



401 B Street, Suite 800  
 San Diego, CA 92101-4231  
 (619) 699-1900  
 Fax (619) 699-1905  
 www.sandag.org

# MEETING NOTICE AND AGENDA

## ENVIRONMENTAL MITIGATION PROGRAM WORKING GROUP

The Environmental Mitigation Program Working Group may take action on any item appearing on this agenda.

Tuesday, January 11, 2011

1:00 to 3:00 p.m.

SANDAG, 7th Floor Conference Room  
 401 B Street  
 San Diego, CA 92101-4231

Staff Contact: Keith Greer  
 (619) 699-7390  
 kgr@sandag.org

### MEMBER AGENCIES

Cities of  
 Carlsbad  
 Chula Vista  
 Coronado  
 Del Mar  
 El Cajon  
 Encinitas  
 Escondido  
 Imperial Beach  
 La Mesa  
 Lemon Grove  
 National City  
 Oceanside  
 Poway  
 San Diego  
 San Marcos  
 Santee  
 Solana Beach  
 Vista  
 and  
 County of San Diego

### ADVISORY MEMBERS

Imperial County  
 California Department  
 of Transportation  
 Metropolitan  
 Transit System  
 North County  
 Transit District  
 United States  
 Department of Defense  
 San Diego  
 Unified Port District  
 San Diego County  
 Water Authority  
 Southern California  
 Tribal Chairmen's Association  
 Mexico

## AGENDA HIGHLIGHTS

- **SWG REPORT TO 2011 ANNUAL BOARD OF DIRECTORS SUMMIT**
- **CONNECTIVITY MONITORING STRATEGIC PLAN**
- **EVALUATION OF DATA MANAGEMENT SYSTEMS FOR THE SAN DIEGO REGION**

*SANDAG offices are accessible by public transit.  
 Phone 1-800-COMMUTE or see [www.sdcommute.com](http://www.sdcommute.com) for route information.*

*In compliance with the Americans with Disabilities Act (ADA), SANDAG will accommodate persons who require assistance in order to participate in SANDAG meetings. If such assistance is required, please contact SANDAG at (619) 699-1900 at least 72 hours in advance of the meeting.*

*To request this document or related reports in an alternative format, please call (619) 699-1900, (619) 699-1904 (TTY), or fax (619) 699-1905.*

# ENVIRONMENTAL MITIGATION PROGRAM WORKING GROUP

Tuesday, January 11, 2011

<b>ITEM #</b>	<b>RECOMMENDATION</b>
1. WELCOME AND INTRODUCTIONS (Chair, SANDAG Board Member, Carrie Downey, City of Coronado Councilmember)	
+2. MEETING SUMMARY OF SEPTEMBER 28, 2010	APPROVE
Review and approve the meeting summary of the September 28, 2010, meeting.	Estimated Start Time: 1:00 – 1:10
3. PUBLIC COMMENTS/COMMUNICATIONS/MEMBER COMMENTS	COMMENT
Members of the public will have the opportunity to address the Environmental Mitigation Program Working Group (EMPWG) on any issue within the jurisdiction of SANDAG that is not on this agenda. Anyone desiring to speak shall reserve time by completing a "Request to Speak" form and giving it to the EMPWG coordinator prior to speaking. Public speakers should notify the EMPWG coordinator if they have a handout for distribution to working group members. Public speakers are limited to three minutes or less per person. EMPWG members also may provide information and announcements under this agenda item.	Estimated Start Time: 1:10 – 1:15
4. SELECTION OF NEW VICE CHAIR (Chair, SANDAG Board Member, Carrie Downey, City Of Coronado Councilmember)	APPROVE
After 35 years with the County of San Diego, Thomas Oberbauer has retired. Tom has been the Vice Chair of the EMPWG for five years. The EMPWG would like to recognize his efforts and will select a new Vice Chair to replace Mr. Oberbauer on the committee.	Estimated Start Time: 1:15 – 1:30
+5. SWG REPORT TO 2011 ANNUAL BOARD OF DIRECTORS SUMMIT (Rob Rundle, SANDAG)	INFORMATION
On December 15, 2010, the Stakeholder Committee on the Quality of Life funding strategy met to continue discussions on the regional funding needs. The Quality of Life efforts will be discussed at the Annual SANDAG Board Summit on February 2-4, 2011. A draft outline of the report is attached. Mr. Rob Rundle and EMPWG representatives on this committee will provide any insight and information to the EMPWG.	Estimated Start Time: 1:30 – 1:45

ITEM #	RECOMMENDATION
+6. STATUS OF MANAGEMENT AND MONITORING ACTIVITIES UNDER THE EMPWG (Keith Greer, SANDAG)	INFORMATION
The SANDAG Board of Directors is scheduled to act on EMPWG funding allotments for FY 11 and the updated the Five-Year Funding Strategy on January 28, 2011. Staff will go over the status of existing efforts.	Estimated Start Time: 1:45 – 1:55
7. CONNECTIVITY MONITORING STRATEGIC PLAN (Ron Rempel, San Diego Management And Monitoring Program)	INFORMATION/ DISCUSSION
Mr. Rempel of the San Diego Management and Monitoring Program will discuss the strategic plan developed for monitoring wildlife connectivity throughout the habitat conservation areas.	Estimated Start Time: 1:55 – 2:35
+8. EVALUATION OF DATA MANAGEMENT SYSTEMS FOR THE SAN DIEGO REGION (Elise Watson, U.S. Fish and Wildlife Service)	INFORMATION/ DISCUSSION
Ms. Watson is under contract to SANDAG to coordinate the review, development, and implementation of a regional database management system in coordination with U.S. Fish and Wildlife Service and the U.S. Geological Survey. She will discuss a report on her review and recommendations of existing biological databases and a request to the regional stakeholders on information needs for the future.	Estimated Start Time: 2:35 – 1:55
9. NEXT MEETING DATE AND ADJOURNMENT	INFORMATION
The next meeting of the EMPWG is scheduled for March 8, 2011. Tentative Topics: Review of Open Space Enforcement Pilot Project, Vegetation Mapping Update, and Rare Plant Monitoring.	Estimated Start Time: 2:55 – 3:00

+ next to an item indicates an attachment

**San Diego Association of Governments**  
**ENVIRONMENTAL MITIGATION PROGRAM**  
**WORKING GROUP**

January 11, 2011

AGENDA ITEM NO.: **2**

**Action Requested: APPROVE**

MEETING SUMMARY OF SEPTEMBER 28, 2010

File Number 3002700

**Members in Attendance:**

Hon. Carrie Downey, (Chair), City of Coronado  
Tom Oberbauer, (Vice Chair), County of San Diego  
Ann Harvey, San Diego Conservation Network  
Michael Beck, Endangered Habitats League  
Barbara Redlitz, City of Escondido  
Deborah Townsend, Wildlife Conservation Board  
Robert Fisher, U.S. Geological Survey  
Marisa Lundstedt, Chula Vista, South County  
Susan Wynn, U.S. Fish and Wildlife Service  
David Mayer, California Department of Fish and Game  
Emily Young, The San Diego Foundation  
Mike Grim, City of Carlsbad, North County Coastal  
Megan Cooper, California Coastal Conservancy  
James Whalen, J. Whalen and Associates

**Others in Attendance:**

Ken Quigley, MCB Camp Pendleton  
Niki McGinnis, City of San Diego  
Dan Root, San Diego Habitat Conservancy  
Mary Lindquist, Padre Dam Municipal Water District  
Megan Hamilton, County of San Diego, Department of Parks and Recreation  
Marcus Spiegelberg, Center for Natural lands Management  
Barbara Kus, U.S. Geological Survey  
Craig Hooker, City of San Diego  
Kailash Mozumder  
Jeff Tracey, San Diego Management and Monitoring Program  
Clark Winchell, U.S. Fish and Wildlife Service  
Christina Schaefer, TAIC  
Patricia Gordon-Reed, Conservation Biology Institute  
Carlton Rochester, U.S. Geological Survey  
Elise Watson, U.S. Fish and Wildlife Service  
Gabriel Buhr, California Coastal Conservancy  
Don Scoles, San Diego Habitat Conservancy  
Dan Root, San Diego Habitat Conservancy

Ron Rempel, San Diego Management and Monitoring Program  
Josh Garcia, City of San Diego Parks and Recreation  
Bill Tippetts, San Diego County Water Authority  
Jeff Lincer, Wildlife Research Institute

**SANDAG Staff in Attendance:**

Rob Rundle  
Keith Greer  
Alex Samarin

**1. Welcome and Introductions**

Chair Hon. Carrie Downey, City of Coronado, called the meeting to order at 1:07 p.m., and welcomed the group. She invited members and guests to introduce themselves.

Dan Root, Environmental Management intern with the San Diego Habitat Conservancy, introduced himself.

**2. July 13 Meeting Summary**

Ms. Downey asked the EMP Working Group if there were any corrections or additions to the July 13, 2010, meeting minutes. There were no corrections or additions. She then asked for a motion to approve the meeting minutes. Tom Oberbauer, County of San Diego, motioned to approve the summary with Michael Beck, Endangered Habitats League, seconding the motion. The motion carried without opposition.

**3. Public Comments and Communications**

Members of the public and Working Group members had the opportunity to address the Working Group. Keith Greer, SANDAG staff, announced the passing of Ms. Janet Fairbanks, former SANDAG staff. He shared a Congressional Record from Senator Barbara Boxer commemorating Ms. Fairbanks' career in regional planning, as well as an obituary in *The San Diego Union-Tribune*. He announced that there would be a Celebration of Life service on October 4 to be held at Balboa Park.

Chair Downey presented a comment e-mail on Agenda Item No. 4, sent in by Diane Nygaard of Preserve Calavera. In a letter, Ms. Nygaard expressed her discontent for the recommendation that one half of the cost of land management for private property dedicated through a development entitlement process be paid for by the San Diego regional funding source.

**4. Update: Quality of Life Stakeholder Meeting on Habitat**

Keith Greer introduced the EMP members participating in the stakeholder working group of the ad hoc committee for the Quality of Life Stakeholder Working Group (SWG). The EMP representatives are Jim Whalen (Alliance for Habitat Conservation), Alfredo Gonzales (The Nature Conservancy), and Michael Beck (Endangered Habitat League). The topical issues for this group are shoreline preservation, habitat preservation, stormwater management, and transit service. The purpose of the Quality of Life SWG is to propose a recommendation to the Quality of Life ad hoc committee on the elements and funding option(s) for quality of life effort. Mr. Greer summed up the progress of this

group thus far, including meetings on shoreline preservation, habitat, and future meetings on stormwater and transit.

Rob Rundle, SANDAG staff, indicated that a half-cent sales tax was just one option that may fund the four topical issues mentioned above. In response to a question concerning the amount and allocation of funds among the projects, Mr. Beck clarified that the total amount of funding proposed for each project (in this case, stormwater) would not necessarily be equal to initial cost assessment for each project. A prioritization of project elements would follow the initial cost assessment to arrive at a total proposed funding amount for each of the proposed elements.

Carrie Downey asked Mr. Beck how the same process of prioritization might apply to the funding proposal of the EMP Working Group. Mr. Beck explained that the funding amounts proposed by the EMP Working Group are, in his opinion, non-negotiable because the habitat conservation plans must meet either Endangered Species Act or Natural Communities Conservation Planning Act standards and are already adopted as such. He stated that the other three elements should refine their funding proposals based on the remaining available amount. Chair Downey asked if any agreement had been made in the Quality of Life SWG on how to divide the funds equitably. Mr. Beck stated that of the \$15 billion provided by the *TransNet* half-cent sales tax, the \$3 billion proposed for habitat projects was one of the lowest amounts of the elements project areas and should remain (note: shoreline is the lowest). Rob Rundle added that there are other options of funding available such as federal, state, and local sources.

Susan Wynn, U.S. Fish and Wildlife Service, asked Mr. Rundle about the timeline for getting the funding proposal on the ballot. Mr. Rundle replied that the SANDAG Board will be reviewing the ballot measure by February 2011, and the goal is to have the proposal voted on in November 2012.

Tom Oberbauer, County of San Diego and EMP Working Group Vice Chair, asked Mr. Rundle about the requirement of completing environmental review to get the funding proposal on the ballot. Mr. Rundle responded that when a public agency proposes a ballot measure, it may need to complete environmental review, depending on how specific the proposed actions are.

Ms. Downey asked for any questions from the public, and announced that the Working Group would proceed to Agenda Item No. 5.

#### **5. Ad Hoc Committee's Recommendation on FY 2011 Land Management Grant Program**

Chair Downey announced that the SANDAG Board of Directors was very pleased with the Land Management Grant Program in the past years.

Keith Greer announced that he would present Agenda Item No. 5 in lieu of Bruce April (who could not attend the meeting). Keith Greer summarized the actions of the Land Management Grant Program, which included allocating \$2.1 million for land management in FY 2011 and the formation of an ad hoc committee to determine fund allocation.

The ad hoc committee met on August 23, 2010, and made the following recommendations: (1) the majority of the funds should continue to be allocated through a competitive land management grant process; and (2) a portion of those funds should be reserved for land management emergencies, available between grant cycles by petitions from land managers. The proposed

amount for land management grants is \$1.95 million, distributed among three eligible land management activities as follows: (1) Invasive Species Control and Habitat Restoration (\$950,000); (2) Species-Specific Management (\$650,000); and (3) Habitat Maintenance, Access Control/Management, and Volunteer Coordination (\$350,000).

The species eligible for the species-specific management grants are: western pond turtle, coastal cactus wren, golden eagle, Nuttall's lotus, San Diego ambrosia, San Diego thornmint, short-leaved dudleya, sticky dudleya, and Orcutt's spineflower. Funds in this category are meant to support projects that conserve, enhance, or restore populations of these species.

New to the funding cycle for FY 2011 is the addition of Volunteer Coordination as an eligible activity.

Mr. Greer then discussed the evaluation criteria for each of the three funding categories. Each of the land management funding categories has the same evaluation criteria, but the weighting scheme for each criterion is different depending on the goal of the land management grant activity.

Mr. Greer also noted that small changes have been made to the land management grant application process, which can be seen on pages 24-28 of the September 28, 2010, EMP Working Group meeting agenda. He stated that being in its fourth application cycle, the Land Management Grant Program is becoming more effective in allocating funds to priority needs.

Chair Downey asked if any interviews had been conducted with former grant recipients and applicants to get feedback on the application process. Mr. Greer responded that the ad hoc application evaluation committee meets prior to reviewing applications in order to establish the same standards for weighting the effectiveness of each applicant's project. In addition, he welcomes post-application interviews with unsuccessful applicants concerning the reasons why their proposal was not funded. Susan Wynn added that the categorization of eligible land management activities and the identification of key species for conservation efforts was done to clarify the intent and priorities of the grant, and activities falling outside those designated have a much lower chance of being funded.

A member of the public asked if cost-effectiveness was considered in ranking grant proposals. Mr. Greer replied that cost-effectiveness is a criterion in weighting grant proposals.

Barbara Redlitz, City of Escondido, asked if the land management grants are reimbursement-based. Mr. Greer answered that the grants are reimbursement-based. Ms. Redlitz also asked if matching an eligible land management category is a requirement. Mr. Greer replied that there is no matching requirement, but they receive additional points during the evaluations. Ms. Redlitz expressed concern about the timing of reimbursement funds and having the possibility of work being done during the grant contract process being eligible for reimbursement from the grant. Mr. Greer responded that work is only eligible for reimbursement once a Notice to Proceed has been issued to the grantee.

Mike Grim, City of Carlsbad, noted that grant proposals concerning invasive species control on land with nearby invasive infestation were not as likely to receive grant money. These applicants would fare better coordinating their efforts and proposals with neighboring land managers to make their

project more effective. In response to a comment by Chair Downey concerning reaching unsuccessful applicants, Mr. Greer suggested the possibility of a preproposal meeting to explain the programs and project expectations.

Emily Young of the San Diego Foundation asked whether the San Diego Canyonlands project would be an eligible project under the new Access Control/Management and Volunteer Coordination category. Keith Greer replied that the Canyonlands project was eligible last year but did not rank as high as other projects, though it may rank better for FY 2011 because of a smaller pool of applicants within that category.

Keith Greer introduced the process and criteria for allocating the \$150,000 for land management emergencies (September 28, 2010, EMPWG Agenda, p. 29). The process would work similar to the land acquisition process, where property can be acquired as long as it meets certain criteria. The criteria must be approved by the SANDAG Executive Director at the recommendation of an ad hoc committee. The committee would consist of representatives from the U.S. Fish and Wildlife Service, California Department of Fish and Game, the *TransNet* EMP Program Manager, and an at-large member of the EMP Working Group representing land managers. If unused, emergency funding will accumulate up to an amount of \$500,000. Eligible emergency events are: (1) a sudden and clear threat to a "critical, core, or major" population to a covered species or sensitive habitat, (2) a catastrophic event that severely impacts populations of covered species or wildlife movement such as fires and floods, (3) the need to eliminate illegal human activity in a preserve such as the use of OHVs, and (4) the rapid advance of invasive species that could alter ecosystem dynamics.

Mike Grim commented that it would be helpful to distinguish between the use of emergency funds for emergency event #3 ("the need to eliminate illegal human activity") versus funds previously designated for enforcement. Keith Greer expressed uncertainty at the distinction between actions eligible for the two funding sources, but noted that the OHV teams from the San Diego Sheriff's Department and the Department of Fish and Game will make a presentation in March about the results of their pilot project, which may help determine the difference in funding sources. Michael Beck commented that the emergency criteria are too narrow, but are sufficiently distinct from the goals of enforcement funds.

Chair Downey asked for a motion to recommend the Land Management Grant Program for FY 2011 to the SANDAG Regional Planning Committee. Mike Grim motioned, with Emily Young seconding the motion. The motion passed without opposition.

Ms. Downey asked for any further discussion. Having none, the Working Group proceeded to Agenda Item No. 6.

## **6. Review of Revised FY 2011 and Five-Year Funding Strategy**

Keith Greer announced that the only addition to the FY 2011 funding allocation was the addition of \$150,000 for the Emergency Land Management Fund. He also presented an updated version of the Five-Year Funding Strategy for Management and Monitoring previously adopted by the Working Group. Chair Downey asked for comments and questions. Susan Wynn suggested merging the monitoring and management coordination. Michael Beck suggested that the Working Group discuss and consider whether or not to include line items for regional security of conserved lands. Chair Downey noted this topic as a future agenda item.

Chair Downey asked for further questions or comments. Seeing none, she asked for a motion to approve. Susan Wynn provided the motion, with Robert Fisher (USGS), seconding the motion. The motion carried without opposition.

## **7. Clark Winchell, U.S. Fish and Wildlife Service: 2009 Gnatcatcher Monitoring Results**

Clark Winchell, USFWS, presented California gnatcatcher population estimates, the capability of the species to recover from fire, habitat requirement, management recommendations, and future work with the species.

Surveys included data from 2004, 2007, and 2009. All data (38,647 records) has been QA/QC'd and placed in a relational database. Clark went over the study design, the recover from the wildfires, population estimates and probability of detections, percent area occupied, and an examination of trends.

Habitat characteristics include: less than 1 percent of the habitat has trees, 25 percent of the habitat is bare ground, and a diversity of shrubs exist in the habitat. Of the vegetated areas in gnatcatcher habitat, *Artemisia* was the most abundant plant, followed by buckwheat, laurel sumac, and black sage.

The following management recommendations were made:

1. Do not conduct preserve level monitoring for CAGN unless monitoring the effects of a specific management action.
2. Take administrative or management actions to increase preserve lands outside the MHPA:
  - a. Increase the proportion of the CAGN population outside the MHPA
  - b. Concentrate on lands ranked as Very High or High Quality
3. Direct restoration efforts after a fire in areas adjacent to Very High quality habitat – previously modeled as Very High quality habitat – and not extend out more than several hundred meters.
4. Selecting sites for acquisition or restoration:
  - a. Look for Laurel Sumac in vicinity
  - b. Limit sites where CSS is senescent
  - c. Manage for shrub diversity (*Artemisa* is important)
  - d. Minimize non-native grasses and black mustard (Important to manage after fire)

Mr. Winchell answered several questions and several members wanted to discuss the analysis in a separate forum. Mr. Winchell's PowerPoint presentation is attached to these minutes (Attachment 1).

## **7. Next Meeting Date and Adjourn**

The next EMPWG meeting was set for November 9, 2010. Chair Downey adjourned the meeting at 2:43 p.m. [The November meeting was subsequently canceled.]

## Monitoring California Gnatcatchers in Southern California 2004 / 2007 / 2009



## Agenda

- Study Design Overview
- Data QA/QC
- Recovery from Fire
- Population Estimates
- Habitat Requirements
- Management Recommendations
- Future Work




## Design



- Population Closure
  - What is it?
    - No births/deaths Immigration/Emigration
    - Fixed number during sample period
  - How did we deal with it?
    - Sample during breeding season
    - Count adult pairs



## Design



- Detectability (Probability of Detection)
  - What is it?
    - Chance of observing a gnatcatcher at a point - given the survey point is occupied
  - How did we deal with it?
    - Repeat visits to set points



## Design



- Detectability (Probability of Detection)
  - What does it look like?
  - Why is it SO important?
 

Estimate of Population

$$\hat{N} = \frac{C}{\hat{p}}$$

Count: what you saw

Probability of Detection

100001
010101
000000
001011
000000
110011



## Design

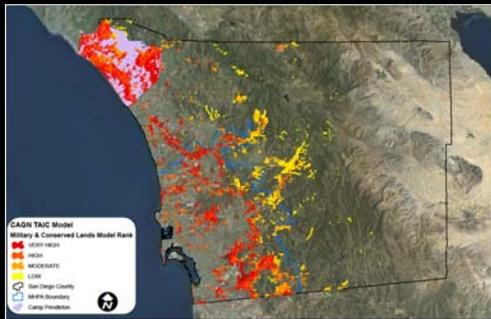


- Spatial Sampling
  - What is it?
    - Establishing the study area or sample frame
    - Creates the area to which results can be inferred
  - How did we deal with it?
    - Probabilistic Sampling Scheme
    - Random Sample on 600 m X 600 m grid





## Sample Frame



## 2007 Project What was measured?

- CAGN:
  - Present / Absent
  - Distance/Angle
  - Time of Observations (tracking)
- Site Environmental Factors
- GIS:
  - Slope
  - Elevation
  - Habitat Patch Size
  - Aspect
  - Distance to Coast
- Field:
  - Plant Community
  - Percent Closed Canopy
  - Shrub Diversity
  - Shrub Abundance
  - Shrub Coverage
  - ARCA Present / Absent
  - Percent Bare Ground
  - Burned (Fire History)
  - Shrub Height
  - Grasses Coverage



## Design



- Spatial Sampling
  - Methodology
  - Point Counts
  - Focused Surveys



## Data QA/QC

- CAGN Presence/Absence Records
  - 18,243
- GIS Site Records
  - 4672
- Habitat Evaluation Records
  - 704
- Soil Data Records
  - 698
- Vegetation Transects Records
  - 14,330



## Data QA/QC

### Photographic Documentation

- Years
  - 2007 & 2009
- 409 Plots
  - Burn & No Burn
- Cataloged in PowerPoint files and printed notebooks
- Systematically taken
  - On Point: North/East/South/West



## Data QA/QC

- Stored in Access
  - Relational Database
  - Managed Records
    - 38,647

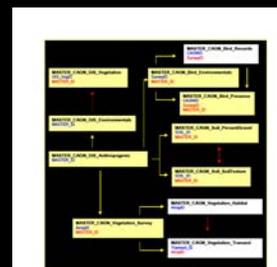
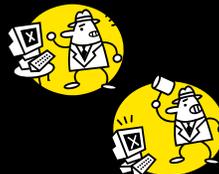
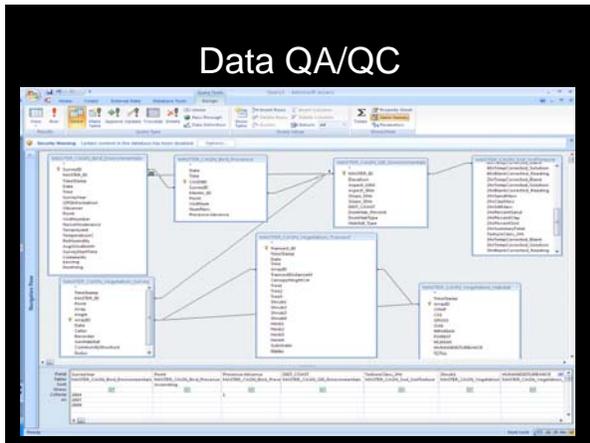
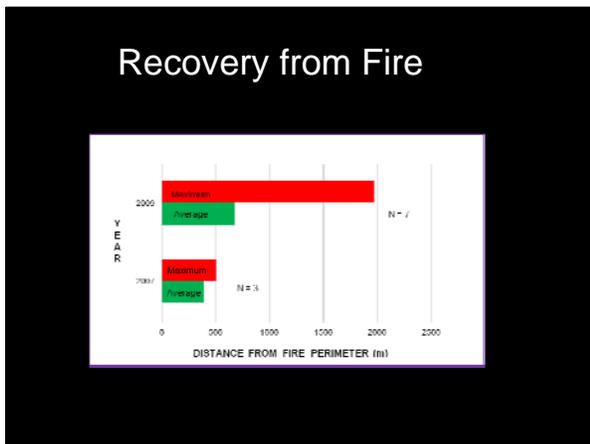
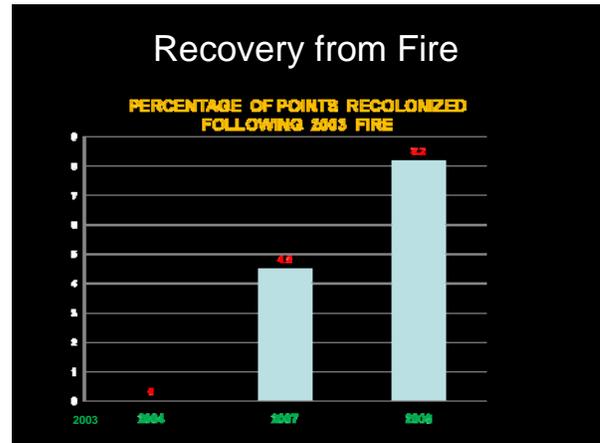


Photo Plots are not integrated into the database. Separate files outside of the database.



- ### Data QA/QC
- 
- Meta Data Files
    - Bird survey Records
    - GIS Information and Sample Selection
    - Vegetation
    - Soil Data
  - Describes Methods of Data Collection
  - Tracks Changes or Updates
  - Navigate through the Data



- ### Recovery from Fire
- The nearest unburned habitat to the point is modeled as Very High (7) or High (1) quality habitat.



### What Burned?

ACCESS	MODEL_RANK	PERCENT BURNED 2003	PERCENT BURNED 2007	TOTAL PERCENT BURNED	PERCENT BURNED TWICE
YES	VERY HIGH	18	27	45	16
No	VERY HIGH	8	14	22	3
YES	HIGH	19	29	48	25
No	HIGH	4	11	15	2
YES	MODERATE	31	44	75	49
No	MODERATE	8	13	21	7
YES	LOW	37	30	67	68
No	LOW	9	14	23	5

### What Burned?

ACCESS	MODEL_RANK	PERCENT BURNED 2003	PERCENT BURNED 2007	TOTAL PERCENT BURNED	PERCENT BURNED TWICE
YES	VERY HIGH	18	27	45	16
YES	HIGH	19	29		
YES	MODERATE	31	44	75	49
YES	LOW	37	30		

1.5 X

2 X

### What Burned?

ACCESS	MODEL_RANK	PERCENT BURNED 2003	PERCENT BURNED 2007	TOTAL PERCENT BURNED	PERCENT BURNED TWICE
YES	VERY HIGH	18	27	45	16
YES	HIGH	19	29	48	25
YES	MODERATE	31	44	75	49
YES	LOW	37	30	67	68

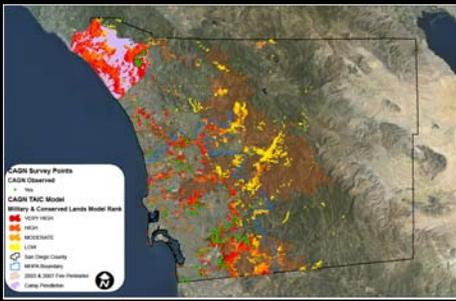
### What Burned?

ACCESS	MODEL_RANK	PERCENT BURNED 2003	PERCENT BURNED 2007	TOTAL PERCENT BURNED	PERCENT BURNED TWICE
YES	VERY HIGH	18	27	45	16
No	VERY HIGH	8	14	22	3
YES	HIGH	19	29	48	25
No	HIGH	4	11	15	2
YES	MODERATE	31	44	75	49
No	MODERATE	8	13	21	7
YES	LOW	37	30	67	68
No	LOW	9	14	23	5

Difference between fire affecting preserve and non-preserve lands.



## Fire and Fragmentation



Roughly 90% of high quality habitat is trapped by SAN (State and National) boundaries.

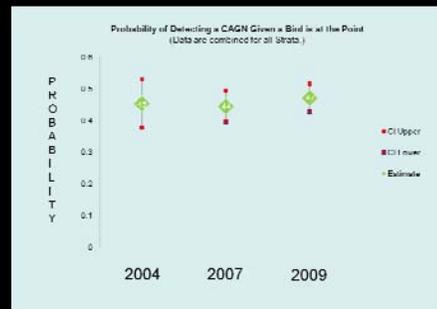
## Population Estimates

$$\hat{N} = \frac{C}{\hat{p}}$$

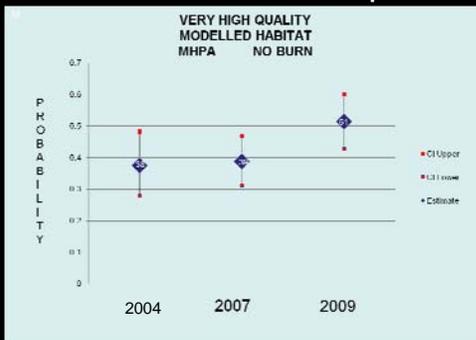
## Occupancy Estimation Model

$$\{\hat{\rho}(\cdot)\hat{\psi}(g)\}$$

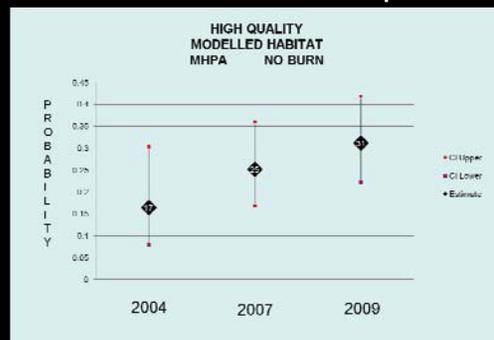
## Probability of Detection

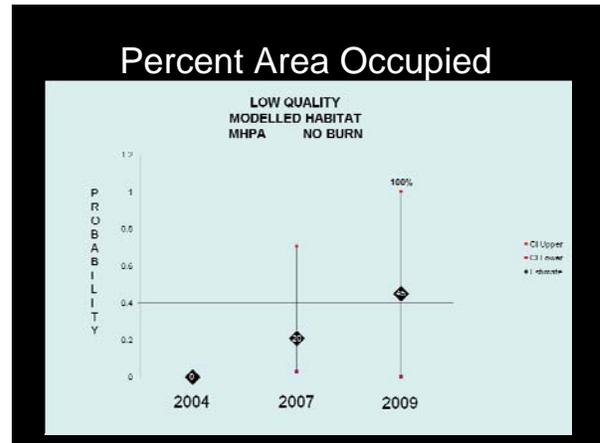
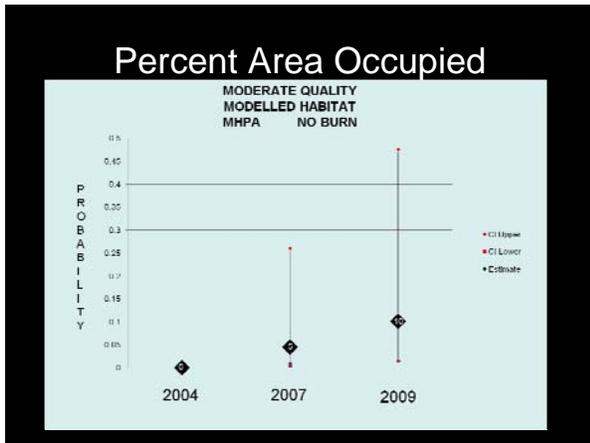


## Percent Area Occupied



## Percent Area Occupied





### Remember

- Confidence Intervals
  - Indicate the reliability of an estimate
  - Increase as sample size decrease
    - Moderate and Low Quality Habitat Stratified towards less effort
  - Increase in program MARK as *psi*, or occupancy, decreases

### Remember

- Areas modeled as Moderate or Low Quality
  - Sampled at a lower intensity
    - Less of the total percentage is sampled
  - This is done because the bulk (> 95%) of the population occupies Very High and High Quality Habitat
    - Put effort here to gain reliability in these results
  - Moderate and Low Quality Habitat is sampled simply to confirm CAGN are using these areas
    - Areas can serve as important dispersal corridors/linkages
    - Areas can serve as refugia, for example after a fire

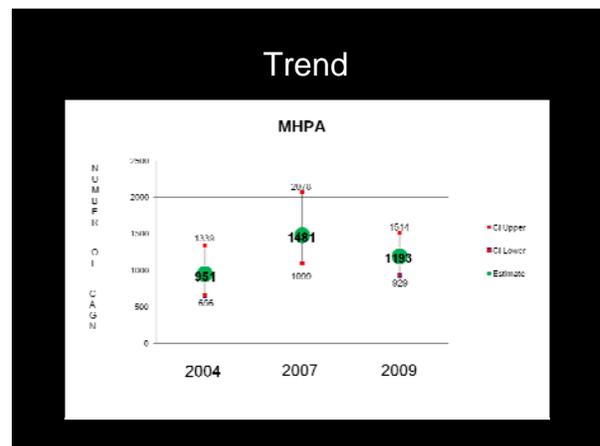
### MHPA Land Area of Unburned Habitat

Model Ranking	2004	2007	2009
Very High	8465	8465	8465
High	5116	5116	5116
Moderate	1477	1980	391
Low	429	451	166

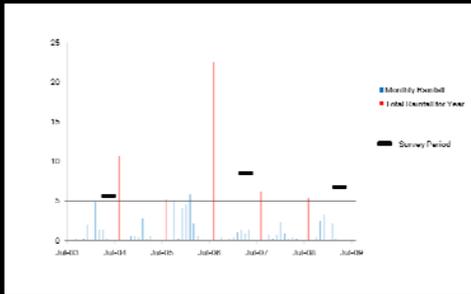
Hectares

Acquisitions (green arrow pointing right)

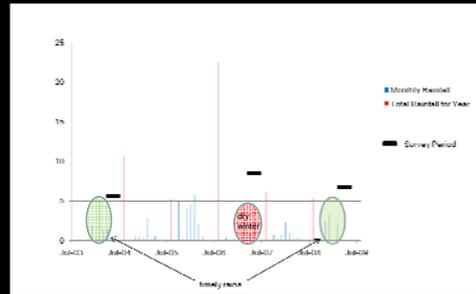
Fire (red arrow pointing left)



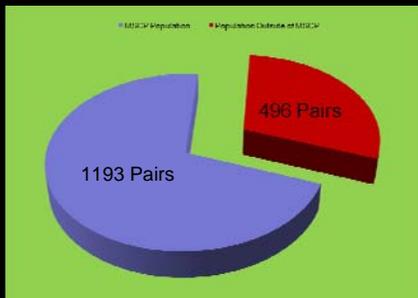
## Effect of Rainfall



## Effect of Rainfall



## MSCP & Other Areas 2009



1689 Pairs within Sample Frame

IS IT  
WORKING?

IS IT  
FAILING?

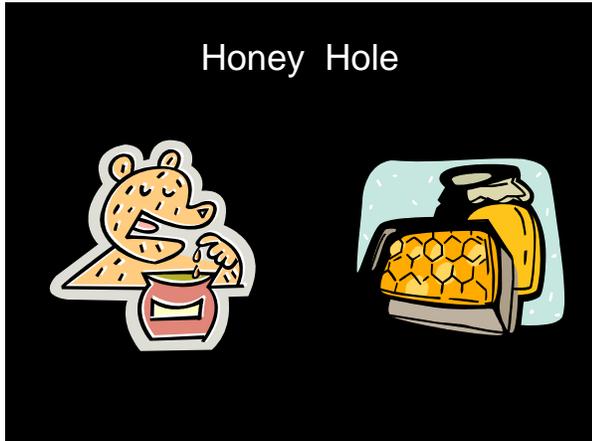
NO



### Plant Transects

Number of Transects	Number of Years CAGN Observed	Sample
10	3 of 3 Survey Years	All Sites Sampled
17	2 of 3 Survey Years	All Sites Sampled
14	1 of 3 Survey Years	All Sites Sampled
30	0 of 3 Survey Years	Random Sample

**All transects were at sites ranked as Very High or High Quality**  
**Sites were not impacted by fire during the course of the study.**



- ### Common Characteristics
- Percent of Vegetation Classified as Tree (>3.0 m)
    - 1 %
  - Percent of Site Bare Soil with no canopy cover
    - 25%
  - Plant characteristics (Diversity)
    - 9 out of 10 sites had ARCA11 (*Artemisia californica*)
      - Chamise / Black Sage / Mission Manzanita: Chaparral
    - 27% cover was ARCA11 (*Artemisia californica*)
    - 15% cover was ERFA2 (*Eriogonum crassifolium*)
    - 9% cover was MALA6 (*Malosma laurina*)
    - 4% cover was SAME3 (*Salvia mellifera*)
  - Invasive Plants
    - 6 out of 10 sites had BRNI (*Brassica nigra*) Black Mustard
      - At those sites mustard <<< 10% of cover
    - 5 out of 5 sites had Non Native Grasses
      - At those sites NNG <<< 4%

- ### Management Recommendations
- Do not conduct preserve level monitoring for CAGN unless monitoring the effects of a specific management action.
  - Take administrative or management actions to increase preserve lands outside the MHPA.
    - Increase the proportion of the CAGN population outside the MHPA
    - Concentrate on lands ranked as Very High or High Quality
  - Direct restoration efforts after a fire in areas adjacent to Very High quality habitat – previously modeled as Very High quality habitat – and not extend out more than several hundred meters.

- ### Management Recommendations
- Selecting sites for acquisition or restoration
    - Look for Laurel Sumac in vicinity
    - Limit sites where CSS is senescent
      - Area of experimentation
    - Manage for shrub diversity
      - Artemisa is important
    - Minimize non-native grasses and black mustard
      - Important to manage after fire



- One more year (2012) of surveys scheduled
- Continue surveys in fire impacted areas after 2012
- Link site covariates and plant transect data with colonization/extinction data
- Consider corridor/linkage work

**SANDAG**

### Partners

Sweetwater Authority	City of Carlsbad	US Geological Survey
City of Santee	City of San Diego	California Dept Fish & Game
City of Chula Vista	City of Encinitas	San Diego Zoological Society
County of San Diego	US Navy	Nature Reserve Orange County
Bureau Land Management	City of Escondido	US Forest Service
US National Park Service	Helix Water District	Naval Weapons Station Fallbrook
California Dept Transportation	California Dept State Parks	
Center Natural Lands Management	Colorado State University	
City of Poway	MCAS Miramar	
	U.S. Fish & Wildlife Service	

**Thank you:**

**EMP Working Group**

&

## QUALITY OF LIFE STAKEHOLDER WORKING GROUP

December 15, 2010

AGENDA ITEM NO.: **4**

**Action Requested: INFORMATION/DISCUSSION**

SWG REPORT TO 2011 ANNUAL BOARD OF DIRECTORS SUMMIT

File Number 3200000

Staff are preparing a report to be presented to the 2011 Annual SANDAG Board of Directors Summit in February. The report will include a description of the 2010 work plan, criteria products developed by the group, a summary of information presented on each of the four Quality of Life elements being considered, and key discussion themes and feedback provided by Quality of Life SWG members. The SWG is asked for input on the draft report outline below, and to suggest key areas related to the Funding Strategy that they would like to communicate to the SANDAG Board.

Attachment: 1. Draft Outline - Quality of Life Stakeholder Working Group Report to 2011 Annual SANDAG Board of Directors Summit

Key Staff Contact: Midori Wong, (619) 699-1968, mwon@sandag.org

## Draft Outline

## Quality of Life Stakeholder Working Group Report to 2011 Annual SANDAG Board of Directors Summit

1. INTRODUCTION
  - A. Context for Quality of Life Funding Strategy
    1. Integrated Regional Infrastructure Strategy (IRIS)
    2. *TransNet* Extension Ordinance EMP Principle No. 10
    3. Work program and past actions by Board of Directors
      - a) Board Policy meetings
      - b) Initial 2008 stakeholder workshop
      - c) Formation of Ad Hoc Steering Committee
      - d) Amendments to *TransNet* Ordinance
  - B. Quality of Life Stakeholder Working Group (SWG)
    1. Formation, membership, and mission
    2. 2010 work plan
    3. SWG-developed evaluation criteria and "scoring" exercise
2. SUMMARY OF PRESENTATIONS ON QUALITY OF LIFE ELEMENTS BEING DISCUSSED
  - A. Shoreline Preservation
    1. Funding needs
    2. Cost estimates
    3. Key feedback provided by SWG
  - B. Habitat Conservation
    1. Funding needs
    2. Cost estimates
    3. Key feedback provided by SWG
  - C. Water Quality Enhancement
    1. Funding needs
    2. Cost estimates
    3. Key feedback provided by SWG
  - D. Public Transit
    1. Funding needs
    2. Cost estimates
    3. Key feedback provided by SWG
3. RESEARCH ON POTENTIAL LOCAL AND REGIONAL REVENUE SOURCES
4. CLOSING
  - A. Overall key discussion themes and feedback
  - B. Policy questions for consideration by SANDAG Board of Directors
  - C. Next steps and 2011 SWG work plan
5. ATTACHMENTS
  - A. Quality of Life Funding Strategy advisory structure handout
  - B. SWG roster
  - C. SWG-developed evaluation criteria

**TRANSNET EMP: HABITAT CONSERVATION FUND  
STATUS OF MANAGEMENT AND MONITORING EFFORTS**

		Approved Prior FYs	Current FY	Status of Effort as of January 2011
	REGIONAL COORDINATION	FY06-10	FY 11	
1	Program Developer/Administrator	\$450,000	\$150,000	A regional coordination entity (San Diego Management and Monitoring Program) has been established. They are housed at the USGS Western Field station and have taken on regional management and monitoring coordination. Accomplishment have included: included options for a regional governance system, the collection of monitoring efforts through out the region for the USFWS and CDFG, aid with facilitation of regional land management coordination efforts, host monthly monitoring coordination meetings, development and analysis of scope of work for burrowing owl monitoring, development of connectivity monitoring strategy, coordination of a regional database, technical review of land management grants, recommendations for future grant effort, and coordination with San Diego State, USFWS, CDFG and USGS. Their website is sdmmp.com.
2	Management & Monitoring Coordinator	\$900,000	\$0	
3	Administrative & Science Support	\$90,000	\$0	
4	Biologist	\$0	\$0	
5	GIS Specialist	\$150,000	\$150,000	
6	Database Support	\$0	\$200,000	
		<b>\$1,590,000</b>	<b>\$500,000</b>	
	REGIONAL MANAGEMENT			
7	Conserved Lands Database Development	\$125,000	\$50,000	SANDAG has created a conserved lands GIS layer available online. Updating the information and collection of management attributes are occurring.
8	Land Management Implementation  Competitive Land Management grants	\$7,365,000	\$1,950,000	40 grants have been issued to land manager over the past four cycles. Activities have included weed removal in vernal pool habitat resulting in increased populations of endangered species; restoration of cactus wren habitat burned by wildfires; removal of invasive species to promote endangered species habitat throughout the region; and installation of fencing, signage, and controlled recreational access to open space lands. Matching funds from the grant applicants have totaled \$3,568,243; a 67 percent match of non-TransNet funds. An RFP is proposed to be issued in February for the 5th cycle of this program.
9	Emergency Land Management Funds	\$0	\$150,000	Upon adoption by the SANDAG Board, this funds will be established to address land management emergencies.
10	Invasive Plant Species Mapping	\$250,000	\$0	SANDAG has been working with its on-call consultants to get a bid for this effort. It is expected to tie into the regional vegetation mapping efforts.
11	Invasive Animal Species Removal	\$0	\$225,000	Upon adoption by the SANDAG Board, this funds will be established to address non-native animals in the preserve system. SANDAG will utilize the recommendations of the SDMMMP for the process to allocate these funds with those recommendations coming back to the EMPWG in March.
12	Updated Vegetation Mapping	\$600,000	\$200,000	Working with the CDFG, SANDAG's consultants AECOM have completed a draft Vegetation Classification System for Western San Diego County. Training on use of this system will occur in February for interested parties. A contract to implement the vegetation mapping this Spring is pending.
13	Enforcement	\$370,000	\$0	A year long pilot project effort with the SD Sheriffs and Cal Fish and Game Wardens is ending in February. A presentation to the EMPWG'S is scheduled for the March 2011 meeting.
14	Preserve level management plan standardization	\$225,000	\$0	SANDAG has entered into a MOA with San Diego State's Institute for Ecological Management and Monitoring to integrate science and adaptive management into land management and monitoring efforts. The scope of work was jointly developed by USFWS, CDFG, SDMMMP, SANDAG and IEMM. Several land managers have already offered to work with IEMM on this effort.
	<b>Subtotal Regional Management</b>	<b>\$8,935,000</b>	<b>\$2,575,000</b>	

**TRANSNET EMP: HABITAT CONSERVATION FUNG  
STATUS OF MANAGEMENT AND MONITORING EFFORTS**

		Approved Prior FYs	Current FY	Status of Effort as of January 2011
	REGIONAL MONITORING			
15	Post Fire Monitoring/ Recovery Planning	\$1,725,000	\$325,000	USGS will continue monitoring with a focus on the small vertebrate communities that have not recovered since the fires, a 4th year of monitoring for riparian birds located in the 2007 burn areas and control sites, and a synthesize data of collected across all species taxa on the fire responses to develop adaptive management actions that will be implemented to manage for diversity following similar future fire events.
16	Vegetation Monitoring	\$295,000	\$100,000	San Diego State have collected an analyzed four years of vegetation monitoring data. Continue efforts in spring 2011 will focus on adding in a structural component to the field monitoring, incorporation of vegetation monitoring results from other efforts to increase sample size (e.g., postfire data, gnatcatcher monitoring), and a direct comparison of various vegetation monitoring efforts and techniques (field vs. remote sensing) to determine the cost-effectiveness of these approaches to establish a best management practice.
17	Rare and Endemic Plant Monitoring	\$300,000	\$0	In 2010 the USGS completed an analysis of 11 years of rare plant monitoring data from 24 species. These results concluded that the monitoring for trend was not possible in any reasonable time frame under the methods current used. A rare plant oversight committee is helping SANDAG and SDMMMP with the development of revised rare plant monitoring protocols. The focus for 2011 is perennials plants and annual plants in 2012. A presentation is scheduled for the EMP Working Group for March.
18	California Gnatcatcher Monitoring	\$740,000	\$0	The USFWS has developed a protocol for conducting California Gnatcatcher monitoring. The protocol was peer reviewed, and monitoring was completed in 2002 (Orange County and parts of San Diego County), 2004 (MSCP areas only) using this new protocol, and 2007 and 2009 throughout the San Diego region. Information provided by these efforts has lead to the conclusion that monitoring for this species could be reduced to one every three years redirecting efforts to other taxa. Mr. Winchell made a presentation at the September 2010 EMP Working Group meeting.
19	California Coastal Cactus Wren Monitoring & Recovery	\$450,000	\$0	The USFWS is under contract to map all the remaining cactus patches that are left after the 2007 wildfires and not the locations of coastal cactus wren occupancy. The USGS will collect samples from the remaining birds for genetic sampling. This work has already started.
20	Burrowing Owl Monitoring	\$295,000	\$0	In 2010 SDMMMP and USFWS devised a protocol for monitoring burrowing owls in south san Diego. The work has been completed and the results analyzed. A coordination committee led by the San Diego Management and Monitoring Program, which includes the U.S. Fish and Wildlife Service, California Department of Fish and Game, San Diego State University, U.S. Geological Survey and the San Diego Zoological Society, will be discussion options for future burrowing owl efforts.
21	Rare Butterfly Monitoring	\$230,000	\$100,000	Work on three butterfly species have been initiated. The Thorne hairstreak distribution and habitat characteristic is being worked on by the University of Nevada, Reno (Matt Forrester and Amy Lucus). SDSU has conducted 1 year of monitoring for the hermes copper butterfly and is set for continuing this effort in the spring. Finally, SANDAG with assistance from UCSD, City of San Diego and National Wildlife Refuge staff conducted initial baseline surveys in five lagoons for the salt marsh skipper.
22	Wildlife Corridor and Linkages Monitoring (including genetic studies)	\$300,000	\$200,000	The development of comprehensive, multi-year strategic plan is being completed by the SDMMMP with input from a large group of wildlife movement and taxa specific experts. Mr. Rempel will make a presentation of the plan the EMP Working Group on January 11, 2011.
23	Other Species Monitoring (e.g. priority 2 species)	\$140,000	\$200,000	Collection of golden eagle data has been obtained from the Wildlife Research Institute - analysis is pending. Other priority species will be addressed over the coming year.
	<b>Subtotal Regional Monitoring</b>	<b>\$4,475,000</b>	<b>\$925,000</b>	
	<b>TOTAL FUNDING STRATEGY</b>	<b>\$15,000,000</b>	<b>\$4,000,000</b>	

**Task 1:**  
**Evaluation of Data Management Systems for  
San Diego Management and Monitoring Program Data**

**INTRODUCTION**

The San Diego Management and Monitoring Program (SDMMP) was recently created to coordinate reserve management as well as species and habitat monitoring efforts in San Diego County. Currently such activities are undertaken by several local, state and federal agencies along with non-profit organizations and consulting firms. Effective management of the data coming from the various sources will require a robust data management system that centralizes storage, viewing and analysis of the data and effectively addresses the various conservation issues facing San Diego County.

The task of managing biological data is typically undertaken on a project by project basis. Project-based data management can lead to difficulty in developing consistent datasets when conducting large-scale trend analyses and typically does not promote data sharing amongst research groups. San Diego County-wide monitoring and habitat management will likely require regional trend analyses as well as access to data collected from various sources. Several agencies in California have developed data management systems to combat these issues and provide a one stop shop for biological monitoring data. Within San Diego County, three examples of these data management systems include California Department of Fish and Game's (CDFG) Biological Information and Observation System (BIOS), U. S. Geological Survey's Multi-taxa Database (MTX), and the County of San Diego's SanBIOS.

Two priority issues that the SDMMP has been tasked to work on are MSCP Connectivity Monitoring and Land Management data. Several types of studies have been proposed over the next few years including carnivore tracking, analysis of genetic data, and bird banding studies. The three data management systems were evaluated on how each would manage these types of data and determine which, if any of the systems, would be best suited to house data collected for and by the SDMMP.

**BACKGROUND ON EXISTING DATA MANAGEMENT SYSTEMS**

BIOS

The BIOS data management system is run by the Biogeographic Data Branch (BDB) of the CDFG, based in Sacramento, CA. BIOS is similar to the California Natural Diversity Database (CNDDDB) except that BIOS incorporates data on all species in a non-standardized format and each dataset is its own layer in the viewer whereas CNDDDB only presents standardized rare species data. BIOS also presents associated environmental data if submitted along with the biological observations.

The following description of the system is taken from the CDFG BDB website (CDFG 2010):

BIOS is a system that enables the visualization of the spatial distribution of biological data generated by the Department of Fish and Game (DFG) and its Partner Organizations, the management of those data when necessary, and the sharing of those data with Department employees and partners. BIOS uses standard guidelines, protocols, and tools that enable the analysis and management of field observation data. Notable features include:

- Recommendations on how to build, collect and store datasets that can be used together,
- Data warehouse to receive datasets, store them in a consistent manner, and serve spatial and attribute data associated with biological observations,
- Catalog and tools that enable online queries based on attributes and spatial location,
- Management system to create and maintain GIS features,
- ArcIMS (Internet Map Server) to view, query, and retrieve biological and spatial data from BIOS, online. [Currently, CDFG is in the process of moving BIOS to ArcGIS Server.]

The BIOS map viewer presents spatially enabled data via the CDFG BIOS website. The data can be viewed along with other selected datasets. Maps can be printed off of the website for inclusion in reports. Currently over 400 datasets are on BIOS and include vegetation mapping, proposed and final critical habitat maps from USFWS, tree delineation, inland fishery data, invasive species data, etc. There are minimal requirements for submissions. Primarily, submitted datasets must contain bio-spatial data and adequate metadata must be included, detailing the specifics of the dataset as well as Contributor contact information. There are currently 2 levels of access, a public and private viewer (for sensitive species). The private viewer requires a Login and password, which is only given to CDFG and associated partners staff. The Contributor must indicate the accessibility level (public, government-only) and download access of each submission (via BIOS or providing specific contact information). If the contributor gives permission for data to be downloadable, it will be in a CSV or DBF format; the original shapefile cannot be obtained from BIOS, only from the contributor. The viewer in itself can be used to conduct spatial analyses of species presence or habitat data. Additional analyses may depend upon the format the data was submitted in and could require working directly with the contributor.

BIOS is essentially a data warehouse, it presents a collection of datasets which can be queried individually but does not allow for queries across multiple datasets. Data submitted to BIOS is still managed by the contributor and typically persons interested in a BIOS data layer must contact the contributor for questions or data requests. To submit data, a shapefile or geodatabase is preferred. There is typically a backlog so posting of data submissions can be several months unless one specifically requests that the data be posted sooner.

While BIOS offers several benefits as a data management system, it does have some drawbacks. If this option is used as the sole data management system, each entity that conducts management and monitoring efforts would still house and manage their own data in most cases. This could potentially make it more time consuming and difficult in compiling and standardizing the multiple datasets into a single analyzable dataset.

## MTX

The USGS Western Ecological Research Center's San Diego Field Office EcoInformatics Program has been developing a data management system, currently called the Multi-Taxa Database (MTX). Development of this regionally integrated database began in 2002 in partnership with California Department of Fish and Game with legacy data migration beginning in 2006 continuing in partnership with U.S. Fish & Wildlife Service and National Biological Information Infrastructure (NBII). This integrated relational database allows for storage and retrieval of protocol driven ecological data using many standardized and customizable tools. Data can be collected, entered, reviewed or reduced using PDAs, desktop and laptop computers with common software (Webforms, Access/Excel, ESRI, etc.) (Holmes and Brown 2010).

The MTX currently houses data on Herpetofauna and Ant Pitfall Trappings efforts, Carnivore Camera and Scent station monitoring data, Vegetation Point sampling, Satellite Telemetry tracking of birds and Pocket Mouse survey data. Associated habitat, weather, observer, water chemistry data can be stored as well as many other aspects of the biological sampling data collection. As USGS migrates additional datasets into the MTX, staff continually update the database structure to accommodate the new datasets. The database can be linked to ESRI's ArcGIS software so spatial analysis and QA is easily conducted through ArcGIS. The data can also be queried and manipulated in a format for use in statistical analysis; the queries can then be exported in a file format readable by other software.

The database is stored in SQLServer and is managed and maintained by staff located in San Diego, Dixon, and Sacramento, with the actual database server located in Sacramento. Data can be submitted for migration as an Excel spreadsheet or Access database. Capability exists to load data directly from a PDA, but specific PDA forms need to be developed based on the project data beforehand. Currently the MTX database is viewable to USGS and other DOI agency personnel. Issues with the USGS firewall and security policies need to be addressed in order to make the viewer accessible to other interested parties or the public. Access to the database from other DOI offices has been tested and works, although the connection is often times slow. The MTX data management staff are aware of the issues and are intending to move toward use of WebForms for data viewing, which should resolve the connection issues. In addition, MTX staff are currently developing user access roles that will enhance database security. Users will be given task-specific permissions based upon their role within the project (data entry, QA, or management). The database provides many benefits as a data management system, with most negative issues related to security and staff time issues. If used as the data management system for the SDMMP, any type of study would be easily uploaded into the database, adequate viewers can be easily built for the data, and analysis of the data would be accomplished by building queries. The issues of access due to firewall security constraints may be an initial problem but the USGS staff are currently investigating ways to deal with this issue.

## SanBIOS

The County of San Diego Land Use and Environment Group has been working on a data management system to manage the data they collect and receive. They received guidance on data management systems from the USFWS in 2006 and created SanBIOS, an ESRI geodatabase, which was designed to be compatible with BIOS. The following description was taken from the County's SanBIOS User Manual (County of San Diego 2009):

Created in 2009, the SanBIOS database serves as a single repository of species observations collected by various departments within the County of San Diego's Land Use and Environment Group. Coordination of biological species tracking between departments ensures a complete dataset, meeting a specific data standard, and will provide the best available information to environmental scientists, advocacy groups, all County departments, and various agencies.

This catalog of species observations have been recorded by professional biologists from the County of San Diego as well as from various other agencies and private firms. These data serve many functions: they serve as a baseline catalog of species records in the adopted South County MSCP and the draft North and East County preserve systems (including invasive species) in the incorporated and unincorporated areas of San Diego County, they are used to direct the location of future permanent plot surveys and for uses in various monitoring projects, they are used in the testing and validation of predictive species niche models and to comply with CEQA regulations, and they are used to identify and monitor invasive species. It is important to note these observations are an indication of confirmed species presence at the time of the survey but offer no indication of species absence. The types of surveys performed to collect these data were variable, ranging from highly organized and standardized surveys to random observations based on chance. SanBIOS was constructed to be interchangeable with the State of California's Biological Information and Observation System (BIOS) database (<http://bios.dfg.ca.gov/>).

SanBIOS is available for download through SanGIS (<http://www.sangis.org/>) and is physically stored in the County's Data Warehouse. Currently the geodatabase has approximately 80,000 records and is 26 MB in size. An interested party, who can be anyone from the public, must first request an account to access SanGIS data and then can download the entire SanBIOS. While metadata exists that describes what each field in SanBIOS means, no metadata exists that describes the data that comprises the geodatabase. Spatial analysis of the SanBIOS data can be done through ESRI ArcGIS software. Persons without this software may have to work with the County staff to get the data in a format useable to them. In addition, the data source/contributor may need to be contacted regarding the metadata before using specific data in any analyses.

Data contributors can download a geodatabase template to use as guidance when submitting data. The standards used to develop the template were based upon the data needs of various County departments that collect GIS data. Each field in the geodatabase must contain data or the designed NULL value. The County will no longer accept data that does not conform to their SanBIOS standard. Additional data can be collected for projects but will not be stored as part of the SanBIOS geodatabase. As stated earlier, the public has access to this data, it is the contributor's responsibility to ensure that sensitive data is treated appropriately before being made available to the public. The SanBIOS staff will QA the data to the extent that it conforms to their geodatabase standard, otherwise the QA is the responsibility of the Contributor before submission to the County. As with the previous data management systems, SanBIOS has both positive and negative aspects as a data management system. If SanBIOS was used as the sole data management system, stakeholders are limited in what data fields are viewable and downloadable in the geodatabase. Also the lack of metadata on what datasets comprise SanBIOS can cause issues in conducting large-scale analyses.

## **SDMMP DATA MANAGEMENT RECOMMENDATIONS**

The SDMMP has indicated that any database they use needs to encompass more than species occurrence data and must meet, at minimum, the reporting requirements for SanBIOS and the USFWS Carlsbad Fish and Wildlife Office (CFWO). They also expressed that the database must meet the needs of stakeholders such as land managers and biologists who will be involved in the connectivity monitoring and other future studies.

The SDMMP has proposed various methodologies to accomplish the MSCP connectivity monitoring tasks, such as GPS telemetry studies, camera and track station monitoring, bird banding and analysis of genetic samples. Land management data that the SDMMP is currently evaluating for database management includes population monitoring and land restoration actions. These studies include tracking of species presence and absence from a reserve, removal of invasive species and replanting of native species.

Currently, BIOS and the MTX house datasets similar to those proposed for connectivity monitoring and could effectively house these data with little or no ‘data massaging’. Both systems currently contain carnivore camera station and tracking data. Thus, it seems logical for the SDMMP to adopt these systems for their data collection as opposed to creation of a new database. Further, the MTX has tables and fields already developed for genetic sample collection and bird band identification data in addition to presence and absence data for species tracking. While the MTX does not currently house much land management data, a LandManagement table has been established and can easily be updated with additional data as it is introduced for import into the database.

Creation of a new database system requires considerable time and research in development of a schema and management protocols. Since data management systems that can effectively handle the potential SDMMP data needs are already in use in San Diego County, there is no need to “reinvent the wheel” and develop a stand-alone database. The SDMMP is still developing and finalizing other types of studies where data will be collected and need to be managed, and development of a new large-scale database system would not be feasible until all protocols and potential data fields are known. To satisfy their immediate data management needs, they should choose an existing database and follow the standards established for that system.

Logistically the adoption of the USGS MTX database is the best option for the SDMMP for several reasons:

1. The MTX database already contains the necessary tables and fields for many biological monitoring protocols including those proposed for Connectivity Monitoring. In addition, some Land Management tracking data can be loaded into the database. It is relatively simple to update the tables to accommodate additional data that is not already included in the MTX.
2. The MTX TaxaObservation table has a SpeciesDetected field, which is useful for projects that target specific species. This allows for the storage of negative sightings data.

3. USGS and SDMMP share the same office. This is ideal for optimal communication between entities as well as resolves the USGS firewall issues for the SDMMP staff.
4. The MTX has minimal data standards thus the SDMMP are not limited by what data they intend to store in the database nor are they required to include data that is not pertinent to their interests.
5. The MTX offers the potential to enter data in multiple formats, via PDA, or MS Excel or Access uploads. USGS is currently investigating use of WebForms for data entry and viewing.

Using BIOS or SanBIOS would be insufficient as the data still needs to be in a centralized location and must be standardized to perform complex analyses beyond spatial analysis of occurrence points. If the SDMMP adopts the MTX, BIOS and SanBIOS should still be utilized as both systems are beneficial in disseminating data to interested parties, as the USGS MTX is not currently available to the public due to firewall issues. The BIOS team could potentially provide SD County with an online viewer specific to the local interest (akin to CalFish, <http://www.calfish.org/>). This may be a better option than SanBIOS as BIOS presents the data as submitted by the Contributor as opposed to a mandated format.

The CalFish program has a website detailing the project and partnerships. They provide interested parties with downloads of data and shapefiles accessible through a series of queries. If a visitor selects the option to “View maps”, they are navigated to the BIOS viewer with the CalFish datasets available for selection. The SDMMP website ([www.sdmmp.com](http://www.sdmmp.com)) could include a weblink to BIOS much like CalFish where the visitor is not even aware that they are accessing the CDFG website.

## REFERENCES

California Department of Fish and Game. Biological Information and Observation System. <http://bios.dfg.ca.gov/>. Accessed 7/29/2010.

County of San Diego. 2009. County of San Diego SanBIOS GIS Data Standard User Manual.

Holmes and Brown. 2010. Data Development Projects for WERC EcoInformatics. Information Sheet. Prepared April 2010.

## SDMMP DATABASE DEVELOPMENT QUESTIONS

The San Diego Management and Monitoring Program (SDMMP) is in the process of developing a centralized database to house both management and monitoring data collected in San Diego County. All data collected for and by the SDMMP is to be maintained in this database. Potential datasets include land management actions, reserve connectivity monitoring, and target plant and animal species monitoring. The following series of questions were developed to assist the SDMMP in identifying the key fields that should be included in the database.

**Question 1: Please describe your current / future management or monitoring activities. Do you use printed datasheets for data collection or a PDA? Is your data currently stored in a database? Please submit a copy of your datasheets or list of data attributes collected for your work as well as a copy of the database you use.**

### DATABASE PURPOSE/ CONTENT

The purpose of the SDMMP database is to centralize and standardize monitoring and management data collected by multiple entities in San Diego County, including federal and state agencies, and make it accessible to the stakeholders. While there are several data management systems already in existence that house biological monitoring data (i.e. BIOS, SANBIOS, USGS-MTX), the data cannot be easily cross-referenced since each is a separate system. Additionally, these systems contain very few fields for data collected on land management such as invasive weed control and habitat restoration or on genetic sample data as may be collected for the connectivity monitoring studies.

Some of the potential Key Data Attributes that will be tracked as part of potential future studies include:

Site Name	Site Maintenance Performed	Observation Date
Site Coordinates	Species Name	Observation Source
Site Function	Species Code	Observation Notes
Coordinate Type	Count of Individuals	Photo Taken
Coordinate Datum	Actual or Estimated Count	Invasive Species
Precision Error	Detection Method	Habitat Type
Land Owner	Animal ID ( eg.CollarID, Band Num)	Habitat Quality
Land Manager	Sample Collected	Habitat Disturbances
Site Maintenance Needed	Observer	

**Question 2: What other attributes should be included in the above table?**

**Question 3: Are there any attributes that you would suggest removing?**

## **DATABASE FUNCTIONALITY**

Data will be entered into the SDMMMP database by multiple methods including transcription from paper and automatic uploads from handheld devices.

Some of the database functionality requirements include:

- Data must be consistent/standardized so it can be cross referenced with data from other programs,
- Sensitive data will have restricted access,
- Both GPS point and polygon data (animal locations, reserve boundaries) will be included,
- Statistical or spatial analyses may be conducted with the data that is collected,
- The database must be able to track certain attributes of target habitats or species over time.

**Question 4: Are there other database functionalities that should be included?**

**Question 5: Are there any other types of analyses that should be considered?**

## **DATA ACCESS**

The SDMMMP will have multiple levels of accessibility. Three levels of access are envisioned:

- Read-only access for the public
- Extended access for those entering data and performing QA/QC
- Full access for those managing the database or analyzing data

**Question 6: What is your preferred primary method of accessing the data (through PDAs, MS Access forms, webforms, a Geodatabase query tool)?**