

CALIFORNIA COASTAL COMMISSION

CENTRAL COAST DISTRICT OFFICE
725 FRONT STREET, SUITE 300
SANTA CRUZ, CA 95060
(831) 427-4863 FAX (831) 427-4877
www.coastal.ca.gov

F7

CENTRAL COAST DISTRICT (SANTA CRUZ) DEPUTY DIRECTOR'S REPORT

For the

June Meeting of the California Coastal Commission

MEMORANDUM

Date: June 13, 2008

TO: Commissioners and Interested Parties
FROM: Charles Lester, Central Coast District Deputy Director
SUBJECT: *Deputy Director's Report*

Following is a listing for the waivers, emergency permits, immaterial amendments and extensions issued by the Central Coast District Office for the June 13, 2008 Coastal Commission hearing. Copies of the applicable items are attached for your review. Each item includes a listing of the applicants involved, a description of the proposed development, and a project location.

Pursuant to the Commission's direction and adopted procedures, appropriate notice materials were sent to all applicants for posting at the project site. Additionally, these items have been posted at the District office and are available for public review and comment.

This report may also contain additional correspondence and/or any additional staff memorandum concerning the items to be heard on today's agenda for the Central Coast District.

DE MINIMIS WAIVERS

1. 3-08-027-W California Department Of Parks & Recreation, Morro Bay State Park, Attn: Debbie Waldecker, Environmental Scientist (Morro Bay, San Luis Obispo County)

IMMATERIAL AMENDMENTS

1. A-266-79-A1 Mike Spangler (Pismo Beach, San Luis Obispo County)

EXTENSION - IMMATERIAL

1. A-3-MCO-04-054-E1 Sunridge Views, Attn: Steve Bradshaw (North Monterey County, Monterey County)

TOTAL OF 3 ITEMS

DETAIL OF ATTACHED MATERIALS

REPORT OF DE MINIMIS WAIVERS

The Executive Director has determined that the following developments do not require a coastal development permit pursuant to Section 30624.7 of the California Coastal Act of 1976.

| <i>Applicant</i> | <i>Project Description</i> | <i>Project Location</i> |
|---|---|--|
| 3-08-027-W California Department Of Parks & Recreation, Morro Bay State Park, Attn: Debbie Waldecker Environmental | Allow geotechnical borings at Morro Bay Marina Restroom area to assess soil conditions and serve in the design for a new comfort station at park. Drillings would occur at two locations along the south side of the restroom with a maximum of three borings needed to complete the testing. | State Park Road (Morro Bay State Park), Morro Bay (San Luis Obispo County) |

REPORT OF IMMATERIAL AMENDMENTS

The Executive Director has determined that there are no changes in circumstances affecting the conformity of the subject development with the California Coastal Act of 1976. No objections to this determination have been received at this office. Therefore, the Executive Director grants the requested Immaterial Amendment, subject to the same conditions, if any, approved by the Commission.

| <i>Applicant</i> | <i>Project Description</i> | <i>Project Location</i> |
|-------------------------------------|--|---|
| A-266-79-A1 Mike Spangler | Request to remove required offer of dedication for affordable housing. | 3990 Shell Beach Road, Pismo Beach (San Luis Obispo County) |

REPORT OF EXTENSION - IMMATERIAL

| <i>Applicant</i> | <i>Project Description</i> | <i>Project Location</i> |
|---|--|---|
| A-3-MCO-04-054-E1 Sunridge Views, Attn: Steve Bradshaw | Subdivision of a 25 acre parcel into 10 lots ranging in size from 1 to 7.8 acres, 2,000 cubic yards of grading, develop a mutual water system, construction of two water tanks, demolition of an existing mobile home, barn, and greenhouse and conversion of an existing mobile home to a senior citizens unit. | 250 Maher Road, North Monterey County (Monterey County) |

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**NOTICE OF PROPOSED PERMIT WAIVER**

Date: June 3, 2008
To: All Interested Parties
From: Dan Carl, Central Coast District Manager *DCM*
Mike Watson, Coastal Planner *MW*
Subject: Coastal Development Permit (CDP) Waiver 3-08-027-W
Applicant: California Department of Parks and Recreation

Proposed Development

Conduct three soil borings near the existing restroom in the Morro Bay State Park Marina parking lot to obtain soils information for use in the design and construction of a new ADA accessible restroom at the Morro Bay State Park Marina.

Executive Director's Waiver Determination

Pursuant to Title 14, Section 13238 of the California Code of Regulations, and based on project plans and information submitted by the applicant(s) regarding the proposed development, the Executive Director of the California Coastal Commission hereby waives the requirement for a CDP for the following reasons:

The proposed soil bores will be taken from beneath the existing asphalt parking area located immediately in front of the existing restroom. A truck with a drill rig in back will be used to perform the drilling procedures, which will be completed within a single day. The drilling site will be fenced to ensure public safety during the drilling and to allow continued use of the restroom facility during construction. Construction BMPs (e.g., equipment staging, material and fluid containment, immediate and proper disposal of drilling spoils, etc.) will be applied to ensure that coastal waters and adjacent sensitive areas are not adversely impacted by the drilling or drilling spoils. In sum, the proposed soil bores represent minor development that will provide important soils data to be used in the evaluation of a potential public access and recreation amenity enhancement at Morro Bay State Park consistent with the Chapter 3 policies of the Coastal Act.

Coastal Commission Review Procedure

This waiver is not valid until the waiver has been reported to the Coastal Commission. This waiver is proposed to be reported to the Commission on Friday June 13, 2008, in Santa Rosa. If four Commissioners object to this waiver at that time, then the application shall be processed as a regular CDP application.

If you have any questions about the proposal or wish to register an objection, please contact Mike Watson in the Central Coast District office.



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NOTICE OF PROPOSED PERMIT AMENDMENT

Date: May 30, 2008
To: All Interested Parties
From: Dan Carl, Central Coast District Manager *DCM*
Mike Watson, Coastal Planner *MW*
Subject: Proposed Amendment to Coastal Development Permit (CDP) A-266-79
Applicant: Mike Spangler

Original CDP Approval

CDP A-266-79 was approved by the Coastal Commission on October 3, 1979, and provided for the subdivision of a 63-acre parcel into 47 single-family residential home sites and one 2.5 acre site to be used for low and moderate income housing at 3990 Shell Beach Road Cliff Drive adjacent to Highway 101 in the Sunset Palisades planning area of the City of Pismo Beach.

Proposed CDP Amendment

CDP A-266-79 would be amended to remove Special Condition 1 that requires the recordation of an offer-to-dedicate over the 2.5 acre site to the San Luis Obispo County housing authority (or similar public or private non-profit housing development organization) for the purposes of providing low and moderate income housing in the City of Pismo Beach coastal zone. The Commission's reference number for this proposed amendment is A-266-79-A1.

Executive Director's Immateriality Determination

Pursuant to Title 14, Section 13166(b) of the California Code of Regulations, the Executive Director of the California Coastal Commission has determined that the proposed CDP amendment is immaterial for the following reasons:

Per the terms of the Commission's original approval, the required OTD was recorded in 1980. Since that time, however, several events have transpired that essentially nullify the OTD's utility with respect to its intended effect. First, despite diligent attempts on behalf of the various permittees since 1980, suitable accepting entities have not been found; in fact, both the San Luis Obispo County Housing Authority and the City of Pismo Beach have taken formal action declining to accept the OTD. Second, the 2.5 acre site was subsequently designated for Open Space – Natural Resource Protection (OS-1) in the LCP by the Commission in 1993 (LCP amendment 1-92). The OS-1 designation is intended for protection of natural resource and open space values, and is not intended for residential development past one single-family residence per legal lot. Third, in 2003, the City approved a coastal development permit for the construction of a single-family residence on the 2.5-acre lot. This approval also required that the remainder of the site be placed under a permanent open space easement, and included a \$22,826 fee (to the City's Affordable Housing In-Lieu Fee Account) to offset affordable housing issues and concerns. The single-family residence has been constructed, the open space easement recorded, and the fee collected. Thus, there is no additional residential development potential for the 2.5 acre site under the



NOTICE OF PROPOSED PERMIT AMENDMENT

CDP A-266-79 (Spangler)

Proposed Amendment A-266-79-A1

Page 2

LCP, and it is easement protected against any such development, including because of its location in the foreground of seaward views from Highway 101. Therefore, the elimination of the OTD requirement would be appropriate, it would "clean-up" the regulatory requirements applicable to the site in a manner reflective of the current regulatory and LCP planning realities applicable here, and the proposed amendment does not have the potential for adverse impacts on coastal resources.

Coastal Commission Review Procedure

The CDP will be amended as proposed if no written objections are received in the Central Coast District office within ten working days of the date of this notice. If such an objection is received, the objection and the Executive Director's response to it will be reported to the Commission on Friday June 13, 2008, in Santa Rosa. If three Commissioners object to the Executive Director's determination of immateriality at that time, then the application shall be processed as a material CDP amendment.

If you have any questions about the proposal or wish to register an objection, please contact Mike Watson in the Central Coast District office.



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**NOTICE OF PROPOSED PERMIT EXTENSION**

Date: May 30, 2008
To: All Interested Parties
From: Dan Carl, Central Coast District Manager *DCM*
Katie Morange, Coastal Planner *KM*
Subject: Proposed Extension to Coastal Development Permit (CDP) A-3-MCO-04-054
Applicant: Stephen Bradshaw

Original CDP Approval

CDP A-3-MCO-04-054 was approved by the Coastal Commission on April 12, 2006, and provided for subdivision of a 25-acre parcel into 10 lots ranging in size from 1 to 7.8 acres at 250 Maher Road (south of Tarpey Road) in the Royal Oaks area of North Monterey County.

Proposed CDP Extension

The expiration date of CDP A-3-MCO-04-054 would be extended by one year to April 12, 2009. The Commission's reference number for this proposed extension is A-3-MCO-04-054-E1.

Executive Director's Changed Circumstances Determination

Pursuant to Title 14, Section 13169 of the California Code of Regulations, the Executive Director of the California Coastal Commission has determined that there are no changed circumstances affecting the approved development's consistency with the certified Monterey County Local Coastal Program and/or Chapter 3 of the Coastal Act, as applicable.

Coastal Commission Review Procedure

The Executive Director's determination and any written objections to it will be reported to the Commission on Friday, June 13, 2008 in Santa Rosa. If three Commissioners object to the Executive Director's changed circumstances determination at that time, then the extension shall be denied and the development shall be set for a full hearing of the Commission.

If you have any questions about the proposal or wish to register an objection, please contact Katie Morange in the Central Coast District office.



A-3-MCO-04-054-E1

6-10-08

Attn: Katie Moranse

Please do not extend the permit
 to build, re applicant Stephen
 Bradshaw, 10 lots. We enjoy that
 our area is rural and traffic
 is still somewhat mild to moderate.
 I do not want North Monterey
 to end up like the bay area.
 The trees are beautiful and I
 don't want them replaced by large
 homes.

Thank you,

Nancy McNeil's
and Steve Maynard

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JUN 10 2008

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(831) 427-4863



June 12, 2008

To: Commissioners and Interested Parties

From: Charles Lester, Senior Deputy Director, Central Coast District

Re: Additional Information for Commission Meeting Friday, June 13, 2008

| <u>Agenda Item</u> | <u>Applicant</u> | <u>Description</u> | <u>Page</u> |
|----------------------|---|---|--------------|
| F9d, MCO-MAJ-2-07 | Monterey County (Doud) | Ex Parte Request for Postponement Staff Report Addendum | 1 2 2a |
| F10a, A-3-SLO-07-024 | SLO Land Corporation | Correspondence | 3 |
| F10c, A-3-CAP-08-021 | City of Capitola Redevelopment Agency & Rispin LLC | Correspondence | 5 |
| F10d, A-3-SLO-08-022 | Bonaire Investments & Sprint-Nextel | Correspondence | 39 |

F9d

EX PARTE COMMUNICATIONS

Name or description of project: **Gualala Festivals Committee, Gualala, Mendocino County, City of Malibu LCP Amendment No. 1-07 and Monterey County LCP Amendment No. MCO-MAJ-2-07 Part 2 (Doud rezoning, Big Sur)**

Date and time of receipt of communication: **June 9, 2008 @ 12:15 - 12:30 pm**

Location and type of communication: **phone**

Person(s) initiating communication: **Lennie Roberts, ORCA**

Detailed substantive description of content of communication:

Commission Cease and Desist Order No. CC C-08-CD-07 (Gualala Festivals Committee, Gualala, Mendocino County.)

Despite the knowledge that their activities cause harm to protected seabirds, the Gualala Festivals Committee is vowing to proceed with the 2008 fireworks. ORCA agrees with the Staff Recommendation to issue a Cease and Desist Order.

ORCA urges the Commission to approve CCC-08-CD-07. We further urge the Commission to request the Department of Fish and Game to assign game wardens to the Gualala fireworks display, should it proceed in defiance of the Cease and Desist Order.

City of Malibu LCP Amendment No. 1-07

The LCP amendment proposed by the City of Malibu and the suggested staff modifications fail to conform to LUP requirement 5.35, which proscribes subdivisions that result in parcel sizes smaller than the average size of neighboring parcels.

The proposed amendment would allow construction adjacent to high-quality sand dunes (an ESHA) without a sufficient buffer between the ESHA and development. LUP Policy 3.2.3 requires a minimum of 100 feet. The City has some discretion to decrease that buffer but they do not have the authority to make it zero feet or five feet.

ORCA does not support the Staff Recommendation or the LCP amendment as proposed. Rather we urge the Commission to reject the amendment as well as the modifications proposed by staff.

Monterey County LCP Amendment No. MCO-MAJ-2-07 Part 2 (Doud rezoning, Big Sur)

The requested OR zoning would allow higher intensity of development than WSC, specifically it allows for residential development as a principally permitted use. Such residential zoning and use would be inconsistent with the Coastal Act and LCP policies that require protection of scenic resources and public views along this spectacular section of coast.

The Staff Report also notes that the entire site has significant habitat resources, including several that constitute ESHAs under the Coastal and LCP.

ORCA supports the Staff Recommendation for Denial of this LCP Amendment.

6/9/2008
Date


Signature of Commissioner

F9d

Katie Morange

From: Holm, Carl P. x5103 [HolmCP@co.monterey.ca.us]
Sent: Thursday, June 05, 2008 3:33 PM
To: Katie Morange; Dan Carl
Cc: mdc@michaelcling.com; 100-District 5 (831) 647-7755
Subject: Doud Rezone

Hi Katie;

I received a message from Michael Cling representing John Doud (property owner) requesting to continue Coastal Commission item F9d of your June 13 agenda (MCO-2-07 Part 2). Monterey County has no objection to a continuance and hereby requests that the item be continued. Mr. Cling has requested consideration for continuing this matter to your September 2008 meeting in Eureka.

Thank you for your consideration,

Carl P. Holm, AICP

Assistant Director of Planning

Monterey County Resource Management Agency

Planning Department

168 W. Alisal, 2nd Floor

Salinas, CA 93901

tel 831.755-5103

fax 831.757-9516

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F9d**Staff Report Addendum**

Date: June 10, 2008
 To: Commissioners and Interested Parties
 From: Dan Carl, District Manager *DC*
 Katie Morange, Coastal Planner
 Subject: Addendum to staff report for agenda item 9d on Friday June 13, 2008 - Monterey County LCP Major Amendment Number 2-07 Part 2 (Doud Property Rezone)

It has come to staff's attention that Motion 1 of 2 on page 4 of the staff report dated prepared May 27, 2008 is incorrect. The purpose of this staff report addendum is to correct this error. Thus, the following section replaces the entirety of Section I.A. on page 4 of the staff report:

A. Denial of Land Use Plan Major Amendment Number 2-07 Part 2

LUP amendments may only be certified by an affirmative vote of a majority of the appointed Commissioners or alternates. In other words, at least seven "yes" votes out of the twelve appointed Commissioners/alternates are required to certify an LUP amendment, regardless of how many Commissioners/alternates are present at the time of the vote.

Staff recommends a NO vote on the motion below.

If the motion is rejected, the LUP portion of the amendment will be denied certification as submitted, and the Commission will adopt the following resolution and the findings in this staff report. If the motion is passed, the LUP portion of the amendment will be certified as submitted, and staff will prepare revised findings for the Commission to consider in support of that certification action.

Motion 1 of 2. I move that the Commission **certify** Part 2 of Major Amendment Number 2-07 to the Monterey County Local Coastal Program Land Use Plan as submitted by Monterey County.

Resolution to Deny. The Commission hereby **denies** certification of Part 2 of Major Amendment Number 2-07 to the Monterey County Local Coastal Program Land Use Plan as submitted by Monterey County and adopts the findings set forth in this staff report on the grounds that, as submitted, the Land Use Plan amendment will not meet the requirements of and be in conformance with the policies of Chapter 3 of the Coastal Act. Certification of the Land Use Plan amendment would not comply with the California Environmental Quality Act because there are feasible alternatives or mitigation measures which could substantially lessen any significant adverse effect which the Land Use Plan Amendment may have on the environment.

**California Coastal Commission**

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JUN 06 2008

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Wilbur W. Hartzell, Jr.

Mavis M. Hartzell

3520 Old Creek Road, Templeton, Ca. 93465

(805) 237-6032 Fax: (805) 237-6033

F 10a

June 2, 2008

California Coastal Commission
725 Front Street #300
Santa Cruz, Ca. 95060

Attn: Jonathan Bishop
Item: F10A
Permit: A3SLO-07-024

Dear Sir,

We own property on the corner of E. and Ash Street in Cayucos, Calif. We wish to address the following problems concerning the above appeal.

1. The project location is not E. Street and Little Cayucos Creek, it is between E. and D. Street on Birch Street.
2. The problem we have is that the applicant keeps trying to get access on an alley that runs between Birch Street and Ash Street. This problem is currently in a legal dispute and is not completed at this time.
3. This proposal is unrealistic so far as using the alley for this project without the legal dispute being settled due to the narrowness of the alley.
4. We therefore protest the appeal on this basis.
5. There is another hearing on this matter in September, 2008.

Sincerely,

Mavis M. Hartzell



Wilbur W. Hartzell



F10c



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420 CAPITOLA AVENUE
CAPITOLA, CALIFORNIA 95010
TELEPHONE (831) 475-7300
FAX (831) 479-8879

JUN 06 2008

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June 5, 2008

Patrick Kruer, Chair
California Coastal Commission
45 Fremont Street
Suite 2000
San Francisco, CA 94105

RE: JUNE 13, 2008 RISPIN MANSION HOTEL APPEAL, F10c – CITY OF CAPITOLA

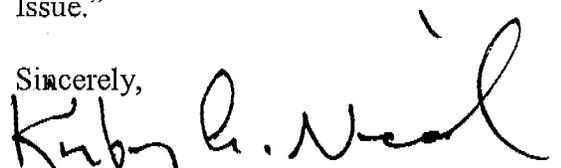
Dear Chair Kruer:

As Mayor of the City of Capitola I can unequivocally state that the City of Capitola strongly supports your staff's extremely well reasoned and well-documented recommendation of "No Substantial Issue."

The Rispin Mansion Hotel project has probably received more attention than any other project in the history of our City. It has received overwhelming community support, and was unanimously approved by the City Council. Also, It has received the support from many local, state and federal agencies such as the State Office of Historic Preservation, and the Department of the Interior. The Rispin Mansion is in a historic district, and if not restored, will continue to remain a vacant, and dilapidated "attractive nuisance," which it has been for almost a half of a century. Vandals have destroyed much of the interior, and have set fires that almost got out of control, resulting in responses by police, and fire personnel, which has been very costly.

The City of Capitola Redevelopment Agency will continue to own the property, and will lease it to the Rispin LLC who will restore the Mansion, construct the hotel, and operate it. The City of Capitola has spent many years putting this project together, and we are looking forward to issuing a building permit so that our community can recoup it's investment, and enjoy the amenities that will be provided to the public, such as a public park/access, and an enhanced butterfly habitat and other enhanced biotic resources.

The City of Capitola has had a great relationship with the Coastal Commission for many years, and thanks you and all of the members of the Commission for your dedication, and all of your hard work, and we look forward to your vote of the staff's recommendation of "No Substantial Issue."

Sincerely,

Kirby A. Nicol, Mayor

Cc: California Coastal Commission
City Council
Rich Hill, City Manager
Charles Lester, Director, California Coastal Commission Central District
Juliana Rebagliati, AICP, Community Development Director
Jesse L. Nickell III, The Rispin LLC
John Barisone, City Attorney
Alexander T. Hanson, Attorney for The Rispin LLC
Ricardo de la Cruz, The Rispin LLC
Anthony J. "Bud" Carney, AICP

F10c

Jonathan Wittwer
William P. Parkin

WITTWER & PARKIN, LLP

147 SOUTH RIVER STREET, SUITE 221
SANTA CRUZ, CALIFORNIA 95060
TELEPHONE: (831) 429-4065
FACSIMILE: (831) 429-4067
E-MAIL: office@wittwerparkin.com

PARALEGAL
Miriam Celia Gordon

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June 6, 2008

JUN 06 2008

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HAND DELIVERED

California Coastal Commission
c/o Central Coast District Office
725 Front Street, Suite 300
Santa Cruz, CA 95060

RE: Substantial Issue Determination; Appeal Number A-3-CAP-08-021

Dear Members of the Commission:

This office represents Save the Habitat, the appellant in the above referenced appeal. This letter is made in response to the Coastal Commission Staff Report's recommendation to find no substantial issue with the modifications to the Rispin Mansion Hotel ("Project"), and amendments to the conditions of approval of Coastal Development Permit ("CDP") No. 05-005, approved by the Capitola City Council on April 9, 2008.

We believe that the City of Capitola's biologist has failed to properly delineate the edge of riparian vegetation. Thus, the appeal zone has been defined too narrowly since it is based on the delineation done by the City's biologist.

Riparian Vegetation Not Properly Defined by the City

The City of Capitola's biologist defined the edge of riparian vegetation as the 20-foot contour, below which there is little vegetation because it is essentially the floodway for Soquel Creek. Exhibit D. Because of the steep walls of Soquel Creek at this location, defining the edge of riparian vegetation in this fashion excludes critical vegetation from the delineation. This was done intentionally to avoid any scrutiny of development along Soquel Creek at this location.

The City's General Plan provides that the Soquel Creek riparian corridor "include[s] the woodland along the west side of Soquel Creek from the Stockton Avenue Bridge to the Highway One overpass." Capitola General Plan, p. 43 (Exhibit A). The Harvey and Stanley Maps prepared for the City and included in the original Soquel Lagoon Management Plan approved by the Commission consider the Coast Live Oak Riparian Forest and other woodland to be riparian

and in the riparian corridor. Clearly the woodland above the 20-foot contour is part of the riparian corridor. For instance, a 1995 Final EIR for the Rispin Mansion concluded that far more of the area was considered riparian habitat. Exhibit B. And, Commission Staff previously asserted that the City's delineation was indeed too narrow. Exhibit C.

Accordingly, the Staff Report's determination that there is no substantial issue is based on inaccurate information from the City of Capitola and an erroneous standard. Accordingly, the appellant asks the Commission to further review the riparian delineation and revisit the substantial issue determination based on an appropriate delineation.

Impacts to ESHA

If the appeal boundaries were properly delineated, the Commission would review impacts to Environmentally Sensitive Habitat Areas ("ESHA"). Pursuant to the Project modifications and changes to the conditions of approval, impacts to ESHA will occur.

Changes to Condition 59 would allow both guests and valet vehicles to drive onsite. Condition 59 was based on mitigation measures contained in the EIR for the Project. Page 4.4-35 of the EIR for the Project explicitly disallows all vehicles except zero emission vehicles (ZEVs) from accessing the site when the Rispin Mansion is operating under Mode B (operation mode based on butterfly migration patterns). Further, page 4.4-39 limits access to the site by ZEVs between October 1 and February 28th. Exhibit D. Eliminating the prohibition of guests and others driving onsite in Condition 59 changes these mitigation measures and will impact the environmentally sensitive habitat area for monarch butterfly habitat which is protected under Public Resources Code Section 30240.

Page 9 of the City's March 27, 2008 Staff Report states, "The Monarch Habitat will be preserved in compliance with the certified EIR and adopted mitigation measures." See CCC Exhibit 7. However, the changes to Condition 59, widening of the driveway, and other improvements are contained in the EIR. In addition, the proposal to remove four acacia trees near the driveway is contrary to the EIR because the EIR uses the acacia trees as a measurement of the **core** monarch overwintering habitat, and identifies that the trees in the driveway area are **critical** to the protection of butterfly overwintering habitat. See EIR page 4.4-32, 34. Exhibit D. Further, the driveway widening will encroach on the butterfly habitat.

Condition 17 is modified to develop driveway improvements that "[a]ccommodates all infrastructure and circulation requirements." Again, this suggests that guests will now be able to drive onsite. Further, page 4.4-38 of the EIR for the Project called for limiting the road bed fill

to a maximum of four inches. Exhibit D. The hand grading and road bed fill limits were also established in the EIR to protect monarch butterfly habitat. In addition, the change to driveway surface and construction will impact the root health of trees in the riparian habitat and monarch butterfly habitat areas. The changes in Condition 17, that eliminate this mitigation measure, amounts to a substantial issue and will by their very nature result in significant disruption of ESHA.

The City also eliminated Condition 12 because City Staff and the applicant believe the condition to be inconsistent with Conditions 13 and 59. We disagree. Condition 12 addresses the prohibition to guests accessing the Rispin site with their own vehicles. Condition 13 addresses the Mode A/B determinations and whether deliveries of guests and other items may be made via ZEVs or other vehicles to the site during October 1 through February 28. Condition 59 also compliments Condition 13; the two must be read together. The proposed deletion of Condition 12 makes no sense because it is consistent with Conditions 13 and 59. In addition, the proposed change to Condition 59 which would delete the prohibition of guests parking onsite was never contemplated and would in fact be inconsistent with the ZEV requirement and offsite parking strategy that is discussed at great length in the EIR traffic study.

Conservation Easements as Recorded is Not Inconsistent with Approved Development

Footnote 4 of the Commission's Staff Report states that the easement language prohibits "certain aspects of the approved development in the conservation easement area that were clearly a part of the original CDP approval." This assertion is based on misinformation from the City. The conservation easement as recorded does not prohibit any of the development under the original CDP, only development under the amended modifications. Accordingly, the Commission Staff has been given inaccurate information concerning the conservation easement. While the Commission is not an arbiter of the terms of the conservation easement, the appellant wishes to correct the record in this regard.

Thank you for your consideration.

Very truly yours,
WITTWER & PARKIN, LLP



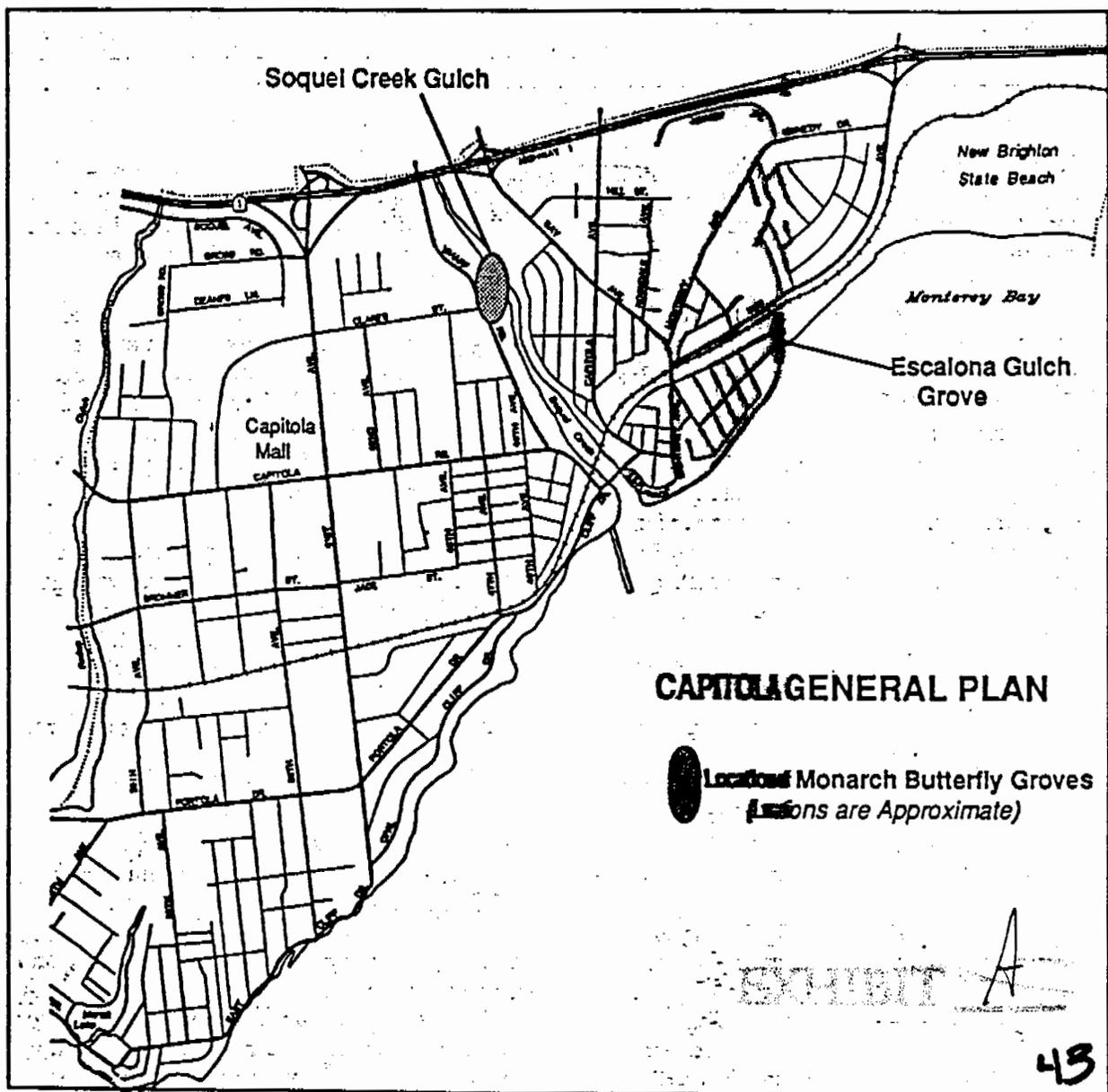
William P. Parkin

water flows and a decline in water quality. Of particular concern has been the increased amounts of algae on the creek and the difficulty of addressing the algae problem without adversely affecting the fish and wildlife. The City continues to work with the California Department of Fish and Game in addressing this problem.

Riparian corridors in the City include the woodland along the west side of Soquel Creek from the Stockton Avenue Bridge to the Highway One overpass (Soquel Creek Riparian corridor), the Noble Gulch Riparian corridor and the Tannery Gulch Riparian corridor. Woodland in these areas include Black Cottonwood trees, California Sycamores, Coast Live Oaks, Eucalyptus, Monterey Pine, Acacia and Willow trees. These corridors provide important natural resources, visual relief and support for numerous wildlife and native vegetation.

Monarch Butterfly habitats are located along Soquel Creek and in the Escalona Gulch area. These areas provide a winter habitat for the migrating Monarch butterfly. Each fall, the Monarchs arrive to spend the winter months sheltered on the branches of the eucalyptus groves of Soquel Creek and Escalona Gulch. The birds have selected these two sites because of their special environmental characteristics. The large trees of these two groves provide excellent protection from winds and freezing temperatures. The orientation of the groves to wind and sun, the size and density of the trees, and the quiet, undisturbed setting are among the factors that make these sites among the few in the County suitable for the butterflies.

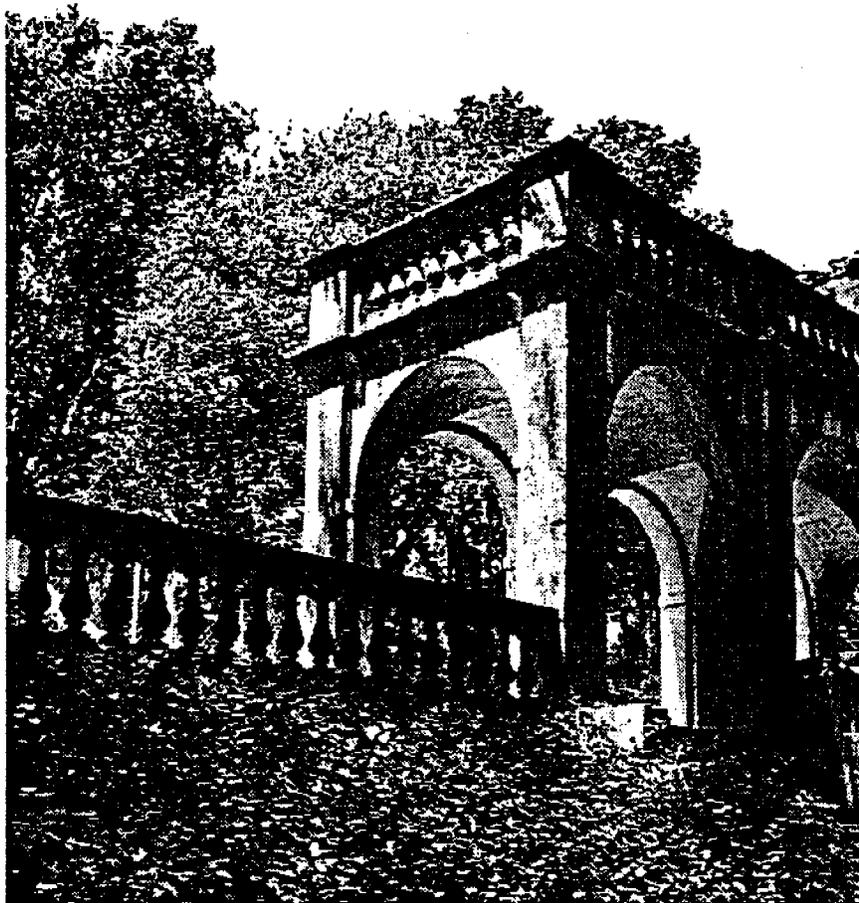
The map illustrates the location of the City's monarch butterfly groves.



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RISPIN PROJECT

Draft Supplemental Environmental Impact Report



Lead Agency:

City of Capitola
Planning Department
Capitola, California

Prepared by:

Jones & Stokes
ASSOCIATES
Sacramento, California

SCH No. 95-033068

April 1995

EXHIBIT

B

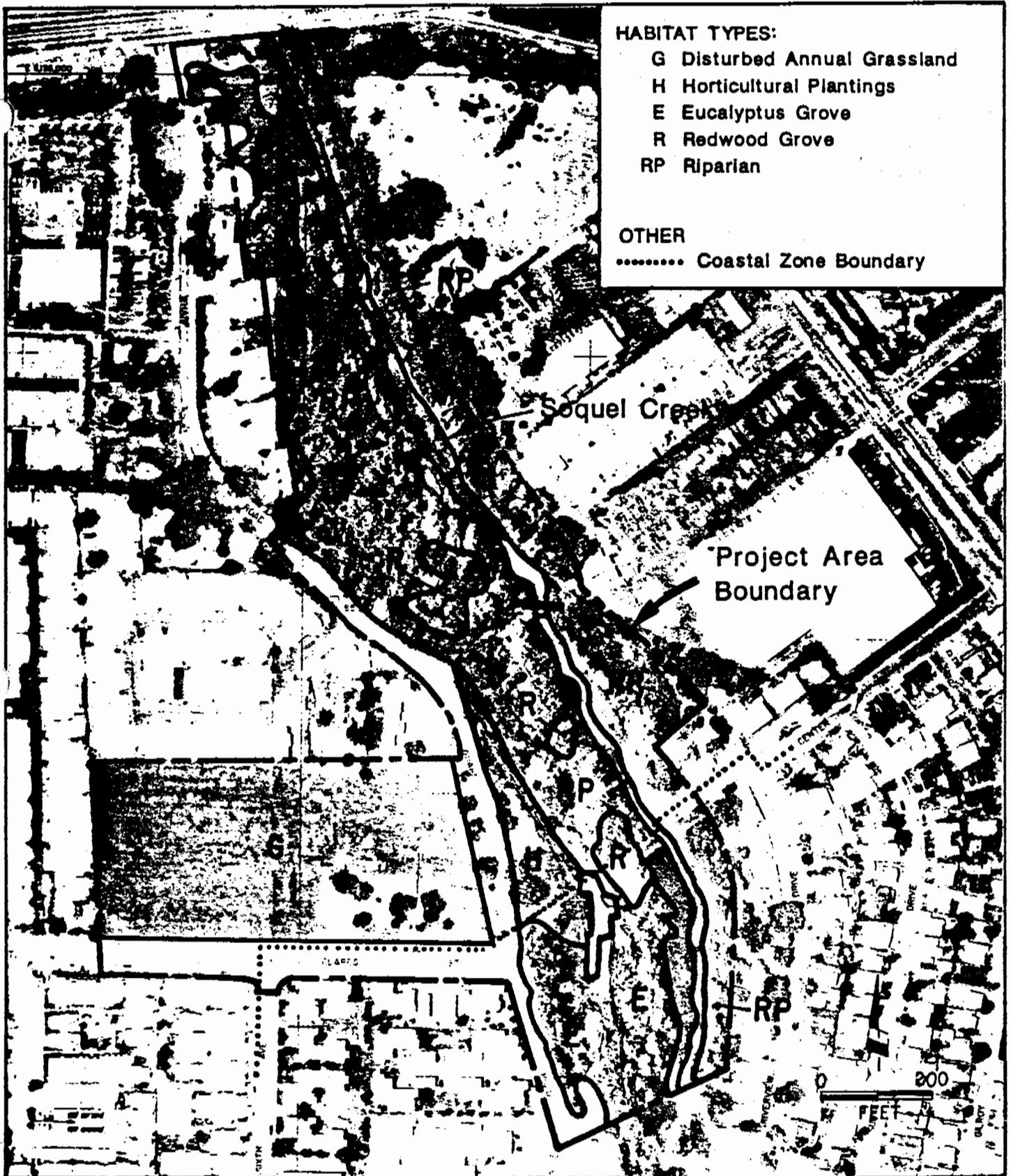


Figure 9-1. Vegetation Map of the Project Area

April 1991 Dist. ER, James Stokes

CALIFORNIA COASTAL COMMISSION

CENTRAL COAST DISTRICT OFFICE
725 FRONT STREET, SUITE 300
SANTA CRUZ, CA 95060
PHONE: (831) 427-4863
FAX: (831) 427-4877



February 22, 2001

City of Capitola Planning Director
420 Capitola Avenue
Capitola, CA 95010

Subject: *Comments on Recirculated Draft EIR for Rispin Mansion (SCH# 1997121056)*

Dear Planning Director:

Thank you for forwarding the above-referenced CEQA document to our office for review and comment. Unfortunately, due to competing staff demands, we were unable to submit comments on the Recirculated Draft EIR (RDEIR) within the State Clearinghouse review period. We hope, nonetheless, that the following comments will still prove useful to the City in addressing coastal resource issues and that this letter, along with appropriate responses to issues raised, can and will still be included in the City's final CEQA document for this project. In any event, please accept these both as comments on the above-referenced CEQA document as well as comments on the project itself that will need to be addressed in any application to the Coastal Commission. After review of the RDEIR, we have some concerns about the proposed development as it relates to applicable City of Capitola Local Coastal Program (LCP) and California Coastal Act policies as follows:

Coastal permit jurisdiction

The coastal zone portion of the site consists of roughly the southern half of the Rispin Mansion parcel on the east side of Wharf Road. Those portions of the project west of Wharf Road (i.e., the mini-park and shared parking lot) and those portions of the project on the northern half of the Rispin Mansion parcel are located outside of the coastal zone. Nonetheless, because proposed development in these non-coastal zone areas directly affect coastal zone resources, particularly with regard to proposed development on the northern portion of the mansion site, these comments, to the extent applicable, should be considered as reflecting on the non-coastal zone areas as well.

As stated in the RDEIR, the coastal zone portion of the Rispin Mansion site is located within an area in which the Coastal Commission retains coastal permitting jurisdiction. As a result, the Applicant will need to apply to the Commission for a coastal development permit for the proposed project. Although the City's certified LCP can and will provide non-binding guidance to the Commission, the standard of review for any such application will be the Coastal Act.

Riparian corridor

The RDEIR uses the flood plain of Soquel Creek as the indicator for the edge of the riparian corridor. We do not believe that this delineation is sufficiently inclusive of the riparian species and vegetation that mark the western bank of Soquel Creek below the Rispin Mansion parcel.

EXHIBIT C 13

We suggest that this edge of riparian vegetation demarcation be adjusted up the slope accordingly. In fact, it is not clear to us that the riparian corridor has changed appreciably since the 1995 FEIR for this site: please explain why the current outer edge of riparian vegetation has been adjusted so dramatically from the much more inclusive 1995 Jones and Stokes assessment for this property. In any event, the RDEIR site plans are not sufficiently clear to be able to understand the relationship of proposed structural development to its effect on the adjacent Soquel Creek riparian corridor. Please clearly identify the edge of the riparian corridor on a site plan that includes the proposed structures as well as site topography, a vegetation map (including individual trees), and a clear graphic scale; all assumptions and methodologies underlying the edge of the riparian corridor must be provided. We concur with the RDEIR that for Coastal Act and LCP consistency, all areas within the riparian corridor must be avoided by non-resource dependent development.

In addition to avoidance of the riparian vegetation, the Coastal Act dictates that indirect impacts on the riparian corridor (i.e., from increased noise, lights, activities, etc), must be prevented and/or minimized to the extent feasible to avoid degradation of such habitat. The RDEIR discusses such indirect impacts generally. We recommend that this general discussion be supplemented for the purposes of evaluating the proposed project for Coastal Act consistency. Specifically, please provide an analysis of how the expected additional noise, light, and activity would impact specific biotic receptors within the riparian corridor. This will require a clear identification of where the noise, lights, and activities are expected to be located. Such analysis should clearly identify impact sources (e.g., a light standard visible from within the riparian corridor), the intensity of each impact source (e.g., the amount of illumination of the light standard), and the expected effect of the impact source on biotic receptors (e.g., decreased foraging activity due to nighttime illumination) and/or the cumulative effect of several impact sources combined (e.g., nighttime lighting along with amplified music at a gathering of 50 wedding guests). As before, all assumptions and methodologies underlying the analysis must be provided.

The primary means identified in the LCP for avoiding indirect impacts is to buffer riparian resources. The LCP guidance in this regard requires a 35 foot minimum setback for development from the outer edge of riparian vegetation. The LCP also states that any such buffers shall be maximized. In other words, the 35 foot setback is not an entitlement, but rather a minimum distance that may need adjustment to a greater setback distance in light of the specific resources present. Please note that the Coastal Act does not contain a specific minimum setback distance requirement for riparian corridors. Rather, site specific buffering standards vary depending on the characteristics and value of the resource being buffered, as well as the topography and other qualities of the site itself. In the past, the Commission has generally used a 100 foot setback as a rebuttable presumption. In this case, absent compelling resource data to the contrary, we cannot support a riparian setback of less than 35 feet. Moreover, a greater setback may be warranted at this location. Once we have seen the further analysis and information identified above in the FEIR, we will have additional recommendations for you on appropriate setbacks for maintaining Coastal Act consistency.

In any case, as directed by the LCP, we would suggest that the project include removal of non-natives and revegetation with native riparian species within the riparian corridor as a CEQA mitigation and a condition of approval.

Monarch butterfly habitat

As we have previously commented, the overwintering Monarch butterfly habitat area at this location is a particularly important resource that should be considered environmentally sensitive habitat area (ESHA) within the meaning of the Coastal Act. As such, we concur with the RDEIR that the overwintering habitat area on this site should be considered ESHA that must be completely avoided pursuant to Coastal Act Section 30240.

Although the RDEIR includes good description of Monarch butterfly habitat issues in general, it is lacking a clear map of the habitat area itself for this site. The only map provided in the RDEIR is Figure 4-4 that maps an area of the site used by butterflies during winter 1997. This map is an insufficient indicator for evaluating consistency of the project with the environmentally sensitive habitat policies of the Coastal Act. Likewise, please note that our copy of the RDEIR was missing the Monarch Butterfly analysis ostensibly within Appendix C. Although the RDEIR appears to have summarized relevant portions of the missing Appendix C report, the omission of the actual report makes it difficult to fully understand the breadth of the Monarch butterfly issues at this location. Please clearly identify the Monarch butterfly ESHA on a site plan that includes the proposed structures as well as a vegetation map (including individual trees) and a clear graphic scale; all assumptions and methodologies underlying the Monarch butterfly ESHA delineation must be provided.

Lacking an adequate habitat map and lacking the Appendix C report, the RDEIR text must be consulted to understand the Monarch butterfly ESHA context for the site. From the text of the RDEIR, it is clear that the entire area of the site south of the mansion is considered overwintering habitat and thus ESHA (RDEIR P. 4.4-17); this is consistent with the earlier studies by Jones and Stokes that show much of the southern portion of the site as 'critical monarch habitat' (in the 1995 FEIR for this site). We are confused, then, that the RDEIR considers the project consistent with Section 30240 when substantial development is proposed in this area. Section 30240 allows for extremely limited development within ESHA, and only when the use itself is dependent on the resource. Otherwise, ESHA is to be avoided. The units proposed south of the mansion do not meet these Section 30240 tests. Likewise, the driveway and parking areas do not meet these tests. Please explore options for accessing the building from the northern end of the site (where the existing access driveway enters from Wharf Road) as opposed to expanding and increasing use of the former driveway area that extends through the butterfly habitat. The RDEIR also includes a map of an "Acceptable Building Envelope" (RDEIR Figure 4-5) in the south end of the site ostensibly within the Monarch ESHA. Not only is the genesis of this figure unclear, the veracity of the building envelope identified in light of ESHA policies is suspect. We cannot recommend approval of non-resource dependent development within ESHA.

Indirect impacts on the Monarch habitat (i.e., from increased noise, lights, activities, smoke, etc), must be prevented and/or minimized to the extent feasible to avoid degradation of such habitat.

The RDEIR includes a good general discussion of such impacts specific to certain activities and smoke, but it needs additional analysis of the potential for degradation of the habitat due to lights and noise. Please provide an analysis of how the expected additional noise and light would affect Monarch butterflies. As with the riparian corridor as detailed above, such analysis should clearly identify impact sources, the intensity of each impact source, and the expected individual and/or cumulative effect of the impact source on the butterfly habitat. All assumptions and methodologies underlying the analysis must be provided.

Water quality

We are generally supportive of the best management practices suggested for maintaining runoff water quality during construction. Such controls are particularly critical given the site location atop Soquel Creek and the sheet flow characteristic of the runoff currently. However, please note that Commission staff are wary of relying upon standard silt and grease traps to adequately protect receiving waterbodies from urban runoff pollutants. The efficacy of such units is suspect in the Commission's experience. In tandem with the post construction mitigations recommended in the RDEIR (i.e., sweeping/vacuuming impervious surfaces, maintenance programs, etc.), we suggest that catch basins that receive runoff from any areas subject to vehicular runoff be capable of both active filtration and active treatment of runoff. Silt and grease traps that act as sediment holding basins are not sufficient in this regard. In any case, the RDEIR does not include a clear description of the proposed runoff containment and filtration system. Please identify this system (and all of its components) on a site plan that includes the proposed structures as well as site topography and any other features of the site pertinent to runoff control.

Maintaining the public's interest

Provided that ESHA can be avoided, adequately buffered, and that the development can be designed in such a way to be sensitive to the resources present at this location above Soquel Creek, please note that we are supportive of efforts to restore Rispin Mansion to provide both enhanced visitor-serving capabilities as well as improved public access to the restored grounds. This is particularly the case given that this is a public property. On this note, we are concerned that it is unclear how the public's interests at this site will be maintained in the expected event of a lease and/or sale of the property as necessary to allow the proposed project to move forward. We are especially concerned in this regard about the ongoing use and enjoyment of the public trail and bridge across the northern portion of the site. No matter the ownership and/or lease agreements eventually established here, appropriate legal instruments need to be put in place to protect on site public access and resources should the proposed project come to fruition.

We recommend that the following property restrictions are codified in favor of the City: 1) all habitat areas should be placed under conservation easement (or equivalent legal instrument); 2) the parameters for public access to and through the grounds should be clearly identified in a public access management plan that is recorded as a deed restriction (please note that we have general guidelines on the contents of such management plans); 3) the facade/design elements of the restored building and related structures should be placed under an easement (or equivalent legal instrument) to protect against untoward modifications when under private control.

In closing, it appears that the proposed project is overly ambitious in light of the significant Monarch butterfly and riparian habitats present at this location. Although we are supportive of efforts to enhance visitor-serving capabilities here, such development must be tempered against the habitat realities at this site. We cannot support non-resource dependent development within ESHA. Please note that this is the same message that Commission staff delivered in our January 4, 1999 comments on the previous DEIR as well as our March 1999 visit to the site with the City's CEQA consultant and the City's identified Rispin developer. Please explore all options available to restructure the project to avoid the ESHA area on the southern portion of the site and to ensure adequate riparian corridor setbacks. This may mean considering a smaller visitor-serving project with site access from the northern portion of the site, where the southern portion of the site is developed with interpretive facilities only (e.g., butterfly observation walkways and grounds). From our current understanding of the project, such modifications will be necessary to ensure Coastal Act consistency. As a public property and project, such modifications are also more consistent with maintaining the public's interest in the habitat and facilities at the Rispin Mansion site.

In any case, we note that the RDEIR figures are unclear with regards these primary issues. Please ensure that the FEIR includes a much clearer set of site plans that identify all existing and proposed structures in relation to site vegetation and topography, that provide clear delineations of both the riparian corridor and the Monarch butterfly habitat, and that clearly show the coastal zone boundary. If these elements are shown on different figures, please make sure that they are at the same scale to allow overlaying of figures; all figures should include a graphic scale.

Thank you for the opportunity to comment in the development stage of this project. As you move forward with your project analysis and environmental review, the issues identified above, as well as any other relevant coastal issues identified upon further review or due to project modifications, should be considered in light of the provisions of the certified City of Capitola LCP and the Coastal Act. In any event, we may have more comments for you on this project after we have seen additional project information, revisions, and/or the FEIR. We should also meet at some time to discuss how the City can complete its LCP for this area of deferred certification, either through this project or otherwise. If you have any questions, please do not hesitate to call me at (831) 427-4893.

Sincerely,



Dan Carl
Coastal Planner

cc: Dan Chance, City of Capitola Planning Department
Katie Shulte Joung, State Clearinghouse (SCH# 1997121056)
Alison Imamura, Denise Duffy and Associates

**REVISED DRAFT
ENVIRONMENTAL IMPACT REPORT
for the
Rispin Mansion Project**

SCH# 97121056

June 2003

Prepared for:
City of Capitola
420 Capitola Avenue
Capitola, CA 95010



Denise Duffy & Associates, Inc.

PLANNING AND ENVIRONMENTAL CONSULTING

[Handwritten signature]

This area is characterized by a moderately dense tree canopy primarily consisting of the native riparian species red alder (*Alnus rubra*), box elder (*Acer negundo* var. *californicum*), California sycamore, shining willow (*Salix lucida* var. *lasianдра*) and the non-native species blue gum, silver wattle, and pittosporum. The understory is largely dominated by a dense cover of California blackberry, periwinkle, English ivy, and scattered poison-oak. Bracken fern (*Pteridium aquilinum*) is moderately abundant, and a considerable amount of the native, moisture-intensive fern ally giant horsetail (*Equisetum telmateia* ssp. *braunii*) is also found there. A few black cottonwoods (*Populus trichocarpa*) occur at the stream edge below the blue gum grove, representing a narrow segment of central coast cottonwood-sycamore habitat that is well developed on the east side of Soquel Creek opposite the Mansion. No stands of cottonwood-willow riparian forest are present along the stream corridor on the Rispin site.

The concrete driveway leading into the northern end of the Mansion from Wharf Road is bordered by a dense pruned hedge of planted tarata (*Pittosporum eugenioides*). Coast live oak occurs in scattered numbers along the fence bordering Wharf Road and on the west side of the Mansion. Also occurring in this area are California coffeeberry (*Rhamnus californicus*), cotoneaster (*cotoneaster pannosa*), blue elderberry (*Sambucus mexicana*), and ruderal grasses and herbs.

A list of trees on the Rispin Mansion project site was provided by the applicant and can be found in **Appendix C** (tree report). The south end of the site is forested with acacia and eucalyptus trees. The mature eucalyptus grove in this area has been identified as a monarch butterfly overwintering habitat. Some individual mature acacia trees between the driveway on the site, Wharf Road, and the garden and Mansion screen the habitat from the street and provide a wind block, a crucial aspect of preserving habitat for the butterflies. The monarch butterfly habitat is further described in **Appendix C** (Elizabeth Bell and Dick Arnold reports).

Riparian Delineation

Portions of the Rispin Mansion parcel have been classified as riparian vegetation by Ecosystems West, and as required in the City's Zoning Ordinance, Chapter 17.95.030.B, "A minimum thirty-five foot setback from the outer edge of riparian vegetation shall be required for all new development." Based on the analysis by Ecosystems West (see **Appendix C**), it is maintained that the FEMA Floodplain and Floodway Boundary depicted on the site plan map (1997) approximates the upper edge of riparian vegetation on the Rispin Mansion parcel. The rationale for this riparian boundary is that species observed below this boundary line are riparian-dependent species including red alder, shining willow, California sycamore and California box elder. All of these species were rooted below the 20-foot contour. Species above the 20-foot contour line are not riparian dependent (additional discussion follows). Based on the location of these species, Ecosystems West conservatively delineated the edge of the riparian vegetation at approximately the 20-foot contour on project plans included within the envelope at the end of this document.¹

The slopes above the 20-foot contour line are steep and hardened material comprised of siltstone and sandstone. Marine terrace deposits underlie the majority of the property,

¹ On a related note, Haro, Kasunich and Associates assessed whether mass grading was historically done at the Rispin site, which would have caused the riparian zone boundaries to be altered. Their conclusion is that no such grading has taken place (see letter dated May 2, 2003 in **Appendix G**).

with the exception of the edge of the creek, and are estimated to be up to 40 feet thick (DD&A 1998). The habitats above the flood plain boundary support species and structure typical of canyon slopes above large stream courses. The habitat above the floodplain transitions from a narrow riparian dependent plant community to a mixed canyon woodland community, primarily consisting of bay, buckeye, and coast redwood. This mixed woodland transitions into coast live oak woodland and ultimately remnant coast live oak savanna habitat on the old coastal marine terraces, typical of the live oak area.

Coast live oak riparian habitat is typically a narrow, homogenous structured community comprised of a dense band of coast live oak along intermittent stream corridors. Tree density and corridor width are a reflection of stream ground water availability and the shallow nature of the slope and banks. Coast live oaks above the 20-foot contour line on the Rispin site are not directly supported by stream flow or stream ground water associated with Soquel Creek, and are therefore not within the riparian dependent habitat.

As presently proposed, the development would be outside the City of Capitola's 35-foot setback from the outer edge of riparian vegetation. Although no direct impacts to riparian vegetation are proposed (except removal of non-native/invasive species and replacement with appropriate native riparian vegetation as mitigation for drainage improvements), there is potential for indirect impacts from erosion or slope slippage from development on the steep slopes above the creek. This possibility is further discussed in the steelhead analysis below, and can be mitigated to a less-than-significant level (also see the **Geology and Soils** and **Hydrology and Water Quality** sections). All Ordinance conditions will be followed, including landscaping compatibility, erosion control, and development setbacks. Retention of the existing mature tree vegetation will continue to provide buffered protection of the riparian vegetation along Soquel Creek near the Rispin Mansion parcel. Mitigation presented within this EIR will result in habitat enhancement along Soquel Creek, and habitat enhancement for special-status species known to occur within or adjacent to the project site.

Potential Wildlife and Environmentally Sensitive Habitat Areas

This section describes the potential wildlife and environmentally sensitive habitat areas that support wildlife in the vicinity of the project site.

Riparian Habitat

"Riparian habitat" has been defined by the Federal Geographic Data Committee as:

"Riparian areas are plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent lotic and lentic water bodies (rivers, streams, lakes, or drainage way). Riparian areas have one or both of the following characteristics: 1) distinctively different vegetative species that adjacent areas, and 2) species similar to adjacent areas but exhibiting more vigorous or robust growth forms. Riparian areas are usually transitional between wetland and upland."

The riparian habitat along Soquel Creek provides a high-quality foraging, breeding and roosting habitat for many wildlife species. The open water in the main area of Soquel

are fully fledged as determined by a qualified biologist in coordination with the California Department of Fish and Game) to prevent nest harassment and brood mortality. Every effort shall be made to avoid removal of, or impact to, known raptor nests within project boundaries. If trees known to support raptor nests cannot be avoided, limbing or removal of these trees may only occur during the non-breeding season.

Impacts on Roosting Bats

Roosting bats are adversely impacted if any action has the potential to increase physiological stress, increase brood mortality, and/or cause maternity roost abandonment. This can occur due to reduced habitat suitability or quality (physical or biological changes in the area), increased frequency of disturbance (i.e., noise, dust, vibration, etc.), increased accidental death (direct mortality), or a shift in microclimate. In the broadest sense, the available roosting habitat at Rispin includes all suitable trees in the southern region of the project site, the adjacent areas surrounding the eucalyptus grove and acacia trees, the eastern side of Soquel Creek, and the abandoned Rispin Mansion itself.

Impact: Suitable habitat for pallid bats, Townsend's big-eared bats, and small-footed myotis occurs within the project area, especially within the abandoned Rispin Mansion itself. Pre-construction surveys for these species are required. *This is a potentially significant impact that can be reduced to a less-than-significant level with implementation of the following mitigation.*

Mitigation

R-11 Pre-construction surveys for roosting bats must be performed 30 days prior to construction by a qualified biologist to be retained by the applicant. If roosts are found, a Memorandum of Understanding (MOU) with the CDFG shall be obtained by the contractor in order to remove bat species, or the construction schedule shall be modified to initiate construction after August 1, when young are assumed to have fledged. Alternative habitat will need to be provided if bats are to be excluded from maternity roosts. If this is the case, a species-specific roost with comparable spatial and thermal characteristics shall be constructed and provided. CDFG and species-specific bat experts shall be consulted regarding specific designs if roost removal becomes necessary.

Impacts on Monarch Butterfly Habitat

This impact assessment is based on the 1998 DEIR, the revised monarch butterfly evaluation in the 2000 RDEIR (wherein the April 1999 plans were evaluated for their impacts [Elizabeth Bell, Ph.D., April 17, 2000]), and a third party review and supplemental report prepared by Dick Arnold, Ph.D. (April 17, 2003). This evaluation is included in **Appendix C** (butterfly reports). In addition, this evaluation includes a general delineation of the butterfly habitat boundaries to determine the projects' consistency with the California Coastal Act and the City of Capitola Environmentally Sensitive Habitat Ordinance by Elizabeth Bell (2000) and by Dick Arnold (2003).

The City of Capitola has established an "Environmentally Sensitive Habitat District," which includes all of the Rispin property. It was the City's intent when it established the

district to further define habitat areas within the district that needed to be protected from future development at the time there is a development application. In the coastal zone, these subsequent delineations would constitute Environmentally Sensitive Habitat Areas "ESHA's" as that term is defined at Section 30107.5 of the Coastal Act. The City of Capitola memorialized the process for achieving this goal when the City adopted Section 17.95 Environmentally Sensitive Habitats of the Zoning Ordinance, which is included in the City's Local Coastal Plan. Chapter 17.95.010 describes the process for approving projects within the City's Environmentally Sensitive Habitat District. More specifically, Chapter 17.95.010[E] states, "In order to provide technical expertise concerning specific habitat protection issues, the city shall require the services of a biologist, botanist, forester, or other qualified professional to assist in determining such questions as the precise location or boundary of a designated natural area, or the effect of the proposed development project on the immediate and long-term health and viability of the natural area."

Overwintering habitat for the monarch butterfly, located on the southern portion of the property, within the Coastal Zone boundary, likely will be interpreted as an environmentally sensitive habitat area (ESHA) by the Coastal Commission based on ESHA definitions provided within the California Coastal Act and the expert opinion of Dr. Arnold. At any particular overwintering site, the roost area includes the roost trees, surrounding windbreak trees, protective topography and even buildings. At the Mansion site, this includes the roost trees, surrounding windbreak trees, the Mansion itself, and the off-site, residential building immediately south of the southern property boundary. Thus, proposed new development of the South End Building and other elements of the project plans within the coastal zone would occur within the ESHA of overwintering monarch habitat, *constituting a significant and unavoidable impact* (assuming that the Coastal Commission concurs with the ESHA interpretation presented within this EIR). Section 30240 of the Coastal Act always prohibits development within an ESHA, except when the use is dependent on the resource. While portions of the project may not be considered a resource-dependent use (i.e. educational facility), it will result in various protective measures and improvements in site conditions to permanently benefit the monarch and its overwintering habitat at the Mansion property (Dick Arnold, Ph.D.). As a result of project review by Dick Arnold (Ph.D.), several aspects of the originally proposed project have been revised.

Dr. Arnold characterized all of the Rispin site as monarch butterfly overwintering habitat. As stated above, it is apparent that all portions of the Rispin site within the coastal zone may represent ESHA. However, prior to Dr. Arnold's analysis, all of the site had been included within the City's Environmentally Sensitive Habitat District, and Chapter 17.95 requires the service of a professional to assist the City in defining the precise location or boundary of a designated natural area, and the effect of the proposed development project on the immediate and long-term health and viability of the natural area. Dr. Arnold verified that the overwintering habitat for the monarch butterfly extends across the entire project site, but he concurs that the roosting area is located only on that portion of the site within the Coastal Zone. Based on his interpretation of overwintering habitat and our review of the ESHA statute and case law, it is apparent that the proposed South End Building would be located within the ESHA delineation (ultimately to be defined by the Coastal Commission). However, and more importantly, Dr. Arnold conclusively states, "The proposed renovation of the Rispin Mansion and development for the South End Units provides a mechanism to not only protect the monarch's overwintering habitat, but to also continuously monitor it and manage it in a manner to

benefit the redevelopment project through numerous revisions to the original site plan. The mitigations identified in this report should minimize anticipated impacts of the project on the monarch and improve the quality of overwintering habitat for the monarch at the Rispin Mansion site."

The Coastal Commissions interpretation of the Coastal Act does not sanction non-resource dependent development within ESHA in exchange for mitigation. Therefore, all subsequent mitigation contained within this document may not mitigate impacts to ESHA to a less-than-significant level. However, in as much as the project has been substantially revised to include habitat restoration and improvement, and adaptive management strategies for aquatic resources, riparian habitat, and special-status wildlife species, all subsequent mitigation measures shall be implemented to avoid significant ESHA degradation and allow development in a fashion that is compatible with ESHA. The proposed project may represent the best opportunity to privately finance adaptive management for the continued utilization of on-site resources by monarchs (Dick Arnold, Ph.D.), as opposed to "No Project", and improvements to on-site riparian and adjacent steelhead habitat.

Monarch butterfly overwintering habitats are adversely impacted if an action has the potential to substantially reduce the number of butterflies using the habitat (colony size) and/or the length of time that a colony persists in the habitat (duration of occupancy). This can occur due to reduced habitat suitability or quality (physical or biological changes in the area), increased frequency of disturbance (i.e., reducing wind protection, increased interactions with people/vehicles), and increased accidental death (direct mortality). In addition, other forms of disturbance during the roosting season can be considered detrimental to the viability of the habitat (such as use of pesticides, smoke from chimneys, use of leaf blowers, and excess vibration).

Because viable monarch habitat requires trees for roosting and wind protection, tree locations (and the ground areas within the dripline of the canopy) are generally used to delineate the extent of monarch habitat boundaries. Therefore, for the purposes of this analysis, the core monarch overwintering habitat includes all mature trees to the south of the Mansion, as well as the grassy open space area located between the acacia along Wharf Road and the eucalyptus grove that is bisected by the access road (as identified in the Elizabeth Bell report). The results of the 1999 - 2000 survey confirmed the determination in the 1998 DEIR that the monarch overwintering habitat on the project site includes all mature trees (eucalyptus and acacia) to the south of the Mansion and the ground area within the dripline. It should be reiterated, however, that all portions of the project site that may provide for continued utilization of the site by monarchs are within the southern portion of the property that is located within the Coastal zone boundary, and in all likelihood will be considered ESHA by the Coastal Commission.

The **Butterfly Habitat Preservation Study** shows the locations of the monarch roosting areas in the southern portion of the project site. The following discussion outlines how the current Rispin Mansion plans could impact mature trees within the habitat and, therefore, the viability of the monarch butterfly overwintering habitat.

Rispin Conservatory. This area contains 11 coast live oak trees, which may function as peripheral wind screens for monarch roost trees (Dick Arnold, Ph.D.). These trees run in a north/south direction between the proposed conservatory and the masonry wall. Three of these oak trees will be removed for construction of the conservatory. Due to the close

proximity of building construction to critical root zones, indirect impacts to other trees may also occur.

South End Building. Based on an on-site survey and staking that delineated acceptable building envelopes for the southwestern corner of the project site, the South End Building shown in the current plans has been sited to be outside of the monarch butterfly roosting areas and associated root zones. The original site plan illustrated two, detached buildings situated at the south end of the site between Wharf Road and monarch roost Area A (see **Butterfly Habitat Preservation Study**). These buildings were originally proposed to be tall enough that they would have shaded some of the roost limbs used by the monarch in Area A or resulted in the need to prune overhanging limbs that are used by roosting monarchs. As originally designed, several acacias, providing windbreak protection and dappled lighting for the monarch roost Area A, would also have been removed to accommodate the new units.

The revised site plan illustrates a single, smaller new building. The project's architect, Mr. Paul Davis, completed a shadow study to insure that the new building would not shade the monarch's roost (shown on the **Butterfly Habitat Preservation Study**). As a result, several changes to the South End Building have been incorporated in the revised site plan, as elucidated by Dick Arnold, including:

- only a single building is now proposed, which has been set back farther from the roost trees and with a reduced footprint (30 x 61 feet) that should minimize the need for safety limb pruning and avoid disturbance to roots of the nearby roost trees;
- the maximum building height will be no more than 17 feet above the existing grade, and slants to only 11 feet above existing grade at its eastern edge to avoid any shadows being cast onto roost Area A;
- the building's roof has been redesigned to accommodate plantings to provide additional windscreen protection, dappled lighting, and nectar for the monarchs, and the height of these plantings will be monitored by the monarch biologist in future years to insure that they do not become tall enough to shade the ground beneath the roost trees in Area A;
- the building has been redesigned to have a glass enclosed patio or deck on its east side, which can be sealed off, including the roof, during the monarch's overwintering period without blocking the sunlight that would transmit through the glass enclosure;
- windows that face the roost trees may require special tinting, curtains, or blinds to limit the spread of interior lighting to these trees during the overwintering period of the monarch when butterflies are present;
- exterior lighting for the South End Unit will utilize low wattage bulbs designed to not attract insects;
- lattice will be part of the exterior walls of the building to support ivy or other nectar sources that will be planted;
- the originally proposed wall along the south end of Wharf Street will be replaced by plantings for windscreening and an open style of fencing to allow dappled light to reach the ground near the roost trees;
- post and rail fencing (or a similar open style fence) may be used along walkways at the site to protect roost trees; and
- only a few existing acacia trees, which currently provide both windscreening and dappled light, will need to be removed, but they will be replaced by the new building and new plantings.

Rapid regrowth of acacia saplings in the southwest corner of the project site during the past few years has resulted in canopy development in this formerly bare area (i.e., grassy open space). Some of these young trees have reached heights of nearly 20 feet now, and they have begun to function as a wind barrier in the habitat. While the loss of these small acacia trees to accommodate a new building may represent a significant and unavoidable impact to the monarch habitat (ESHA), this impact would be reduced by the presence of the building itself in conjunction with the planting of appropriate trees as required in the mitigation measures in this EIR. Please refer to the Interim Management Plan for Preservation of Rispin Mansion Butterfly Habitat and Screening of Rispin-Peery Bridge Connection (April 2003, Lewis Tree Service [Appendix C]).

Rispin Driveway/Parking/Well-House Area. The trees in this area are critical to the protection of the monarch butterfly overwintering habitat and therefore any damage to these trees is considered significant. Changes in grade in the critical root zones of these trees are detrimental. Lowering the grade (through "cut") around trees has immediate and long-term effects including damage to roots and reduced soil moisture resulting in lack of sufficient water uptake. In addition, altered drainage patterns due to site grading and construction may cause root rot and/or uplift leading to potential tree loss.

Other Improvements. The applicant proposes to have a pathway, which would be comprised of brick with a permeable substrate, meandering between the existing road into the Mansion and the South End Building. This pathway will meander in order to avoid having to trim too drastically the existing acacia trees, and will have a small fence along its sides to prevent walking into the butterfly areas. Signage will also encourage people to stay out of these sensitive areas.

The applicant proposes a six-foot high wall along the entire south end of the Rispin site from the well-house to the south end property line. This wall, which will be constructed using cantilevered supports, will provide a windblock and prevent people from coming into the butterfly areas.

Mode A/B Site Operation Program. The applicant proposes to operate the Rispin Mansion in two modes to protect the monarch overwintering habitat at the site. The Mansion would operate in Mode A during the spring and summer, which is when the monarchs are not present and do not have the potential for coming to the site. Mode A would allow for:

- vehicles to travel on the driveway at the site;
- removal of the slanted windows from the South End Building;
- the patios and decks on the South End Building to be open; and
- use of the two wood-burning fireplaces (one in the living room of the Mansion, one in the Rispin Conservatory) and the gas burning fireplaces in the South End Building and Rispin Pavilion.

The applicant proposes to operate the Mansion in Mode B during the fall and winter when the monarch expert determines that the butterflies could be present. Under Mode B the following shall be required:

- all cars and trucks, with the exception of zero emission vehicles (ZEVs) and the small fire engine required as a mitigation in the **Public Services** section, would be prevented from accessing the site. Disabled visitors would gain access to the Mansion by utilizing the ZEVs (vehicles without emissions that are virtually noiseless and engine-vibration free), which will pick up visitors and supplies in the parking lot across the street and transport them to the Rispin Mansion. These ZEVs will be properly licensed so that they can drive on the road to the Mansion from the parking lot;
- the slanted windows on the east side of the South End Building will be closed, thus closing off all human activity from the side of the building adjacent to the monarch habitat;
- there will be no wood burning fireplaces used; gas fireplaces will only be used if the ambient air temperature does not disturb the butterfly population, at the discretion of the contracted monarch expert;
- vents for heating systems will be directed away from the roost areas; and
- guests and visitors will be restricted to well-marked paths to avoid disturbances to any roosting monarchs.

Impact: South of the Rispin Mansion, construction of the South End Building, parking spaces, pathway, cantilevered wall, and security guard quarters/ZEV garage in and below the well-house would constitute non-resource dependent uses within monarch overwintering habitat and may result in loss of and damage to mature trees in the monarch overwintering habitat and one cypress and one redwood tree just south of the site. *This is in violation of the Coastal Act (Section 30240) and therefore constitutes a significant and unavoidable impact. Implementation of the following mitigation, in addition to the Mode A/B Site Operation Program requirements, will not reduce this impact to a less-than-significant level, but will avoid significant ESHA degradation and will allow development in a fashion that is compatible with ESHA.*

Mitigation

- R-12 The monarch's overwintering habitat at the Rispin Mansion site shall be permanently managed by an independent monarch biologist, who is hired by the owners/operators of the Rispin Mansion and who will periodically report to the City Council. Please note that the judgment of the monarch specialist overrides the opinions of the applicant, landscape architect, arborist, and work crews that may be involved in the decision making process. At a minimum, the monarch biologist will have the following duties:
- a) advise the owners/operators of the Rispin Mansion when monarch butterflies begin to use the overwintering habitat in the fall so the Mansion can shift to fall/winter operational mode, and similarly, advise the owners/operators when the monarchs have left the Rispin Mansion site in the spring so the Mansion can shift to spring/summer operational mode;
 - b) work with the arborist to determine how to best prune the trees at the Rispin Mansion to enhance overwintering habitat values for achieving wind protection, dappled light, roost limbs, etc.;
 - c) work with the landscape architect to insure that appropriate plant taxa are used to enhance overwintering habitat values for the monarch, and that the selected plant materials are placed at the most appropriate locations on the site;

- d) monitor and manage the gradual removal of invasive/non-native ivy from the site as it is replaced by alternative, more desirable (native) nectaring sources;
- e) routinely work with the landscaping crew to insure that maintenance practices are compatible with protection and enhancement of the monarch's overwintering habitat;
- f) periodically re-evaluate overwintering habitat conditions for the monarch and provide recommendations for corrective actions and improvements;
- g) prepare a monarch overwintering habitat monitoring and management plan for the Rispin Mansion site, which will identify methods for annual monitoring of the butterfly and its habitat, plus identify specific management practices for all parts of the roost areas; and
- h) advise the owners/operators about methods for raising butterflies in the restored Rispin aviary and propagating the milkweed food plant of monarch larvae in non-roosting portions of the site.
- i) ensure that tree pruning and removal is done in accordance with the Interim Management Plan for Preservation of Rispin Mansion Butterfly Habitat and Screening of Rispin-Peery Bridge Connection (April 2003, Lewis Tree Service).

R-13 The applicant shall take proper measures to avoid damage to the remaining oaks, cypress and redwood in these areas. Specifically, grading or construction shall not occur within 15 feet of the base of all oak, cypress and redwood trees unless performed under the supervision of a qualified on-site arborist.

R-14 A final landscaping and tree mitigation plan shall be implemented that contains the following measures for tree preservation during construction. This plan shall be reviewed and approved by the City of Capitola prior to construction.

- Provide for an on-site consulting arborist during preliminary grading.
- Establishment of a tree preservation zone (TPZ) by installing fencing, with stakes embedded in the ground, no less than 48 inches in height, at the dripline (the perimeter of the foliar canopy) of the tree, or at the critical root radius, as defined by the consulting arborist. This installation will be done prior to any construction activities.
- Within the dripline of existing trees (the TPZ), no storage of construction materials, debris, or excess soil will be allowed. Parking of vehicles or construction equipment in this area is prohibited. Any solvents or liquids shall be properly disposed or recycled.
- Minimize soil compaction on the construction site. Protect the soil surface with a deep layer of mulch (tree chips). The addition of mulch will reduce compaction, retain moisture, and stabilize soil temperature.
- Maintain the natural grade around trees that are not removed. No additional fill or excavation will be permitted within areas of tree root development. If tree roots are unearthed during the construction process, the consulting arborist will be notified immediately. Exposed roots will be covered with moistened burlap until a determination is made by the on site arborist.
- Any areas of proposed trenching will be evaluated with the consulting arborist and the contractor prior to construction. All trenching on this site will be

- Acacia limbing or removal will be confirmed by consultation with the monarch biologist to be retained by the applicant and shall be done in accordance with the Interim Management Plan for Preservation of Rispin Mansion Butterfly Habitat and Screening of Rispin-Peery Bridge Connection (April 3, 2003, Lewis Tree Service).
- Replacement planting shall be done in consultation with the retained monarch biologist.
- As replacement plantings reach a sufficient size and stature to replace the remaining existing acacias (as determined by the consulting monarch biologist), these acacias will be permanently removed.
- Replacement plant taxa to be used for windscreening, dappled light, and nectar shall be the same as those listed above in the approved planting list, and those recommended in the landscape plans by Dick Arnold (also those recommended by The Monarch Project 1993).
- Trees must be planted between any parking or unloading/loading spaces near the Mansion and Area A to buffer the direct impacts to butterflies (see approved planting list above).
- Adequate setbacks to building walls shall be provided from tree trunks (15-foot minimum) to create "tree protection zones". Trees shall be protected with fencing during construction.
- A temporary fence, as approved by the on-site arborist, shall be placed around the entire roosting area bounded by Wharf Road, the south-gate access road and the Mansion fence that extends from the well-house to the south gate. This area shall not be used for parking or equipment and materials storage during the construction phase.

R-16 Widening of the existing driveway on the south side of the site shall not be allowed.

R-17 During reconstruction/resurfacing of the driveway, the applicant shall adhere to specific guidelines for roadbed design, construction materials and procedures provided by the consulting arborist in order to avoid above and below ground damage to the trees near the driveway. These construction guidelines shall include the following:

- hand grading or use of mini-excavator;
- road bed fill not to exceed four inches in the acacia area;
- use of light-colored, water permeable substrate for the road and parking lot surface;
- establishment of tree protection zones;
- limit use of driveway during construction to vehicles that clear the tree canopy; and
- prohibit use of this driveway for construction vehicles and equipment between October 1 and February 28.

approved by the on-site arborist. Trenching within a tree dripline will be performed by hand. Tree roots encountered will be avoided or properly pruned under the guidance of the consulting arborist.

- Unauthorized pruning or canopy alterations of any tree on this site will not be allowed. If any tree canopy encroaches on the building site the required pruning will be done on the authority of the consulting arborist and monarch expert and to ISA pruning guidelines and ANSI A300 pruning standards. Education of landscaping and maintenance personnel shall be required prior to commencement of construction.

R-15 The final landscaping and tree replacement/mitigation plan shall include the following components:

- For every mature tree (of any species) that is removed, four (4) 24-inch box trees or twelve (12) 15-gallon trees shall be planted. For every sapling tree that is removed, one (1) 24-inch box tree or three (3) 15-gallon trees shall be planted. Loss of acacia clumps must be replaced at a 1-to-1 ratio (i.e., one 24-inch box or three 15-inch box) based on the number of trunks in the group. The on-site arborist shall determine the type of tree (i.e., mature, sapling, clump) that is being removed or permanently damaged prior to its removal. The following species may be used for replacing the acacia that are removed, based on their size and foliage, as recommended by the butterfly expert (Dick Arnold, Ph.D.):
 - Red ironbark (*Eucalyptus sideroxylon*), recommended by both Elizabeth Bell and Dick Arnold as a roosting tree
 - Holly-leaf cherry (*Prunus ilicifolia*), recommended by Dick Arnold as a windscreen
 - Monterey cypress (*Cupressus macrocarpa*), windscreen
 - Sydney blue-gum (*Eucalyptus saligna*), windscreen
 - Swamp mahogany (*Eucalyptus robusta*), windscreen
 - Coast redwood (*Sequoia sempervirens*), windscreen
 - California bay (*Umbellularia californica*), windscreen
 - Red alder (*Alnus rubra*), windscreen
 - Cooibah (*Eucalyptus microtheca*), roost tree
 - Hinds willow (*Salix hindsiana*), winter nectar source
 - Western black willow (*Salix lucida*), windscreen/nectar source
 - Arroyo willow (*Salix lasiolepis*), windscreen/nectar source
- The locations on the project site for replacement trees shall be in conformance with guidance from the qualified monarch expert to eventually compensate for limbs and trees lost due to project construction. As part of the landscaping and tree replacement/mitigation plan, implement the following:

- R-18 The final placement of the cantilevered wall along the Wharf Road site boundary shall be determined through on-site consultation with the monarch butterfly specialist or arborist to minimize damage to acacias that are important to the monarch habitat. The final design of the cantilevered wall shall provide for proper drainage and avoidance of root damage to preserve the trees in the habitat. The design specifications of the wall shall be reviewed and approved by the arborist.
- R-19 Avoid removal of lower eucalyptus or acacia limbs for creation of the pathway, unless recommended by the arborist to address safety concerns, to minimize potential canopy loss within the monarch habitat. Vegetation pruning and clearing shall be minimized and barriers shall be installed along the pathway to keep visitors off of undisturbed areas. The final design of the pathway shall be completed in coordination with the monarch butterfly expert. All acacia pruning and/or removal shall be done in accordance with the Interim Management Plan for Preservation of Rispin Mansion Butterfly Habitat and Screening of Rispin-Peery Bridge Connection (April 3, 2003, Lewis Tree Service).
- R-20 Buildings shall not be placed beneath canopy driplines except as authorized by the monarch butterfly expert. Boardwalks and viewing platforms or patios may be placed beneath driplines if the existing eucalyptus canopy is maintained. Only limited limb removal for view enhancement and safety concerns may occur, but it must be consistent with health of trees and performed under the guidance of the consulting arborist and monarch butterfly specialist.

Impact: The existing driveway is located within the main roosting area of the butterfly habitat. When butterflies are roosting at the site, vehicle and pedestrian use of the driveway has the potential to disturb the monarch butterfly habitat due to vibration, changes in air temperature, and air pollutants in engine exhaust. *This is a potentially significant impact that can be reduced to a less-than-significant level with implementation of the following mitigation.*

Mitigation

- R-21 During facility operation between October 1 and February 28 (or as determined by the monarch biologist) of each year, the driveway shall only be accessed by zero emission vehicles for guest drop-off and deliveries, as outlined in the Mode A/B Site Operation Program discussed above. Between March 1 and September 30, use of the site for guest drop-off and valet service in standard vehicles, in addition to the above, will be acceptable. Vehicles taller than the lowest tree canopies shall be restricted from entering the site.

Impact: Use of blowers may be incompatible with the use of the habitat by butterflies. *This is a potentially significant impact that can be reduced to a less-than-significant level with implementation of the following mitigation.*

Mitigation

- R-22 Landscape and ground maintenance workers must be informed of conservation issues regarding overwintering monarch habitat through a training seminar conducted by the monarch expert. Use of blowers shall be prohibited between October 1 and February 28.

Impact: Emissions from fireplace chimneys (smoke, heat and carbon dioxide) in the vicinity of roost areas can cause disturbance of roosting monarchs; this may lead to increased flight activity, emigration, mortality and reduced colony stability. *This is in violation of the Coastal Act (Section 30240) and therefore constitutes a significant and unavoidable impact. Implementation of the following mitigation, in addition to the Mode A/B Site Operation Program requirements, will not reduce this impact to a less-than-significant level, but will avoid significant ESHA degradation and will allow development in a fashion that is compatible with ESHA.*

Mitigation

R-23 Any new buildings south of the Mansion on the project site must be designed and built without wood-burning fireplaces or stoves (gas-burning fireplaces are acceptable). Operation of wood-burning fireplaces in the Mansion and the Rispin Conservatory shall be prohibited if it has the potential to create adverse conditions during the time when monarchs are potentially present in the habitat (October 1 through February 28, or as determined by the monarch biologist). A fireplace plan shall be developed, subject to review by the butterfly expert and approval by the City of Capitola. The fireplace plan shall include at a minimum:

- a description of the locations and design of exhaust system features, and
- an operational program that specifies the methods (such as warning signs and lockable ignition switches or gas valves) proposed to ensure that fireplaces do not create adverse conditions, including restrictions on operations proposed in the Mode A/B Site Operation Program detailed above, for times when butterflies are potentially present in the Rispin habitat.

Impact: Exhaust and low frequency vibrations, inherent to the operation of heavy equipment, as well as activities involved with the trimming/removal of trees on the project site, may disturb and/or dislodge roosting monarchs during the overwintering season. This will increase colony disturbance and butterfly mortality. The severity of this impact will depend on the distance of roosting butterflies from the area where the equipment is being operated. *This is a potentially significant impact that can be reduced to a less-than-significant level with implementation of the following mitigation.*

Mitigation

R-24 Site preparation (e.g., tree trimming, tree removal, grading, excavation, and roadbed construction) on the project site shall *not* occur when monarchs are potentially present (October 1 through February 28).

Impact: If insecticides are used on the Rispin Mansion site, butterflies ingesting nectar or dew may ingest toxic residues in the process of feeding. The use of biological insecticides (including bacteria, viruses, protozoans and nematodes used in the control of undesirable insects) can result in long-term contamination of the habitat. *This is a potentially significant impact that can be reduced to a less-than-significant level with implementation of the following mitigation.*

Mitigation

R-25 Use of biological insecticides (including bacteria, viruses, protozoans and nematodes) that are effective in the control of all lepidoptera shall be prohibited throughout the habitat. Chemical insecticides shall not be applied during the overwintering season (October 1 through February 28). Use of chemical insecticide agents during the non-roosting season may be done only if approved by the consulting butterfly expert. Grounds maintenance workers shall be made aware of monarch habitat conservation requirements as they pertain to grounds management (see mitigation R-22 above).

Impact: Outdoor guest/visitor activities during the roosting season may disturb the roost area (e.g., dust, vibration, and night-lighting). [Noise from operation of the Rispin Mansion and associated visitor serving uses is not expected to adversely affect the monarch. Overwintering habitat for this butterfly is often located in noisy locations. The vast majority of butterflies that have been studied to date have been found to be deaf, so noisy locations do not bother them. Indeed, uses similar to those proposed at the Rispin Mansion now occur at motels in Pacific Grove (Butterfly Town, USA) where Monarch overwintering habitat is located among and adjacent to motels that exercise fewer restrictions in their guest and visitor-serving activities than are proposed for the Rispin Mansion (Dick Arnold, Ph.D.)] *This is a potentially significant impact that can be reduced to a less-than-significant level with implementation of the following mitigation.*

Mitigation

R-26 The following measures, at a minimum, shall be implemented during the time when monarchs are potentially present in the habitat (October 1 through February 28, or as determined by the monarch biologist):

- All pedestrians/visitors/guests shall be kept outside of the monarch roosting area by monarch biologist approved fencing.
- Outdoor activities, such as weddings, will be limited to designated portions of the Mansion property to avoid roosting area disruption.
- Outside night-lighting along the paths, and at the Mansion and South End Building shall utilize low wattage bulbs and fixtures that are mounted close to ground level and directed away from the roosts. In addition, lighting shall not be directed toward Sequel Creek or on-site riparian vegetation.

Additional Monarch Discussion and Recommendations from Dr. Arnold's Report

Conservation Easement. Dick Arnold recommends that a conservation easement be placed on at least that portion of the Rispin Mansion site that supports the primary overwintering habitat for the monarch butterfly (see attached site plan showing monarch butterfly and historical conservation easements). The purpose of the conservation easement would be to provide permanent protection of the monarch's overwintering habitat at the Rispin Mansion. The Land Trust of Santa Cruz County, or a similar entity, may be willing to serve as the easement holder. The specific easement area and responsibilities of the operator, City, and easement holder will need to be described in the easement document.

Habitat Protection and Enhancement. At many sites in California, overwintering habitats have been protected, but in time they decline or even fail to support overwintering monarchs due to lack of monitoring and habitat management. Local and state agencies do not have the funds or expertise to manage overwintering sites of the monarch in perpetuity. The proposed renovation of the Rispin Mansion and development of the South End Building provide a mechanism to not only protect the monarch's overwintering habitat, but to also continuously monitor it and manage it in a manner to benefit the monarch butterfly in perpetuity. The applicant has addressed anticipated impacts of the proposed redevelopment project through numerous revisions to the original site plan. The avoidance and minimization measures identified in this EIR should minimize anticipated impacts of the project on the monarch and improve the quality of overwintering habitat for the monarch at the Rispin Mansion site.

Public Education.

With all of the efforts that are directed at maintaining and enhancing the Monarch's overwintering habitat at the Rispin Mansion site, opportunities for public education are plentiful. This may be as simple as providing a few information signs and a viewing area for observing the roosting Monarchs. Since the applicant is considering raising butterflies in the reconstructed Rispin aviary and plans to restore the well house to include an interpretive center, the educational program could be expanded to include tours (i.e., small groups of people supervised by an interpretive tour guide) of the aviary and overwintering habitat, as well as programs about the Monarch butterfly and its annual migration, butterfly gardening, and selection of landscaping plants to benefit the Monarch and other butterflies. These activities and programs should be offered not only to guests at the Rispin Mansion, but also to the general public. Since the public will enter the site through the restored well house/interpretive center, controlled access of the general public will provide additional protection for the Monarch's primary overwintering area (i.e., from fire, vandalism, etc.) and avoid disruption of any roosting butterflies. The applicant should check with appropriate local, state, and federal authorities about permits required for raising butterflies.

Results of November 2002 Storm. A few of the acacia trees which grow along Wharf Road at the Rispin Mansion site were recently trimmed, perhaps as a result of damage incurred by a November 2002 winter storm. Dr. Arnold presumes that work crews from the City of Capitola performed the trimming of these trees for safety reasons. Although he has only seen photographs of the situation, he suspects it has created a gap in the windscreen that these mature acacia trees had previously afforded Roost Areas A and B. It will be interesting to see if the overwintering monarchs leave the Rispin Mansion site earlier than normal this year. While this incident may have a detrimental effect on the overwintering monarchs, it underscores the need for a long-term monitoring and maintenance plan at the Rispin Mansion to properly protect and enhance the butterfly's overwintering habitat there.

Impacts on Steelhead Habitat (and Other Riparian and/or Aquatic Species)

Streams and stream functioning are inextricably linked to adjacent riparian and upland (or upslope) areas. The riparian habitat provides an array of important watershed functions that directly benefit steelhead and aquatic species. Vegetation within the riparian habitat shades the stream, stabilizes the banks, and provides organic litter and large woody debris that are components of quality steelhead habitat. On-site trees at the Rispin Mansion site provide important shading to the Soquel Creek (which aid in

maintaining a tolerable water temperature for steelhead). Accordingly, the tallest trees on-site (blue-gum eucalyptus, including those that support monarch butterfly overwintering habitat) provide the greatest amount of shade. Riparian habitat also stores sediment, recycle nutrients and chemicals, mediate stream hydraulics, and control microclimate. Healthy riparian zones help ensure water quality essential to steelhead as well as the forage species they depend on.

Impact: The proposed redevelopment of the Rispin Mansion property may impact the Soquel Creek and associated riparian vegetation through erosion, vegetation removal, and increased stormwater runoff, which in turn could adversely impact steelhead. *This is a potentially significant impact that can be reduced to a less-than-significant level with implementation of the following mitigation (also see riparian mitigation above).*

Mitigation

- R-27 The removal of any riparian or upland trees on the Rispin site that provide shade to the Soquel Creek shall not be allowed unless immediately replaced. The amount of shading within the creek currently supplied by Rispin property trees shall be established as a base-line, and any actions reducing this percentage shall require management to improve stream shading by a City approved forester/botanist. Such management shall include planting of native riparian tree species along the creek (i.e. big-leaf maple, sycamore, alder, cottonwood, box-elder, willow), to provide shade and aid in cooling of the creek, and to enhance habitat.
- R-28 Protect the eucalyptus grove and patches of redwood trees as valuable sources of shade to the stream, erosion prevention on the steep slope, and as monarch butterfly habitat.
- R-29 Consult with a qualified engineer (as determined by the City) to see if runoff from the library parking lot could be detained to reduce the peak discharge level to the pre-development rate. If feasible (to be decided with contracted engineer), install a buried stormwater detention facility near the driveway that would feed into the existing drainage system.
- R-30 Retrofit the storm drain pipe buried across the Rispin bench with a detention tank that can meter out water at a slower rate, with an overflow in the event that the tank becomes overwhelmed. This shall be done in consultation with a qualified engineer.
- R-31 Stabilize the drainage channel leading from the energy dissipater to the creek (located in the south-central portion of the site). This shall be done in coordination with a qualified engineer.
- R-32 The addition of impermeable surfaces at the Rispin Mansion site shall be accompanied with an effective drainage plan. This drainage plan shall ensure the capture of any increase in runoff on the bench (as much as is feasible), without additional overland movement of water down the steep slope toward the creek (to minimize erosion and sedimentation, and the introduction of pollutants).

- R-33 Improve the existing driveway on the south end of the site to facilitate rain percolation. Re-surface the driveway with porous pavement blocks or comparable material.
- R-34 Extend the drainpipe from the walkway grate leading to the Rispin-Peery Bridge to Soquel Creek.
- R-35 Investigate the hydrologic source of water flowing under the west footing of the Peery Park walk/bicycle bridge and re-route it away from the footing to a stable release point. This shall be done in coordination with a qualified engineer.
- R-36 Remove non-native/invasive species in work areas within the riparian habitat (i.e. drainage improvements) as much as is feasible, and re-plant with appropriate native riparian species. A qualified botanist shall determine an appropriate native species palette in coordination with the monarch biologist.
- R-37 As much as is feasible, and in coordination with the monarch specialist, remove non-native/invasive species (especially pampas grass) in the vicinity of the Peery Park walk/bicycle bridge.
- R-38 Repair or replace the retaining wall along the eastern edge of the Rispin Mansion. The replacement of this wall will require erosion/sedimentation control techniques recommended by a qualified engineer.
- R-39 Replace the fence above the retaining wall of the Rispin Mansion to exclude people from accessing the creek through created footpaths.
- R-40 Construct a meandering footpath from the Rispin site to Soquel Creek that is less erosive than the existing trail paralleling the storm drain down to the energy dissipater. No trees shall be removed or substantially limbed during construction of this trail. The trail shall be covered with base rock and designed to avoid the concentration of storm runoff. Although this trail will be preferable to the existing one, do not clearly mark the trail or encourage its utilization.
- R-41 Revegetate the existing shortcut path on the west side of the Rispin property (adjacent to the walkway) with native vegetation. Plant native thorny shrubs or undesirable species, such as blackberry or poison oak, adjacent to the walkway to discourage further use of the existing path.
- R-42 To avoid disturbance to steelhead (and other aquatic or semi-aquatic wildlife), nighttime lighting of the riparian habitat and/or Soquel Creek shall not be allowed. On-site lighting required for Mansion grounds shall not be oriented towards the creek.

CUMULATIVE RIPARIAN HABITAT IMPACTS

This project has been determined to be outside of the required setback from this habitat area and, therefore, will not directly impact riparian habitat. Cumulative indirect impacts such as erosion or slope slippage (due to development on steep slopes above the creek)

may occur due to this project and other cumulative projects. With the implementation of relevant mitigation measures in this EIR that aim to prevent erosion and slope slippage, the project's contribution to this cumulative impact would be less-than-cumulatively considerable and, therefore, less-than-significant, pursuant to CEQA Guidelines section 15130 (a)(3).

CUMULATIVE MONARCH BUTTERFLY IMPACTS

Long-term impacts on monarch butterfly habitat were identified above due to construction and general use of areas under and near the roost locations. In addition, the monarch butterfly survey in **Appendix C** (Elizabeth Bell report) identifies the fact that the Escalona Gulch has been adversely impacted. The following cumulative impacts may result with implementation of cumulative projects:

- Post-construction habitat modifications including limb and/or tree removal for safety purposes (perceived hazard reduction). Adequate building setbacks from the canopies can prevent or limit the pressure for this type of activity. The amount of post-construction tree and limb removal at Escalona Gulch (and other locations in Santa Cruz & Monterey Counties) has continued to degrade monarch habitats in areas where development has occurred.
- Habitat degradation has occurred in most monarch overwintering habitats countywide (and statewide) over the past 15 years and this appears to be a continuing trend. Degradation of habitat at Natural Bridges State Park has been caused by the death of Monterey Pines that provide wind protection on the east and west sides of the overwintering grove. Habitat quality on other sites has been caused by tree loss during development or tree removal and canopy reductions for safety purposes after development has occurred (Escalona Gulch site, Moran Lake site, Meder Street Site, Oxford & Almar site, Highlands Avenue site).

Based on the above, cumulative development in and near areas used as overwintering habitat for monarch butterflies can significantly impact availability and suitability of habitat areas. This would represent a significant and unavoidable cumulative impact. However, implementation of relevant mitigation measures in this EIR identified for project-specific impacts on monarch butterfly habitat will avoid significant ESHA degradation and will allow development in a fashion that is compatible with ESHA. In addition, long-term avoidance of physical changes to monarch habitats (including tree removal, damage, or substantial limbing), adaptive management for continued habitat suitability, and implementation of similar mitigation measures for cumulative projects near all monarch butterfly habitats could effectively avoid or reduce impacts on these sensitive habitats.

Cumulative Impact: Cumulative development has the potential to significantly impact the availability and suitability of monarch butterfly overwintering habitats in the region due to general degradation of and disturbance to those habitats. *Implementation of the following mitigation will avoid significant ESHA degradation.*

Cumulative Mitigation

- C-2 Cumulative projects shall be properly sited with adequate buffers from monarch butterfly habitats to avoid physical degradation to the habitat. Removal or substantial limbing of significant trees or other permanent changes to monarch butterfly habitats (including changes to the wind protection, shading, amount or accessibility of roost sites and nectar sources) shall be prohibited, except as approved by a qualified butterfly expert.

CUMULATIVE STEELHEAD IMPACTS

Long-term impacts on steelhead habitat were identified above due to the potential reduction of shade trees and the potential for on-site erosion and sedimentation (leading to a reduction of habitat quality and/or availability within Soquel Creek and the Soquel Lagoon). The following cumulative impacts may result with implementation of cumulative projects:

- Post-construction habitat modifications including the loss of shade trees, and a reduction in habitat quality due to erosion and sedimentation resulting from development along watercourses in the region.
- Impacts due to dams, reduction in stream flow, etc., in the region.

Based on the above, cumulative development in and near areas used by steelhead can significantly impact availability and suitability of habitat areas. This is a potentially significant cumulative impact. The Rispin project's contribution to this cumulative impact may be considered to be less-than-cumulatively considerable and, therefore, less-than-significant, pursuant to CEQA Guidelines section 15130 (a)(3), if relevant mitigation measures in this EIR identified for project-specific impacts on steelhead habitat are implemented. In addition, long-term avoidance of physical changes to steelhead habitats and implementation of similar mitigation measures for cumulative projects near all watercourses utilized by steelhead could effectively avoid or reduce impacts on these habitats.

F10d

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REFER TO FILE #
030769-2162

June 9, 2008

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JUN 09 2008

CALIFORNIA
COASTAL COMMISSION
CENTRAL COAST AREA

VIA FACSIMILE (831) 427-4877 AND U.S. MAIL

Pat Kruer, Chairperson, and Members of the Commission
California Coastal Commission
725 Front Street, Suite 300
Santa Cruz, CA 95060-4508

Re: Item F10d, Appeal No. A-3-SLO-08-022

Dear Chairperson Kruer and Members of the Commission:

This law firm represents SprintNextel ("Sprint"). We are writing to express our support for the staff recommendation on Item F10d, Appeal No. A-3-SLO-08-022. The staff report does a good job of describing the telecommunications facility proposed by Sprint. As stated in the staff report, the proposed facility, which will have no visual effects whatever, is in a fully-developed urban location, neither within nor adjacent to any environmentally sensitive habitat area ("ESHA"). It represents an ideal solution to the needs of Sprint customers affected by the existing coverage gap.

The staff report correctly states that because the facility, with conditions, will comply with FCC radiofrequency ("RF") emissions limitations, federal law preempts state and local consideration of the environmental effects of such emissions. (47 U.S.C. § 332(c)(7)(B)(iv).)

There are a number of other federal grounds supporting Sprint's proposed project, which we have described in our March 12 and March 31, 2008 letters to the San Luis Obispo County Board of Supervisors, copies of which are submitted herewith and incorporated by reference herein. (I am sending color copies of our coverage maps by Overnight Express.)

Even if the Commission were to disregard the federal issues, however, the appeal does not raise a substantial issue under the Coastal Act. Because the project will not be located within or adjacent to any ESHA, and because there is no evidence of any ESHA that will be affected by the project, there is no substantial issue.

NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP

California Coastal Commission

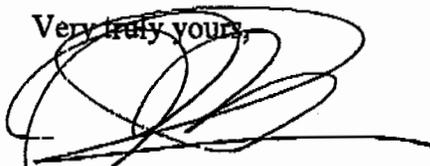
June 9, 2008

Page 2

My partner, Scott Yamaguchi, will be present at the Commission hearing of June 13, 2008, for the purpose of supporting the staff recommendation, and answering any questions the Commission members might have.

Thank you for your consideration of my letter. On behalf of Sprint, we reserve the right to present further facts and argument at the time of the hearing.

Very truly yours,



John J. Flynn III
of NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP

JIF/og

Enclosures

cc: Jonathan Bishop
Dan Carl

LAW OFFICES

NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP

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REFER TO FILE #
 030769-2182

March 12, 2008

VIA FACSIMILE AND U.S. MAIL

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JUN 09 2008

The Honorable James R. Patterson, Chairperson,
 and Members of the Board of Supervisors
 County Government Center
 1055 Monterey Street
 San Luis Obispo, CA 93408

CALIFORNIA
 COASTAL COMMISSION
 CENTRAL COAST AREA

Re: DRC 2006-00204

Dear Chairperson Patterson and Members of the Board of Supervisors:

I am writing on behalf of SprintNextel ("Sprint"), the applicant for Minor Use Permit/Coastal Development Permit DRC 2006-00204, for construction and operation of an unmanned wireless telecommunications facility to be located on the roof of an office building at 1337 Los Osos Valley Road, at the intersection with South Bay Boulevard in the community of Los Osos. The subject property is zoned Office & Professional; telecommunications uses are conditionally permitted. This proposed facility, as contrasted with the proposal submitted by Sprint in 2005, is *entirely* hidden from public view. There will be *no* adverse effects resulting from the installation of this facility.

The Hearing Officer's approval of Sprint's application on January 18, 2008, has been appealed to the Board of Supervisors. There are, however, no legitimate grounds for the appeal.

1. RESPONSE TO APPEAL.

(a) **RF Emissions:** First of all, as the Board already knows, the environmental effects of radio frequency ("RF") emissions are legally irrelevant, so long as the facility will satisfy FCC emissions standards. The RF report prepared by Hammett & Edison, dated April 24, 2007, and cited by the Hearing Officer in his decision, demonstrates that this facility will comply with FCC standards.

(b) **Co-location Alternatives Not Available:** According to the appellants, Sprint has an obligation under the County's zoning ordinance to explain why co-location alternatives cannot be employed. Sprint has already provided to the County an analysis of alternatives, and the evidence demonstrating why the alternatives will not accomplish Sprint's coverage goals, materials relied upon by the Hearing Officer, and attached to his decision.

NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP

The Honorable James R. Patterson
March 12, 2008
Page 2

(c) Alleged Inconsistency With the County's Zoning Ordinance and LCP: The County's zoning ordinance specifies an order of preference for placement of telecommunications facilities:

- i. Side-mount antenna on existing structures (buildings, water tanks, etc.) when integrated into the existing structure, completely hidden from public view or painted and blended to have matched existing structures, or
- ii. Within existing signs when blended within or on existing signage to be completely hidden from public view, or
- iii. Atop existing structure (buildings, water tanks, etc.) with appropriate visual/architectural screening to be completely hidden from public view, or
- iv. Existing monopoles, existing electric transmission towers, and existing lattice towers, or
- v. New locations.

This rooftop facility, completely hidden from public view, is therefore entitled to a preferred status under the County's code.

There are no credible grounds stated for the suggestion that the proposed facility is inconsistent with the County's zoning ordinance or the LCP. Telecommunications uses are conditionally permitted uses in the Office & Professional zone, and the facility will have no impacts. Contrary to what is alleged by the appellants, this proposal is far less intrusive than the flagpole facility proposed in 2005, since the current proposal will result in installation of a facility that will be entirely hidden from public view. Whether there are less intrusive alternatives depends upon the significance of the impacts that will result from the proposed facility. In this case, since the facility will have no impacts, there can be no less intrusive alternative.

As demonstrated by Exhibit A, Sprint nevertheless considered four alternative sites, but the proposed facility is the least intrusive and the farthest removed from existing residences (between 220 and 350 feet). The appellants have presented no evidence of a "proliferation" of telecommunications facilities at this or any other location, any of which would be subject to the County's permitting process, in any event.

(d) Exempt From California Environmental Quality Act: This facility quite clearly qualifies for an exemption under section 15303 of the CEQA Guidelines, found at Title 14 of the California Code of Regulations. There are *no* grounds on which to find that the exemption does not apply.

NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP

The Honorable James R. Patterson
 March 12, 2008
 Page 3

(e) **Moratorium:** There is no lawful basis on which to impose a moratorium. The proposed facility complies fully with the County's code and LCP, and the facility will have no adverse environmental or other effects. Further, imposition of a moratorium would only result in unreasonable delay in the decisionmaking process, in violation of the Telecommunications Act of 1996 (47 U.S.C. § 332(c)(7)(B)(ii)), and would result in unreasonable discrimination as between those who were approved prior to the moratorium, and those whose permit applications would be subject thereto. 47 U.S.C. § 332(c)(7)(B)(i)(I).

2. PUBLIC DEMAND FOR WIRELESS TELEPHONE SERVICE.

Cell phone service is no longer a privilege of the well-to-do: Between 1996 and 2006, the number of wireless telephone users has increased more than fivefold – from 44 million to more than 219 million wireless subscribers. 24 *Yale J. on Reg.* 55, 70 (2007); *Sprint Telephony PCS, L.P. v. County of San Diego, supra*, 490 F.3d at 702-03. There are now more wireless subscriptions than landline telephone subscriptions in the United States. 24 *Yale J.* at 70. Sixty-two percent of all Americans and over 90% of those in the 20 to 49 age group own cell phones. For many Americans, cell phones have become an indispensable replacement for traditional landline telephones. Approximately 5.5% of all Americans and 14% of 18 to 24 year olds live in *wireless-only* households. 24 *Yale J. on Reg.*, *supra*, at 71.

For Americans living in wireless-only homes and those outside of their homes, cell phones are often their only lifeline in emergencies. Since 1995, the number of 911 calls made by people using wireless phones has more than doubled, to over 50 million a year. Public safety agencies estimate that approximately 30% of the millions of 911 calls they receive daily are placed from cell phones, and the percentage is growing.
<http://www.fcc.gov/cgb/consumerfacts/wireless911srv.html>, as of Apr. 26, 2007.

Cell phones also play an increasingly critical role in times of public emergency. As reported by the San Francisco Chronicle on April 20, 2007, the Governor's Office of Emergency Services and the California Public Utilities Commission and the wireless industry are working on a plan to employ wireless networks for broadcast of emergency alerts. This system, it is hoped, will be implemented and operational in the next two to five years.

3. THE TELECOMMUNICATIONS ACT OF 1996 WAS INTENDED BY CONGRESS TO FACILITATE THE RAPID DEPLOYMENT OF A NATIONWIDE NETWORK OF WIRELESS TELECOMMUNICATIONS SYSTEMS.

The Telecommunications Act of 1996 ("Telecom Act") was intended by Congress
 to provide a procompetitive, deregulatory national policy
 framework designed to accelerate rapidly private sector
 deployment of advanced telecommunications and

NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP

The Honorable James R. Patterson
 March 12, 2008
 Page 4

information technologies and services to all Americans by opening up telecommunication markets to competition

Omnipoint Communications MB Operations, LLC v. Town of Lincoln, 107 F. Supp. 2d 108, 114 (D. Mass. 2000) (citations omitted). To achieve the congressional objectives, the Telecom Act “significantly limits the ability of state and local authority to apply zoning regulations to wireless telecommunications.” *Id.*

As the Ninth Circuit U. S. Court of Appeals stated recently:

Congress reaffirmed its commitment to nationwide telecommunications and cellular service when it passed the [Telecommunications Act] in 1996. It announced its intent ‘to promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid deployment of new telecommunications technologies’.

Sprint Telephony PCS, LP v. County of San Diego, *supra*, 490 F.3d at 703.

Sprint has a demonstrated gap in coverage, and has proposed to the County a facility that has no adverse environmental or other effects whatever.

3. THE TELECOM ACT FORBIDS REGULATION OF THE PLACEMENT OF WIRELESS TELECOMMUNICATIONS FACILITIES ON THE BASIS OF PERCEIVED ENVIRONMENTAL EFFECTS OF RF EMISSIONS.

The opponents of the project have clearly been driven by their objection to alleged RF effects of the proposed facility. The Telecom Act expressly forbids regulation of “the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions.” 47 U.S.C. § 332(c)(7)(B)(iv). The courts have made clear that “Congress intended federal regulation of [RF] issues to be so pervasive as to occupy the field.” *Southwestern Bell v. Johnson County B.D.*, 199 F.3d 1185, 1193 (10th Cir. 1999); *Sprint Spectrum L.P. v. Mills*, 124 F.Supp.2d 211, 218 (S.D.N.Y. 2000). This means that the FCC’s regulation over RF emissions is exclusive and therefore results in a *total* preemption of any state and local law which purports to regulate in this area. *Ibid.*; see also *Southwestern Bell v. Johnson County B.D.*, *supra*, 199 F.3d at 1193 (discussing preemptive effect of FCC regulation of RF emissions).

The Project will comply with FCC RF safety standards. Sprint is therefore protected by the preemptive effects of § 332 of the Telecom Act. *Ibid.* Accordingly, the objections of project opponents to the perceived environmental effects of RF emissions are legally irrelevant.

NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP

The Honorable James R. Patterson

March 12, 2008

Page 5

4. THE TELECOM ACT BARS LOCAL GOVERNMENTS FROM PROHIBITING THE PROVISION OF PERSONAL WIRELESS SERVICES.

The Telecom Act bars state and local governments from prohibiting the provision of personal wireless services. 47 U.S.C. § 332(c)(7)(B)(i)(II); § 253(a). The Ninth Circuit U.S. Court of Appeals has determined that a prohibition of service under section 332(c)(7)(B)(i)(II) of the Telecom Act exists where (a) a provider has a significant gap in its service coverage; and (b) the provider has proposed the "least intrusive" means to fill the significant gap. *See MetroPCS, Inc. v. City and County of San Francisco, supra*, 400 F.3d at 731-34. In this case, Sprint has demonstrated both the existence of a "significant gap" in coverage, and that it has proposed the "least intrusive" means by which to fill the gap.

5. THE CITY IS REQUIRED TO BASE DENIALS OF PERMIT APPLICATIONS ON SUBSTANTIAL EVIDENCE.

Section 332 of the federal Telecommunications Act of 1996 ("Telecom Act") states, in relevant part:

Any decision by a State or local government or instrumentality thereof to deny a request to place, construct, or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record.

47 U.S.C. § 332(c)(7)(B)(ii). The courts have interpreted this to mean that any denial of "a request to place, construct, or modify personal wireless service facilities" must: (a) be separate from the written record; (b) describe the reasons for the denial; and (c) contain a sufficient explanation of the reasons for the denial to allow a reviewing court to evaluate the evidence in the record that supports those reasons. *New Par v. City of Saginaw*, 301 F.3d 390, 395-396 (6th Cir. 2002). Each reason for denial must be supported by substantial evidence in a written record. Along these lines, denials based on "hollow generalities and empty records" are prohibited by the Telecom Act. *Amherst, N.H. v. Omnipoint Communications*, 173 F.3d 9, 16 (1st Cir. 1999). With regard to such generalized and unsupported concerns, one court wrote:

It would completely frustrate the purpose of the [Telecom Act] if the voicing of negative opinions by a small number of citizens, without more, could serve as a basis of denial. Any municipality could defeat the request for a permit by simply making a very limited record that in the opinion of three or four citizens, the tower would blight the landscape. *Congress did not intend that rejection of a license application could be accomplished on such a sparse record.*

NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP

The Honorable James R. Patterson
March 12, 2008
Page 6

Iowa Wireless Servs. L.P. v. City of Moline, Ill., 29 F. Supp. 2d 915, 922 (C.D. Ill. 1998) (emphasis added); see also *Omnipoint Corp. v. Zoning Hearing Bd.*, 181 F.3d 403, 409 (3rd Cir. 1999) (same principle cited).

Consistent with the substantial evidence requirement, the courts have repeatedly rejected attempts by local jurisdictions to regulate placement of wireless telecommunications facilities based on generalized or speculative concerns. Instead, they require *evidence* beyond "unsupported and hypothetical potential" for such impacts. See *OPM-USA-Inc. v. Bd. of County Com'rs*, 7 F.Supp.2d 1316, 1324 (M.D.Fla. 1997); see also *Town of Oyster Bay*, 166 F.3d at 496; *Town of North Stonington*, 12 F.Supp.2d at 254.

The proposed facility will have *no* significant impacts. There is no evidence in the record on which to base a denial of Sprint's application.

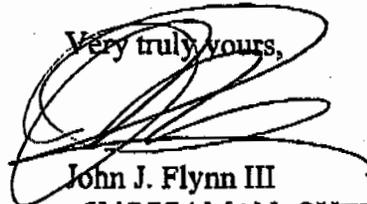
6. CONCLUSION.

As demonstrated above, the Hearing Officer's approval of Sprint's application is supported by both the law and the facts. A denial, on the other hand, would result in a violation of the Federal Telecommunications Act of 1996.

We respectfully request that the Board deny the appeal and affirm the decision of the Hearing Officer on the subject application.

Thank you very much for your consideration of our letter. We reserve the right to provide additional arguments and evidence at or before the hearing of this matter.

Very truly yours,



John J. Flynn III
of NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP

JJF/trg

cc: R. Wyatt Cash, Esq. (via fax)
Timothy McNulty, Esq. (via fax)

LAW OFFICES

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REFER TO FILE #
030769-2182

March 31, 2008

VIA FACSIMILE AND U.S. MAIL

The Honorable James R. Patterson, Chairperson,
and Members of the Board of Supervisors
County Government Center
1055 Monterey Street
San Luis Obispo, CA 93408

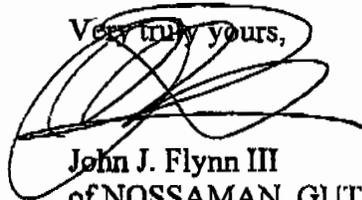
Re: DRC 2006-00204

Dear Chairperson Patterson and Members of the Board of Supervisors:

It appears that we may have omitted the materials identified in my March 12, 2008 letter as "Exhibit A." Exhibit A is comprised of a Propagation Map Narrative and coverage maps that were long ago submitted to the County, and considered by the Hearing Officer whose decision is on appeal to the Board. For ease of reference, the Members of the Board can find the "Exhibit A" materials in the staff report exhibits for the meeting date of April 1, 2008, at pages C1-18 through C1-24.

I apologize for any confusion or inconvenience that may have been caused by our omission of Exhibit A.

Very truly yours,



John J. Flynn III
of NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP

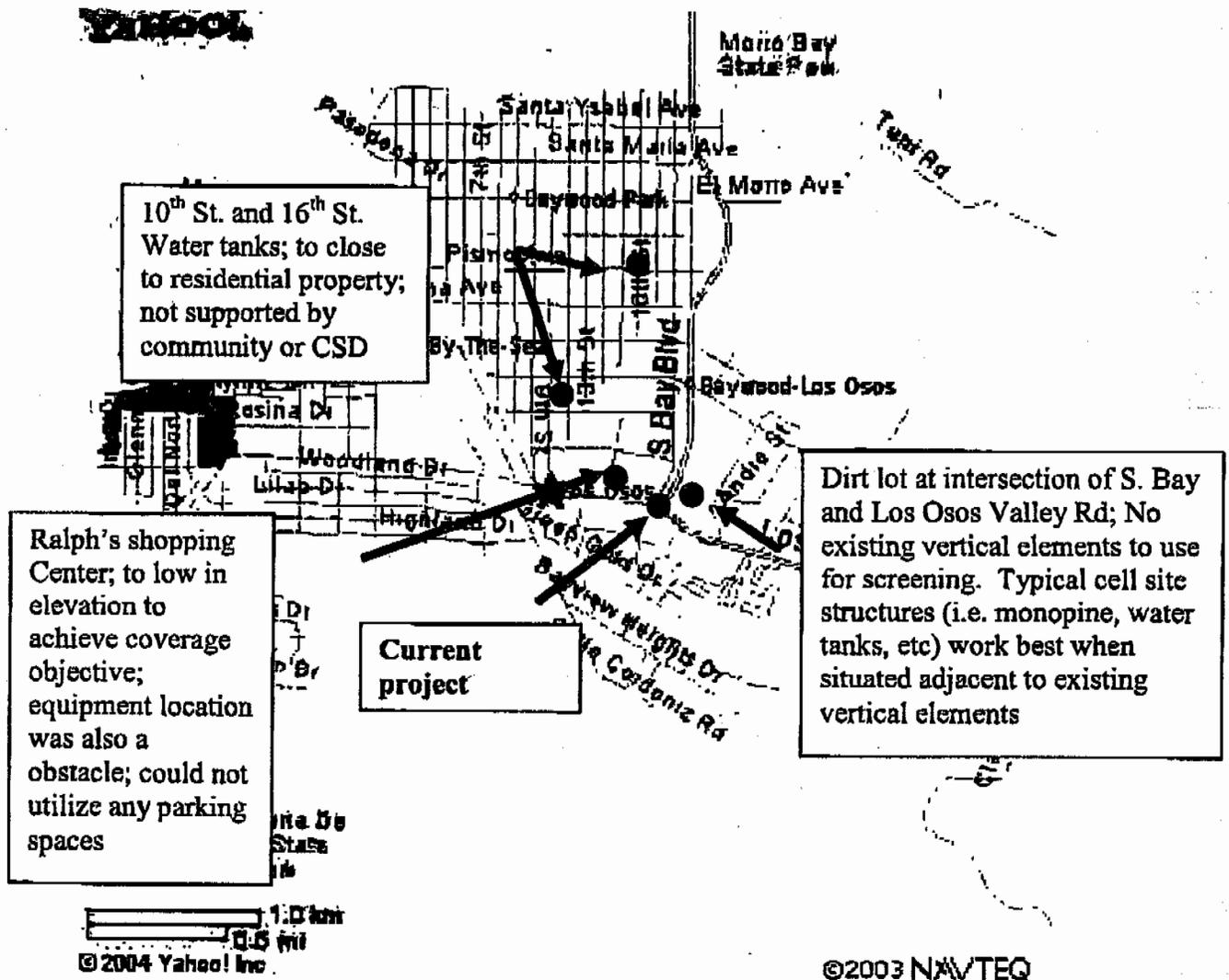
JJF/rrg

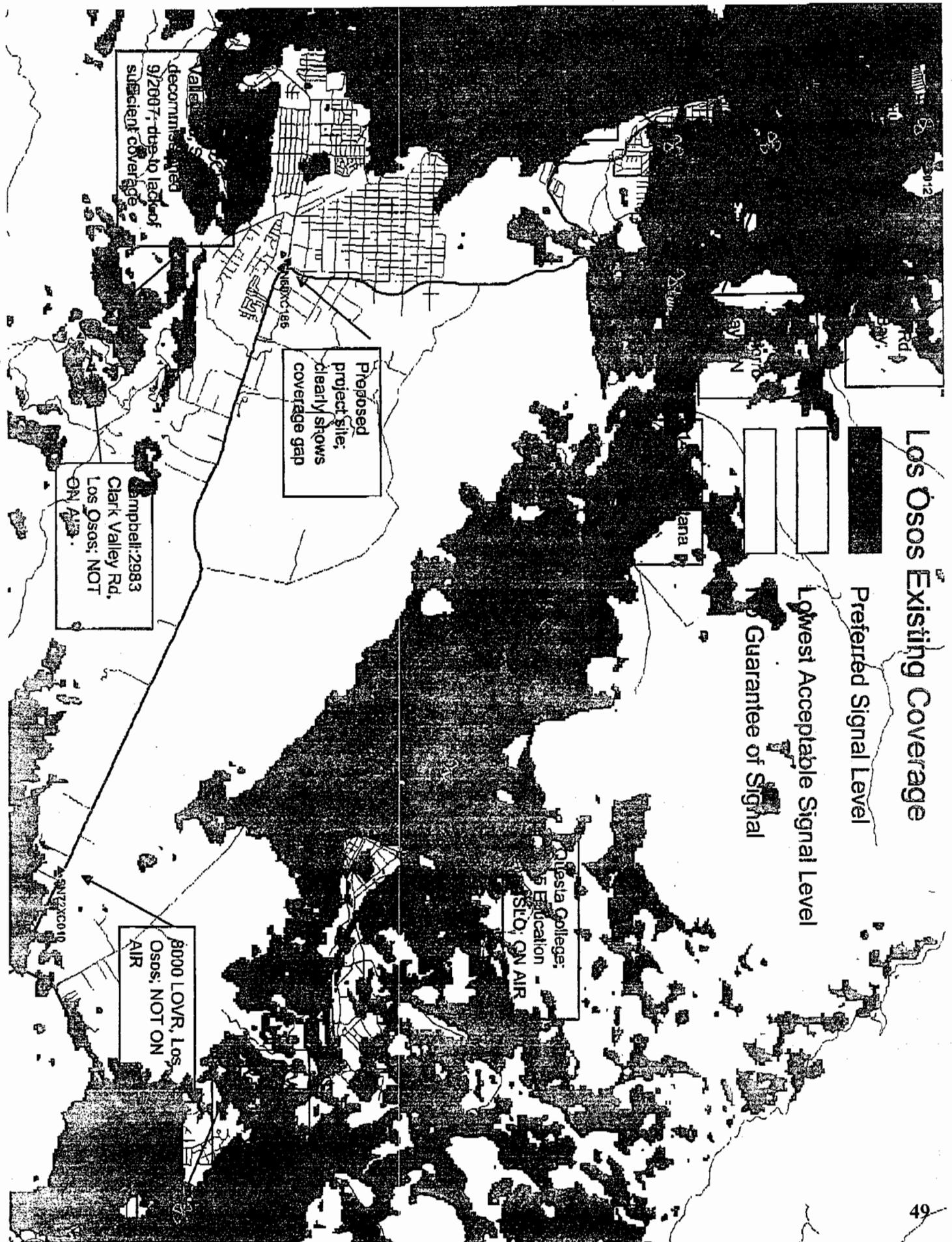
cc: R. Wyatt Cash, Esq. (via fax)
Timothy McNulty, Esq. (via fax)

Alternative Sites Considered for Sprint Project:

Bonaire Investments

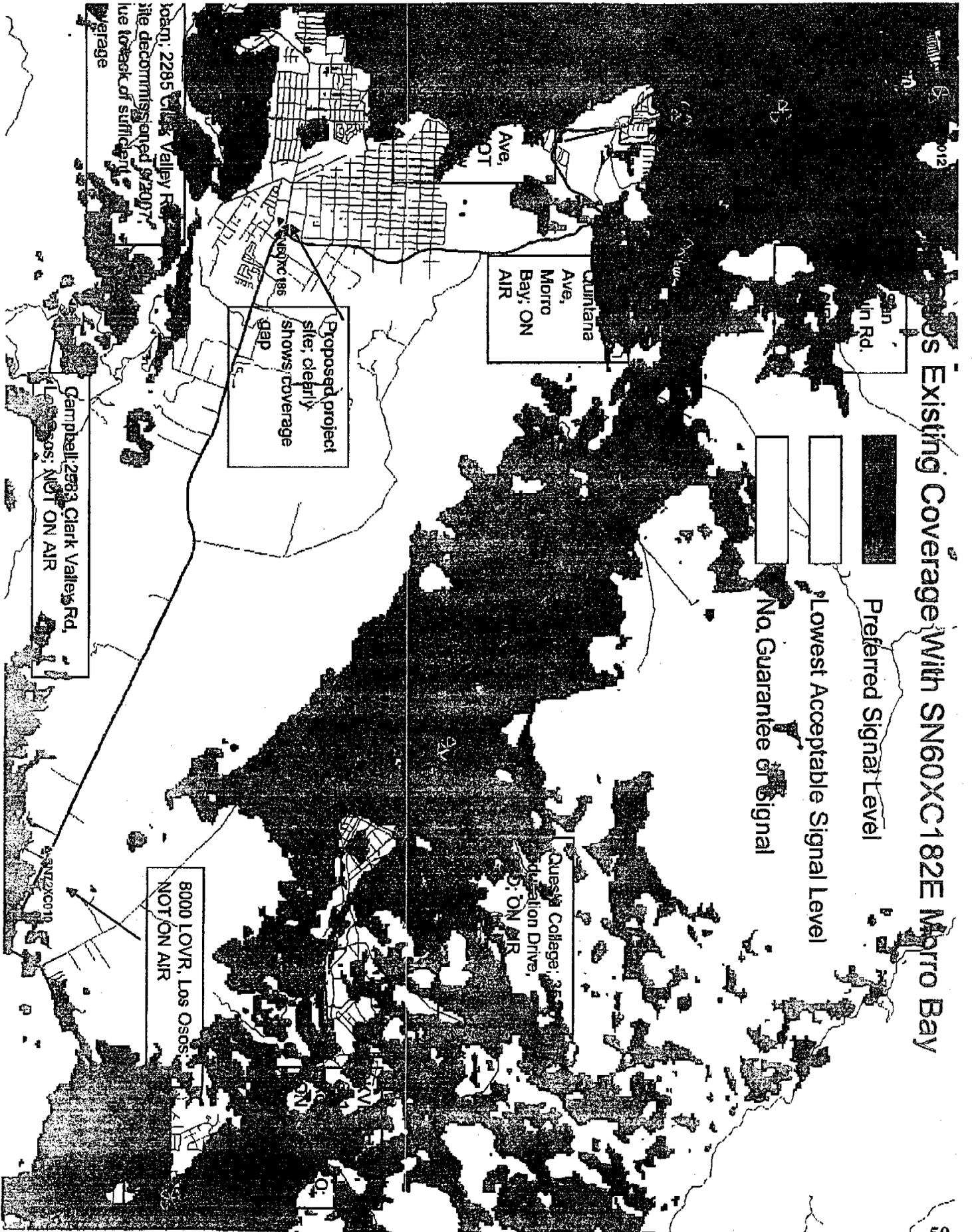
All alternate locations would require a new structure; current proposal of using existing structure; completely stealthed is the preference per the County of SLO telecom ordinance.





Existing Coverage With SN60XC182E Morro Bay

-  Preferred Signal Level
-  Lowest Acceptable Signal Level
-  No Guarantee of Signal



San Juan Rd.

Cuintana Ave, Morro Bay; ON AIR

Proposed project site; clearly shows coverage gap

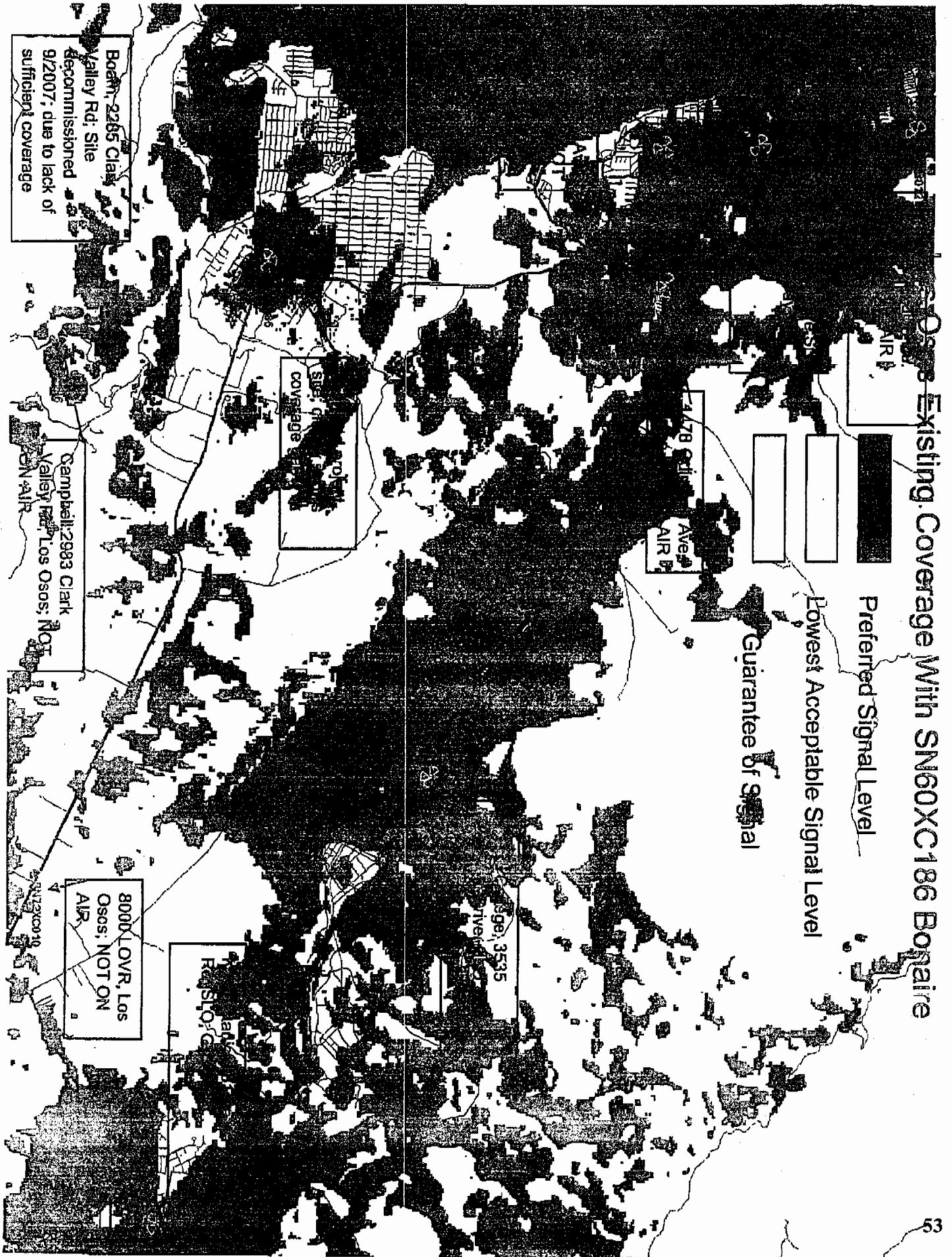
Room: 2285 Clark Valley Rd. Site decommissioned 9/2007. Due to lack of sufficient coverage

Campbell; 2583 Clark Valley Rd. Los Osos; NOT ON AIR

Quest College; 3577 Education Drive; ON AIR

8000 LOVR, Los Osos; NOT ON AIR





Existing Coverage With SN60XC186 Bonaire

AIR B

Preferred Signal Level

Lowest Acceptable Signal Level

Guarantee of Signal

4478 Clark Ave; AIR B

3535

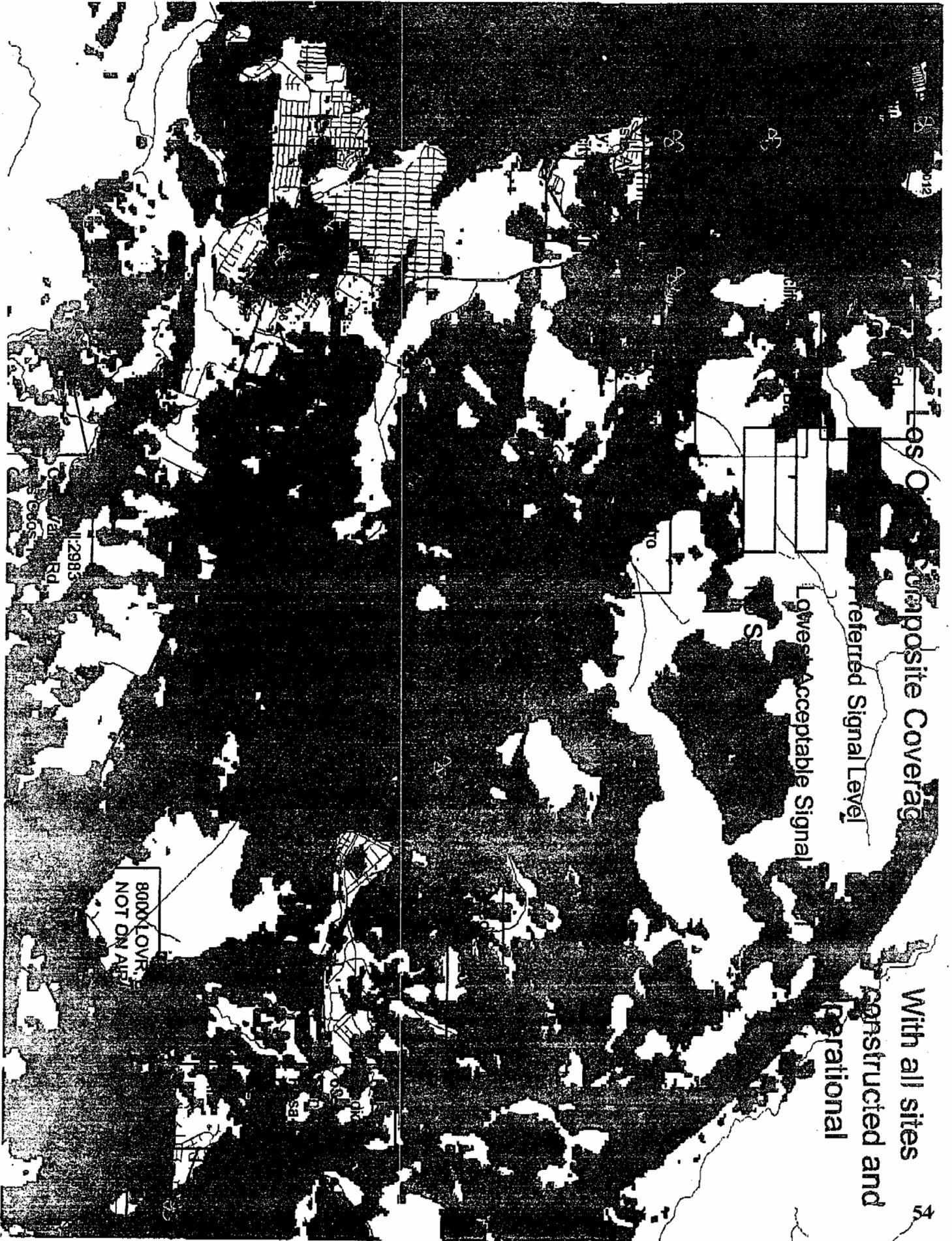
Clark Rd; Los Osos; CA; 92051; 3535

8000 LVR, Los Osos; NOT ON AIR

Boehn, 2285 Clark Valley Rd; Site decommissioned 9/2007; due to lack of sufficient coverage

Campbell, 2983 Clark Valley Rd; Los Osos; NOT ON AIR

Site, full coverage



Composite Coverage

Preferred Signal Level

Lowest Acceptable Signal

With all sites constructed and operational

8000' LOV' NOT ON AIR

C. Adams Rd
112983

F10d

GENE & MIMI KALLAND

June 9, 2008

RECEIVED

JUN 10 2008

CALIFORNIA
COASTAL COMMISSION
CENTRAL COAST AREACalifornia Coastal Commission
725 Front Street: Suite 300
Santa Cruz, CA 95060Re: A-3-SLO-08-022
Bonaire Investments

Dear Honorable Commissioners:

In regard to the appeal filed by Ms. Judy Vick against the construction of a wireless telecommunications facility in Los Osos, California, I urge you to DENY the appeal.

Ms. Vick's previous appeal, which had to do with aesthetics and health, was denied by the County Board of Supervisors. Now, she argues that the antenna will impact wildlife, with references to studies of European storks, house sparrows and frogs. The connection is tenuous at best. The studies she cites, very limited in number, suggest that emissions from cell towers may have an adverse effect on wildlife. But none are conclusive and all refer to the many uncontrollable variables that can play a role in the decline of observed populations. As your staff clearly indicates, no substantial issue exists.

Sincerely,

Dr. Gene Kalland
Dr. Mimi Kalland
1182 Seventh Street
Baywood Park CA 93402

JOYCE KATHLEEN ALBRIGHT
597 Woodland Drive, Los Osos, CA 93402
805-534-9230 . jkalbright@att.net

June 6, 2008

RECEIVED

JUN 06 2008

CALIFORNIA
COASTAL COMMISSION
CENTRAL COAST AREA

California Coastal Commission
c/o Jonathan Bishop, Coastal Planner -- 831-427-4877
725 Front Street, Suite 300
Santa Cruz, CA 95060

Re: A-3-SLO-08-022
Bonaire Investments

Dear Honorable Commissioners,

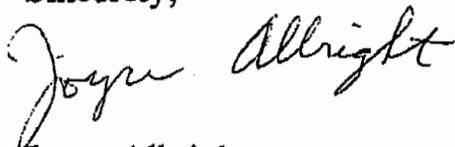
This is regarding a new appeal filed by Ms. Judy Vick against the construction of an unmanned wireless telecommunications facility in Los Osos, California.

I urge you to DENY the appeal. Ms. Vick's health arguments are totally unfounded.

It is my understanding that there will be no visual impact with the equipment, which will be screened from public view.

My very best wishes to you all—your continued efforts on behalf of our community are greatly appreciated.

Sincerely,



Joyce Albright
597 Woodland Drive
Los Osos, California 93402
805/534-9230

cc: Katcho Achadjian at kachadjian@co.slo.ca.us

GRAPHIC DESIGN & FINE ART • 350 Mitchell Drive, Los Osos, California 93402
T: 805/528-7014 F: 805/528-7033 W: PandoraAndCompany.c

June 5, 2008

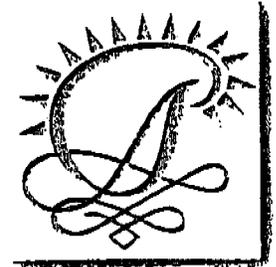
California Coastal Commission
725 Front Street, Suite 300
Santa Cruz, CA 95060

Re: A-3-SLO-08-022
Bonaire Investments

RECEIVED

JUN 05 2008

CALIFORNIA
COASTAL COMMISSION
CENTRAL COAST AREA



Dear Honorable Commissioners,

I am responding to your notice regarding a new appeal filed by Ms. Judy Vick against the construction of an unmanned wireless telecommunications facility in Los Osos, California.

I own a residential rental property near the proposed cell tower site. I have no financial interest in the Bonaire project.

I urge you support your staff's recommendation of "No substantial Issue Exists," and that you will vote to DENY the appeal. The arguments against this project have been emotional and stressed unfounded health issue concerns as well as aesthetics. The American Cancer Society's website discusses health concerns and states: "... cell phone antennas or towers are unlikely to cause cancer."

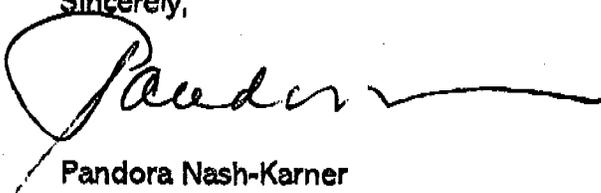
See: http://www.cancer.org/docroot/PED/content/PED_1_3X_Cellular_Phone_Towers.asp

Further the American Cancer Society continues by stating "No human studies have focused specifically on cellular phone towers or even on radio waves more generally....A number of animal studies have been conducted, generally showing no carcinogenic effect of radio waves." Their site includes a long list of additional resources and references.

The aesthetic argument has focused on towers or antennae having the potential to destroy the character of a residential neighborhood. The Bonaire proposed project is at the corner of a busy intersection and there will not be any visual impact as the equipment will be completely screened from public view.

Thank you for your consideration.

Sincerely,


Pandora Nash-Karner

350 Mitchell Drive
Los Osos, California 93402
805/528-7014

cc: Katcho Achadjian

California Coastal Commission
Central Coast District Office
725 Front Street, Suite 300
Santa Cruz, Ca 95060
June 6, 2008

Item # F10d
oppose project

Re: Bonaire Investments Sprint/Nextel
Permit Number A-3-SLO-08-022
Hearing Date June 13, 2008

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CALIFORNIA
COASTAL COMMISSION
CENTRAL COAST AREA

Dear Commissioners:

I oppose this project and ask you uphold the appeal for the following reasons:

1. The project does not comply with FCC guidelines in that the RF engineering report states "the power density may exceed the public limits at the roof." Therefore, the project poses a threat to wildlife, especially birds, as well as humans who work inside the building as well as humans who live & work nearby. (Residences are directly behind & uphill from the project.)

2. Los Osos is within a sensitive resource area. The project is adjacent to the Los Osos Oaks Preserve, an area designated as a sensitive resource area, Los Osos is also on the bird migration fly-way.

3. The project is designated a Special Use under the Officer Professional Category of our Local Coastal Plan. This is not an encouraged use we were told by Planning Dept Staff. Note the antennas are completely inside the building & pose a occupational hazard. (The project is not a principally permitted use)
Please deny this project. Sincerely Lee Andrea Caulfield
748 KILAC BL
LOS OSOS, CA 95051

F10d

1 of 3 pgs

RECEIVED

CA Coastal Commission, June 13, 2008

JUN 09 2008

Agenda Item: NEW APPEALS 10.d

CALIFORNIA
COASTAL COMMISSION
CENTRAL COAST AREA

Appeal No. A-3-SLO-08-022

Judy Vick, Appellant

Re: Appeal of. Bonaire Investments, Sprint-Nextel. Location: 1337 Los Osos Valley Road, Los Osos, CA

Dear Commissioners,

I am appealing a Minor Use Coastal Development Permit, for a cell antenna project in Los Osos, near environmentally sensitive habitat, where a number of endangered species exist. The following are documents to support my appeal and request for further mitigation.

Attachment A): Photos taken from the project site, showing ESHA in close proximity:

1. View from project site, due east.
2. View from project site, due west.
3. View east from 2 blocks west of project site (not visible, left).
4. View east from inside site-adjacent manzanita grove.

The engineering report states the radiofrequency radiation emissions from the project "may exceed public exposure limits" at the roof. The FCC regulations allow posting of warning signs for compliance. **However, the FCC interprets "environmental effects" as meaning "the effects of their actions on the quality of the human environment," a definition they restrict to human exposure** (The FCC's limits, and the NCRP and ANSI/IEEE limits on which they are based, are derived from exposure criteria quantified in terms of specific absorption rate (SAR). Specific absorption rate is a measure of the rate of energy absorption by the body. The FCC exposure limits are also based on data showing that the human body absorbs RF energy at some frequencies more efficiently than at others.).

THE FCC REGS ARE SILENT ON THE EFFECT OF RF RADIATION ON WILDLIFE AND THE NATURAL ENVIRONMENT. Our Coastal Permit Appeal does not pertain to effects of radiation on "the human environment -- human exposure -- **BUT TO THE EFFECTS ON WILDLIFE THAT CONSTITUTE CALIFORNIA'S COASTAL RESOURCES.** Therefore, the Telecom Act does not preempt the right of state agencies to regulate on the basis of these effects. In other words: **There are no FCC regulations "concerning such emissions" -- i.e. effects of RF emissions on wildlife/coastal resources.**

Attachment B): The D.C. Circuit Court of Appeals 2008 ruling requires the Federal Communications Commission to conduct Environmental Impact Assessments of cell towers on migratory birds before granting permits and underscores the point that the FCC has not been considering "environmental effects" as the Coastal Commission uses the term (i.e. the Court "said FCC should consult with wildlife experts and require environmental impact assessments for the towers").

Attachment C): The FCC Public notice dated May 1, 2008 further supports the above court ruling.

Attachment D): 4/27/06 letter from Michael J. Bartlett, Supervisor, New England Field Office of the U.S. Fish and Wildlife Service:

"... In addition to collision mortality related to birds striking towers and their guy-support wires, **a threat dealing with the impacts of radiation is beginning to be documented in Europe. Tower-emitted radiation appears to be impacting breeding and resident bird populations as new communications towers--especially cellular telephone communication facilities--are installed in areas where migratory birds historically breed or reside.** Service wildlife biologist Dr. Albert Manville first discussed the radiation issue in 2002 at an international conference and published concerns about it in the June 2005 Proceedings of the Third International Partners in Flight Conference (PIF)."

"... Since the PIF proceedings were released, Mr. Alfonso Balmori has published several technical papers in scientific journals further raising concerns about radiation impacts to migratory birds, including Wood Storks (Balmori 2004, Balmori 2005)."

"Other utilities, such as the electric utility industry have successfully funded independent research efforts exceeding tens of millions of dollars since the 1970s to reduce transmission wire strikes and distribution wire electrocutions. The electric wind turbine industry has funded well over \$7 million since 1994 to minimize bird strikes at turbine blades. **By contrast, the telecommunications industry has funded no research to date to minimize impacts to birds.**"

Attachment E): 6/3/08 Letter to appellant Judy Vick regarding this appeal, written by Mr. Albert Manville, Senior Wildlife Biologist of the U.S. Fish & Wildlife Division of Migratory Bird Management: “. . . the Division of Migratory Bird Management (Washington Office) certainly supports the need to conduct peer-reviewed research on the impacts of cellular telephone antennas and the radiation from them on resident and migratory birds. . .” “. . . **We would strongly encourage the industry/company proposing to site the antenna(s) to fund such research – provided the study (ies) is (are) conducted by an independent, non-industry-affiliated consultant, and that the results be made available to the public, and published in a refereed scientific journal.**

Attachment F): Briefing Paper on the Need for Research into the Cumulative Impacts of Communication Towers on Migratory Birds and Other Wildlife in the United States, U.S. Fish & Wildlife Service (August 13, 2007).

My request is for the California Coastal Commission to find substantial issue with this permit and impose a condition of the development permit: Require Sprint-Nextel to fund a research study as specified by Mr. Manville.

I appreciate your consideration of my request.

Sincerely,



Judy Vick, Los Osos
Coalition for the Appropriate Placement of Cell Antennas
(805) 528-1688, venturemind@hotmail.com

4 PHOTOS OF ESHA SURROUNDING PROJECT SITE

California Coastal Commission Appeal, June 13, 2008
Re: Project Number A-3-SLO-08-022. Applicant: Bonaire Investments, Sprint-Nextel. Location: 1337 Los Osos Valley Road, Los Osos, CA

1. View from project site, due east.



vanbeastx.jpg

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JUN 09 2008

CALIFORNIA
COASTAL COMMISSION
CENTRAL COAST AREA

2. View from project site, due west.

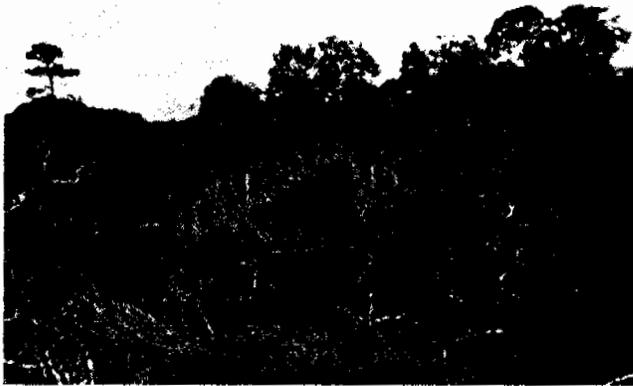


vanbwestx.jpg

Page 2 of 2 (PHOTOS OF ESHA SURROUNDING PROJECT SITE)

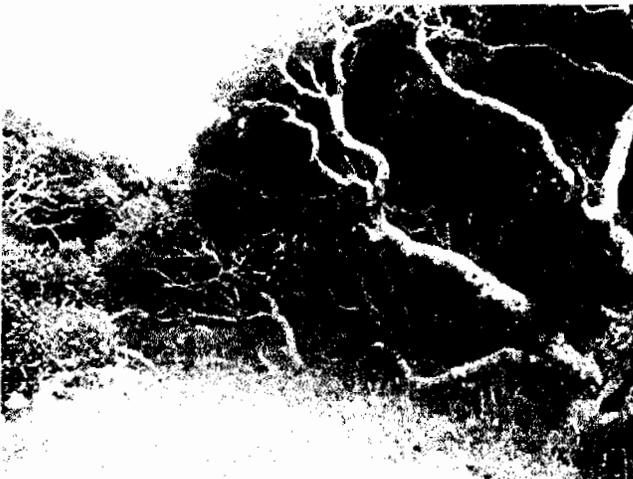
California Coastal Commission Appeal, June 13, 2008
Re: Project Number A-3-SLO-08-022. Applicant: Bonaire Investments,
Sprint-Nextel. Location: 1337 Los Osos Valley Road, Los Osos, CA

3. View east from 2 blocks west of project site (not visible, left).



vanbtositex.jpg

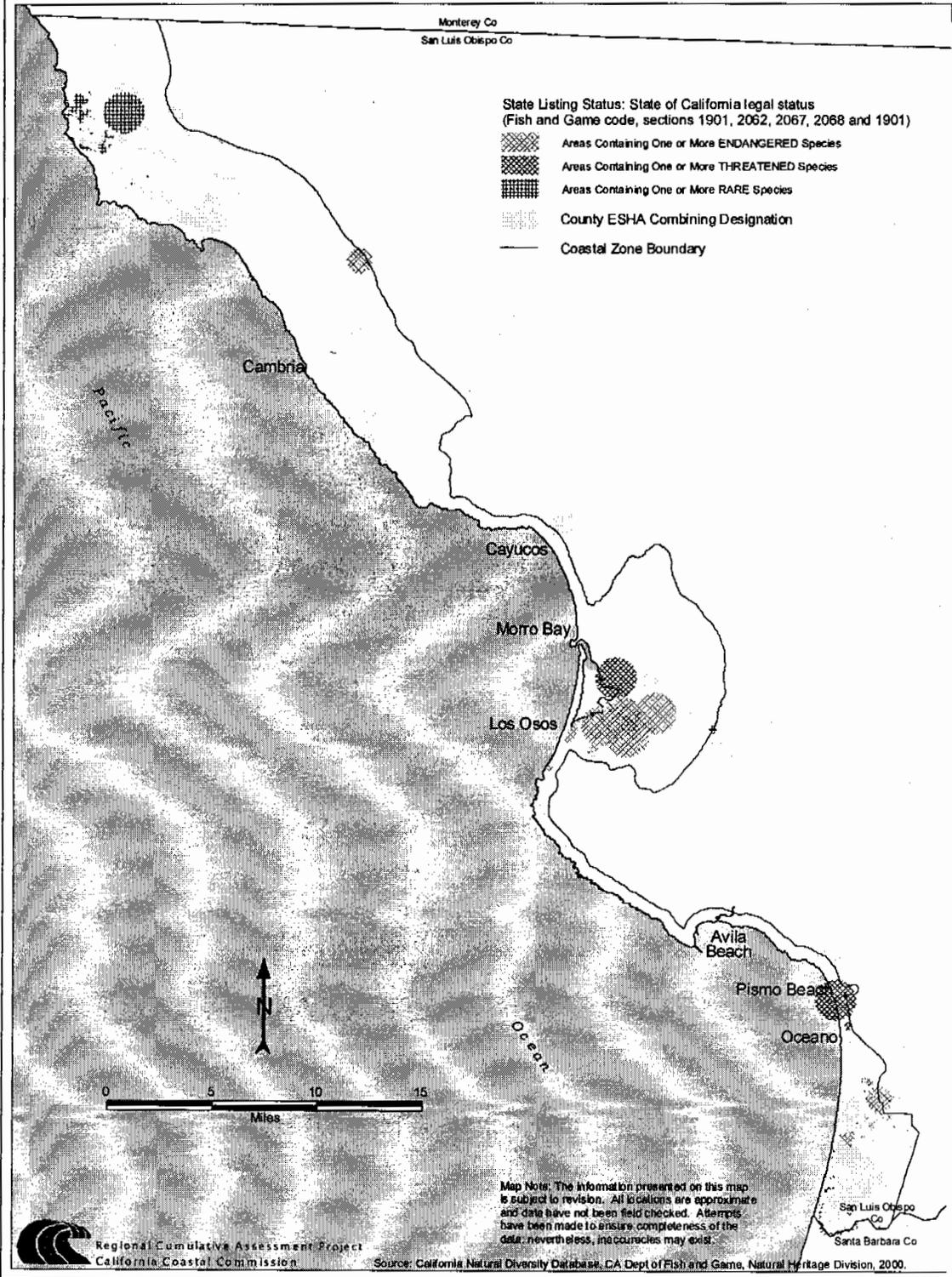
4. View east from inside site-adjacent manzanita grove.



vanbinx.jpg

San Luis Obispo County
Periodic Review

County's ESHA Combining Designation and Areas Containing State Listed Species



Map 4-

Subject: Fw: Environmental Impact Analysis: New Requirement for Cell Towers (USA)

Here is an article published February 21, 2008, on a new D.C. Circuit Court of Appeals ruling requiring the Federal Communications Commission to conduct Environmental Impact Assessments of cell towers on migratory birds before granting permits. Projecting forward, this ruling could be a new opening to raise concerns over other effects of tower radiation. We believe this is a significant move forward as it is a crack in the veneer created by the mobile phone industry in the Telecommunications Act of 1996 where EISs were explicitly excluded. Expect the mobile phone industry to immediately begin legislative moves to counter this high court decision....Stay tuned.....

WILDLIFE: Cell towers must protect birds, U.S. court rules

(02/19/2008)

Allison Winter, *E&ENews PM* reporter

The government must require cell phone towers to be equipped with protection for migratory birds, a federal court ruled today.

The split decision by the U.S. Circuit Court of Appeals for the District of Columbia says that the Federal Communications Commission illegally licensed 6,000 towers along the Gulf Coast. The court says the agency must reassess those permits to make sure the communications towers comply with the Endangered Species Act and National Environmental Policy Act.

The decision addresses FCC's ruling on towers in the Gulf of Mexico, but lawyers who argued for environmentalists on the case said it could have broader reach for all of the agency's permits on new communications towers.

"The reason we think it's significant is that it directs FCC to carefully review the environmental impact of towers before they issue the permits," said Steve Roady, a lawyer with Earthjustice.

Two members of the three-judge panel said FCC should consult with wildlife experts and require environmental impact assessments for the towers. The court also said FCC failed to sufficiently involve the public in its tower approval process. Circuit Judge Brett Kavanaugh dissented. He said the suit was premature because FCC is re-examining the issue of migratory birds and towers in a separate, broader rulemaking.

"The Catch-22 for the interested parties ... is that the commission provides public notice of individual tower applications only after approving them," Judges Judith Rogers and Merrick Garland wrote in their majority opinion.

The American Bird Conservancy and other environmental groups had sued FCC in an effort to block the communications towers along the Gulf Coast, a major migratory corridor for birds. The group says 5 million to 50 million birds are killed each year in collisions and other accidents with communications towers.

"We are very pleased by today's ruling, which will require the FCC to assess the environmental impacts of towers," said Darin Schroeder of the American Bird Conservancy. "Given the large number of bird deaths caused by towers, an environmental review is long overdue." He added that the decision a "huge victory" for birds.

Aviation lights on communications towers can attract and confuse birds, especially in foggy conditions, environmentalists say. Groups say birds could be saved if FCC would change its requirements for lighting on the towers, placing white strobe lights over the constant red lights, to alert the birds. Some industry groups say the lighting schemes would be expensive and have questionable benefits.



PUBLIC NOTICE

(C)

Federal Communications Commission
445 12th St., S.W.
Washington, D.C. 20554

News Media Information 202 / 418-0500
Internet: <http://www.fcc.gov>
TTY: 1-888-835-5322

DA 08-1040

May 1, 2008

OPENING OF DOCKET IN RESPONSE TO AMERICAN BIRD CONSERVANCY, INC. V. FCC, 516 F.3d 1027 (D.C. CIR. 2008)

WT Docket No. 08-61

By this Public Notice, the Wireless Telecommunications Bureau announces that, effective today, it is opening WT Docket No. 08-61 in response to the decision of the Court of Appeals for the District of Columbia in *American Bird Conservancy, Inc. v. FCC*, 516 F.3d 1027 (2008), in which the Court affirmed in part and vacated and remanded in part the Commission's 2006 *Memorandum Opinion and Order* relating to a petition filed by the American Bird Conservancy, the Forest Conservation Council, and the Friends of the Earth.¹

Presentations made in connection with WT Docket No.08-61 will be subject to the "permit-but-disclose" requirements set forth in § 1.1206 of the Commission's *ex parte* rules. Specifically, under the Commission's rules, the Commission's proceeding on remand is subject to treatment by the Commission as restricted for *ex parte* purposes under § 1.1208 of the Commission's rules, unless otherwise provided.² Because this proceeding implicates broadly applicable policy issues, we find, pursuant to Note 2 to § 1.1208 and consistent with § 1.1200(a), that this proceeding should be treated as permit-but-disclose under the *ex parte* rules.³ *Ex parte* presentations in this proceeding will be allowed but must be disclosed in accordance with the requirements of § 1.1206(b).⁴ Commenters seeking to protect the confidentiality of information produced shall follow the procedures set forth in § 0.459 of the Commission's rules.⁵

Parties making oral *ex parte* presentations in this proceeding are reminded that memoranda summarizing the presentation must contain the presentation's substance and not merely list the subjects discussed.⁶ More than a one-or two-sentence description of the views and arguments presented is generally required.⁷

¹ In the Matter of Petition by Forest Conservation Council, American Bird Conservancy and Friends of the Earth for National Environmental Policy Act Compliance, *Memorandum Opinion and Order*, 21 FCC Rcd 4462 (2006).

² 47 C.F.R. § 1.1208.

³ 47 C.F.R. § 1.1208 Note 2; *see also* 47 C.F.R. §§ 1.1200(a), 1.1206.

⁴ 47 C.F.R. § 1.1206(b).

⁵ 47 C.F.R. § 0.459.

⁶ *See* "Commission Emphasizes the Public's Responsibilities in Permit-But-Disclose Proceedings," *Public Notice*, 15 FCC Rcd 19945 (2000).



United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087



April 27, 2006

Ms. Pamela B. Katz, PE
Chairman, Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Dear Ms. Katz:

Migratory birds, especially neotropical songbirds, continue to face growing threats from human development, including the installation of tall structures such as communication towers, power transmission lines, wind turbines, tall buildings, bridges, and monuments. The U.S. Fish and Wildlife Service (Service) has reported that more than 60 bird species of conservation concern are known to be impacted by communication towers.

In addition to collision mortality related to birds striking towers and their guy-support wires, a threat dealing with the impacts of radiation is beginning to be documented in Europe. Tower-emitted radiation appears to be impacting breeding and resident bird populations as new communication towers—especially cellular telephone communication facilities—are installed in areas where migratory birds historically breed or reside.

Service wildlife biologist Dr. Albert Manville first discussed the radiation issue in 2002 at an international conference and published concerns about it in the June 2005 Proceedings of the Third International Partners in Flight Conference (PIF). At that time he noted:

“Preliminary research in Valladolid, Spain, has shown strong negative correlations with levels of tower-emitted microwave radiation and bird breeding, nesting, and roosting in the vicinity of these electromagnetic fields. In the House Sparrow (*Passer domesticus*), White Stork (*Ciconia ciconia*), Rock Dove (*Columba livia*), Magpie (*Pica pica*), Collared Dove (*Streptopelia decaocto*), and other species, nest and site abandonment, plumage deterioration, locomotion problems, and even death were reported among those species found close to cellular phone antennas (A. Balmori, 2003 unpubl. ms). Laboratory mice were treated with radiation to replicate conditions found close to an antenna park by Magras and Xenos (1997) in Greece. After 5 generations of newborns, irreversible infertility occurred. What similar effect antennas may have on birds is unknown.” (Manville 2005: 1056)

Since the PIF proceedings were released, Mr. Alfonso Balmori has published several technical papers in scientific journals further raising concerns about radiation impacts to migratory birds, including Wood Storks (Balmori 2004, Balmori 2005). The Service would like to see similar research replicated in the eastern United States to determine what radiation impacts, if any, are being documented on North American avifauna.

Notwithstanding other issues that the Service may have, the consideration of the siting of cellular phone antennas on Beebe Hill in Falls Village, Connecticut, proposed by Nextel provides such an opportunity for research, as would an experimental and a control site in the adjacent Berkshire Mountains of Massachusetts. The Service would be glad to help design an independent study, perhaps to be conducted by scientists at the U.S. Geological Survey's Biological Resources Discipline, to assess radiation impacts to migratory birds. A scientifically robust, statistically sound, three-year study could probably be conducted for approximately \$400,000 at both sites and in a laboratory. A detailed budget can be developed.

Other utilities, such as the electric utility industry, have successfully funded independent research efforts exceeding tens of millions of dollars since the 1970s to reduce transmission wire strikes and distribution wire electrocutions. The electric wind turbine industry has funded well over \$7 million since 1994 to minimize bird strikes at turbine blades. By contrast, the telecommunications industry has funded no research to date to minimize impacts to birds. By this letter, the Service respectfully requests that the Siting Council consider asking Nextel to fund these studies in Falls Village and the Berkshires.

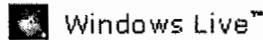
Should you need additional information, please contact Mr. Vernon Lang (Vernon.Lang@fws.gov; 603/223-2541) of my staff; Alex Hoar (Alex.Hoar@fws.gov; 413/253-8631) of our Regional Office staff in Hadley, Massachusetts; or Dr. Al Manville (Albert.Manville@fws.gov; 703/358-1963) of the Division of Migratory Bird Management, Arlington, Virginia. Thank you for your consideration of this request.

Sincerely yours,



Michael J. Bartlett
Supervisor
New England Field Office

(E)

**Re: I would appreciate your expert comments as soon as possible**From: **Albert_Manville@fws.gov**

Sent: Tue 6/03/08 2:07 PM

To: judy V. (venturemind@hotmail.com)

Cc: jbishop@coastal.ca.gov; jnewton@emrpolicy.org; Michael_Green@fws.gov

Attachments: Manville_mortalityEdited- Manville review.doc (131.4 KB), Security scan upon download 
Comm Tower Research Needs Public Briefing-2-807.doc (101.6 KB)

Dear Ms. Vick,

I just returned to the office today from vacation so this is the first I've heard about this issue. Per your follow-up email sent today, you requested that I write a letter in support of your appeal to the CA Coastal Commission. The USFWS does not generally intervene in State issues, including cellular telephone tower (antenna) sitings. Even if I were able to provide comments to the Commission supporting your position, they would have to be cleared likely by our Solicitors and Migratory Bird management before release. Our Migratory Birds Program in Oregon (Region 1 Headquarters -- Dr. Mike Green, copied) has the lead on the avian-tower issue. I would suggest that you coordinate with Dr. Green who may be able to contact the appropriate CA Ecological Services Field Office staff person who could review this project -- just to see if they are engaged.

However, the Division of Migratory Bird Management (Washington Office) certainly supports the need to conduct peer-reviewed research on the impacts of cellular telephone antennas and the radiation from them on resident and migratory birds. Radiation represents a new and essentially unknown and unstudied impact to wildlife -- certainly in North America. Attached is my research needs proposal reflecting this recommendation. We would strongly encourage the industry/company proposing to site the antenna(s) to fund such research -- provided the study (ies) is (are) conducted by an independent, non-industry-affiliated consultant, and that the results are made available to the public, and published in a refereed scientific journal.

As you have done below, you also are welcome to reference the materials I provided to Congressional staff in May 2007. I'm also attaching an article -- in addition to the research needs document -- that elevates this issue. I say "suspected" because we have yet to validate research being conducted in Europe on radiation impacts to avifauna in N. America. The evidence seems very strong, but actual "cause and effect" have yet to be documented. Teasing out the etiology and the dynamics remains a major challenge. I would suggest avoiding any reference to the bee-cell phone issue since the study in which it was conducted in Germany was flawed.

You are welcome to use this document in your submission to the Commission. Good luck. Wish I could be of more help but we're early yet in the radiation impacts assessment process -- thus the important need for bona fide research. -Al Manville-

Albert M. Manville, II, Ph.D., CWB
Senior Wildlife Biologist: Bird Strike, Bycatch, Policy, & International Issues
Division of Migratory Bird Management
U.S. Fish & Wildlife Service
4401 N. Fairfax Dr., MBSP-4107
Arlington, VA 22203
Ph. 703/358-1963
Fx. 703/358-2272
Albert_Manville@fws.gov
Web: <http://birds.fws.gov>

**Briefing Paper on the Need for Research into the Cumulative Impacts of
Communication Towers on Migratory Birds and Other Wildlife in the United States
Division of Migratory Bird Management (DMBM), U.S. Fish & Wildlife Service – for
Public Release**

LAST UPDATED: August 13, 2007

[Comm Tower Research Needs Public Briefing-2-807.doc]

ISSUE: The number of communication towers including radio, television, cellular, microwave, emergency broadcast, national defense, and paging towers has grown exponentially in the U.S. over the past decade. These towers present health and safety challenges for humans, but they are also a growing impact to populations of migratory birds, 4-5 million of which are conservatively estimated to die each year in tower and guy-wire collisions (Manville 2005). Virtually unknown, however, are the potential effects of non-ionizing, non-thermal tower radiation on avifauna, including at extremely low radiation levels, far below maximum safe¹ exposure levels previously determined for humans.

This briefing paper addresses the need to cumulatively assess the impacts of communication towers on migratory birds both from collisions and radiation, especially neotropical migratory songbirds that are most impacted (Shire *et al.* 2000). The paper discusses some suggested research protocols needed to conduct a nationwide cumulative impacts analysis that would assess effects of tower collisions and radiation on avifauna and on other wildlife pollinators including bats and bees.

BACKGROUND

Light Attraction to Birds in Inclement Weather

Beginning with the earliest reported bird-tower kill in the U.S. (in September 1948 at a 137-m [450-ft] radio tower in Baltimore, MD [Aronoff 1949]), the nighttime attraction of lighting during inclement weather has proved to be a key liability for birds. However, much of the past research focused on carcass collections that were not necessarily correlated to nighttime lighting or to weather events. For example, the first long-term study of the impact of a television tower on birds began in 1955 by the Tall Timbers Research Station in FL. After the first 25 years of the study, 42,384 birds representing 189 species were tallied (Crawford and Engstrom 2001). Kemper (1996) reported collecting more than 12,000 birds killed in inclement weather on one night at a television tower in Eau Clair, WI. Manville (2005, 2007) provided additional details of documented bird-tower collision studies in the U.S., especially in regard to lighting and weather events.

Recently, Gehring *et al.* (2006, 2007) reported where red, steady-burning lights were extinguished allowing only flashing or strobe lights to persist on towers, the lighting change-out resulted in a 71% reduction in avian collision mortality at towers in MI. In a short-term study,

¹ "Safe" levels were based on thermal heating standards, now inapplicable. The standards are nearly 25 years out of date, and the EPA office tasked to direct the human safety issues was eliminated due to budget cuts in the early 1980s. Furthermore, the standards in place do not address the potential effects of radiation on wildlife. No government agency currently monitors the rising background levels of electromagnetic radiation (EMF). Current safety standards assume that non-ionizing radiation is safe if the power is too weak to heat living tissue. However, since the 1980s, growing amounts of published research are showing adverse effects on both humans and wildlife far below a thermal threshold – usually referred to as "non-thermal effects," especially under conditions of long-term, low-level exposure (DiCarlo *et al.* 2002, Levitt and Morrow 2007).

Evans *et al.* (2007) looked at lighting attraction at ground level in complete cloud cover, but found that neither red, steady-burning nor red flashing lights induced bird aggregation. They hypothesized that the disorientation to red light only occurs if birds are actively using magnetoreception and the red light creates an imbalance in the magnetoreception mechanism. Additional studies are underway to better understand the mechanisms of lighting attraction.

Published research protocols developed to count and estimate bird-tower kills have been developed (*e.g.*, Avery *et al.* 1978, Manville 2002, Derby *et al.* 2002, and Gehring *et al.* 2007) and will be briefly reviewed below for use in future cumulative effects assessments for both collision and radiation studies.

Potential Radiation Impacts to Birds

In 2002, T. Litovitz (Catholic University, pers. comm.; DiCarlo *et al.* 2002) raised troubling concerns about the impacts of low-level, non-thermal radiation from the standard 915 MHz cell phone frequency on domestic chicken embryos under laboratory conditions. Litovitz noted deformities, including some deaths of the embryos subjected to hypoxic conditions under extremely low radiation doses².

Preliminary research on wild birds at cellular phone tower sites in Valladolid, Spain, showed strong negative correlations between levels of tower-emitted microwave radiation and bird breeding, nesting, and roosting in the vicinity of the electromagnetic fields (Balmori 2003). Birds had historically been documented to roost and nest in these areas. House Sparrows, White Storks, Rock Doves, Magpies, Collared Doves, and other species exhibited nest and site abandonment, plumage deterioration, locomotion problems, and even death among some birds found close to cellular phone antennas. Balmori did not observe these symptoms prior to construction of the cell phone towers. Balmori (2004, 2005) noted that the White Stork appeared most heavily impacted by the tower radiation during the 2002-2004 nesting season in Spain. Manville (2005) reported Balmori's (2003) preliminary results, and raised concerns of similar events in the U.S.

Everaert and Bauwens (2007) found strong negative correlations between the amount of radiation presence (both in the 900 and 1800 MHz frequency bands) and the presence of male House Sparrows. In areas with high electric field strength values, fewer House Sparrow males were observed. Everaert and Bauwens' preliminary conclusion, long-term exposure to higher radiation levels was affecting bird abundance or bird behavior in this species. Balmori and Hallberg (2007) reported similar declines in House Sparrows directly correlated with levels of electromagnetic radiation in Valladolid, Spain.

Of concern to DMBM are the potential impacts of radiation on bird populations. Beason and Semm (2002) tested neural responses of Zebra Finches to 900 MHz radiation under laboratory conditions and showed that 76% of the neurons responded by 3.5-times more firings. No studies have yet been conducted in the U.S. on radiation impacts to wild bird populations. Magnetite, a mineral highly sensitive to electromagnetic frequencies (EMFs), has been discovered in human, bird, and fish brains. It has been suggested that radio frequency radiation (RF) may be acting as an attractant to birds since their eye, beak and brain tissues are loaded with magnetite, a mineral highly sensitive to magnetic fields that birds use for navigation (Ritz *et al.* 2004, R. Beason cited in Levitt and Morrow 2007). Communication tower radiation in the U.S. may already be impacting breeding and migrating populations of birds, bees, and other wildlife, based on research conducted in Europe. It is therefore important to gain a far better understanding of the

² *i.e.*, doses as low as 1/10,000 below the allowable "safe" level of radiation (T. Litovitz 2002 pers comm.; DiCarlo *et al.* 2002).

suspected impacts of radiation on birds and other wildlife, particularly if those suspected impacts are having effects on species at the population level.

Potential Radiation Effects on Other Pollinators

Radiation has also been implicated in effects on domestic honeybees, pollinators whose numbers have recently been declining due to “colony collapse disorder” (CCD) by 60% at U.S. West Coast apiaries and 70% along the East Coast (Cane and Tepedino 2001). CCD is being documented in Greece, Italy, Germany, Portugal, Spain, and Switzerland. One theory regarding bee declines proposes that radiation from mobile phone antennas is interfering with bee navigational systems. Studies performed in Europe have documented navigational disorientation, lower honey production, and decreased bee survivorship (Harst *et al.* 2006, Kimmel *et al.* 2006, Bowling 2007). This research needs further replication and scientific review, including in North America. Because pollinators, including birds, bees, and bats, play a fundamental role in food security (33% of our fruits and vegetables would not exist without pollinators visiting flowers [Kevan and Phillips 2001]), as pollinator numbers decline, the price of groceries goes up.

Harst *et al.* (2006) performed a pilot study on honeybees testing the effects of non-thermal, high frequency electromagnetic radiation on beehive weight and flight return behavior. They found that of 28 unexposed bees released 800 m (2,616 ft) from each of 2 hives, 16 and 17 bees returned in 28 and 32 minutes, respectively, to hives. At the 1900 MHz continuously-exposed hives, 6 bees returned to 1 hive in 38 minutes while no bees returned to the other hive. In exposed hives, bees constructed 21% fewer cells in the hive frames after 9 days than those unexposed. Harst *et al.* selected honeybees for study since they are good bio-indicators of environmental health and possibly of “electrosmog.” Because of some concerns raised regarding the methods used to conduct the Harst *et al.* (2006) study, specifically the placement of the antenna where bees could contact it (*i.e.*, potentially a bias), the experimental methods need to be redesigned and the studies retested to better elucidate and fine tune the impacts of radiation. The results, while preliminary however, are troubling. Kimmel *et al.* (2006) performed field experiments on honeybees under conditions nearly identical to the Harst *et al.* (2006) protocol except that bees were stunned with CO₂ and released simultaneously 500 m (1,635 ft) from the hives. However, in one of their experimental groups, they shielded the radiation source and antenna in a reed and clay box to address potential biases raised in the Harst *et al.* study. Sixteen total hives were tested, 8 of which were irradiated. After 45 minutes when the observations were terminated, 39.7% of the non-irradiated bees had returned to their hives while only 7.3% of the irradiated bees had.

RESEARCH DISCUSSION

If communication tower collisions are killing 4-5 million or more birds per year in the U.S. due to collisions, what impact – if any – might radiation have on avifauna? Bees? Other wildlife? We simply do not know. In 2000, the Communication Tower Working Group (chaired by DMBM/Manville) developed a nationwide tower research protocol that would assess cumulative impacts from tower collisions nationwide, suggesting the use of some 250 towers of different height, lighting, and support categories. The preliminary cost estimate for a 3-year study was \$15 million. No funding was ever acquired and the collision study has not yet been conducted.

The proposed 2000 study was to focus on the collision impacts of communication towers to birds during spring and fall migrations, but the same types of mortality monitoring could be conducted during the late spring/summer breeding seasons, looking particularly for evidence of injury and death to breeding birds in close proximity to communication towers. Radiation levels would need to be measured at the tower sites and nests adjacent to the towers during nesting activity, and bird behavior would also need to be monitored throughout the breeding season. Laboratory necropsies

would need to be performed on birds and other wildlife suspected of impacts from radiation to better understand what caused their deaths and to verify that they did not die from blunt force trauma from tower or wire collisions. Pre-construction studies should be performed to assess habitat use by breeding and resident avifauna. Post-construction studies should assess site abandonment, development of deformities, injuries, and deaths. A careful review of the protocols developed by Balmori (2004, 2005), Balmori and Hallberg (2007), Everaert and Bauwens (2007), and others is critical because similar studies should be performed in the U.S.

METHODS FOR ASSESSING AVIAN COLLISION MORTALITY

Methods for Assessing Tall Tower Mortality

Bird strike mortality studies at “tall”³ communication towers conducted previous to research performed by Avery *et al.* (1978) indicated that most dead birds were found within 60 m (197 ft) of the central communication tower structure. Avery *et al.* assessed songbird mortality at a 369-m (1,210-ft) Omega Loran U.S. Coast Guard tower in ND. Based on daily monitoring during 3 fall and 2 spring migration seasons, 63% of the birds they found dead or injured at this tower were within 92 m (300 ft) of the tower. Avery *et al.* placed tagged bird carcasses (*e.g.*, House Sparrows and European Starlings) in catchment nets and on non-netted habitats (*e.g.*, gravel pads, roads, and marshy plots) to assess persistence and scavenging/predation loss. They completely examined the inner 46-m (150-ft) radius of the tower (concentric circle designated “A”) for bird carcasses, including both the areas covered with catchment nets and the non-netted areas. Placing tagged carcasses in random search plots, which are then found or not found and/or removed or not removed, helps determine biases (Erickson *et al.* 1999). However, there are inherent problems associated with using tagged bird carcasses, including the attraction of predators, cost, availability, and adequate sample size (D. Strickland, WEST Inc., pers. comm.).

In addition to the total area assessed during this study (168 ha [415 ac]), for the remainder of the search area, Avery *et al.* (1978) divided the habitat into concentric circles of radii 92 m (designated “B”; 303 ft), 183 m (C; 600 ft), and 731 m (D; 2,398 ft), respectively. Two compass lines (north-south and east-west) divided B, C, and D into 12 substrata beyond the inner core. In each of the substratum, 2 net catchment sampling plots, 12.4 m (41 ft) on a side, were randomly selected. Nylon netting suspended on steel frames 1.5 m (5 ft) high, with the net’s center anchored to the ground, was utilized. See Manville (2002) beyond for additional net details.

Sampling nets were demonstrated by Avery *et al.* (1978) to be highly effective in preventing losses to scavengers and predators; none of 33 of the test birds placed in nets during the Avery *et al.* study were taken during the first night, but 12 of 69 test birds placed on non-netted gravel sampling plots were taken during the same period. During the Avery *et al.* study, dead bird searches were made daily at dawn during the peak of songbird migration. In a study at a Tallahassee, FL, television tower – where sampling nets were not used – scavenging was considerably higher; only 10 of 157 birds were left undisturbed after one night (*i.e.*, 93.6% scavenging; Crawford 1971).

Homan *et al.* (2001) placed carcasses of House Sparrows in dense vegetation, comparing searcher efficiencies of humans and canines. The dogs received no special training in carcass searching.

³ hereafter, towers greater than 61 m (199 ft) above ground level (AGL), generally guyed, and always lit at night.

Thirty-six trials were conducted in 5 x 40-m (16 x 131-ft) study plots. Humans found 45% of the carcasses while dogs found 92%. The ratio of recovered to missed carcasses was approximately 12:1 for dogs and 1:1 for humans, making dogs much more efficient in finding carcasses. Searcher efficiencies were not improved but remained similar when testing residual cover (April searches) versus new growth cover (August searches). Because the protocol in the Homan *et al.* study improved quantitative and qualitative assessments, it provides considerable promise for the research initiatives being proposed in this briefing paper.

Arnett (2006) further tested the dog-search protocols of Homan *et al.* (2001) and others, assessing the abilities of dog-handler teams to recover dead bats at 2 commercial wind turbine facilities. Dogs found 71% of the bats placed during searcher-efficiency trials at Mountaineer, WV, and 81% of those at Meyersdale, PA, while human searchers found only 42% and 14% of the carcasses, respectively. Both dogs and humans found a high proportion of the trial bats within 10 m (33 ft) of the turbine tower, usually in open ground (88% and 75%, respectively). During a 6-day fatality search trial at 5 Mountaineer turbines, dog-handler teams found 45 carcasses while human searchers during the same period found only 19 (42%). As vegetation height and density increased, humans found fewer carcasses while dog-handler team searcher efficiencies remained high. Arnett's (2006) study further reinforces the hypothesis that use of dogs greatly improves efficiencies in finding dead bats very similar to what Homan *et al.* (2001) found for locating passerines. Dog use should be given serious consideration in conducting bird and bat mortality studies at telecommunications towers.

From 2003 through 2005, Gehring *et al.* (2006, 2007) studied 24 tall communication towers in MI. They used flagged, straight-line transects, each technician walking at a rate of 45-60 m (147-196 ft) per minute and searching for carcasses within 5 m (16 ft) on either side of each transect, as suggested by Erickson *et al.* (2003). The transects covered a circular area under each tower with a radius equal to 90% the height of the tower. The straight line transects were much easier to navigate than were circular transects (J. Gehring, Michigan Natural Features Inventory, pers. comm.). Due to dense vegetation, observer fatigue, human error, scavenging by predators, and crippling loss of birds and bats that may have escaped the detection area, Gehring *et al.* tested each technician's observer detection rate and rate of carcass removal. Ten bird carcasses of predominately Brown-headed Cowbirds, with painted plumage to simulate fall song bird migration plumage, were placed once each field season within each study plot to assess observer efficiencies. Likewise, 10-15 predominately Brown-headed Cowbirds were placed by each technician at the edge of designated tower search area to monitor the daily removal of carcasses by scavengers. These carcasses were not painted to avoid placing any foreign scent on them. No catchment nets were used in this study.

Methods for Assessing Short Tower Mortality

Manville (2002) developed a protocol for the U.S. Forest Service (USFS) to study the effects of cellular telecommunications towers on birds and bats, recommending use of elevated catchment nets for a Coconino, Kaibab, and Prescott National Forest study in AZ. Modifying the Avery *et al.* (1978) search protocol, Manville suggested use of 1.9-cm (0.75-in) mesh knitted polyethylene nets, 15 x 15 m (50 x 50 ft) in size, suspended 1.5 m (5 ft) above ground, with 8 gauge monofilament nylon line attached around the periphery of the entire net, supported with 2-m-long (6.5-ft) steel angle posts driven into the ground and spaced every 2-3 m (7-10 ft) apart. He recommended pulling the center of each net close to the ground, securing with monofilament to a cinder block, thus creating a downslope gradient from the edge of the net to its center so a carcass landing in the net would tend not to be blown from the netting edge to the ground by a strong wind. He did not recommend using a wooden lip on the net's edges as Avery *et al.* (1978) had suggested. Materials for each net were estimated to cost \$320 (Avery and Beason 2000).

Manville (2002) postulated that use of elevated catchment nets would make finding dead birds killed by tower strikes more reliable, especially under variable habitat conditions (e.g., unsuitable substrate for searching, tall grass, shrubs, roots, boulders, or trees). Manville recommended breaking down the tower's circumference into 3, 120° arcs, then breaking the study plot into 2 concentric circles. The radius of the first circle from the tower's center was 30 m (100 ft) and nets were to be randomly deployed to cover 24% of the total area of that concentric circle, 1 net randomly placed in each 120° arc. For the second concentric circle (30-60 m in radius from the center [100-197 ft]), nets were placed randomly in 8% of the total area, 1 net randomly placed in each of the 3 arcs.

Manville (2002) did not recommend using tagged bird carcasses in the AZ study because he believed that double sampling would address sampling efficiency biases. Double sampling involves (1) net sampling, allowing for an estimate of the number of carcasses that fall beneath each tower and are relatively unbiased for searcher efficiency and carcass removal, and (2) ground sampling where biases are inherent. For short towers, he recommended the entire area the radius of the tower height be completely searched (including under the nets) at dawn each day during the migration season and once weekly during the breeding season. Net sampling allows for adjustment of the ground sampling estimates that would correct for carcass removal and searcher efficiency bias based on the relative difference of the number of carcasses found using the 2 sampling methods at each communication tower studied.

Manville (2002) indicated that the probability of catching a bird in a net would change with increased distance from the tower (i.e., birds may fly or be carried by the wind for a distance before dying). He suggested that if there is a bias because birds tend to die greater than 30 m (100 ft) from a short tower, probabilities can be determined by searching strip transects that radiate from a tower. He recommended using a transect 1.5- 2 times the height of the tower, 15 m (50 ft) wide, placed on a randomly selected compass line. Carcass searches within the transect should help to estimate the area that should be sampled by nets, develop a correction factor outside the radius of the area sampled by the nets, and improve the correction factor for ground surveys conducted exclusive of the net surveys. Manville suggested this transect survey be conducted at least once per week, preferably in the early morning hours, during both migration and breeding seasons. With the recent use of trained dogs to detect and locate dead and injured birds and bats, where dogs have been shown to be at least 50% more effective in finding carcasses, dog use should be considered a viable monitoring alternative (E. Arnett, Bat Conservation International, pers. comm., Homan *et al.* 2001, Arnett 2006).

Derby *et al.* (2002) modified the Manville (2002) protocol to conduct the cellular telecommunications tower study in AZ for the USFS. There, 6 of the 7 cell towers were surrounded by 3-m (10 ft) walls, 29 m (95-ft) long on each side. The walled square was divided into 4 equal blocks, and within 1 of these blocks a 12 x 12-m (40 x 40-ft) nylon mesh net was randomly placed based on net specifications recommended by Manville (2002) but placed > 3 m (10 ft) above the ground to allow company personnel to perform maintenance on the sites. Outside the walled compounds, Derby *et al.* used 4, 6 x 6-m (20 x 20-ft) nets, 3 of the nets randomly set outside the wall to a distance of 30.5 m (100 ft) from the tower, and the 4th net randomly placed in the band from 31 to 61 m (100-200 ft) from the tower. Inside the walled compound the entire area was searched by walking transects 6 m (20 ft) apart (3 m [10 ft] search width). The surveys were performed at dawn 4 times per week during peak songbird migration.

Derby *et al.* (2002) also recommended using straight line transects, 4 oriented perpendicular to the walls, and 4 diagonal from the corners of the wall – representing the “spokes of a wheel.”

Each transect was 61 m (200 ft) long, and 6-m (20 ft) wide. Because the Derby *et al.* protocol also used double sampling, no tagged carcasses were used in their study.

Both Manville (2002) and Derby *et al.* (2002) recommended daily searches of all electrical wiring to assess for electrocution and wire collision mortality.

Homan *et al.* (2001) used Labrador retrievers and a Chesapeake Bay retriever to search 6 plots, 5 x 40 m (16 x 131 ft) in size, delineated by flagging, to detect 8 thawed House Sparrow carcasses randomly thrown in each of the plots from 1 m (3 ft) outside the plot, allowing the human or human-dog team to search each plot for 10 minutes. Dogs were kept on 5-m (16-ft) leashes during searches. Humans were active searchers when using the dogs. Searches were not conducted during steady rain or when winds were ≥ 32 km/hr (20 mph). The technique with leashed dogs could easily be used to survey both tall and short tower plots, based on the protocols previously recommended. With the dogs confined to leashes, additional training would be unnecessary.

Arnette (2006) used 2 trained chocolate Labrador retrievers to locate test bat carcasses of different species and in different stages of decomposition at commercial wind turbine facilities on the Appalachian Mountain front in PA and WV. His dogs were trained in basic obedience, "quartering" (*i.e.*, systematically searching back and forth in a 10-m-wide [33 ft] transect), and blind retrieval handling skills. The dogs were trained with dead bats 7 days prior to field trials. When a dog found a test bat, the dog was rewarded with a food treat if it performed the task of finding the bat, sitting or stopping movement when given a whistle command to do so, and leaving the carcass undisturbed. Arnette walked the transect lines at a rate similar to that of humans (*i.e.*, approximately 13-25 m/min [43-82 ft/min]) while the dogs were allowed to quarter the entire width of the transect (5 m [16 ft] on either side of the center line). While this technique was tested on bats, it also shows great promise for use on birds. Dogs would require additional training, but unlike the Homan *et al.* (2001) technique, they would not need to be leashed. The Arnette technique also shows great promise for use at both tall and short communication towers to locate dead birds and bats.

METHODS FOR ASSESSING RADIATION IMPACTS TO BIRDS

Methods for Assessing Radiation Impacts at Tall Towers

At present, radiation studies at tall towers in Europe have not yet been conducted since the impacts to birds and other wildlife have been documented at short, cellular communication towers. The methods suggested below for short tower radiation studies should also be applicable to future tall tower radiation studies.

Methods for Assessing Radiation Impacts at Short Towers

Balmori (2005) selected 60 nests of White Storks in Valladolid, Spain, to monitor breeding success, visiting each nest from May to June 2003, taking care to select nests with similar characteristics located on rooftops. Tree nests were not studied. Nests were selected based on very high (N=30) or very low (N=30) exposure levels of electromagnetic radiation, depending on the distances nests were located from the cell towers. Thirty nests were within 200 m (656 ft) of the towers, while the remaining 30 were located > 300 m (981 ft) beyond any tower. Chick productivity was closely observed. Electric field intensities (radiofrequencies and microwave radiation) were measured using a unidirectional antenna and portable broadband electric field meter set at 10% sensitivity. Between February 2003 and June 2004, 25 visits were made to nests located within 100 m (327 ft) of 1 or several cell phone towers to observe bird behavior. The

visits were made during all phases of breeding, from nest construction until Stork fledging. RFs and EMFs were also measured at all nest sites using a unidirectional antenna and field meter.

Balmori and Hallberg (2007) studied the urban decline of House Sparrows in Valladolid, Spain, since this species is in significant decline in the United Kingdom and western Europe, and because it usually lives in urban environments, where electromagnetic contamination is higher. They felt it would be a good biological indicator for detecting the effects of radiation. Forty visits, approximately 1 per month were made between October 2002 and May 2006, and were performed at each of 30 point transect locations (*i.e.*, point counts, the protocol recommended by Bibby *et al.* 2000) between 7 a.m. and 10:00 a.m. by the same ornithologist following the same protocol. At each transect site, all sparrows heard and seen were counted, without differentiating birds by sex and age, and radio frequencies and levels of microwave radiation were recorded using a unidirectional antenna and a portable broadband electric field meter set at 10% sensitivity. Bird densities from each point were calculated based on the number of sparrows per hectare.

Everaert and Bauwens (2007) counted male House Sparrows during the breeding season at 150 point locations (Bibby *et al.* 2000) in 6 residential districts in Belgium, each point location situated at variable distances (mean= 352 m [1,151 ft]; range= 91- 903 m [298- 2,953 ft]) from nearby cell phone antenna towers. Point counts were conducted for 5 minutes, all male House Sparrows heard singing or visible within 30 m (98 ft) were counted, counts occurred between 7 a.m. and 11:00 a.m. when males were most active, and counts were conducted only during favorable weather conditions. Electric field strengths at 900 MHz and 1800 MHz were measured for 2 minutes at each frequency using a portable calibrated high-frequency spectrum analyzer with a calibrated EMC directional antenna. To measure maximum radiation values, the EMC antenna was rotated in all directions.

METHODS FOR ASSESSING RADIATION IMPACTS TO BEES

Methods for Assessing Radiation Impacts to Bees

Harst *et al.* (2006) exposed 4 beehives to 1900 MHz radiation from an antenna placed at the bottom of each hive immediately under the honeycombs, while they left 4 hives unexposed. Each of the 8 colonies contained approximately 8,000 bees. They were set up in a row, with a block of 4 hives equipped with DECT (Digital European Cordless Telecommunications) stations on the bottom of each hive. Metal lattices were installed between the exposed hives to avoid possible effects to the non-exposed control group. The average transmitting power per station was 10 mW, with peak power at 250 mW. The sending signal was frequency modulated and pulsed with a pulsing frequency of 100 Hz. A transparent 10 cm (4 in) plastic tube with a diameter of 4 cm (1.6 in) was mounted at the entrance of each hive to collect single bees and watch them return later to the hives. Twenty-five bees from each hive were randomly selected, stunned in a cooling box, marked with a marker dot on the thorax, and released 800 m (2,616 ft) away from the hives. All marked bees were released simultaneously and were timed from the moment of their release. Return times were noted as the bees each entered the plastic tubes, with the observation lasting 45 minutes. Any bees returning after 45 minutes were disregarded. Bees were able to touch the radiation sending antenna within the hive. Some have asserted that the antenna placement may have resulted in a behavioral bias in regard to bee response, raising a legitimate concern about the methods used to test bee response to radiation in this experiment.

Harst *et al.* (2006) also studied the effects of radiation on bee building behavior using the protocol discussed above. They photographically documented change in honeycomb area, and measured development of honeycomb weight for each hive. Sixteen colonies were selected for

this experiment, 8 of which were irradiated, all aligned in a row. At the beginning of the experiment, the empty honeycomb frames were weighed, the hives were filled with bees (400 g [14 ounces]), and provided 250 ml (0.26 quart) food. Bees were fed 2 more times during the 9-day experiment. The honeycombs were photographed each day. The placement of the sending antenna, as previously suggested, may have altered bee behavior and hive productivity.

Kimmel *et al.* (2006) tested 16 bee colonies, 8 of which were irradiated. The experiment was nearly identical to that utilized by Harst *et al.* (2006) except that the sending antenna in 1 experimental group was shielded in a reed and clay box to address concerns about behavioral biases raised in the Harst *et al.* study. Bees were paralyzed using CO₂ instead of cold and were simultaneously released 500 m (1,635 ft) from the hives instead of 800 m (2,616 ft).

RESEARCH RECOMMENDATIONS FOR ASSESSING AVIAN COLLISION IMPACTS

Tall Tower Collision Research Recommendations

We recommend using either the Avery *et al.* (1978) or the Gehring *et al.* (2006, 2007) protocol for tall tower collision studies, depending on the feasibility and availability of catchment nets and dead bird carcasses. Avery *et al.* provided the opportunity to use catchment nets, testing searcher efficiency and carcass removal by placing test carcasses on site (in nets and on the ground). The protocol presumes that the majority of carcasses will be found within a certain distance of the tower's base. The protocol has particular utility for studying very tall towers, especially where terrain around the structures is highly variable and difficult to traverse. It can be used as a standing protocol, or modified as a hybrid based on combining other techniques suggested within this paper such as the use of dogs (Homan *et al.* 2001, Arnett 2006). Dogs have tremendous promise for both tall and short tower studies. If trained hunting dogs are used, then the Arnett (2006) protocol is an excellent tool since the dogs can be used off-leash. However, if untrained hunting dogs are available, then the Homan *et al.* (2001) protocol using leashed dogs is an excellent option.

Gehring *et al.* (2006, 2007) also successfully assessed mortality at tall towers, but catchment nets were not deployed in this study. Due in part to timing, budget constraints, and number of towers studied, this protocol has significant utility where many towers need to be studied. It could also be modified by using trained dogs or incorporating catchment nets.

The statistical designs for both short and tall tower studies – both for assessing collisions and radiation impacts, should be worked out with qualified biometricians. Both the USFWS and the USGS/Biological Resources Discipline (BRD) have well qualified statistical expertise. They should be consulted early in the development of a proposed study.

In both short and tall tower studies, data collection must include all of the following: time of day each tower is examined, time spent searching each site, time since the last search, and weather conditions, particularly inclement weather. Weather data should include the previous night's temperature, wind, cloud cover (clear if < 10% cover, partly cloudy 10-90% cover, or overcast > 90% cover), barometric pressure, rainfall, fog, obscuration, and other relevant weather conditions (Derby *et al.* 2002).

When bird and bat carcasses, and injured vertebrates are found, regardless of the sampling method, data must include tower identification number, name of species (if known), date of collection, closest transect, distance from the tower, azimuth to the tower, exact mapped location (GPS coordinates are very helpful), estimated number of days since death/injury, body condition,

probable cause of death, and evidence of scavenging. The carcass is to be collected, numbered, and saved to be used in other investigations (Gehring *et al.* 2007) for which a Federal and possibly state salvage permit will be required (Manville 2002).

Short Tower Collision Research Recommendations

Depending on the availability and utility of catchment nets and the layout of the tower site, we recommend using either the Manville (2002), the Derby *et al.* (2002), Homan *et al.* (2001), or the Arnette (2006) protocols – the latter 2 with greatly improved searcher efficiency, or a hybrid of these methodologies. Manville (2002) suggested using elevated catchment nets, but due to double sampling, he did not recommend using tagged bird carcasses. He also recommended using random transects to adjust for biases.

Derby *et al.* (2002) modified the Manville (2002) protocol, specifically in regard to challenges created by the tower study site in AZ. A randomly-placed catchment net was used within the walled enclosure of each of the sites, and the entire area within the walled compound (ground and net) was searched. Four randomly placed catchment nets were also utilized beyond the walls. Due to double sampling, no tagged bird carcasses were utilized. The protocol could be used as a free-standing technique but should be searched daily during the entire peak of bird migration.

RESEARCH RECOMMENDATIONS FOR ASSESSING RADIATION IMPACTS TO BIRDS

Tall Tower Radiation Research Recommendations

For both short and tall tower studies, any nests close to a tower should be noted, with its GPS coordinates recorded. Breeding, nest success, and survivorship should be monitored, where possible. How birds use their habitats for breeding and residence should be noted, including any issues of site abandonment, egg and clutch failure, development of deformities, injuries, and deaths.

For both short and tall tower studies, where birds appear to be injured or killed by radiation, proximity of the bird/carcass to known nest or roost sites and towers should be noted. Radiation levels at the tower, carcass site, and the nest site should be recorded. Any abnormal behaviors should also be described. Laboratory necropsies should be performed on birds and other wildlife suspected of impacts from radiation to better understand what caused their deaths and to verify that they did not die from blunt force trauma due to collisions. Tower and ambient radiation should be measured using equipment and techniques suggested by Harst *et al.* (2006) and Kimmel *et al.* (2006), or variations of equipment and methods available in the U.S. See the methods section of this paper for specifics.

Where carcass counts need to be assessed at specific tall towers, we suggest using the tall tower collision mortality protocols, discussed above in the methods section of this paper.

Short Tower Radiation Research Recommendations

Depending on the avian species being studied, we recommend using the Balmori (2005) protocol for assessing potential impacts to colonial nesting species such as herons and egrets. Where passerines are to be studied, we suggest the use of the Everaert and Bauwens (2007) and Balmori and Hallberg (2007) protocols for assessing potential impacts. Refer to the methods section above for specific details.

Where carcass counts need to be made at specific short towers, we recommend using the short tower collision mortality protocols, discussed above in the methods section.

RESEARCH RECOMMENDATIONS FOR ASSESSING RADIATION IMPACTS TO BEES

Bees and other pollinators also deserve close scrutiny from the potential impacts of radiation, and their study should be included as part of the overall research effort suggested in this paper. In addition to testing and validating the protocol and results from the Kimmel *et al.* (2006) study (see background and methods sections above), which we recommend be performed at multiple locations in the U.S., bee behavior, hive productivity, and bee survivorship need to be field-tested at both tall and short towers in the U.S. Variations on the protocols used by Harst *et al.* (2006) and Kimmel *et al.* (2006) could easily be developed to field-test potential radiation impacts on bee navigation, flight behaviors, hive productivity, and bee survivorship around both short and tall towers. However, any research protocol developed to assess potential insect impacts – and for that matter, impacts to birds, bats, and other wildlife, must attempt to eliminate extraneous variables that may bias study results. These include everything from antenna placement in the Harst *et al.* (2006) study, to the impacts of diseases, parasites, weather and climatic events, pesticides, contaminants, and other mortality factors on insects and other wildlife. Fine-tuning a research protocol must include the combined efforts of trained entomologists, research radiation specialists, ornithologists, wildlife biologists, and biometricians.

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F10d

Jonathan Bishop

From: Albert_Manville@fws.gov
Sent: Tuesday, June 03, 2008 2:08 PM
To: judy V.
Cc: Jonathan Bishop; jnewton@emrpolicy.org; Michael_Green@fws.gov
Subject: Re: I would appreciate your expert comments as soon as possible

Dear Ms. Vick,

I just returned to the office today from vacation so this is the first I've heard about this issue. Per your follow-up email sent today, you requested that I write a letter in support of your appeal to the CA Coastal Commission. The USFWS does not generally intervene in State issues, including cellular telephone tower (antenna) sitings. Even if I were able to provide comments to the Commission supporting your position, they would have to be cleared likely by our Solicitors and Migratory Bird management before release. Our Migratory Birds Program in Oregon (Region 1 Headquarters -- Dr. Mike Green, copied) has the lead on the avian-tower issue. I would suggest that you coordinate with Dr. Green who may be able to contact the appropriate CA Ecological Services Field Office staff person who could review this project -- just to see if they are engaged.

However, the Division of Migratory Bird Management (Washington Office) certainly supports the need to conduct peer-reviewed research on the impacts of cellular telephone antennas and the radiation from them on resident and migratory birds. Radiation represents a new and essentially unknown and unstudied impact to wildlife -- certainly in North America. Attached is my research needs proposal reflecting this recommendation. We would strongly encourage the industry/company proposing to site the antenna(s) to fund such research -- provided the study (ies) is (are) conducted by an independent, non-industry-affiliated consultant, and that the results are made available to the public, and published in a refereed scientific journal.

As you have done below, you also are welcome to reference the materials I provided to Congressional staff in May 2007. I'm also attaching an article -- in addition to the research needs document -- that elevates this issue. I say "suspected" because we have yet to validate research being conducted in Europe on radiation impacts to avifauna in N. America. The evidence seems very strong, but actual "cause and effect" have yet to be documented. Teasing out the etiology and the dynamics remains a major challenge. I would suggest avoiding any reference to the bee-cell phone issue since the study in which it was conducted in Germany was flawed.

You are welcome to use this document in your submission to the Commission. Good luck. Wish I could be of more help but we're early yet in the radiation impacts assessment process -- thus the important need for bona fide research. -Al Manville-

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To <albert_manville@fws.gov>

05/29/2008 01:57 PM

CC <jbishop@coastal.ca.gov>, <jnewton@emrpolicy.org>

Subject I would appreciate your expert comments as soon as possible

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Re: Appeal to the CA Coastal Commission: Bonaire Investments/Sprint-Nextel Minor Use Coastal Development Permit in Los Osos

Dear Mr. Manville,

We are appealing a Minor Use Coastal Development Permit to the CA Coastal Commission, for a cell antenna project (hidden in the roof of a building) in the California Coastal Zone, near environmentally sensitive habitat, where an number of endangered species exist. The hearing is scheduled for June 13, 2008, in Santa Rosa, CA.

The proposed cellular communications facility would be the first cell antenna project in the town of Los Osos. Los Osos has 4 cell company providers hosted just outside of town and over 600 residents have signed a petition stating this is an unnecessary project.

The engineering report states the radiofrequency radiation emissions "may exceed public exposure limits" at the roof. The only mitigation planned is warning signs. The FCC regulations allow posting of warning signs for compliance. However, the FCC interprets "environmental effects" as meaning "the effects of their actions on the quality of the human environment," a definition they restrict to human exposure.

As I am sure you are aware, "The FCC's limits, and the NCRP and ANSI/IEEE limits on which they are based, are derived from exposure criteria quantified in terms of specific absorption rate (SAR). Specific absorption rate is a measure of the rate of energy absorption by the body." The FCC exposure limits are also based on data showing that the human body absorbs RF energy at some frequencies more efficiently than at others.

However, the FCC regulations pertain solely to human exposure. **THE FCC REGS ARE SILENT ON THE EFFECT OF RF RADIATION ON WILDLIFE AND THE NATURAL ENVIRONMENT.**

Our Coastal Permit Appeal does not pertain to effects of radiation on "the human environment -- human exposure -- **BUT TO THE EFFECTS ON WILDLIFE THAT CONSTITUTE CALIFORNIA'S COASTAL RESOURCES.** Therefore, the Telecom Act does not preempt the right of state agencies to regulate on the basis of these effects. In other words: There are no FCC regulations "concerning such emissions" -- i.e. effects of RF emissions on wildlife/coastal resources.

The D.C. Circuit Court of Appeals ruling (2/19/08) requiring the Federal Communications Commission to conduct Environmental Impact Assessments of cell towers on migratory birds before granting permits underscores the point that the FCC has not been considering "environmental effects" as the Coastal Commission uses the term (i.e. the Court "said FCC should consult with wildlife experts and require environmental impact assessments for the towers"). Meaning that is clearly what they have not been doing.

I would very much appreciate your comments on the basis of our appeal. Please see the full appeal statement below.

Genuinely,

Judy Vick
Coalition for the Appropriate Placement of Cell Antennas
(805) 528-1688
venturemind@hotmail.com

APPEAL STATEMENT:

**THE PROPOSED PROJECT DOES NOT CONFORM TO THE FOLLOWING LCP POLICIES:
COASTAL PLAN POLICIES CHAPTER 6- ENVIRONMENTALLY SENSITIVE HABITATS**

A. Policy 1: Land Uses Within or Adjacent to Environmentally Sensitive Habitats

New development within or adjacent to locations of environmentally sensitive habitats (within 100 feet unless sites further removed would significantly disrupt the habitat) shall not significantly disrupt the resource. Within an existing resource, only those uses dependent on such resources shall be allowed within the area.

Policy 2: Permit Requirement

As a condition of permit approval, the applicant is required to demonstrate that there will be no significant impact on sensitive habitats and that proposed development or activities will be consistent with the biological continuance of the habitat. This shall include an evaluation of the site prepared by a qualified professional which provides: a) the maximum feasible mitigation measures (where appropriate), and b) a program for monitoring and evaluating the effectiveness of mitigation measures where appropriate. ~POLICY SHALL BE IMPLEMENTED PURSUANT TO SECTIONS 23.07.170-178 OF THE CZLUO.]

As noted in COASTAL PLAN POLICIES - ENERGY AND INDUSTRIAL DEVELOPMENT

POLICY 3-c1: The coastline from Shell Beach to Morro Bay includes some of the most biologically productive, environmentally sensitive, pristine and irreparable (in the event of oil pollution) habitats and coastal resources along the San Luis Obispo County coastline. These include the important kelp-bed and rocky-intertidal habitats, the Morro Bay estuary, important off-shore rocks, a proposed state underwater park and the southern range of the threatened California Sea Otter.

Environmentally sensitive habitats are defined by the Coastal Act as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments." The Morro

Bay Estuary is one of the most significant migratory stops on the Pacific Flyway. Up to 25,000 waterfowl have been counted on one peak day and 89 species of water-associated birds have been observed. The winter months bring large numbers of Brant to the estuary. The rare black rail is believed to be breeding there and the California clapper rail has been seen here. The Los Osos area is known habitat for sensitive birds including resident Peregrine Falcon, Long-billed Curlew (non-breeding) and Bryant's Savannah Sparrow. California Black Rail and Swainson's Thrush may breed in the Sweet Springs preserve.

Recent research has found a strong correlation between the presence of electromagnetic signals from cellular phone masts and a marked decline of several species of birds in the UK and several European countries, with a strong dependency between bird density and field strength and the increasing installation of cell sites. ("The Urban Decline of the House Sparrow," Balmori and Hallberg, *Electromagnetic Biology and Medicine*, 26: 141-151, 2007). Nest and site abandonment, plumage deterioration, locomotion problems, and death were reported among those species found close to cellular phone antennas. Additional avian studies in Europe (Everaert and Bauwens 2007) found strong negative correlations between the amount of radiation presence (both 900 and 1800 MHz frequencies) and the presence of male House Sparrows, with fewer House Sparrow males seen in areas with high electric field strength values. Multiple studies have found similar effects on insects and vegetation (cited, Balmori and Hallberg).

Negative impacts on nest productivity up to 200 meters (650 feet) from the antennae have been documented ("Possible Effects of Electromagnetic Fields from Phone Masts on a Population of White Storks," Balmori, *Electromagnetic Biology and Medicine*, 26: 109-119, 2005), with 40% of nests within the 200m range never fledging chicks. This study concluded: "Consistent with these results, the microwaves could be affecting one or several reproductive stages: the construction of the nest, the number of eggs, the embryonic development, the hatching or the mortality of chicks in their first stages. ... We recommend electromagnetic contamination in the microwave range be considered a risk factor in the decline of some populations, especially urban birds, especially when exposed to higher radiation levels."

The Commission should take note of the testimony before Congress of Albert M. Manville, II, Ph.D., Senior Wildlife Biologist Division of Migratory Bird Management, USFWS (May 10, 2007, "Congressional Staff Briefing on the Environmental and Human Health Effects of Radiofrequency (RF) Radiation"). Dr. Manville reported the concerns of the U.S. Fish & Wildlife Service over potential radiation impacts of cellular communication towers on migratory birds and other wildlife.

Dr. Manville noted that in 2002, the USFWS list of "birds of conservation concern," saw an increase in the number of bird populations in trouble from 124 to 131 species, that this was "not good news," and in addition, 77 endangered and 15 threatened birds were included under ESA.

Dr. Manville went on to note that in 2002 "at a briefing similar to this one, T. Litovitz (Catholic Univ., pers. comm.) raised troubling concerns about the impact of low-level, non-thermal radiation from standard 915 MHz cell phone frequency impacting domestic chicken embryos (data from DeCarlo *et al.* 2002). Deformities, including some deaths under hypoxic conditions were noted."

Dr. Manville further noted that Colony Collapse Disorder (CCD) been recently documented in domestic honey bees – in 60% of U.S. West Coast apiaries and 70% on the East Coast. CCD is also being documented in Greece, Italy, Germany, Portugal, Spain and Switzerland (Harst *et al.* 2006, pilot study by Lean and Shawcross 2007). One theory as to the cause is radiation from cell phone antennas interfering with bees' navigation systems.

In 2006, the USFWS New England Field Office suggested to the Chairman of the Connecticut Siting Council that as a stipulation of a cell tower siting permit they fund a research effort at control and experimental study sites in Massachusetts to assess radiation effects.

Dr. Manville urged, because this issue is so potentially significant, that such experiments be carried out in the East, Midwest and West. The Coastal Commission could stipulate funding for such experiments as a condition of the permit, and for the permits of any and all future cell phone antennae projects

allowed in the Coastal Zone, in addition to requiring that all such antennae be located at a prudent distance from known nesting and breeding areas, bird migration routes, and apiaries.

THE COMMISSION IS NOT BARRED BY FEDERAL PREEMPTION

Section 704 of the Federal Telecommunications Act of 1996 states, under General Authority: "Except as provided in this paragraph, nothing in this Act shall limit or affect the authority of a State or local government or instrumentality thereof over decisions regarding the placement, construction, and modification of personal wireless service facilities.... No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions."

Per the project's engineering report (Hammett & Edison, 2007), the RF radiation "power density may exceed the public limits on the roof at the subject building." At the San Luis Obispo County Board of Supervisors meeting of April 1, 2008, County staff admitted to this exceedence of FCC safe emission levels and cited the placement of "warning" signs on the roof of the subject building as sufficient mitigation. The Commission should note 1) This provides no mitigation for wildlife and habitat impacts, and 2) provides no immunity under Telecom Act Section 704, which does not admit of or contemplate mitigation. Because the Bonnaire antennae will not "comply with the [Federal Communications] Commission's regulations concerning such emissions," the Coastal Commission is not barred from "regulating the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions."

The potential decimation of bird, bat, and insect species is not consistent with the biological continuance of habitat (Coastal Plan Policy 2). The Commission must require that the applicant demonstrate that there will be no significant impact on sensitive habitats and that proposed development or activities will be consistent with the biological continuance of the habitat. Failing that, the Commission should deny the permit.

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Suggested citation:

Manville, A.M., II. 2005. Bird strikes and electrocutions at power lines, communication towers, and wind turbines: state of the art and state of the science – next steps toward mitigation. Bird Conservation Implementation in the Americas: Proceedings 3rd International Partners in Flight Conference 2002, C.J. Ralph and T. D. Rich, Editors. U.S.D.A. Forest Service General Technical Report PSW-GTR-191, Pacific Southwest Research Station, Albany, CA: 1051-1064

Collisions, Electrocutions, and Next Steps - Manville

BIRD STRIKES AND ELECTROCUTIONS AT POWER LINES, COMMUNICATION TOWERS, AND WIND TURBINES: STATE OF THE ART AND STATE OF THE SCIENCE B NEXT STEPS TOWARD MITIGATION¹

Albert M. Manville, II, Ph.D. ²

Abstract: Migratory birds suffer considerable human-caused mortality from structures built to provide public services and amenities. Three such entities are increasing nationwide: communication towers, power lines, and wind turbines. Communication towers have been growing at an exponential rate over at least the past 6 years. The U.S. Fish and Wildlife Service is especially concerned about growing impacts to some 836 species of migratory birds currently protected under the Migratory Bird Treaty Act of 1918, as amended. While mortality estimates are often sketchy, and won't be verified until nationwide cumulative impact studies are conducted, current figures are troubling. Communication towers may kill from 4-50 million birds per year. Collisions with power transmission and distribution lines may kill anywhere from hundreds of thousands to 175 million birds annually, and power lines electrocute tens to hundreds of thousands more birds annually, but these utilities are poorly monitored for both strikes and electrocutions. More than 15,000 wind turbines may kill 40,000 or more birds annually nationwide, the majority in California. This paper will address the commonalities of bird impacts among these industries; those bird species that tend to be most affected; and research (completed, current, and proposed) intended to reduce bird collisions and electrocutions nationwide. The issues of structure location (siting), lighting, guy supports, lattice or tubular structures, bird behavior, and habitat modifications are reviewed. In addition, this paper reviews the respective roles and publications of the Avian Power Line Interaction Committee and the Wildlife Workgroup of the National Wind Coordinating Committee, the roles of the Service-chaired Communication Tower Working Group and Wind Turbine Siting Working Group, and the Fish and Wildlife Services= voluntary communication tower, and turbine siting and placement guidelines. An update on recent Communication Tower Working Group research initiatives will also be discussed along with promising research findings and needs.

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1. A version of this invited paper was presented on March 23rd at the Third International Partners in Flight Conference, March 20-24, 2002, Asilomar Conference Grounds, California.
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Key Words: APLIC, avian impacts, avian mortality, BGEPA, bird strikes, collisions, communication towers, CTWG, electrocutions, ESA, MBTA, mitigation measures, NWCC, power lines, transmission and distribution lines, wind turbines.

INTRODUCTION

Acquiring reliable estimates of avian population mortality is difficult, even under controlled circumstances, and the threats to birds from human development continue to increase in the United States and elsewhere globally. As the U.S. human population grows B now the third largest in the world B human structures and the services needed to meet population demands continue to increase. Unfortunately, the impacts of these structures and services on birds, bats, and other species are generally unaccounted for, unknown, or only roughly estimated. This paper will address three of these structural impacts, those from power lines, communication towers, and wind turbines.

To better understand the impacts of human-caused mortality on landbirds B and recently on bats, attempts have been made not only to estimate these mortality factors, but also to assess the spring and fall populations of breeding landbirds in North America to determine rough mortality percentages. While bird hunting mortality has been documented back to at least Biblical times, mortality caused by structures was first documented in the United States in 1874 at lighthouses and lamps (Forest and Stream 1874) and in 1876 at telegraph wires (Coues 1876). The first U.S. Fish and Wildlife Service (USFWS or Service) attempt to estimate nationwide human-caused annual mortality was published by Banks (1979) where he estimated 196 million bird deaths caused by human activity. This estimate represented 1.9 percent of the then existing estimated bird population in North America. Of the 196 million estimated deaths, 61 percent were from hunting, 32 percent from collisions with structures, and 2 percent from pollution and poisoning. To assess the nationwide status of breeding bird populations, Aldrich and others (1975) used the 1973 Breeding Bird Survey, which averaged 1,284 birds/km² (3,325 birds/mi²), to estimate 9.975 billion breeding landbirds in the US exclusive of Alaska and Hawaii. They concluded that the autumn landbird population was probably twice that figure B 20 billion. Banks (1979) used the figure of 10 billion breeding birds in the contiguous US and assumed an average annual mortality of 10 billion birds. J. Trapp (unpubl. data), of the USFWS= Division of Migratory Bird Management, examined Breeding Bird Censuses for 1991 and 1992, extrapolated from these figures, and concluded that it was probably safe to talk about minimum breeding populations on the order of 10 billion birds, and minimum fall populations on the order of 20 billion birds in North America north of Mexico. While there are far more birds than people generally realize, population impacts can be sizable and most human-caused avian mortality factors are not systematically monitored or assessed.

The USFWS is currently responsible for the conservation and management of 836 species of migratory birds in the US; these birds are killed by myriad non-hunting-related factors. These include collisions with communication towers, power lines, wind turbines, buildings and windows, smokestacks and monuments, automobiles, and aircraft; electrocutions at power lines; predation by domestic cats; poisoning from pesticides, oil

and contaminant spills; drowning in oil and wastewater pits; entanglement, strangulation, and drowning in fishing gear; and loss or degradation of habitat.

Of the 836 migratory bird species managed by USFWS, at least 223 are in trouble. These include 92 listed on the Federal Endangered Species Act (ESA; 16 U.S.C. 1531 et seq.: 77 are endangered and 15 are threatened), and 131 on the USFWS's National List of Birds of Conservation Concern 2002 (USFWS 2003). Populations are declining precipitously for some of these species. To add yet another challenge to managing birds, we essentially lack data on the status of fully one-third of all North American bird populations. These challenges make management difficult. Recent extrapolations from various databases indicate that human-caused mortality could account for billions of bird deaths per year (Klem 1990, Corcoran 1999, Erickson and others 2001, Manville 2001a, Manville 2001b). Based only on estimates of annual mortality from vehicles strikes (60-80 million), building and window collisions (98- 980 million), smoke stack casualties (tens to hundreds of thousands), power line electrocutions (tens to hundreds of thousands), power line impacts (hundreds of thousands to perhaps 175 million), communication tower accidents (4-5 to 40-50 million), and wind turbine impacts (~34,000 to perhaps hundreds of thousands), Erickson and others (2001) estimated from 100 million to well over one billion birds killed annually. The extent to which cumulative mortality from all human-caused factors affects bird populations, and measures that can be taken to reduce these events, are matters of considerable interest and concern to the Service and others (Manville 2001b).

STRUCTURAL REVIEW

The U.S. Power Grid

Since the U.S. power grid was first constructed in the late 1880s, power line expansion has increased tremendously. With a growing U.S. population, industrial expansion, and public demand for more electricity as exemplified by energy challenges in California in 2001, more power lines are being installed. The most recent nationwide estimates indicate that there are more than 804,500 km (500,000 mi) of bulk transmission lines in the US (transmission lines in the US carry $\geq 115,000$ volts/115 kV, with conductors attached to either tall wood, concrete or steel towers; Harness 1997, APLIC 1996, Edison Electric Institute 2000). Much of the problem with bird collisions is associated with transmission lines. Distribution lines (those in the US carrying $\leq 69,000$ v/69kV) are constructed on 11-15 m (36- 49 ft) wooden, steel, or concrete poles, typically configured with one, two, or three energized (phase) wires and one neutral (grounded) wire. Raptor electrocutions, especially in the western United States, are most frequently associated with distribution lines. Distribution lines have phase-to-phase and phase-to-ground wire clearances which place birds perching on the supporting poles at much greater risk of completing a circuit and suffering electrocution, often resulting in a power outage (Boeker and Nickerson 1975, Harness 1997). Because of rapid expansion, new development, and jurisdictional issues, no good accounting of the total amount of distribution line is available for the US; it is certainly in the millions of kilometers. Williams (2000) cites the figure of 116,531,289 distribution poles in the US but lists no figure for wire length.

Power Line Electrocutions

Birds have been subject to electrocutions and collisions in the United States since the first overhead telegraph wires were strung in the late 1860s, initially reported by Coues (1876) in rural Colorado. Electrification of the US and development of the U.S. power grid began by the late 1880s and has rapidly expanded since. Not surprisingly, by 1922, eagle electrocutions were first reported at transmission lines, followed in 1933 by hawk electrocutions at distribution lines, and in 1940 by power outages on Idaho Power lines which subsequently were retrofitted with a deterrent device intended to discourage eagles from landing (R. Harness, EDM International, pers. comm.). By the early 1970s the electric utility industry had become acutely aware of bird electrocutions B especially to eagles, hawks, and owls. Reports of significant bird mortality during the winter of 1970-1971 in Colorado and Wyoming drew the attention of state and Federal law enforcement agents and the industry; nearly 1,200 eagle deaths were reported resulting from poisoning (N = 30+), shooting from aircraft (N = 800+) and electrocution or shooting along a power line (N = 300+) (Olendorff and others 1981; L. Suazo, USFWS, pers. comm.). M.W. Nelson=s 1980 film ASilver Wires, Golden Wings@ followed, which was one of the first public relations efforts designed to help prevent eagle electrocutions and to encourage use of nesting platforms on power poles (Lehman and others 1999). Nelson filmed trained Golden Eagles (*Aquila chrysaetos*) during take-offs and landings on un-energized mock-up power poles to determine how electrocutions occurred and how they might be prevented. His and other research led to an update to the Suggested Practices document (Olendorff and others 1981).

In an attempt to begin addressing both collision (specifically Whooping Cranes [*Grus americana*]) and electrocution problems, an ad hoc committee represented by several investor-owned electric utilities (IOUs), the National Audubon Society (NAS), and the Service was created in 1983. By 1989, a more formal relationship was established with the creation of the Avian Power Line Interaction Committee (APLIC) composed then of nine IOUs and the FWS (Lewis 1997) B with technical advice from staff of NAS, Clemson University, and the University of Idaho. APLIC was housed in the IOU trade association Edison Electric Institute (EEI), Washington, DC (Huckabee 1993). Following research and earlier publications in 1975 and 1981, Suggested Practices for Raptor Protection on Powerlines (APLIC 1996) became the first definitive work on raptor electrocutions. It was reprinted in 2000 in Spanish. That same year the instructional video, Raptors at Risk (North American Falconers= Association and others 2000) was released to the public, documenting raptor electrocutions and illustrating inexpensive avoidance techniques. Copies can be obtained from R. Harness at EDM International, <rharness@edmlink.com>.

While the efforts of APLIC to reduce bird electrocutions and collisions have been key, many in the electric utility industry may still not be getting the message that human-caused bird deaths are unacceptable (Williams 2000). At present, APLIC is composed of 18 IOUs (out of 186-some IOUs within this country); one IOU trade association (EEI); some 960 cooperatives represented by the National Rural Electric Cooperative Association (NRECA; out of approximately 1,056 cooperatives housed under the U.S. Department of Agriculture [USDA]); one research organization (Electric Power Research Institute); and

three Federal agencies (including USFWS, the Bonneville Power Administration, and the Western Area Power Administration)(L. Suazo, USFWS, pers. comm.; R. Loughery, Edison Electric Institute, pers. comm.; www.APLIC.org). To be a more effective arm of the overall industry, APLIC still needs to recruit additional utility membership. However, many of the cooperatives are small companies, and the \$5,000 APLIC initiation fee and \$2,500 annual dues are viewed by many as better spent on mitigation or for other purposes.

NRECA B somewhat like APLIC B is the not-for-profit national service organization representing most of the USDA cooperatives which provide electricity to more than 30 million consumer-owners primarily in sparsely population rural areas in 46 states. NRECA published a definitive manual for their industry, Animal Caused Outages (Southern Engineering Company 1996), which addresses wire configurations and situations unique to this segment of the industry. APLIC and NRECA are working to integrate guidance in Suggested Practices for Raptor Protection on Power Lines (APLIC 1996) that conforms to both types of utility structures and needs. USDA cooperatives, for example, now must construct distribution lines using non-conducting wooden braces and cross arms, and install ground wires that are raptor safe.

Prior to 1999, only two fines had been levied by law enforcement agents against electric utility companies for electrocuting birds protected under the Migratory Bird Treaty Act (MBTA; 16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (BGEPA; 16 U.S.C. 668-668C), one in 1993 and the other in 1998. MBTA is a strict liability statute; the killing of any protected migratory bird is not technically allowed under law unless a permit is obtained, and the Service does not issue Aincidental or accidental take@ permits. The landscape changed in August 1999 with the District Court=s decision against the Moon Lake Electric Association in western Colorado and eastern Utah. Beginning in 1997, agents of the Service=s Office of Law Enforcement (LE) in the West investigated bird mortalities from electrocutions and strikes, and found to their dismay that the statistics rivaled those from the 1970s. As a result of this investigation, the Department of Justice prevailed in its first criminal prosecution of a utility under BGEPA and MBTA. Moon Lake pleaded guilty and agreed to pay \$100,000 in fines and restitution, serve 3 year=s probation, sign a memorandum of understanding (MOU) with the Service, implement an avian protection plan, and retrofit poles that were killing raptors. The message was a powerful one, sending shock waves through the electric utility, wind generation, and communication tower industries. In addition to fines as high as \$500,000, company officers could be convicted of felonies, lose their right to vote, pay personal fines as high as \$250,000, and be jailed for up to two years (Williams 2000).

Following release of the Moon Lake MOU, LE was inundated with requests for other MOUs. In 2002, an historic MOU was signed with Xcel Energy and the USFWS Denver, Colorado, Regional Office in concurrence with the Department of Justice. The proactive agreement presently covers Colorado and Wyoming. The USFWS is currently finalizing the template for an avian protection plan (APP) with APLIC. These voluntary, proactive agreements will call for the development of comprehensive APPs which are intended to reduce electrocutions and bird strikes by participating companies.

Looking specifically at the problem of electrocutions, eagles are the most commonly reported electrocuted birds, Golden Eagles reported 2.3 times more frequently than Bald Eagles (*Haliaeetus leucocephalus*) by Harness (1997) in the West, with juveniles more frequently reported killed than adults. Red-tailed Hawks (*Buteo jamaicensis*) and Great Horned Owls (*Bubo virginianus*) were the most commonly reported hawk and owl species by Harness (1997) and Harness and Wilson (2001). Power outages can result in damaged equipment, safety problems, brush and forest fires, and loss of service to customers. Nationwide, animals are the third leading identifiable cause of all power outages, with birds causing more outages than any other animal (Southern Engineering Company 1996). Of 4,300 eagle mortalities investigated by the Department of Interior from the early 1960s to 1995, electrocution was reported as the second greatest cause of mortality to Golden Eagles and the third greatest cause to Bald Eagles (LaRoe and others 1995). Electrocution is now rated the fourth leading cause of death for Bald Eagles, following accidental trauma, poisoning, and shooting (Lehman 2001).

Where vegetation is low and terrain is flat, power poles are particularly attractive to raptors in the West since they provide structures from which to hunt and roost (Boeker 1972, Benson 1981). Eagles and buteos (soaring hawks) actively seek out poles, especially where prey is abundant and few other perches exist, increasing their range of vision, allowing greater attack speed when hunting, and advertising territorial ownership (Olendorff and others 1981, Colson and Associates 1995). It was commonly believed in the 1980s that a very small percentage of distribution poles was actually electrocuting raptors. These were designated as A-preferred poles, situated in good habitat or near high prey concentrations (Olendorff and others 1981). Nelson and Nelson (1976) even estimated that 95 percent of electrocutions could be prevented by modifying 2 percent of the poles. Conventional wisdom indicates that these assessments were probably unrealistic due, in part, to lack of a nationwide reporting system and systematic nationwide studies, and observational and data-collection biases (Lehman 2001).

Twelve North American raptor species are known nesters on utility structures. In the East, Osprey (*Pandion haliaetus*) is frequently seen nesting on power poles (Blue 1996). Due to lack of staff and funding, very little of the U.S. power grid is assessed B if even infrequently B for bird electrocutions. The estimates of tens of thousands to hundreds of thousands or more birds killed each year are only very rough approximations based on very limited data. True mortality could be much higher. Recent information suggests that raptor electrocutions may be under-reported, possibly larger by several orders of magnitude (Lehman 2001).

Mitigation measures can vary in cost, depending on whether or not they are required for new construction or are retrofitted. Sufficient phase-to-phase and phase-to-ground wire spacing is critical for large-winged birds. This can be costly if wires have to be re-strung for wider separation. Three-phase transformers can be especially deadly where bare energized jumper wires connect transformers, protective cutouts, and surge arresters. These can be deadly to small and large raptors (Negro and Ferrer 1995). Jumper wires on all electrical equipment should be insulated, including at tap and dead-end locations. Existing transformers can be retrofitted by replacing bare wire with either 600 v insulated jumpers or by sliding insulating material over bare jumpers; new jumpers should contain

600 v insulated jumpers and be insulated with bushing covers (Harness 1997, Harness and Wilson 2001). Specifications are provided by APLIC (1996) and Southern Engineering Company (1996). With the use of cost-effective new or replacement steel distribution poles B steel has been used on transmission towers for years B we see a new electrocution challenge. The mitigation measures used on wooden poles are not effective on metal ones. In a European study, insulating cross-arm braces on steel distribution poles proved most effective, while perch guards were less effective (Janss and Ferrer 1999). Harness and Wilson (2001) call for more research to attempt to qualify the relationships between raptor electrocutions and different types of electrical power structures. The Service strongly agrees.

Power Line Collisions

Birds of a much greater variety strike power transmission and distribution lines. Coues (1876) was the first to report over 100 dead birds, mostly Horned Larks (*Eremophila alpestris*), along a 4.8-km (3-mi) section of telegraph line, and even witnessed the deaths of three birds. Cohen (1896) reported 14 Red Phalaropes (*Phalaropus fulicaria*) and a Ruddy Duck (*Oxyura jamaicensis*) verified by necropsies as telegraph wire kills. Emerson (1904) reported shorebirds and a Black Rail (*Laterallus jamaicensis*) colliding with electrical wires over a salt marsh and evaporation ponds B representing the first reported power line strikes. Large, less maneuverable birds are more vulnerable to collisions with power lines, including Great Blue Herons (*Ardea herodias*), cranes (*Grus spp.*), swans (*Cygnus spp.*), and pelicans (*Pelicanus spp.*; Huckabee 1993). Line collisions resulted in 36 percent of the known mortality to fledged Greater Sandhill Cranes (*G. canadensis tabida*) in the Rocky Mountains (Drewien 1973), 44 percent mortality of fledged Trumpeter Swans (*C. buccinator*) in Wyoming (Lockman 1988), and 40 percent of the know mortality of endangered fledged Whooping Cranes in the Rocky Mountains (Lewis 1993). In a study near wetlands in North Dakota, Faanes (1987) found that waterbirds (based on 46 percent documented mortality), waterfowl (26 percent), shorebirds (8 percent), and passerines (5 percent) were most vulnerable to strikes with transmission lines. In habitats away from wetlands, raptors and passerines appear to be most susceptible to collisions with power lines. Collisions from many other species have also been reported (Erickson and others 2001).

On Kaua=i, Hawaiian Islands, studies by Podolsky and others (1998) and Ainley and others (2001) documented rather unique lighting and power line impacts to Newell=s Shearwaters (*Puffinus auricularis newelli*). During the first nocturnal flights of fledglings from nests to the ocean, a high percentage (≥ 2 to ≥ 10 percent) of fledglings were reported blinded by man-made lighting, disoriented, and killed while colliding with lights, utility poles, wires, buildings, and automobiles (Ainley and others 2001). Contrary to recommendations by APLIC, wide spacing of power transmission lines appeared to increase collisions of summer nesting season adults and subadults during their nocturnal and crepuscular flights to and from bird colonies (Podolsky and others 1998). It was hypothesized that the wide spacing increased the incidence of collisions as birds attempted to avoid hitting one line, only to hit another. In experimental areas, light shielding was shown to reduce attraction by as much as 40 percent while reducing light intensity also

lowered deaths significantly (Ainley and others 2001). Burying power lines was also recommended for particular hot spots.

Estimates of mortality from avian collisions with power lines have varied considerably and have frequently been based on extrapolations. Faanes (1987) estimated 124 avian fatalities/km/yr (200 fatalities/mi/yr) near prairie wetlands and lakes in North Dakota. Koops (1987) examined 4,666 km (2,900 mi) of bulk transmission line in the Netherlands, estimating 0.75 - 1 million birds killed there per year. U.S. mortality could range from hundreds of thousands up to perhaps 175 million birds per year, based on extrapolations by Erickson and others (2001) and Koops (1987). Very little of the power grid, however, is currently being examined so these estimates are not particularly meaningful.

In an attempt to comprehensively address the collision problem, APLIC (1994) provided voluntary guidance to the industry on avoiding power line strikes. The document will be updated once research being conducted by the Electric Power Research Institute and others at the Audubon National Wildlife Refuge, North Dakota, is completed, and results of tests on a Bird Strike Indicator and Bird Activity Monitor can be published. Other research findings will also likely be included. For example, marker balls, bird diverters, and paint have been shown to reduce collisions, sometimes significantly. Strikes were reduced by 53 percent at a South Carolina transmission line outfitted with yellow marker balls (Savereno and others 1996). In southwestern Colorado, polyvinyl chloride plastic dampers reduced collisions of cranes and waterfowl by 61 percent while yellow fiberglass square plates reduced mortality to the same species by 63 percent (Brown and Drewien 1995).

Communication Tower Collisions and Related Problems

Communication towers, whether monopole cellular telephone, or tall, lattice structured digital television (DTV) antennas, are an increasingly familiar sight in neighborhoods, near highways, and along ridge tops. For at least the past 6 years, the number of communication towers (including but not necessarily limited to radio, television, cellular, microwave, emergency broadcast, national defense, paging, and related) constructed across the landscape has been growing at an exponential rate. Based on the July 2002 statistics from the Federal Communication Commission's (FCC) Antenna Structure Registry Database (FCC 2002), more than 138,000 towers were listed with the Commission B of which some 106,000 were lighted. Revised published statistics (FCC 2003) may have indicated some double-counting of the 2002 numbers, since nearly 93,000 towers were reported registered in June 2003. However, due to an under-reporting to the FCC of up to some 35 percent, the actual number of existing towers is likely higher (Manville 2001b).

While this is positive news for the communications industry, it is decidedly problematic for migrating birds. Towers today pose a likely significant impact on migratory birds, especially some 350 species of passerines. The earliest known report of a bird-tower kill in the United States took place in September 1948 at a 137-m (450-ft) radio tower in Baltimore, Maryland, although no details about the incident were available (Aronoff 1949). The first long-term study of the impact of a television tower on birds was begun in 1955 by the Tall Timbers Research Station in northern Florida. After the first 25 years of

the study, 42,384 birds representing 189 species were tallied (Crawford and Engstrom 2000). On average, 1,517 birds were killed per year over the 29-year period of this study, 65% of the mortalities documented in the fall and 20% in the spring (Crawford and Engstrom 2001). The longest study yet conducted B over 38 years B was performed by physician C. Kemper, beginning in 1957. He collected nearly 121,560 birds representing 123 species and he still holds the all-time record for most birds collected and identified from a single-night tower strike: more than 12,000 birds were retrieved in 1963 from the base of a television tower in Eau Clair, Wisconsin, not accounting for almost certain scavenging by wild and domestic predators (Kemper 1996). Able (1973) reported single night kills exceeding 1,000 birds at television towers in Tennessee and Florida during the fall 1972. While published accounts of kills at short towers are limited, Herndon (1973) reported 1,801 birds of 44 species killed during two foggy nights in the fall 1972 at 38-m (125-ft) and 26-m (85-ft) towers and floodlit buildings. In bad weather, bird strikes have been recorded near or at the ground level, usually associated with lighting. James (1956) retrieved 2,421 dead birds of 39 species (mostly warblers) beneath light poles on a coastal island following a single stormy spring night in 1951. Lord (1951) reported 200 birds of 23 species killed after apparently being confused by floodlights and striking a lodge on the Blue Ridge Parkway during a foggy night in the fall 1950. In 1975, Wylie (1977) reported 73 birds of 21 species killed by striking an unlit, 30-m (100-ft) tall fire tower during a night of rain and fog. Until more research is conducted on the effects of short towers on birds, we cannot assume that they are not having an impact on populations of songbirds.

To assess tower mortality, Banks (1979) estimated that 1.25 million birds were killed per year in strikes with towers, basing this estimate on 505 tall towers likely to impact birds in 1975. Evans (1998) reassessed mortality based on increased numbers of tall towers, estimating 2-4 million bird deaths per year. Manville (2001a, from a December 1999 evaluation) estimated annual mortality at 4-5 million birds, while Manville (2001b, based on a December 2000 assessment) again cited the 4-5 million figure but indicated that mortality could range as high as 40-50 million. He cautioned that only a cumulative impacts study would assess the true magnitude of the problem and again raised concerns over impacts on already imperiled bird species.

A recently discovered and potentially troubling problem for birds is the impact of low-level, non-thermal radiation emitted from towers. Several studies have recently been conducted using standard 915 MHz cell phone radio frequency microwave radiation on domestic chicken embryos for either 4 days of continuous exposure or at timed intervals twice daily for 4 days (T. Litovitz, Catholic University, pers. comm., data published in DiCarlo and others 2002; Farrel and others 1998). Radiation levels in one study (T. Litovitz, Catholic University, data, published in DiCarlo and others 2002) were far below current FCC-approved and permissible human health radiation standards (i.e., 1.6 W/kg of whole body tissue). With exposures of 30 minutes or more of radiation per day, embryos developed deformities (e.g., induced DNA damage at 1/600th [0.0024 W/kg] the current permissible level) and in some cases died (e.g., due to affected calcium levels in the heart at 1/10,600th [0.00015 W/kg] the permissible level under hypoxic conditions). While extended low doses of microwave cell-phone radiation are being shown to be a distinct risk to human health through enhanced probabilities of cancer (Hardell and Mild 2001) and Alzheimer=s disease (Sobel and others 1996), what effects tower-emitted radiation

have on nesting and roosting wild birds on or next to towers are only now being studied. Preliminary research in Valladolid, Spain, has shown strong negative correlations with levels of tower-emitted microwave radiation and bird breeding, nesting, and roosting in the vicinity of these electromagnetic fields. In the House Sparrow (*Passer domesticus*), White Stork (*Ciconia ciconia*), Rock Dove (*Columba livia*), Magpie (*Pica pica*), Collared Dove (*Streptopelia decaocto*), and other species, nest and site abandonment, plumage deterioration, locomotion problems, and even death were reported among those species found close to cellular phone antennas (A. Balmori, 2003 unpubl. data). Laboratory mice were treated with radiation to replicate conditions found close to an Antenna park® by Magras and Xenos (1997) in Greece. After 5 generations of newborns, irreversible infertility occurred. What similar effect antennas may have on birds is unknown.

From a collision perspective, the towers that cause the most problems are tall (especially those exceeding 305 m [1,000 ft]), illuminated at night with solid or pulsating incandescent red lights, guyed, near wetlands, in major songbird migration pathways or corridors, and with a history of inclement weather during spring and fall migrations (Manville 2001a). All towers, however, have the potential to kill birds. Light appears to be a key attractant for night-migrating songbirds, especially on nights with poor visibility, low cloud ceilings, heavy fog, or various forms of precipitation associated with either passing or stationary cold fronts (Tordoff and Mengel 1956, Ball and others 1995). Its attractant effects were first reported in Forest and Stream (1874) and later Allen (1880, cited in Cochran 1959) reported birds killing themselves by flying against lighthouse lights. Cochran and Graber (1958) and Cochran (1959) reported that songbirds were heavily attracted to red incandescent lights at a television tower during inclement weather. In two studies where lighted towers attracted songbirds, and the lights were extinguished, birds continued on their migrations leaving previously lit, cloud enshrouded towers (Cochran and Graber 1958, Avery and others 1976). In both studies, when the lights were turned back on, within minutes birds began circling the towers in large numbers. Gauthreaux and Belser (1999) showed a greater proportion of bird attraction to red flashing incandescent lights than to white strobes; strobes still attracted some birds compared to unlit controls that attracted none. When nighttime weather conditions and visibility improved, in all cases reported in the literature, the birds left the lighted towers, apparently continuing on their migrations. While tall lighted towers appear to be a major problem, lights can draw birds close to or at ground level, as James (1956) reported on South Padre Island, Texas, when several thousand carcasses were retrieved following a one-night storm.

The Service's Fisheries and Habitat Conservation program and our 78 Ecological Services field offices have been involved, to varying degrees, for decades in assessing towers and their impacts on species listed under ESA and required consultations under Section 7 of the Act. However, not until 1998 did the Division of Migratory Bird Management become actively involved in the tower collision issue when in January 1998, up to 10,000 Lapland Longspurs (*Calcarius lapponicus*) and several other species died in a one-night multi-tower accident in western Kansas (Manville 2000). In response to pressure from the environmental community to address this growing problem, the Service developed a tower risk model in late 1998 (the key points of the model referenced in Manville 2001a) and in June 1999 chaired a meeting facilitated by the environmental dispute resolution group,

RESOLVE. The most noteworthy outcome of the RESOLVE meeting was the formation of the multi-stakeholder group, the Communication Tower Working Group (CTWG) B made up of more than 14 Federal and several state agencies; most of the communication industry trade associations and several companies; radar, acoustical and physiological ornithologists; consultants; and a number of conservation organizations. The purpose of the CTWG is to develop research protocols, seek funding, and implement pilot studies and a strategic nationwide tower monitoring and cumulative impacts study. Specific details of Working Group developments and related tower challenges are referenced in Manville (2001a, 2001b; see also <http://migratorybirds.fws.gov/issues/towers/abcs.html>).

In 1999, the USFWS co-sponsored a workshop on Avian Mortality at Communication Towers@ at Cornell University (complete transcripts available at <http://migratorybirds.fws.gov/issues/towers/agenda.html>). Following meetings in 1999 and 2000, the CTWG developed protocols for conducting pilot studies; approved the framework for a nationwide monitoring study; and prioritized research needs for pilot studies on lighting attraction, behavior effects of lighting, dead bird searches, a critique for dangerous towers, and Geographic Information System needs. Three pilot studies were peer-reviewed by members of the Ornithological Council of which one on lighting has been funded and implemented in the spring 2003.

In 2001, Florida-based Richland Towers funded and implemented the first avian mortality study west of the Rocky Mountains in Sacramento County, California. Avian mortality was small; researchers discovered some 10 dead birds during the one-month spring migration study. No bad weather events occurred during the research.

In February 2002, the CTWG met to discuss developing a public-private partnership. Since that meeting, the National Fish and Wildlife Foundation (NFWF) committed \$50,000 in funding to be matched 1:1 by industry or another source. At the February 2004 meeting of the CTWG, NFWF continued to commit the \$50,000. The majority of NFWF funding has now been used to match a portion of \$200,000 in funding from the State of Michigan for a lighting study now underway.

Like the voluntary Suggested Practices used by the electric utility industry, the Service developed voluntary tower siting and placement guidelines for the communication tower industry in September 2000 (<http://migratorybirds.fws.gov/issues/towers/comtow.html>) B based on two years of comments and concerns from the industry, key scientists, and conservationists, and based on the best science available. As new research findings are discovered, for example through new studies, the guidelines will be updated with this information.

The U.S. Forest Service is to be commended for using the USFWS=s siting guidelines for companies proposing to site short, unguied cellular phone towers in Arizona National Forests, and for requiring the companies to fund and implement three-year tower monitoring studies in Coconino, Prescott, and Kaibab NF s. They have also adopted the Migratory Bird Division=s suggested monitoring protocol for these studies that should yield needed data on the magnitude of avian mortality at short towers in the West. The U.S. Coast Guard is also to be commended for signing a memorandum of understanding

with the Service, in which they will use the Service's voluntary communication tower guidance to collocate existing and some proposed new antennas on other towers, buildings, or similar structures; and they will fund and implement a joint Service-USCG research study at a select number of new towers around the U.S. coastline and the Great Lakes. Lighting will be a key component of the research.

Wind Generation

Wind-generated electrical energy is renewable, produces no emissions, and is a generally environmentally clean technology that is becoming competitive with electricity produced from fossil fuels and nuclear power (American Wind Energy Association [AWEA] unpubl. data, <http://www.awea.org>). However, like so many technologies, there is no free lunch. Wind generation has several significant downsides: rotor blades kill birds especially raptors in the West and bats; birds and bats can strike the towers; electrocutions can occur if designs are poor; and wind farms may impact bird movements, fragment habitats, and cause disturbances. Wind turbine technology is not new to the United States. In the late 1930s, Vermont boasted the world's then-largest turbine that was likely disabled by high winds due to design flaws, and Cape Cod supported over 1,000 working windmills in the 1800s (Ferdinand 2002). But wind turbine farms and their impacts to birds are a recent phenomenon, as compared to power lines and communication towers where mortality has been documented for decades or longer. The problem in the US surfaced in the late 1980s and early 1990s at the Altamont Pass Wind Resource Area a facility then containing some 6,500 turbines on 189 km² (73 mi²) of gently rolling hills just east of San Francisco Bay, California (Davis 1995). Orloff and Flannery (1992) estimated that several hundred raptors were killed each year due to turbine collisions, guy wire strikes, and electrocutions. The most common fatalities were those of Red-tailed Hawks, American Kestrels (*Falco sparverius*) and Golden Eagles, with less mortality of Turkey Vultures (*Cathartes aura*), Common Ravens (*Corvus corax*), and Barn Owls (*Tyto alba*). The impacts of this wind farm were of most concern to the population of Golden Eagles which was showing a disturbing source of mortality to a disproportionately large segment of the population (Southern Niagara Escarpment [WI] Wind Resource Area unpubl. report). Of the variety of wind turbines at the site, the smaller, faster moving, Kenetech-built, lattice-supported turbines caused most of the mortality at Altamont Pass. As part of a re-powering effort, these turbines are now being replaced with slower moving, tubular-supported turbines. While mortality has declined, an average of 40-60 Golden Eagles and several hundred Red-tailed Hawks and American Kestrels are still estimated to die annually (Hunt 2002) a continuing concern to the Service. While Europeans have used tubular towers almost exclusively, the US has almost solely used lattice support at least until recently (Berg 1996).

Wind farms can also disturb and fragment habitats and disrupt birds (Manes and others 2003). A 7-year ongoing radio telemetry study of Lesser Prairie-Chickens (*Tympanuchus pallidicinctus*) in the Midwest (R. Robel, unpubl. data, Kansas State University) raises serious questions about turbine impacts to breeding grassland birds that use leks. Because

of habitat fragmentation, prairie chickens and Sage Grouse (*Centrocercus urophasianus*) are already in serious trouble.

Colson (1995) indicated that some 16,000 wind turbines operated in California, making the State the largest concentration of wind energy development in the world. Since 1995, that statistic has changed. While California still boasts the greatest number of turbines in the US, many smaller turbines are being replaced by fewer but larger models. Worldwide, an estimated 50,000 turbines are generating power (AWEA unpubl. data; Ferdinand 2002), of which over 15,000 are currently in 29 states in the US. Turbine numbers are often difficult to track since statistics are generally presented in megawatts (MW) of electricity produced, rather than number of turbines present. The latter statistic is of greater concern to ornithologists. In 1998, for example, Germany was the greatest producer with 2,874 MW of electricity produced by turbines, followed by the US (1,884), and Denmark (1,450; AWEA unpubl. data). While some project that the number of wind turbines in the US may increase by another 16,000 in the next 10 years, current trends indicate an even greater potential growth. While the US presently produces less than 1 percent of its electrical energy from turbines compared, for example, to Norway's 15 percent. In 2001 was a banner year for U.S. turbine technology, doubling the previous record for installed wind production. Companies installed 1,898 turbines in 26 states, which will produce nearly 1,700 MW, at a cost of \$1.7 billion for the new equipment (J. Cadogan, U.S. Department of Energy, pers. comm.). Over the past decade, wind power has been the fastest growing energy industry in the world. By 2020, the AWEA (unpubl. data) predicts that wind will provide 6 percent of this nation's electricity to as many as 25 million households. Enron Wind Corporation constructed some 1,500 of the 1,898 turbines installed in the US in 2001. Although Enron is now bankrupt, General Electric purchased the company and is now producing wind turbines.

In 2002, President Bush signed the Job Creation and Worker Assistance Act, extending the production tax credit to the wind industry for another two years. The President recently reauthorized the production tax credit, extending it through 2006. However, the race to meet the tax credit deadline is forcing the industry to rush turbine development without critical pre-construction site evaluation. Extending the reauthorization period for this Act for more than two years would partially solve this problem. Even with a bright future for growth, and with low speed tubular-constructed wind turbine technology now being stressed, larger and slower moving turbines still kill raptors, passerines, waterbirds, other birds, and bats. Low wind speed turbine technology requires much larger rotors, blade tips often extending more than 128 m (420 ft.) above ground, and blade tips can sometimes reach speeds in excess of 320 kph (200 mph) under windy conditions (J. Cadogan, U.S. Department of Energy, pers. comm.). When birds approach spinning turbine blades, motion smear & the inability of the bird's retina to process high speed motion stimulation occurs primarily at the tips of the blades, making the blades deceptively transparent at high velocities. This increases the likelihood that a bird will fly through this arc, be struck by a blade, and be killed (Hodos and others 2001).

What cumulative impact these larger turbines will have on birds and bats has yet to be determined. Johnson and others (2002) raised some concerns about the impacts of newer, larger turbines on birds. Their data indicated that higher levels of mortality might be

associated with the newer and larger turbines, and they indicated that wind power-related avian mortality would likely contribute to the cumulative impacts on birds. Since little research has been conducted on the impacts of large land-sited and offshore turbines on birds and bats, this newer technology is ripe for research.

Howell and Noone (1992) estimated U.S. avian mortality at 0.0 to 0.117 birds/turbine/yr., while in Europe, Winkelman (1992) estimated mortality at 0.1 to 37 birds/turbine/yr. Erickson and others (2001) reassessed U.S. turbine impact, based on extrapolations from 12 wind facilities predominately in the West and Midwest, and estimated mortality in the range of 10,000 to 40,000 (mean = 33,000), with an average of 2.19 avian fatalities/turbine/yr. and 0.033 raptor fatalities/turbine/yr. As previously mentioned, this may be a considerable underestimate. As with other structural impacts, only a systematic turbine review will provide a more reliable estimate of mortality. While some have argued that turbine impacts are small (Berg 1996), especially when compared to those from communication towers and power lines, turbines can pose some unique problems especially for birds of prey and mortalities must be reduced especially as turbine numbers increase. In addition to protections under the MBTA, Bald and Golden Eagles are afforded protections under the ESA for the former and the BGEPA for both raptors. As strict liability statutes, MBTA and BGEPA also provide no provisions for un-permitted Atake. Wind farms can affect local populations of Golden Eagles and other raptors whose breeding and recruitment rates are naturally slow and whose populations tend to have smaller numbers of breeding adults (Davis 1995). Large raptors are also revered by Native Americans as well as by many others within the public, they are symbolic megafauna, and they provide greater emotional appeal to many than do smaller avian species. Raptors also have a lower tolerance for additive mortality (Anderson and others 1997). In the eastern United States, recent and proposed installations of hundreds of turbines on Appalachian Mountain ridges raise new concerns for raptors, songbirds, and bats. Environmentalists are calling for a systematic area-wide pre-construction review of these sites. As with all other human-caused mortality, we thus have a responsibility to reverse mortality trends at wind farms.

Until very recently, U.S. wind turbines have mostly been land-based. Perhaps following the European lead of siting wind turbines in estuarine and marine wetlands (van der Winden and others 1999, van der Winden and others 2000), and perhaps due to an assessment of a large number of potential offshore turbine locations in the US (based on Weibull analyses of Agood, excellent, outstanding, and superb wind speed potentials [National Renewable Energy Laboratory 1987]), a new trend is evolving in North America. Several proposals for huge offshore sites are being submitted for locations on both Atlantic and Pacific coasts. These, at the very least, should require considerable research and monitoring to assess possible impacts to resident and migrating passerines, waterfowl, shorebirds, and seabirds. One site at Nantucket Shoals, offshore of Nantucket Island near Cape Cod, Massachusetts, is proposed by the Cape Wind Association to contain 170 turbines, many over 128 m (420 ft.), within a 65 km² (25 mi²) area (AWEA unpubl. data, Ferdinand 2002). What impacts will this wind farm have on wintering sea ducks and migrating terns, especially the Federally endangered Roseate Tern (*Sterna dougallii dougallii*), and on Northern Gannets (*Morus bassanus*)? The Long Island Power Authority is proposing a site offshore of Long Island, New York's south shore, covering

as much as 813 km² (314 mi²). Other sites are being proposed for Portland, Maine, and Lake Erie. The largest proposed wind farm in North America is being planned for a 130 km² (50 mi²) area between Queen Charlotte Island, BC, and Alaska. It is being designed to contain 350 turbines, many exceeding 122 m (400 ft.) in height. While the potential for significant offshore turbine impacts on waterbirds is great, virtually no research has been conducted in the United States to quell these concerns, and finding carcasses at sea is very challenging.

In an attempt to begin addressing the bird mortality issue and ancillary to this the issue of ESA-listed bat strikes also of concern to the USFWS the National Wind Coordinating Committee was created in 1994 as part of President Clinton's Global Climate Change Action Plan (Colson 1995). Shortly following the creation of the Committee, the Avian Subcommittee now called the Wildlife Workgroup was formed, with the Service joining in 1995. In 1999, the Avian Subcommittee published a Metrics and Methods document to study turbine impacts on birds (Anderson and others 1999). The document provides an excellent resource for conducting research on proposed and existing turbines and wind farms.

To address the turbine collision and habitat fragmentation problems in-house, the Service's Wind Turbine Siting Working Group developed interim voluntary site evaluation, siting, placement, and monitoring guidelines for the wind industry, much like those that exist in the Suggested Practices for power companies, or the tower guidelines for the communication tower industry. The Guidance was published in the *Federal Register* on July 10, 2003, and can be located at: <http://www.fws.gov/r9dhcbfa/windenergy.htm>. We encourage use of this guidance and are soliciting input from industry, other experts, and the public for a two-year period, beginning when the guidance was released in 2003. Once the public comment period closes in 2005, we will reassess and update the voluntary guidance. The guidance is intended to assist the wind industry in avoiding or at least minimizing wildlife impacts by evaluating potential wind development sites, properly siting and designing turbines within these areas, and conducting pre- and post-construction research and monitoring to identify impacts to wildlife and their habitats. The guidance also contains a detailed protocol for evaluating and ranking a site before it is developed.

Based on the efforts of a team of Federal, state, university, and wind industry biologists in Montana, a protocol was developed to evaluate and rank potential sites proposed for wind development. The process is designed to identify and evaluate so-called Reference sites areas where wind development would result in a maximum negative impact to wildlife and habitats and then use these reference sites to rank sites proposed for actual development. Ranking a site results in an index score for that location. The protocol is intended to be used nationwide.

Based on considerable published information from the Wildlife Workgroup, and from other sources, the Service's Working Group also agreed to a number of recommendations under the categories listed below. Some of these include:

Site development:

- avoid siting turbines in major bird migration corridors or in areas where birds are highly concentrated;
- avoid placing turbines in areas that attract raptors; specifically, consider setbacks from cliff/rim edges, avoid dips or passes along ridges, and avoid turbine sites in or near prairie dog and ground squirrel colonies;
- avoid attracting high densities of prey animals consumed by raptors, reduce carrion availability, and avoid creating wetlands adjacent to turbines;
- in known prairie grouse habitat, avoid siting turbines within at least 8 km (5 mi) of documented lek breeding areas;
- where rotor swept area is a risk to wildlife, adjust turbine tower height where feasible to reduce or eliminate the risk from turbine strikes;
- avoid siting turbines near bat hibernation and breeding colonies, migration corridors, and in flight paths; and
- avoid siting turbines in areas with Federally ESA-listed plants, animals, and designated critical habitat.

Turbine design and operation:

- use tubular supports with pointed tops rather than lattice supports to minimize bird perching and nesting opportunities;
- avoid using guy support wires for turbines and meteorological study towers. Where guys must be used, mark them with recommended bird deterrent devices (APLIC 1994);
- for turbines whose rotor-swept area exceeds 61 m (199 ft) above ground level, use white strobe lighting with the minimum number, minimum intensity, and minimum number of flashes per minute allowed by the Federal Aviation Administration during nighttime operations. Avoid lighting all turbines but have all lights flash simultaneously on lighted structures. Avoid solid red or pulsating red incandescent lighting;
- where feasible, place electric power lines underground to avoid electrocuting birds and use the Suggested Practices (APLIC 1996, Southern Engineering Company 1996) for above-ground lines, transformers, and conductors;
- in areas of high seasonal bird concentrations, where feasible, shut down turbines during periods when birds are highly concentrated at those sites; and
- when retrofitting, specifically where studies indicate high levels of mortality, follow the above guidance as closely as possible.

The Working Group also included a monitoring and dead-bird-search protocol that is being used by the Forest Service to study communication towers; this should easily be modified to study wind turbines. The Group also identified these additional research needs:

- assess the effects of inclement weather in attracting birds B especially passerines B and bats to lighted turbines and their rotor-swept areas;
- monitor and assess local impacts of turbines on wildlife, including habitat loss and fragmentation, effects of noise, and habituation;
- assess turbine string configuration and its potential for mortality, including end-of-row, dip and pass, and setback placements;
- determine the effectiveness of deterrents including blade colors (black/white and UV gel coatings to reduce the Asmeareffect@), lighting, infrasound, and visual markers;
- assess acoustic, infrared, and radar technologies to detect bird presence, movement, flight level, and position in relation to turbines;
- assess mortality estimates, including the number of lost carcasses (especially passerines) fragmented by the blades and lost to the wind, review the size and shape of dead-bird-search areas, and review possibilities of recording collisions through acoustic, radar, or infrared monitoring;
- determine the utility of GIS as a tool to assess migratory pathways and stopovers, particularly for passerines, bats, and butterflies;
- assess the effectiveness of time-specific or seasonal shutdowns to prevent mortalities; and
- compare the impacts of newer larger turbines to their smaller counterparts.

In conclusion, the challenges posed by power lines, communication towers and wind turbines are daunting and our avian friends need all the help we can provide them. This will require the collective minds of many individuals and interest groups.

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**Briefing Paper on the Need for Research into the Cumulative Impacts of
Communication Towers on Migratory Birds and Other Wildlife in the United States
Division of Migratory Bird Management (DMBM), U.S. Fish & Wildlife Service – for
Public Release**

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ISSUE: The number of communication towers including radio, television, cellular, microwave, emergency broadcast, national defense, and paging towers has grown exponentially in the U.S. over the past decade. These towers present health and safety challenges for humans, but they are also a growing impact to populations of migratory birds, 4-5 million of which are conservatively estimated to die each year in tower and guy-wire collisions (Manville 2005). Virtually unknown, however, are the potential effects of non-ionizing, non-thermal tower radiation on avifauna, including at extremely low radiation levels, far below maximum safe¹ exposure levels previously determined for humans.

This briefing paper addresses the need to cumulatively assess the impacts of communication towers on migratory birds both from collisions and radiation, especially neotropical migratory songbirds that are most impacted (Shire *et al.* 2000). The paper discusses some suggested research protocols needed to conduct a nationwide cumulative impacts analysis that would assess effects of tower collisions and radiation on avifauna and on other wildlife pollinators including bats and bees.

BACKGROUND

Light Attraction to Birds in Inclement Weather

Beginning with the earliest reported bird-tower kill in the U.S. (in September 1948 at a 137-m [450-ft] radio tower in Baltimore, MD [Aronoff 1949]), the nighttime attraction of lighting during inclement weather has proved to be a key liability for birds. However, much of the past research focused on carcass collections that were not necessarily correlated to nighttime lighting or to weather events. For example, the first long-term study of the impact of a television tower on birds began in 1955 by the Tall Timbers Research Station in FL. After the first 25 years of the study, 42,384 birds representing 189 species were tallied (Crawford and Engstrom 2001). Kemper (1996) reported collecting more than 12,000 birds killed in inclement weather on one night at a television tower in Eau Clair, WI. Manville (2005, 2007) provided additional details of documented bird-tower collision studies in the U.S., especially in regard to lighting and weather events.

Recently, Gehring *et al.* (2006, 2007) reported where red, steady-burning lights were extinguished allowing only flashing or strobe lights to persist on towers, the lighting change-out resulted in a 71% reduction in avian collision mortality at towers in MI. In a short-term study,

¹ “Safe” levels were based on thermal heating standards, now inapplicable. The standards are nearly 25 years out of date, and the EPA office tasked to direct the human safety issues was eliminated due to budget cuts in the early 1980s. Furthermore, the standards in place do not address the potential effects of radiation on wildlife. No government agency currently monitors the rising background levels of electromagnetic radiation (EMF). Current safety standards assume that non-ionizing radiation is safe if the power is too weak to heat living tissue. However, since the 1980s, growing amounts of published research are showing adverse effects on both humans and wildlife far below a thermal threshold – usually referred to as “non-thermal effects,” especially under conditions of long-term, low-level exposure (DiCarlo *et al.* 2002, Levitt and Morrow 2007).

Evans *et al.* (2007) looked at lighting attraction at ground level in complete cloud cover, but found that neither red, steady-burning nor red flashing lights induced bird aggregation. They hypothesized that the disorientation to red light only occurs if birds are actively using magnetoreception and the red light creates an imbalance in the magnetoreception mechanism. Additional studies are underway to better understand the mechanisms of lighting attraction.

Published research protocols developed to count and estimate bird-tower kills have been developed (*e.g.*, Avery *et al.* 1978, Manville 2002, Derby *et al.* 2002, and Gehring *et al.* 2007) and will be briefly reviewed below for use in future cumulative effects assessments for both collision and radiation studies.

Potential Radiation Impacts to Birds

In 2002, T. Litovitz (Catholic University, pers. comm.; DiCarlo *et al.* 2002) raised troubling concerns about the impacts of low-level, non-thermal radiation from the standard 915 MHz cell phone frequency on domestic chicken embryos under laboratory conditions. Litovitz noted deformities, including some deaths of the embryos subjected to hypoxic conditions under extremely low radiation doses².

Preliminary research on wild birds at cellular phone tower sites in Valladolid, Spain, showed strong negative correlations between levels of tower-emitted microwave radiation and bird breeding, nesting, and roosting in the vicinity of the electromagnetic fields (Balmori 2003). Birds had historically been documented to roost and nest in these areas. House Sparrows, White Storks, Rock Doves, Magpies, Collared Doves, and other species exhibited nest and site abandonment, plumage deterioration, locomotion problems, and even death among some birds found close to cellular phone antennas. Balmori did not observe these symptoms prior to construction of the cell phone towers. Balmori (2004, 2005) noted that the White Stork appeared most heavily impacted by the tower radiation during the 2002-2004 nesting season in Spain. Manville (2005) reported Balmori's (2003) preliminary results, and raised concerns of similar events in the U.S.

Everaert and Bauwens (2007) found strong negative correlations between the amount of radiation presence (both in the 900 and 1800 MHz frequency bands) and the presence of male House Sparrows. In areas with high electric field strength values, fewer House Sparrow males were observed. Everaert and Bauwens' preliminary conclusion, long-term exposure to higher radiation levels was affecting bird abundance or bird behavior in this species. Balmori and Hallberg (2007) reported similar declines in House Sparrows directly correlated with levels of electromagnetic radiation in Valladolid, Spain.

Of concern to DMBM are the potential impacts of radiation on bird populations. Beason and Semm (2002) tested neural responses of Zebra Finches to 900 MHz radiation under laboratory conditions and showed that 76% of the neurons responded by 3.5-times more firings. No studies have yet been conducted in the U.S. on radiation impacts to wild bird populations. Magnetite, a mineral highly sensitive to electromagnetic frequencies (EMFs), has been discovered in human, bird, and fish brains. It has been suggested that radio frequency radiation (RF) may be acting as an attractant to birds since their eye, beak and brain tissues are loaded with magnetite, a mineral highly sensitive to magnetic fields that birds use for navigation (Ritz *et al.* 2004, R. Beason cited in Levitt and Morrow 2007). Communication tower radiation in the U.S. may already be impacting breeding and migrating populations of birds, bees, and other wildlife, based on research conducted in Europe. It is therefore important to gain a far better understanding of the

² *i.e.*, doses as low as 1/10,000 below the allowable "safe" level of radiation (T. Litovitz 2002 pers comm.; DiCarlo *et al.* 2002).

suspected impacts of radiation on birds and other wildlife, particularly if those suspected impacts are having effects on species at the population level.

Potential Radiation Effects on Other Pollinators

Radiation has also been implicated in effects on domestic honeybees, pollinators whose numbers have recently been declining due to “colony collapse disorder” (CCD) by 60% at U.S. West Coast apiaries and 70% along the East Coast (Cane and Tepedino 2001). CCD is being documented in Greece, Italy, Germany, Portugal, Spain, and Switzerland. One theory regarding bee declines proposes that radiation from mobile phone antennas is interfering with bee navigational systems. Studies performed in Europe have documented navigational disorientation, lower honey production, and decreased bee survivorship (Harst *et al.* 2006, Kimmel *et al.* 2006, Bowling 2007). This research needs further replication and scientific review, including in North America. Because pollinators, including birds, bees, and bats, play a fundamental role in food security (33% of our fruits and vegetables would not exist without pollinators visiting flowers [Kevan and Phillips 2001]), as pollinator numbers decline, the price of groceries goes up.

Harst *et al.* (2006) performed a pilot study on honeybees testing the effects of non-thermal, high frequency electromagnetic radiation on beehive weight and flight return behavior. They found that of 28 unexposed bees released 800 m (2,616 ft) from each of 2 hives, 16 and 17 bees returned in 28 and 32 minutes, respectively, to hives. At the 1900 MHz continuously-exposed hives, 6 bees returned to 1 hive in 38 minutes while no bees returned to the other hive. In exposed hives, bees constructed 21% fewer cells in the hive frames after 9 days than those unexposed. Harst *et al.* selected honeybees for study since they are good bio-indicators of environmental health and possibly of “electrosmog.” Because of some concerns raised regarding the methods used to conduct the Harst *et al.* (2006) study, specifically the placement of the antenna where bees could contact it (*i.e.*, potentially a bias), the experimental methods need to be redesigned and the studies retested to better elucidate and fine tune the impacts of radiation. The results, while preliminary however, are troubling. Kimmel *et al.* (2006) performed field experiments on honeybees under conditions nearly identical to the Harst *et al.* (2006) protocol except that bees were stunned with CO₂ and released simultaneously 500 m (1,635 ft) from the hives. However, in one of their experimental groups, they shielded the radiation source and antenna in a reed and clay box to address potential biases raised in the Harst *et al.* study. Sixteen total hives were tested, 8 of which were irradiated. After 45 minutes when the observations were terminated, 39.7% of the non-irradiated bees had returned to their hives while only 7.3% of the irradiated bees had.

RESEARCH DISCUSSION

If communication tower collisions are killing 4-5 million or more birds per year in the U.S. due to collisions, what impact – if any – might radiation have on avifauna? Bees? Other wildlife? We simply do not know. In 2000, the Communication Tower Working Group (chaired by DMBM/Manville) developed a nationwide tower research protocol that would assess cumulative impacts from tower collisions nationwide, suggesting the use of some 250 towers of different height, lighting, and support categories. The preliminary cost estimate for a 3-year study was \$15 million. No funding was ever acquired and the collision study has not yet been conducted.

The proposed 2000 study was to focus on the collision impacts of communication towers to birds during spring and fall migrations, but the same types of mortality monitoring could be conducted during the late spring/summer breeding seasons, looking particularly for evidence of injury and death to breeding birds in close proximity to communication towers. Radiation levels would need to be measured at the tower sites and nests adjacent to the towers during nesting activity, and bird behavior would also need to be monitored throughout the breeding season. Laboratory necropsies

would need to be performed on birds and other wildlife suspected of impacts from radiation to better understand what caused their deaths and to verify that they did not die from blunt force trauma from tower or wire collisions. Pre-construction studies should be performed to assess habitat use by breeding and resident avifauna. Post-construction studies should assess site abandonment, development of deformities, injuries, and deaths. A careful review of the protocols developed by Balmori (2004, 2005), Balmori and Hallberg (2007), Everaert and Bauwens (2007), and others is critical because similar studies should be performed in the U.S.

METHODS FOR ASSESSING AVIAN COLLISION MORTALITY

Methods for Assessing Tall Tower Mortality

Bird strike mortality studies at “tall”³ communication towers conducted previous to research performed by Avery *et al.* (1978) indicated that most dead birds were found within 60 m (197 ft) of the central communication tower structure. Avery *et al.* assessed songbird mortality at a 369-m (1,210-ft) Omega Loran U.S. Coast Guard tower in ND. Based on daily monitoring during 3 fall and 2 spring migration seasons, 63% of the birds they found dead or injured at this tower were within 92 m (300 ft) of the tower. Avery *et al.* placed tagged bird carcasses (*e.g.*, House Sparrows and European Starlings) in catchment nets and on non-netted habitats (*e.g.*, gravel pads, roads, and marshy plots) to assess persistence and scavenging/predation loss. They completely examined the inner 46-m (150-ft) radius of the tower (concentric circle designated “A”) for bird carcasses, including both the areas covered with catchment nets and the non-netted areas. Placing tagged carcasses in random search plots, which are then found or not found and/or removed or not removed, helps determine biases (Erickson *et al.* 1999). However, there are inherent problems associated with using tagged bird carcasses, including the attraction of predators, cost, availability, and adequate sample size (D. Strickland, WEST Inc., pers. comm.).

In addition to the total area assessed during this study (168 ha [415 ac]), for the remainder of the search area, Avery *et al.* (1978) divided the habitat into concentric circles of radii 92 m (designated “B”; 303 ft), 183 m (C; 600 ft), and 731 m (D; 2,398 ft), respectively. Two compass lines (north-south and east-west) divided B, C, and D into 12 substrata beyond the inner core. In each of the substratum, 2 net catchment sampling plots, 12.4 m (41 ft) on a side, were randomly selected. Nylon netting suspended on steel frames 1.5 m (5 ft) high, with the net’s center anchored to the ground, was utilized. See Manville (2002) beyond for additional net details.

Sampling nets were demonstrated by Avery *et al.* (1978) to be highly effective in preventing losses to scavengers and predators; none of 33 of the test birds placed in nets during the Avery *et al.* study were taken during the first night, but 12 of 69 test birds placed on non-netted gravel sampling plots were taken during the same period. During the Avery *et al.* study, dead bird searches were made daily at dawn during the peak of songbird migration. In a study at Tallahassee, FL, television tower – where sampling nets were not used – scavenging was considerably higher; only 10 of 157 birds were left undisturbed after one night (*i.e.*, 93.6% scavenging; Crawford 1971).

Homan *et al.* (2001) placed carcasses of House Sparrows in dense vegetation, comparing searcher efficiencies of humans and canines. The dogs received no special training in carcass searching.

³ hereafter, towers greater than 61 m (199 ft) above ground level (AGL), generally guyed, and always lit at night.

Thirty-six trials were conducted in 5 x 40-m (16 x 131-ft) study plots. Humans found 45% of the carcasses while dogs found 92%. The ratio of recovered to missed carcasses was approximately 12:1 for dogs and 1:1 for humans, making dogs much more efficient in finding carcasses. Searcher efficiencies were not improved but remained similar when testing residual cover (April searches) versus new growth cover (August searches). Because the protocol in the Homan *et al.* study improved quantitative and qualitative assessments, it provides considerable promise for the research initiatives being proposed in this briefing paper.

Arnett (2006) further tested the dog-search protocols of Homan *et al.* (2001) and others, assessing the abilities of dog-handler teams to recover dead bats at 2 commercial wind turbine facilities. Dogs found 71% of the bats placed during searcher-efficiency trials at Mountaineer, WV, and 81% of those at Meyersdale, PA, while human searchers found only 42% and 14% of the carcasses, respectively. Both dogs and humans found a high proportion of the trial bats within 10 m (33 ft) of the turbine tower, usually in open ground (88% and 75%, respectively). During a 6-day fatality search trial at 5 Mountaineer turbines, dog-handler teams found 45 carcasses while human searchers during the same period found only 19 (42%). As vegetation height and density increased, humans found fewer carcasses while dog-handler team searcher efficiencies remained high. Arnett's (2006) study further reinforces the hypothesis that use of dogs greatly improves efficiencies in finding dead bats very similar to what Homan *et al.* (2001) found for locating passerines. Dog use should be given serious consideration in conducting bird and bat mortality studies at telecommunications towers.

From 2003 through 2005, Gehring *et al.* (2006, 2007) studied 24 tall communication towers in MI. They used flagged, straight-line transects, each technician walking at a rate of 45-60 m (147-196 ft) per minute and searching for carcasses within 5 m (16 ft) on either side of each transect, as suggested by Erickson *et al.* (2003). The transects covered a circular area under each tower with a radius equal to 90% the height of the tower. The straight line transects were much easier to navigate than were circular transects (J. Gehring, Michigan Natural Features Inventory, pers. comm.). Due to dense vegetation, observer fatigue, human error, scavenging by predators, and crippling loss of birds and bats that may have escaped the detection area, Gehring *et al.* tested each technician's observer detection rate and rate of carcass removal. Ten bird carcasses of predominately Brown-headed Cowbirds, with painted plumage to simulate fall song bird migration plumage, were placed once each field season within each study plot to assess observer efficiencies. Likewise, 10-15 predominately Brown-headed Cowbirds were placed by each technician at the edge of designated tower search area to monitor the daily removal of carcasses by scavengers. These carcasses were not painted to avoid placing any foreign scent on them. No catchment nets were used in this study.

Methods for Assessing Short Tower Mortality

Manville (2002) developed a protocol for the U.S. Forest Service (USFS) to study the effects of cellular telecommunications towers on birds and bats, recommending use of elevated catchment nets for a Coconino, Kaibab, and Prescott National Forest study in AZ. Modifying the Avery *et al.* (1978) search protocol, Manville suggested use of 1.9-cm (0.75-in) mesh knitted polyethylene nets, 15 x 15 m (50 x 50 ft) in size, suspended 1.5 m (5 ft) above ground, with 8 gauge monofilament nylon line attached around the periphery of the entire net, supported with 2-m-long (6.5-ft) steel angle posts driven into the ground and spaced every 2-3 m (7-10 ft) apart. He recommended pulling the center of each net close to the ground, securing with monofilament to a cinder block, thus creating a downslope gradient from the edge of the net to its center so a carcass landing in the net would tend not to be blown from the netting edge to the ground by a strong wind. He did not recommend using a wooden lip on the net's edges as Avery *et al.* (1978) had suggested. Materials for each net were estimated to cost \$320 (Avery and Beason 2000).

Manville (2002) postulated that use of elevated catchment nets would make finding dead birds killed by tower strikes more reliable, especially under variable habitat conditions (e.g., unsuitable substrate for searching, tall grass, shrubs, roots, boulders, or trees). Manville recommended breaking down the tower's circumference into 3, 120° arcs, then breaking the study plot into 2 concentric circles. The radius of the first circle from the tower's center was 30 m (100 ft) and nets were to be randomly deployed to cover 24% of the total area of that concentric circle, 1 net randomly placed in each 120° arc. For the second concentric circle (30-60 m in radius from the center [100-197 ft]), nets were placed randomly in 8% of the total area, 1 net randomly placed in each of the 3 arcs.

Manville (2002) did not recommend using tagged bird carcasses in the AZ study because he believed that double sampling would address sampling efficiency biases. Double sampling involves (1) net sampling, allowing for an estimate of the number of carcasses that fall beneath each tower and are relatively unbiased for searcher efficiency and carcass removal, and (2) ground sampling where biases are inherent. For short towers, he recommended the entire area the radius of the tower height be completely searched (including under the nets) at dawn each day during the migration season and once weekly during the breeding season. Net sampling allows for adjustment of the ground sampling estimates that would correct for carcass removal and searcher efficiency bias based on the relative difference of the number of carcasses found using the 2 sampling methods at each communication tower studied.

Manville (2002) indicated that the probability of catching a bird in a net would change with increased distance from the tower (i.e., birds may fly or be carried by the wind for a distance before dying). He suggested that if there is a bias because birds tend to die greater than 30 m (100 ft) from a short tower, probabilities can be determined by searching strip transects that radiate from a tower. He recommended using a transect 1.5- 2 times the height of the tower, 15 m (50 ft) wide, placed on a randomly selected compass line. Carcass searches within the transect should help to estimate the area that should be sampled by nets, develop a correction factor outside the radius of the area sampled by the nets, and improve the correction factor for ground surveys conducted exclusive of the net surveys. Manville suggested this transect survey be conducted at least once per week, preferably in the early morning hours, during both migration and breeding seasons. With the recent use of trained dogs to detect and locate dead and injured birds and bats, where dogs have been shown to be at least 50% more effective in finding carcasses, dog use should be considered a viable monitoring alternative (E. Arnett, Bat Conservation International, pers. comm., Homan *et al.* 2001, Arnett 2006).

Derby *et al.* (2002) modified the Manville (2002) protocol to conduct the cellular telecommunications tower study in AZ for the USFS. There, 6 of the 7 cell towers were surrounded by 3-m (10 ft) walls, 29 m (95-ft) long on each side. The walled square was divided into 4 equal blocks, and within 1 of these blocks a 12 x 12-m (40 x 40-ft) nylon mesh net was randomly placed based on net specifications recommended by Manville (2002) but placed > 3 m (10 ft) above the ground to allow company personnel to perform maintenance on the sites. Outside the walled compounds, Derby *et al.* used 4, 6 x 6-m (20 x 20-ft) nets, 3 of the nets randomly set outside the wall to a distance of 30.5 m (100 ft) from the tower, and the 4th net randomly placed in the band from 31 to 61 m (100-200 ft) from the tower. Inside the walled compound the entire area was searched by walking transects 6 m (20 ft) apart (3 m [10 ft] search width). The surveys were performed at dawn 4 times per week during peak songbird migration.

Derby *et al.* (2002) also recommended using straight line transects, 4 oriented perpendicular to the walls, and 4 diagonal from the corners of the wall – representing the “spokes of a wheel.”

Each transect was 61 m (200 ft) long, and 6-m (20 ft) wide. Because the Derby *et al.* protocol also used double sampling, no tagged carcasses were used in their study.

Both Manville (2002) and Derby *et al.* (2002) recommended daily searches of all electrical wiring to assess for electrocution and wire collision mortality.

Homan *et al.* (2001) used Labrador retrievers and a Chesapeake Bay retriever to search 6 plots, 5 x 40 m (16 x 131 ft) in size, delineated by flagging, to detect 8 thawed House Sparrow carcasses randomly thrown in each of the plots from 1 m (3 ft) outside the plot, allowing the human or human-dog team to search each plot for 10 minutes. Dogs were kept on 5-m (16-ft) leashes during searches. Humans were active searchers when using the dogs. Searches were not conducted during steady rain or when winds were ≥ 32 km/hr (20 mph). The technique with leashed dogs could easily be used to survey both tall and short tower plots, based on the protocols previously recommended. With the dogs confined to leashes, additional training would be unnecessary.

Arnette (2006) used 2 trained chocolate Labrador retrievers to locate test bat carcasses of different species and in different stages of decomposition at commercial wind turbine facilities on the Appalachian Mountain front in PA and WV. His dogs were trained in basic obedience, "quartering" (*i.e.*, systematically searching back and forth in a 10-m-wide [33 ft] transect), and blind retrieval handling skills. The dogs were trained with dead bats 7 days prior to field trials. When a dog found a test bat, the dog was rewarded with a food treat if it performed the task of finding the bat, sitting or stopping movement when given a whistle command to do so, and leaving the carcass undisturbed. Arnette walked the transect lines at a rate similar to that of humans (*i.e.*, approximately 13-25 m/min [43-82 ft/min]) while the dogs were allowed to quarter the entire width of the transect (5 m [16 ft] on either side of the center line). While this technique was tested on bats, it also shows great promise for use on birds. Dogs would require additional training, but unlike the Homan *et al.* (2001) technique, they would not need to be leashed. The Arnette technique also shows great promise for use at both tall and short communication towers to locate dead birds and bats.

METHODS FOR ASSESSING RADIATION IMPACTS TO BIRDS

Methods for Assessing Radiation Impacts at Tall Towers

At present, radiation studies at tall towers in Europe have not yet been conducted since the impacts to birds and other wildlife have been documented at short, cellular communication towers. The methods suggested below for short tower radiation studies should also be applicable to future tall tower radiation studies.

Methods for Assessing Radiation Impacts at Short Towers

Balmori (2005) selected 60 nests of White Storks in Valladolid, Spain, to monitor breeding success, visiting each nest from May to June 2003, taking care to select nests with similar characteristics located on rooftops. Tree nests were not studied. Nests were selected based on very high (N=30) or very low (N=30) exposure levels of electromagnetic radiation, depending on the distances nests were located from the cell towers. Thirty nests were within 200 m (656 ft) of the towers, while the remaining 30 were located > 300 m (981 ft) beyond any tower. Chick productivity was closely observed. Electric field intensities (radiofrequencies and microwave radiation) were measured using a unidirectional antenna and portable broadband electric field meter set at 10% sensitivity. Between February 2003 and June 2004, 25 visits were made to nests located within 100 m (327 ft) of 1 or several cell phone towers to observe bird behavior. The

visits were made during all phases of breeding, from nest construction until Stork fledging. RFs and EMFs were also measured at all nest sites using a unidirectional antenna and field meter.

Balmori and Hallberg (2007) studied the urban decline of House Sparrows in Valladolid, Spain, since this species is in significant decline in the United Kingdom and western Europe, and because it usually lives in urban environments, where electromagnetic contamination is higher. They felt it would be a good biological indicator for detecting the effects of radiation. Forty visits, approximately 1 per month were made between October 2002 and May 2006, and were performed at each of 30 point transect locations (*i.e.*, point counts, the protocol recommended by Bibby *et al.* 2000) between 7 a.m. and 10:00 a.m. by the same ornithologist following the same protocol. At each transect site, all sparrows heard and seen were counted, without differentiating birds by sex and age, and radio frequencies and levels of microwave radiation were recorded using a unidirectional antenna and a portable broadband electric field meter set at 10% sensitivity. Bird densities from each point were calculated based on the number of sparrows per hectare.

Everaert and Bauwens (2007) counted male House Sparrows during the breeding season at 150 point locations (Bibby *et al.* 2000) in 6 residential districts in Belgium, each point location situated at variable distances (mean= 352 m [1,151 ft]; range= 91- 903 m [298- 2,953 ft]) from nearby cell phone antenna towers. Point counts were conducted for 5 minutes, all male House Sparrows heard singing or visible within 30 m (98 ft) were counted, counts occurred between 7 a.m. and 11:00 a.m. when males were most active, and counts were conducted only during favorable weather conditions. Electric field strengths at 900 MHz and 1800 MHz were measured for 2 minutes at each frequency using a portable calibrated high-frequency spectrum analyzer with a calibrated EMC directional antenna. To measure maximum radiation values, the EMC antenna was rotated in all directions.

METHODS FOR ASSESSING RADIATION IMPACTS TO BEES

Methods for Assessing Radiation Impacts to Bees

Harst *et al.* (2006) exposed 4 beehives to 1900 MHz radiation from an antenna placed at the bottom of each hive immediately under the honeycombs, while they left 4 hives unexposed. Each of the 8 colonies contained approximately 8,000 bees. They were set up in a row, with a block of 4 hives equipped with DECT (Digital European Cordless Telecommunications) stations on the bottom of each hive. Metal lattices were installed between the exposed hives to avoid possible effects to the non-exposed control group. The average transmitting power per station was 10 mW, with peak power at 250 mW. The sending signal was frequency modulated and pulsed with a pulsing frequency of 100 Hz. A transparent 10 cm (4 in) plastic tube with a diameter of 4 cm (1.6 in) was mounted at the entrance of each hive to collect single bees and watch them return later to the hives. Twenty-five bees from each hive were randomly selected, stunned in a cooling box, marked with a marker dot on the thorax, and released 800 m (2,616 ft) away from the hives. All marked bees were released simultaneously and were timed from the moment of their release. Return times were noted as the bees each entered the plastic tubes, with the observation lasting 45 minutes. Any bees returning after 45 minutes were disregarded. Bees were able to touch the radiation sending antenna within the hive. Some have asserted that the antenna placement may have resulted in a behavioral bias in regard to bee response, raising a legitimate concern about the methods used to test bee response to radiation in this experiment.

Harst *et al.* (2006) also studied the effects of radiation on bee building behavior using the protocol discussed above. They photographically documented change in honeycomb area, and measured development of honeycomb weight for each hive. Sixteen colonies were selected for

this experiment, 8 of which were irradiated, all aligned in a row. At the beginning of the experiment, the empty honeycomb frames were weighed, the hives were filled with bees (400 g [14 ounces]), and provided 250 ml (0.26 quart) food. Bees were fed 2 more times during the 9-day experiment. The honeycombs were photographed each day. The placement of the sending antenna, as previously suggested, may have altered bee behavior and hive productivity.

Kimmel *et al.* (2006) tested 16 bee colonies, 8 of which were irradiated. The experiment was nearly identical to that utilized by Harst *et al.* (2006) except that the sending antenna in 1 experimental group was shielded in a reed and clay box to address concerns about behavioral biases raised in the Harst *et al.* study. Bees were paralyzed using CO₂ instead of cold and were simultaneously released 500 m (1,635 ft) from the hives instead of 800 m (2,616 ft).

RESEARCH RECOMMENDATIONS FOR ASSESSING AVIAN COLLISION IMPACTS

Tall Tower Collision Research Recommendations

We recommend using either the Avery *et al.* (1978) or the Gehring *et al.* (2006, 2007) protocol for tall tower collision studies, depending on the feasibility and availability of catchment nets and dead bird carcasses. Avery *et al.* provided the opportunity to use catchment nets, testing searcher efficiency and carcass removal by placing test carcasses on site (in nets and on the ground). The protocol presumes that the majority of carcasses will be found within a certain distance of the tower's base. The protocol has particular utility for studying very tall towers, especially where terrain around the structures is highly variable and difficult to traverse. It can be used as a standing protocol, or modified as a hybrid based on combining other techniques suggested within this paper such as the use of dogs (Homan *et al.* 2001, Arnett 2006). Dogs have tremendous promise for both tall and short tower studies. If trained hunting dogs are used, then the Arnett (2006) protocol is an excellent tool since the dogs can be used off-leash. However, if untrained hunting dogs are available, then the Homan *et al.* (2001) protocol using leashed dogs is an excellent option.

Gehring *et al.* (2006, 2007) also successfully assessed mortality at tall towers, but catchment nets were not deployed in this study. Due in part to timing, budget constraints, and number of towers studied, this protocol has significant utility where many towers need to be studied. It could also be modified by using trained dogs or incorporating catchment nets.

The statistical designs for both short and tall tower studies – both for assessing collisions and radiation impacts, should be worked out with qualified biometricians. Both the USFWS and the USGS/Biological Resources Discipline (BRD) have well qualified statistical expertise. They should be consulted early in the development of a proposed study.

In both short and tall tower studies, data collection must include all of the following: time of day each tower is examined, time spent searching each site, time since the last search, and weather conditions, particularly inclement weather. Weather data should include the previous night's temperature, wind, cloud cover (clear if < 10% cover, partly cloudy 10-90% cover, or overcast > 90% cover), barometric pressure, rainfall, fog, obscuration, and other relevant weather conditions (Derby *et al.* 2002).

When bird and bat carcasses, and injured vertebrates are found, regardless of the sampling method, data must include tower identification number, name of species (if known), date of collection, closest transect, distance from the tower, azimuth to the tower, exact mapped location (GPS coordinates are very helpful), estimated number of days since death/injury, body condition,

probable cause of death, and evidence of scavenging. The carcass is to be collected, numbered, and saved to be used in other investigations (Gehring *et al.* 2007) for which a Federal and possibly state salvage permit will be required (Manville 2002).

Short Tower Collision Research Recommendations

Depending on the availability and utility of catchment nets and the layout of the tower site, we recommend using either the Manville (2002), the Derby *et al.* (2002), Homan *et al.* (2001), or the Arnette (2006) protocols – the latter 2 with greatly improved searcher efficiency, or a hybrid of these methodologies. Manville (2002) suggested using elevated catchment nets, but due to double sampling, he did not recommend using tagged bird carcasses. He also recommended using random transects to adjust for biases.

Derby *et al.* (2002) modified the Manville (2002) protocol, specifically in regard to challenges created by the tower study site in AZ. A randomly-placed catchment net was used within the walled enclosure of each of the sites, and the entire area within the walled compound (ground and net) was searched. Four randomly placed catchment nets were also utilized beyond the walls. Due to double sampling, no tagged bird carcasses were utilized. The protocol could be used as a free-standing technique but should be searched daily during the entire peak of bird migration.

RESEARCH RECOMMENDATIONS FOR ASSESSING RADIATION IMPACTS TO BIRDS

Tall Tower Radiation Research Recommendations

For both short and tall tower studies, any nests close to a tower should be noted, with its GPS coordinates recorded. Breeding, nest success, and survivorship should be monitored, where possible. How birds use their habitats for breeding and residence should be noted, including any issues of site abandonment, egg and clutch failure, development of deformities, injuries, and deaths.

For both short and tall tower studies, where birds appear to be injured or killed by radiation, proximity of the bird/carcass to known nest or roost sites and towers should be noted. Radiation levels at the tower, carcass site, and the nest site should be recorded. Any abnormal behaviors should also be described. Laboratory necropsies should be performed on birds and other wildlife suspected of impacts from radiation to better understand what caused their deaths and to verify that they did not die from blunt force trauma due to collisions. Tower and ambient radiation should be measured using equipment and techniques suggested by Harst *et al.* (2006) and Kimmel *et al.* (2006), or variations of equipment and methods available in the U.S. See the methods section of this paper for specifics.

Where carcass counts need to be assessed at specific tall towers, we suggest using the tall tower collision mortality protocols, discussed above in the methods section of this paper.

Short Tower Radiation Research Recommendations

Depending on the avian species being studied, we recommend using the Balmori (2005) protocol for assessing potential impacts to colonial nesting species such as herons and egrets. Where passerines are to be studied, we suggest the use of the Everaert and Bauwens (2007) and Balmori and Hallberg (2007) protocols for assessing potential impacts. Refer to the methods section above for specific details.

Where carcass counts need to be made at specific short towers, we recommend using the short tower collision mortality protocols, discussed above in the methods section.

RESEARCH RECOMMENDATIONS FOR ASSESSING RADIATION IMPACTS TO BEES

Bees and other pollinators also deserve close scrutiny from the potential impacts of radiation, and their study should be included as part of the overall research effort suggested in this paper. In addition to testing and validating the protocol and results from the Kimmel *et al.* (2006) study (see background and methods sections above), which we recommend be performed at multiple locations in the U.S., bee behavior, hive productivity, and bee survivorship need to be field-tested at both tall and short towers in the U.S. Variations on the protocols used by Harst *et al.* (2006) and Kimmel *et al.* (2006) could easily be developed to field-test potential radiation impacts on bee navigation, flight behaviors, hive productivity, and bee survivorship around both short and tall towers. However, any research protocol developed to assess potential insect impacts – and for that matter, impacts to birds, bats, and other wildlife, must attempt to eliminate extraneous variables that may bias study results. These include everything from antenna placement in the Harst *et al.* (2006) study, to the impacts of diseases, parasites, weather and climatic events, pesticides, contaminants, and other mortality factors on insects and other wildlife. Fine-tuning a research protocol must include the combined efforts of trained entomologists, research radiation specialists, ornithologists, wildlife biologists, and biometricians.

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CALIFORNIA
COASTAL COMMISSION
CENTRAL COAST AREA

For distribution to Coastal Commissioners. per hearing of 6/13/08

RE: Appeal No. A-3-SLO-08-022 (Bonaire Investments and Sprint/Nextel, Los Osos)

The Santa Lucia Chapter of the Sierra Club, representing Sierra Club members in San Luis Obispo County, supports a finding of substantial issue in the appeal of the CDP for the Sprint/Nextel wireless telecommunications facility in Los Osos.

There are three issues the Commission must consider in this appeal in deciding the question of substantial issue: 1) the ability of the Coastal Commission to impose regulatory conditions on the basis of the environmental effects of RF emissions, 2) the proximity of the project environmentally sensitive habitat, and 3) the evidence of harm to this habitat by RF emissions.

In the first instance, the staff report cites the Federal Telecommunications Act as preempting the Commission's ability to regulate by virtue of FTA Section 704, which appears to preempt the Commission's regulatory authority "on the basis of the environmental effects of radio frequency emissions." This appearance is deceptive. The use of the phrase "environmental effects" in the Telecommunications Act refers to the interpretation of this phrase in FCC regulations. The FCC regulations make clear that the regulated environmental effects refer explicitly and solely to "the human environment" – i.e. potential hazards of human exposure to RF radiation. State and local agencies are prohibited from taking regulatory action on this basis. In repeating this

phrase from the FTA in response to the appeal, the staff report is using the same phrase to refer to different effects. There are no FCC regulations concerning the potential effects of RF radiation on wildlife and coastal resources. It is clear that neither the FCC nor the FTA contemplated the impact of RF radiation on sensitive habitats or the biological continuance of habitats, per LUP ESHA Policies 1 and 2, within the definition of the phrase "environmental effects" as it is used in the federal regulations. Hence there is no basis for preemption under the FTA, and the Commission is free to impose conditions on the basis of these potential effects.

In the second instance, the staff report's representation of the project site is incorrect and incomplete: "The building is located at a busy intersection corner, and is in an existing fairly developed area generally, with other similar development extending in both directions along both Los Osos Valley Road and South Bay Boulevard. In other words, the site is in the middle of a developed urban area and not an undeveloped rural area."

The project site is on the far eastern corner of downtown Los Osos; everything west of the site is heavily vegetated rural residential land and oak woodland habitat. The staff report's characterization omits the existence of a substantial manzanita grove immediately adjacent to the project site on its western side, extending over an entire block. This grove, and the lot across the street from the project site to the east, both represent the type of habitat that directly pertains to the appeal's contentions as to the potential for the project's harm to wildlife from RF emissions.

Pursuant to the staff report's assertions that "the Commission is not aware of any ESHAs and/or sensitive species in the immediate area," we direct Commissioners' attention to the fact that the Commission is on record as "requir[ing] biological assessment for any project which may adversely impact an ESHA, whether or not presently mapped as an SRA in the LCP," and has previously admonished the County for submitting an LCP amendment, rejected by the Commission because it "fails to conform with Coastal Act requirements because the rigidly map-based structure of LCP ESHA policies results in non-protection of habitats and species not recognized, or not mapped, at the time of LCP certification (a gross deficiency)."¹

In the third instance, we find the weight of evidence presented over the last three years in papers published in peer-reviewed scientific journals strongly correlating observed harmful effects on wildlife, specifically nesting birds, with proximity to wireless telecommunications facilities is sufficient to find substantial issue on the basis of LUP ESHA Policies 1

and 2. Claiming a lack of "definitive" scientific studies as justification for taking no action is not appropriate. It would be appropriate to employ the precautionary principle and conclude that current research shows the potential for significant impact, requiring action to protect the resource. The staff report admits that "there is clearly some evidence that indicates that there may well be significant wildlife impacts from RF emissions," and notes that additional "rigorous analysis would be necessary to conclude in a statistically relevant way on [isolating the effect of RF emissions] (see, for example, Balmori 2006 and Balmori 2007 that suggest additional controlled studies to develop more conclusive information in this regard)." We agree, and we sympathize with the observation that "the Commission is not in a position to spearhead such a complex research and analysis effort." Indeed it is not, but the permit applicant is.

Therefore, the Commission's best course in order to fulfill the mandate of the Coastal Act and bring the project into conformity with the LCP would be to find substantial issue, uphold the appeal, and impose as a permit condition a requirement for a study by the project proponent. This should incorporate the Radiation Research Recommendations of the U.S. Fish and Wildlife Service:

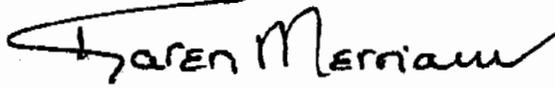
"Any nests close to a tower should be noted, with its GPS coordinates recorded. Breeding, nest success, and survivorship should be monitored, where possible. How birds use their habitats for breeding and residence should be noted, including any issues of site abandonment, egg and clutch failure, development of deformities, injuries, and deaths.... Depending on the avian species being studied, we recommend using the Balmori (2005) protocol for assessing potential impacts to colonial nesting species such as herons and egrets. Where passerines are to be studied, we suggest the use of the Everaert and Bauwens (2007) and Balmori and Hallberg (2007) protocols for assessing potential impacts."²

This study would fulfill the requirement LUP ESHA Policy 2: *As a condition of permit approval, the applicant is required to demonstrate that there will be no significant impact on sensitive habitats and that proposed development or activities will be consistent with the biological continuance of the habitat.*

More permits for cellular towers in the Coastal Zone will be coming before the Commission, in increasing numbers. It would therefore be prudent for the Commission to deal with this issue sooner rather than later, and to abide by the tenets of the Precautionary Principle, rather than simply to state that "the degree to which radio frequency emissions from wireless facilities adversely impacts sensitive wildlife and habitats is not completely established," and leave it at that. We encourage the

Commission to abide by the ESHA policies in our Land Use Plan and require the applicant to show that there will be no significant impact from his project to the habitat and its continued biological integrity and that it shall not significantly disrupt the resource.

Sincerely,



Karen Merriam
Chapter Chair

¹Revised Findings, North Coast Area Plan Comprehensive Update, San Luis Obispo County Local Coastal Program (LCP) Major Amendment No. 1-97.

²Briefing Paper on the Need for Research into the Cumulative Impacts of Communication Towers on Migratory Birds and Other Wildlife in the United States, *Division of Migratory Bird Management (DMBM), U.S. Fish & Wildlife Service, 8/13/07.*