include a management plan to ensure that native species dominate revegetated areas years after initial seeding. For the last several hundred years native grass species have been outcompeted in California by introduced annual grasses, which now dominate the Project site. If the Project is going to cause even greater disturbance, efforts should be made to restore the area so that it supports native species.

Section 4.0 *Plans and Policies* in the dEIR describes the Project as being consistent with 16 specific policies in the General Plan. We have listed six of the same policies the dEIR calls out, and dispute their assertions that the Project is consistent with these policies in terms of grading, clustered development, and preservation of ridgelines. To carpet the valley floor of the main project site and portions of the northern ridgeline with dense housing is not clustering, and basically demolishing the northern ridgeline and recontouring it to hide massive grading cannot be considered minimization of grading or true preservation of viewsheds.

Chapter 1 of the General Plan states that, "A city's general plan has been described as its constitution for development – the framework within which decisions on how to grow, provide public services and facilities, and protect and enhance the environment must be made." It also states that, "*policies* provide more specific direction on how to achieve goals. Policies outline actions, procedures, programs, or techniques to attain the goals." If the Project conflicts with at least 16 policies that are designed to provide specific direction on how to achieve Pittsburg's General Plan goals, and if the General Plan is the framework within which decisions *must* be made, then how can the current proposed Project be in alignment with the goals and best interests of Pittsburg?

Comments on dEIR Section 5.1, Aesthetics

Significant and Unavoidable Impacts to Viewsheds

While the ridgeline in the northern portion of the main project site is not a designated Major or Minor Ridgeline, it is visible over a large swath of Pittsburg and contains a broad rock outcropping, the preservation of which is encouraged in General Plan goal 4-G-4. This ridgeline would be excavated, reduced in elevation by about 75 ft., and be developed on its lower south facing slopes. The visual simulations included in the dEIR from the vantage point of Kirker Pass Rd. give some indication of how much the massive grading proposed on the Project would carve out of the northern ridgeline and how degraded the scenery would be in the process. A water tank would be visible from the north as well. While the Applicants maintain that the majority of Pittsburg would not be able to view the development or a degraded ridgeline since it would be recontoured to look more natural, in truth, the heart of the ridge will be carved out from the southern end and its total height will be substantially reduced. The ridge would, in essence, be a prop screen with only the facade of being natural. In addition, large numbers of residents pass the site daily on Kirker Pass Road, from which the development would be highly visible.

Perhaps the only positive component of the Project is that it calls for a "greenbelt" along the southern ridgeline, but even this is soured by the fact that the Project calls for grading the eastern portion of this Major Ridgeline. This is discussed further below.

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Existing policy direction makes it clear that preserving the quality and character of the southern hills and ridges is of the utmost importance for Pittsburg. As such, the EIR should include an alternative that preserves all portions of the northern and southern ridgelines at the main project site, without the grading, recontouring, and development on the south-facing lower slopes of the northern ridgeline and without the grading of the southern Major Ridgeline. If necessary, a water tank could still be a component of this alternative. It is likely that a much lower number of houses would be required for such an alternative to be possible. If the number of residential units for the Project were reduced, then clustered development that preserves terrain features as called for in the General Plan could be put in place and the Project would be consistent with Pittsburg's land use and development policy goals. While the dEIR includes a Ridgeline Preservation Alternative, this alternative does not preserve all portions of the ridges in project site.

Another benefit would be that the significant and unavoidable impacts to at-risk persons living near the proposed Project in the Woodlands neighborhood, such as the young, elderly, and people with respiratory problems, would not be as severely impacted by emission of PM2.5 because the amount of grading would be reduced. As the dEIR recognizes, impacts to sensitive persons by PM2.5 emissions, which is identified as a Toxic Air Contaminant by the State of California, would still be a significant and unavoidable impact even after all mitigation measures are implemented.

Impacts to Major and Minor Ridgelines in the Southern Ridgeline

As the above discussion of policy 2-P-23 describes, the eastern portion of the Major and Minor Ridgelines of the southern ridgeline on the main project site would be graded to recontour the ridge for stormwater retention basins. This would alter a view visible over a large swath of Pittsburg and surrounding areas from a natural to an artificial-looking terrain, and with the substantial grading and lowering of the northern ridgeline, together constitute a significant and unavoidable impact to the aesthetics of the area. While the Applicants propose hydroseeding and recontouring the northern ridgeline to make it look natural, the ridgeline would indeed be artificial and no mitigation measure can adequately make a 75 foot lowering of a ridge less than significant.

With regard to the Major Ridgeline that would be recontoured, the EIR should include an alternative scenario that does not involve altering the southern ridgeline (as called for above). If the alteration is necessary for the Project as it is currently proposed, the scenario should be adjusted to exclude the stormwater detention basin that necessitates recontouring the southern ridgeline and any residential units associated with the excluded basin. Avoiding modification to the Major and Minor Ridgelines in the southern portion of the main project site would be consistent with the spirit of many of Pittsburg's specific General Plan policies (see above discussion).

Inadequacy of Visual Simulations Included in the dEIR

The dEIR does not include visual simulations looking south toward the Project from the north, so the visual impacts of the most severe grading (the lowering and excavation of the northern ridgeline), cannot be adequately evaluated. Most people that see the project area do so from the

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north, from Pittsburg, and the ridgeline that will be most substantially altered under the Project lies in the Railroad Av./SR-4 viewshed. The EIR should include visual simulations of the effects of the Project from vantage points along Railroad Av. and SR-4.

Comments on Cumulative Impacts Analysis

The list of Major Projects included in the dEIR to be analyzed in the Cumulative Analysis include Sky Ranch II, Black Diamond Ranch, Tuscany Meadows, and the James Donlon Boulevard Extension (JDBE). If approved, the latter project would be the one located closest to the Project. In a few short sentences, the dEIR states that because the JDBE is a roadway and no other improvements would be made in the area of that project, "views of the hillsides to the east would not substantially alter lands to the east of the project." How could a major arterial roadway located in steep, landslide-prone hills where currently no development exists, not substantially alter the aesthetics of the hills? Extreme amounts of grading and cut-and-fill will be necessary to construct the JDBE, which will also affect the views of these hills. In addition, the impact on local agriculture of the Project and the JDBE together is not discussed in the dEIR. If the Project is approved and built, ranching activity will largely end at the Project site, but considered together with the JDBE, ranching would be rendered much more difficult over a wide swath of the Pittsburg southern hills due to the JDBE bisecting a large working cattle ranch. Where is this discussion of cumulative impacts in the dEIR?

Taken together, the Major Projects and the Project represent more than 2,000 new homes and a major roadway in the vicinity of the southern hills of Pittsburg. This is not even the whole story, as the Pointe project, a project being proposed by Discovery Builders, which along with the Applicants is owned by the Seeno family, is not even listed with the Major Projects. This is puzzling, since it lies only 2.3 miles away from the main project site and is located at the other end of the JDBE. Given that the Pointe would actually demolish an entire hill and require even more grading and excavating than the Project, and would add traffic and other impacts that could affect the Project since it is also a residential subdivision, how is the Pointe not included in the list of Major Projects? How could the construction of more than 2,000 homes and a major roadway in the southern limits of Pittsburg and Antioch not be severely growth inducing and not cumulatively have major impacts on the southern hills?

The cumulative impacts analysis in the dEIR should include the Pointe project and be redone to fully account for the significant impacts that taken together all these projects would have in terms of traffic, air quality, greenhouse gas emissions, aesthetics, biological resources, land use and planning, and other impact categories.

Comments on dEIR Section 5.6, Public Services

Section 5.6 of the dEIR identifies some of the public services that are expected to serve the Project as well as the adequacy of service provided. It is striking that even before the West Leland Fire Station was closed in July 2013, Pittsburg was unable to meet established fire

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response time guidelines (Leach 2011[2]). Now that there is one less fire station to serve the area, it is reasonable to say that fire services would be further strained by adding a significant number of residential units, as the Project calls for. In addition, the Project is beyond the current city limits, accessible only by one road, and as discussed above, the subdivision itself seems to have only one main entrance (most of the division will likely use one entrance due to accessibility issues and a traffic signal). So not only would the Project add an additional burden on already inadequate resources, but the accessibility of the Project itself is limited. If fire resources are unable to adequately serve residential neighborhoods as they exist now, what sense does it make to add more housing that will make service increasingly inadequate?

These same points are also true for police response time. Even if we only consider housing that already exists in Pittsburg, the Pittsburg Police Department is not meeting its goal for emergency calls (LAFCO 2011[3]). The same question must then be asked, what sense does it make to place additional burdens on an already overburdened system?

Regarding the schools that are expected to service the Project, the elementary and junior high schools were operating at or over capacity three years ago, and the high school was just barely under capacity (SCI 2010[4]). The high school (Pittsburg High School) currently has 2,950 students enrolled, which is nearly at their maximum capacity of 3,000 students (Williams pers. comm.[5]). Why is Pittsburg even considering placing additional students in schools that are already at or beyond their maximum capacity to accept more students?

Given that fire, police, and school services, cannot adequately serve the Pittsburg communities that already exist, let alone serve an additional community of the size that the Project plans, wouldn't the logical thing to do be to not develop new residential areas when those that already exist cannot be serviced within established guidelines? The Project should not be considered until public services can adequately service the residential areas that currently exist.

Other Comments on the dEIR

The Applicants are not identified anywhere in the main dEIR document. They should be named in the Executive Summary and/or Project Description sections and clearly identified as the Applicants for this Project.

The dEIR's Section 4.0, *Plans and Policies*, regards the Project as consistent with a number of specific General Plan policies that we find the Project to be remarkably inconsistent with. In addition, since the section discussed a topic typically found in an EIR's Land Use and Planning

[2] Leach, Ted. 2011. Fire Inspector, Contra Costa County Fire Protection District. Personal communication via electronic mail with Paul Stephenson, Impact Sciences, December 15.
[3] Contra Costa County. 2011. Contra Costa Local Agency Formation Commission (LAFCO), East County Sub-Regional Municipal Services Review. December 10.
[4] SCI Consulting Group. 2010. Comment by Pittsburg Unified School District on the Montreux Annexation and Subdivision Application. October 5.
[5] Williams, Beverly. 2014. Phone conversation with Pittsburg High School employee Beverly Williams. Enrollment and capacity figures provided by Principal Todd Whitmire.

section, we ask why the Applicants decided to label this section as they did. The change from a standard component in an EIR seems unnecessary and confusing. The section should be retitled and revised, and an honest, realistic discussion of the Project's inconsistency's with the General Plan included.

Closing Remarks

Save Mount Diablo supports development that is planned and executed in a sustainable, environmentally sensitive manner. Infill of areas already surrounded by development or the revitalization of run-down neighborhoods would be types of development that we could support. However, this Project lies outside of the Pittsburg City Limits, is not connected to other development, calls for massive grading of ridgelines, and would degrade important viewsheds. The Project is nothing more imaginative than another "cookie-cutter" residential subdivision that makes no attempt to preserve terrain features or cluster development to incorporate natural elements into overall project design. To propose this Project next to several lands that have been protected for open space and wildlife values is inconsistent with the overall character of the area and flies in the face of the various goals and policies established by Pittsburg that have already been discussed. The cumulative impacts of this Project and others being proposed or already under construction would also significantly change the appearance and character of the southern hills. The public services that would service the Project are already inadequate for the amount of development that already exists. How can it be a good idea to place more burdens on an already over-burdened system?

We are opposed to this Project and those like it. However, if the process must move forward, major changes to the Project should be made, including preservation (no grading or excavation) of both the northern and southern ridgelines and clustered development in the valley. Serious inadequacies in the dEIR must also be addressed.

Thank you for the opportunity to provide comments on the Project.

Sincerely,
Juan Pablo Galván
Land Use Planner

Cc: Meredith Hendricks, Save Mount Diablo
Ron Brown, Save Mount Diablo
Mayor Sal Evola, City of Pittsburg
Vice Mayor Pete Longmire, City of Pittsburg
Council Member Ben Johnson, City of Pittsburg
Council Member Will Casey, City of Pittsburg
Council Member Nancy Parent, City of Pittsburg
Bob Doyle, East Bay Regional Parks
Joel Devalcourt, Greenbelt Alliance
Dick Schneider, Sierra Club
Mack Casterman, California Native Plant Society

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Appendix E

April 29, 2013

Kristin Vahl Pollot, AICP
Associate Planner
City of Pittsburg
Civic Center
65 Civic Avenue
Pittsburg, California 94565

Subject: Notice of Preparation (NOP) for the Montreux Residential Subdivision Project (APN: 089-020-009; 011; 014; and 015).

Dear Ms. Vahl Pollot:

Save Mount Diablo (SMD) appreciates the opportunity to comment on the Notice of Preparation for the proposed Montreux Residential Subdivision project. SMD is a non-profit conservation organization founded in 1971 which acquires land for addition to parks on and around Mt. Diablo, and monitors land use planning which might affect protected lands and resources. Save Mount Diablo has an interest in the lands surrounding Black Diamond Mines Regional Preserve, and between it and the Keller Landfill and the Naval Weapons Station Concord. SMD supports open space preservation in the vicinity of these areas in order to preserve open space scenic values, recreational opportunities and wildlife habitat, especially in the corridor between these areas.

General Comments

The setting of the Montreux property is open space. It is surrounded by the PG&E buffer and Keller Preserve to the west; the East Bay Regional Park District's Black Diamond Mines Preserve to the east; Save Mount Diablo's Wayne Thomas property across Kirker Pass Road; and the Concord Naval Weapons Station property to the south. These properties have been preserved to protect endangered species, agriculture, recreation resources and open space. Our fundamental question is: *How would a cookie cutter subdivision that proposes to fill in drainages, remove trees and entire hillsides be*

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consistent in the steep and landslide-prone hills south of Pittsburg, surrounded by properties that have been preserved for endangered species, recreation, open space and their aesthetic values?

The project has been around for decades. Why would it be proposed at this time given the large number of units that have been approved but not built or are still under consideration in Sky Ranch II, Tuscany Meadows and other projects? Also, what is the disposition of the open space to the north, and why would the City of Pittsburg consider allowing the removal of hillsides within this open space that form the aesthetic backdrop for the entire City and wider region?

Specific Comments

In reviewing the NOP, SMD is concerned about the following issues and requests that information be included in the DEIR to address these critical matters.

1) ***The Project Description is Incomplete:*** The DEIR project description should include the architectural design plans to allow for evaluation of the project in relation to policy direction related to maintaining rural character. According to the NOP, "No architectural design plans have been submitted at this time, and the future design of the units would be subject to design review". Particularly, given the visual sensitivity of the project proposed within the southern hills of Pittsburg, the architectural plans and specifications should be included in the DEIR. It is premature to evaluate the project without this information. The Project Description should also describe the existing PG&E pipeline that appears to cross the property and how it would be affected by the proposed project.

2) ***The Project design is fundamentally inconsistent with the policy guidance provided in the General Plan for Hillside Areas.*** The NOP notes that "Grading would include cuts to the hill slopes of approximately 75 vertical feet in some locations and fills of between 10 and 85 feet of graded soil in the low portions of the site. The northern ridgeline (with an elevation of up to 655 feet) would be significantly reconfigured. Most of the existing ridgeline would be graded and re-contoured, with the crest of the ridge shifted toward the north and graded to conform to the topography of the north side of the hills. A partially buried water tank would be added at the top of the hill on the northern boundary of the site."

General Plan Policy 4-G-4 indicates "Encourage development that preserves unique natural features such as topography, rock outcroppings, mature trees, creeks and ridgelines in the design of hillside neighborhoods." The project as proposed removes key features such as ridgelines, rock-outcroppings, mature trees, and ephemeral drainages.

Policy 2-P-75 indicates: "Cluster new residential development within the hills to maximize preservation of open space resources and viewsheds." The proposed project does not cluster units. It is a standard residential subdivision.

Other General Plan policy direction that should be considered in the DEIR includes:

- "Natural topography be retained to the maximum extent feasible, and large-scale grading discouraged". The project involves massive grading, and removal of an entire hillside and ridgeline.

- "No development on minor and major ridgelines (as identified on Figure 4-2, above) with residential construction on flatter slopes encouraged." The site is being flattened and northerly ridgelines removed.

- "Development designed and clustered so as to be minimally visible from Kirker Pass Road". Units are not clustered. The development would dramatically affect views from Kirker Pass Road.

Given the inconsistency of the proposed project with policies applicable to hillside areas, the Initial Study Land Use Section 10 (b) should be identified as a ***Potentially Significant Impact***, and should be fully evaluated in the DEIR. The DEIR should include a comprehensive analysis of the level of consistency of the project with existing plans and policies.

3) ***The Project is fundamentally inconsistent with the Viewshed Protection objectives stated in the General Plan.*** The project consists of a standard urban subdivision located within the visually sensitive hills south of the City of Pittsburg. The Aesthetic section of the DEIR should include visual simulations from Kirker Pass Road, the Black Diamond Mines Regional Preserve, and from the City of Pittsburg. The hills form a key aesthetic backdrop to the City; General Plan Figure 4-1, the Viewshed Analysis, identifies the 500-foot Contour and Major and Minor Ridgelines that

should be protected. The project as proposed would dramatically affect the topography of the site by lowering and re-contouring key ridgelines, thereby significantly affecting visual quality of these hillsides.

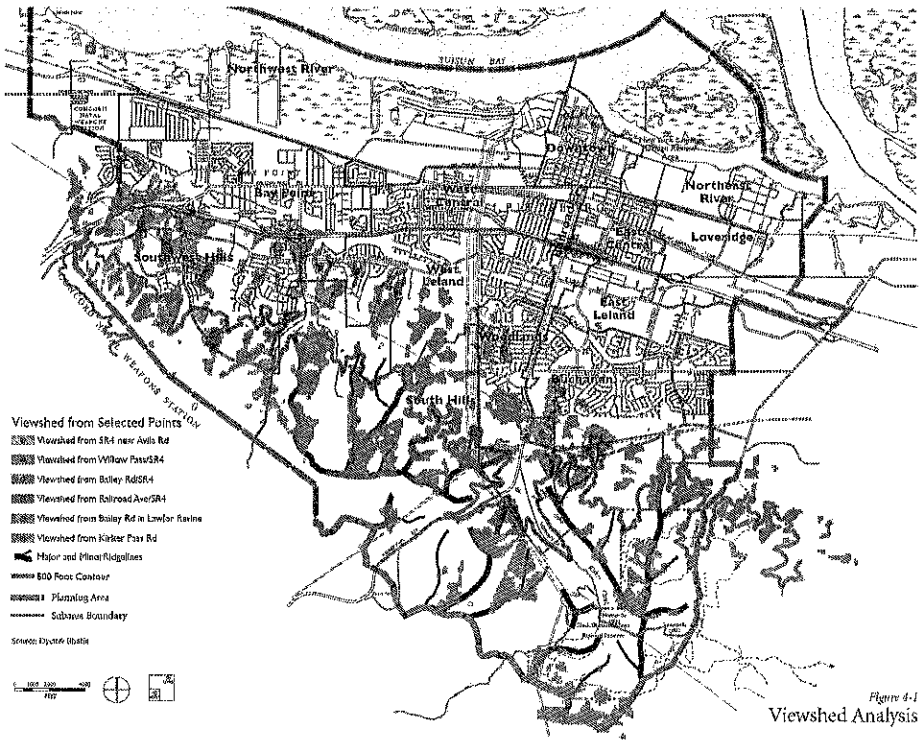


Figure 4-1
Viewshed Analysis

General Plan Policy 2-P-23 indicates: "Restrict development on minor and major ridgelines (as defined by Figure 4-2). Encourage residential construction on flatter natural slopes or non-sensitive graded areas that reduce environmental and visual impacts. Minimize cut-an-fill of natural hillsides." The proposed project does not protect these ridgelines and does not encourage construction on flatter natural slopes. Instead, the project proposes massive grading to flatten slopes and ridgelines. It is designed in a manner that is diametrically opposed to this policy direction.

Similarly, General Plan Policy 2-G-8 indicates: Ensure that hillside development enhances the built environment, improves safety through slope stabilization, is respectful of topography and other natural constraints and preserves ridgelines and viewsheds. Again, the proposed project is designed in a manner that is fundamentally inconsistent with this direction.

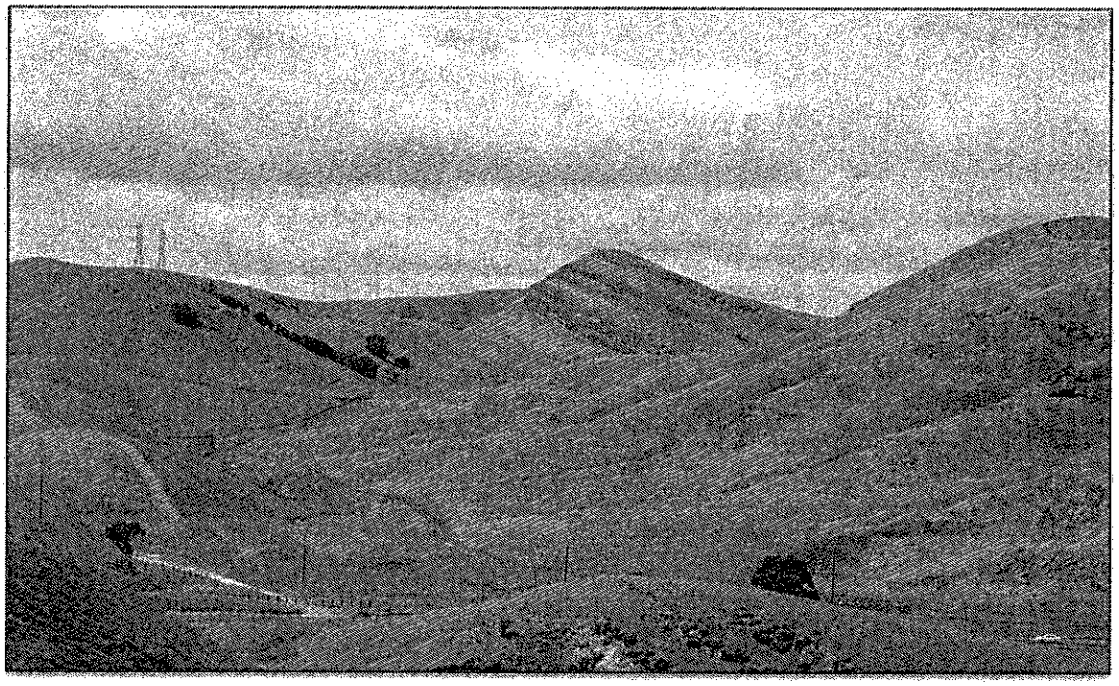
The DEIR should include an extensive consistency analysis of the project in relation to existing plans and policies, particularly policies related to hillside development.

4) ***The Project consists of 'Leap Frog' Development:*** The project represents leap-frog development that contradicts current land use practices that promote development that is close to public transportation and existing urban services. By proposing a project outside of the existing city limits and service boundaries, the applicant is creating a project that would result in much higher greenhouse gases during construction and over the long term than would be the case for sites already within the city limits and already served with urban services.

   The DEIR should evaluate the project in relation to General Plan Policy 2-G-1: "Maintain compact urban form within the City's projected municipal boundary. Ensure that hillside lands not environmentally suitable for development are maintained as open space."

5) ***The Project design should protect Wetlands and Creek Channels.*** According to the NOP, a total of 0.468 acres of wetlands and creek channels were delineated on the project site. This total includes 0.342 acres of jurisdictional waters of the US, including wetlands and 0.126 acres of non-jurisdictional isolated wetlands and ephemeral creeks. Degradation of these resources conflicts with General Plan Policy 2-P-25 "As a condition of approval, ensure that residential developers incorporate natural creeks as open space amenities into the design of residential neighborhoods." Initial Study Issue 9 (d) should be evaluated more completely, given the alteration of site drainage that would result from the project. The DEIR should study potentially significant impacts related to biological resources and hydrology.

6) ***Mature Trees should be Protected:*** The project site supports a number of mature oak trees along drainage and hillside areas. The DEIR should describe and evaluate trees that would be affected by the proposed project. Mitigation measures should be included to protect or replace impacted trees.



View across Kirker Pass Road toward the Montreux Project site
(Photo by Scott Hein; original photo cropped to focus on the Montreux property)

The Seeno companies have a long history of grading, encroaching on streams, cutting trees and performing work on various properties they control, prior to environmental analysis and without permits. This was the case for the trees removed without a permit on the Montreuxu site, in 1999, and is part of a pattern.

7) ***The Mass Grading that is proposed would result in Potentially Significant Impacts to Air Quality and Greenhouse Gases.*** Removal/ flattening of the northern hillside within the project site not only conflicts with the policy direction in the General Plan, but also results in potentially significant impacts related to air quality and greenhouse gases. Both issues should be studied in the DEIR as potentially significant impacts and cumulative impacts.

The NOP mentions that basic construction mitigation measures would be implemented as indicated in Table 8-1 of the BAAQMD CEQA Guidelines (May 2011) (*8-1 Basic Construction Mitigation Measures*). As a project involving massive grading and removal of entire ridgelines, at minimum, the additional mitigation measures included in Table 8-2 *Additional Construction Mitigation Measures*, should also be identified in the DEIR to mitigate construction impacts. The NOP seems to vastly underestimate construction emissions.

NOP *Table 1: Estimate Construction Emissions* indicates that "The PM10 and PM2.5 emissions are for the vehicle exhaust component only." However, the BAAQMD CEQA Guidelines, on page B-10, indicate that URBEMIS assumes that fugitive PM dust emissions from soil disturbance activities and travel on unpaved roads account for approximately 79 percent and 21 percent of total the fugitive PM dust emissions, respectively. The NOP Appendix B Air Quality and GHG Modeling Data indicates that PM10 levels in 2014 would be 82.84 lbs per day mitigated. The BAAQMD threshold indicated in Table 1 on page 28 of the NOP is 82 lbs per day, so the project appears to exceed the threshold of significance. The DEIR should provide further clarification regarding the project's impact related to fugitive particulate matter dust emissions.

8) ***The DEIR should include Alternatives that are designed to be consistent with the General Plan policy direction provided for Hillside development and an Alternative Located within the Existing City Limits.*** The proposed project appears to have been designed in a manner that ignores the policy framework related to Hillside Development. The DEIR should include an environmentally sensitive alternative which is designed in a manner that is consistent with the policy direction for hillside development, and that is also consistent with the existing pre-zoning for the site (Hillside Planned Development (HPD) and Open Space (OS)). Given the standard urban subdivision that is proposed, an off-site alternative located on a flatter site within the existing city limits should also be considered.

   The NOP notes that "with the approval of the proposed change from HPD to RS-6, the proposed project would be consistent with the City of Pittsburg Zoning Ordinance." However, currently, the proposed project is not consistent with the existing zoning. In 2005, Pittsburg voters approved the City of Pittsburg Voter Approved Urban Limit Line and Prezoning Act. Measure P included prezoning of the site for HPD and OS. While prezoning can be changed by either a subsequent vote of the voters at a city election or by a majority vote of the City Council, SMD believes that the prezoning as HPD and OS is critical for preserving the hillsides south of Pittsburg. Apart from the No Project Alternative and an off-site alternative located within the city limits, the alternatives considered should be consistent with the HPD and OS pre-zoning, given the visually sensitive location in the hills south of the City of Pittsburg.

9) ***Cumulative and Growth Inducing Impacts:*** The project should be evaluated together with the James Donlon Extension, Tuscany Meadows, and Sky Ranch II projects. Together, these developments are likely to result in a surplus of housing that will be growth-inducing for the region. Unlike projects that are built near city centers served by public transportation, cumulative and growth-inducing impacts related to aesthetics,

traffic, air quality, geology, hydrology, land use, noise, public services and utilities will all be unnecessarily aggravated, and should be studied in the DEIR.

10) The Hillside Preservation Ordinance is Needed to Evaluate this Project: The project is premature and should not be considered until the City of Pittsburg has finalized its Hillside Preservation Ordinance which was started several years ago, and then apparently put on-hold. General Plan Policy 2-P-21 indicates:

"Revise the City's Hillside Preservation Ordinance to reflect General Plan policy direction. Revisions may include but are not limited to:

- Designating protected ridgelines, creeks and other significant resources areas, along with daylight plane or setback standards;
- Defining protected viewsheds;
- Designating location and density of low-density hillside residential development based on slope stability and visual impact;
- Provision of well-designed hillside projects that provide larger, family-oriented lots and
- Protection of significant ridgelines and incorporation of hill forms into project design."

Since the City of Pittsburg has not yet finalized its Hillside Preservation Ordinance, the DEIR should evaluate the project in relation to the direction provided by Policy 2-P-21 indicated above.

Thank you for the opportunity to submit comments on the proposed Montreux Residential Subdivision NOP and the information required in the DEIR to comply with the California Environmental Quality Act (CEQA).

Save Mount Diablo also requests notification of all materials distributed related to the project and associated environmental process, and all public discussions, meetings and hearings conducted.

Sincerely,

Nancy Woltering

Nancy Woltering
Land Conservation Analyst