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08-AFC-3	
DATE	FEB 23 2010
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February 23, 2010

Dockets Unit
California Energy Commission
1516 Ninth Street, MS 4
Sacramento, CA 95814

RE: Marsh Landing Generating Station
Application for Certification 08-AFC-03

On behalf of Mirant Marsh Landing, LLC, the applicant for the Marsh Landing Generating Station (MLGS), we are pleased to submit the *Responses to Data Request 3b: (#99-101).*

Please include this document in the AFC record.

URS Corporation

Anne Connell
Project Manager

Enclosure

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Responses to Data Request Set 3b: (#99–101)

Application for Certification (08-AFC-03) for MARSH LANDING GENERATING STATION Contra Costa County, California

February 2010

Prepared for:

MIRANT℠
MARSH LANDING, LLC

Prepared by:

URS

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LIST OF ACRONYMS AND ABBREVIATIONS USED IN RESPONSES

AAQS	ambient air quality standard
AERMOD	American Meteorological Society and Environmental Protection Agency preferred atmospheric dispersion model
BAAQMD	Bay Area Air Quality Management District
CCPP	Contra Costa Power Plant
CEC	California Energy Commission
CEMS	continuous emissions monitoring system
cm/sec	centimeters per second
CO	carbon monoxide
K	Kelvin
kg/ha/yr	kilograms per hectare per year
km	kilometers
m	meters
mg/m^3	milligrams per cubic meter
MLGS	Marsh Landing Generating Station
m/sec	meters per second
NH_3	ammonia
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NWR	National Wildlife Refuge
PM_{10}	particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PPP	Pittsburg Power Plant
PSD	Prevention of Significant Deterioration
RMNP	Rocky Mountain National Park
SO_2	sulfur dioxide
SO_X	sulfur oxides
USDA	U.S. Department of Agriculture
UTM	Universal Transverse Mercator
VOC	volatile organic compound

Technical Area: Biological Resources
Author: Heather Blair

BACKGROUND

The Applicant's proposed change to the project design of the Marsh Landing Generating Station would reduce the electrical output of the facility from 930 megawatts (MW) to 760 MW, thereby potentially changing estimated operational emissions of nitrogen oxides (NOx) and ammonia (NH_3). Therefore, applicant responses to Biological Resources data requests 61, 62, and 63 should be revised to reflect recent revisions to the proposed project. For complete background information on the issue of nitrogen deposition and the need for these data requests, please refer to data requests 61, 62, and 63 (April 2009).

DATA REQUEST

99 Please provide an analysis of impacts due to total nitrogen deposition from operation of the MLGS. The analysis should specify the amount of total nitrogen deposition in kg/ha/yr at:

a. the Sardis Unit and Stamms Unit of the Antioch Dunes National Wildlife Refuge;

b. the freshwater/brackish marsh habitat north of the project area along the San Joaquin River shoreline; and

c. all other "Areas of Concern" (B through R) as illustrated in AFC Figure 7.2-1.

RESPONSE

In June 2009, Mirant Marsh Landing submitted Responses to Data Request Set 2 (numbers 60 through 63). As requested by the California Energy Commission (CEC), the nitrogen deposition modeling and analysis were redone to reflect the project design changes to the Marsh Landing Generating Station (MLGS) (i.e., to four Siemens 5000F combustion turbine units operating in simple-cycle mode). In addition, the meteorological data for this modeling have been updated to reflect meteorological data provided by the Bay Area Air Quality Management District (BAAQMD) since the original analysis was performed in June 2009. This meteorological data are the same data used in the latest modeling for MLGS provided to CEC and BAAQMD. The revised results are presented herein in the responses to Data Requests 99 through 101.

Maximum modeled nitrogen dioxide (NO_2) and ammonia (NH_3) concentrations were added together to estimate total nitrogen. A deposition rate of 2 centimeters per second (cm/sec), which represents an average gravitational settling speed for small particles, was used to convert concentrations of total nitrogen estimated from the MLGS air quality emissions modeling to nitrogen deposition values (Hanna et al, 1982). The analysis is based conservatively on total nitrogen deposition and did not distinguish between wet and dry deposition. The maximum modeled nitrogen deposition rate from MLGS sources is 0.3 kilogram per hectare per year (kg/ha/yr), located approximately 0.5 mile southeast of the project site (see Revised Figures 62-1a and 62-1b). When adding the background level of 1.6 kg/ha/yr from the response to Data Request 60, the maximum modeled nitrogen deposition rate for MLGS is 1.9 kg/ha/yr.

As illustrated in Revised Figures 62-1a and 62-1b, nitrogen deposition rates from MLGS at the Sardis Unit and Stamms Unit of the Antioch Dunes National Wildlife Refuge (NWR) are between

0.03 and 0.04 kg/ha/yr. With background, the maximum nitrogen deposition rate for the Antioch Dunes NWR is 1.64 kg/ha/yr.

Significant levels of nitrogen deposition can be problematic in areas where native plant species are adapted to grow on nutrient-poor soils (e.g., serpentine soils or dune sand). In these soils, lack of nitrogen prevents invasion of nonnative species. Nitrogen deposition results in an increased availability of nitrogen and, if added in significant amounts, can favor the growth of plant species that have a high demand for nitrogen, specifically nonnative plants. When this occurs, nonnative plant species may out-compete the native plant species (i.e., serpentine endemic plants) (Weiss, 1999). Both the Antioch Dunes evening primrose and Contra Costa wallflower occur at the Antioch Dunes NWR, where the dune sand can be considered nutrient limited. As such, these species could be impacted by large additions of nitrogen.

In the freshwater/brackish marsh habitat north of the project area along the San Joaquin River shoreline, nitrogen deposition rates are between 0.02 and 0.03 kg/ha/yr. With added background, the maximum modeled nitrogen deposition rate for this area is estimated to be 1.63 kg/ha/yr. Tidal marshes have high biomass production and accumulation, in addition to tidal processes that help control nutrient fluxes. They also have nitrogen fluxes an order of magnitude higher than many other systems and are not particularly sensitive to nitrogen deposition (Rozema et al., 2000).

For all other Areas of Concern, total nitrogen deposition with background is estimated to be between 1.62 kg/ha/yr and 1.72 kg/ha/yr. These areas either lack species sensitive to nitrogen deposition or lack nitrogen deficient soils. For example, Contra Costa goldfields is found in vernal pools and wet grasslands; these communities are not known to be nitrogen limited, nor are they expected to be particularly sensitive to nitrogen deposition. In addition, most of the other Areas of Concern are located in areas mapped as clay and loam soils or marshes which are not considered nutrient deficient. These areas are not known to support nutrient limited communities or species sensitive to nitrogen deposition.

Based on a review of available scientific literature, the following nitrogen deposition rate standards or thresholds have been identified for the applications indicated below\:

- Below a nitrogen deposition rate of 3 to 10 kg/ha/yr, no significant change to herbaceous plant communities (primarily within forested ecosystems of wilderness areas in the United States) is expected (Fox et al., 1989)

- In sand dune systems in the United Kingdom, 15 kg/ha/yr of nitrogen was identified as the threshold at which species composition and biomass changes were observed between high and low nitrogen inputs. Authors recommend a critical load threshold (i.e., the value at which communities are impacted) to be 10 to 20 kg/ha/yr of nitrogen (Jones et al., 2004).

- In the northeastern United States, watershed export of nitrogen increases with atmospheric deposition, particularly above 7 to 8 kg/ha/yr (Aber et al., 2003).

- In the Mojave Desert, a nitrogen application of 3.2 grams per square meter per year (32 kg/ha/yr), comparable to estimated deposition rates in the nearby Los Angeles area, was found to increase the dominance of nonnative plants over native species. While this effect is of concern in the indicated context, the application associated with this study is an order of magnitude higher than the predicted deposition in the MLGS project area due to the proposed project.

- In forests in the western United States, field studies and simulation modeling indicate that nitrogen deposition of 20 to 35 kg/ha/yr elevate nitrate leaching, decrease base cation pools in the soil, and lead to soil acidification (Fenn et al., 1996).

- In the Pacific Northwest, sensitive organisms and communities respond to nitrogen inputs of 3 to 8 kg/ha/yr (Fenn et al., 2003; Peterson et al., 1992)

- In California coniferous forests, the critical load for nitrogen impacts to lichen communities was estimated at 3.1 kg/ha/yr. The critical load for nitrogen leaching was estimated at 17 kg/ha/yr (Fenn et al., 2008).

- In Rocky Mountain National Park, 2.7 kg/ha/yr of wet nitrogen deposition was identified as the target goal to prevent long-term community composition impacts to native alpine flowering communities (RMNP, 2006).

- In California, 5 kg/ha/yr has been used as a benchmark for comparing nitrogen deposition on plant communities (Weiss, 2006 and CEC, 2007).

While these data represent the best available science, it is important to recognize that the vegetation communities (and soil types) presented in these studies differ from those surrounding the MLGS, and may respond differently to nitrogen deposition. The most relevant standard is provided by analyses of nitrogen deposition in the local project area. Based on recent evaluations of nitrogen deposition for other projects in the San Francisco Bay Area (CEC, 2007), ecosystems and plant communities are not expected to be significantly affected if the total nitrogen deposition rate is less than approximately 5 kg/ha/yr. Therefore, in this analysis, the significance threshold of 5 kg/ha/yr presented in Weiss, 2006 (and previously accepted by the CEC) is used for nutrient limited communities, including sand dune and serpentine plant communities. Nitrogen levels on the order of those evaluated in this analysis are not expected to have a significant affect on nonnutrient limited plant communities, such as tidal marshes. These estimates are based largely on data collected throughout the United States, in wilderness areas that primarily consist of forested ecosystems. Studies on dune vegetation (Jones et al., 2004) indicate that dune ecosystems could be impacted at nitrogen deposition values between 10 and 20 kg/ha/yr. However, for purposes of this analysis, 5 kg/ha/yr was selected as the threshold to assess potential impacts to nutrient limited communities.

Based on the results of the nitrogen deposition modeling, the predicted maximum nitrogen deposition values due to the MLGS project in the areas of interest would be well below the 5 kg/ha/yr benchmark, and would range between 1.63 kg/ha/yr and 1.9 kg/ha/yr as discussed above. Therefore, project impacts from nitrogen deposition on nitrogen-sensitive biological resources would be less than significant.

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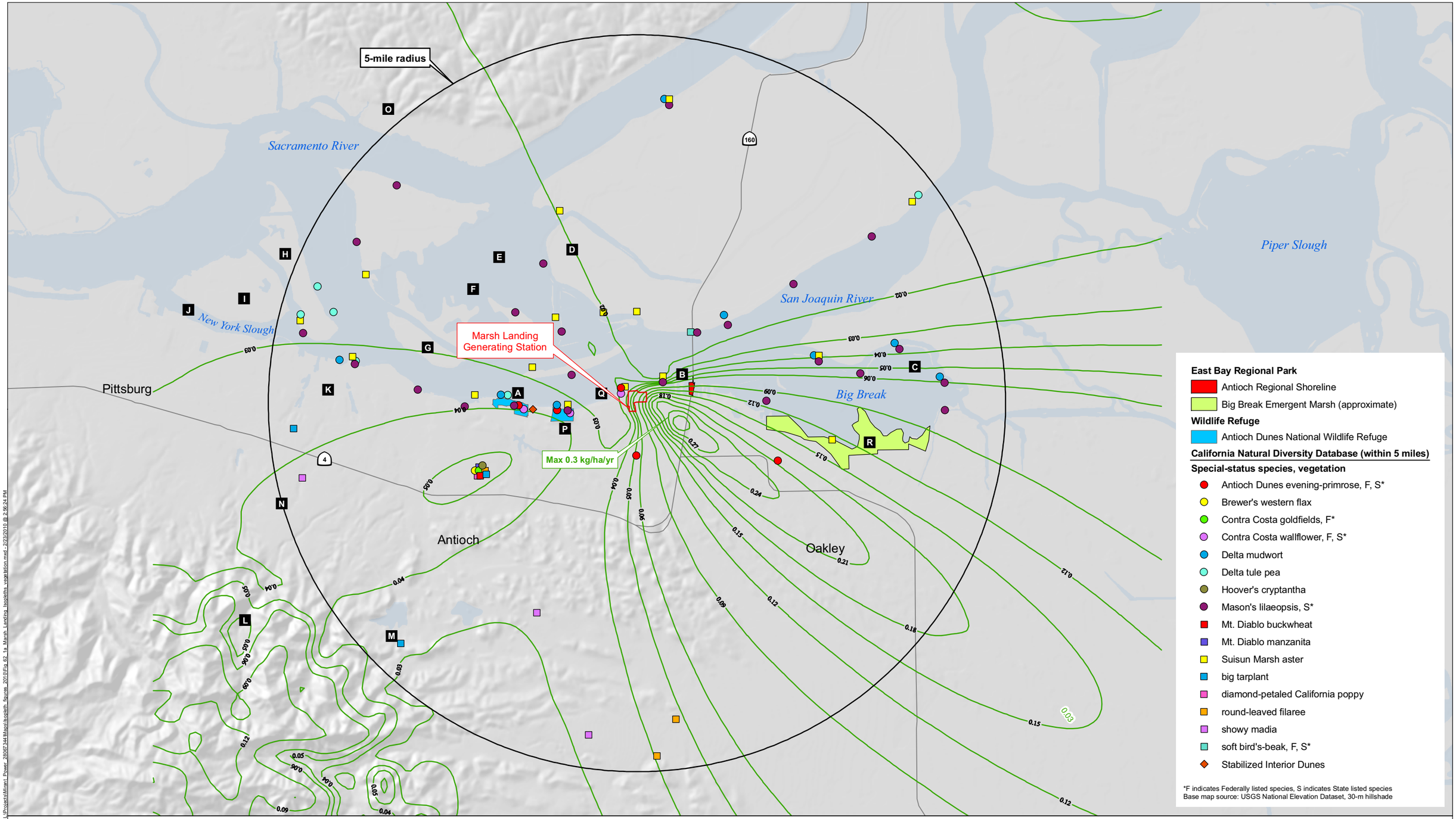

Areas of Concern

A Antioch Dunes NWR
B Antioch Shoreline
C Big Break
D Sherman Island
E Sherman Lake
F Sherman Island Water Flow Management Area
G Kimball Island
H Winter Island
I Browns Island
J New York Slough
K DOW Wetlands Preserve
L Black Diamond Mines Regional Preserve
M Contra Loma Regional Park & Reservoir
N Mouth of Contra Costa Channel
O Montezuma Habitat Enhancement Site
P Sardis Unit of the Antioch Dunes National Wildlife Refuge
Q Antioch Sand Dunes
R Big Break Emergent Marsh Supporting CA Black Rail

Isopleth Contour (kg/ha/yr)

N

0 1 2 MILES

Nitrogen Deposition Isopleth Map (kg/ha/yr)-Vegetation

Marsh Landing Generating Station
Mirant Marsh Landing, LLC
Contra Costa County, California

February 2010
28067344

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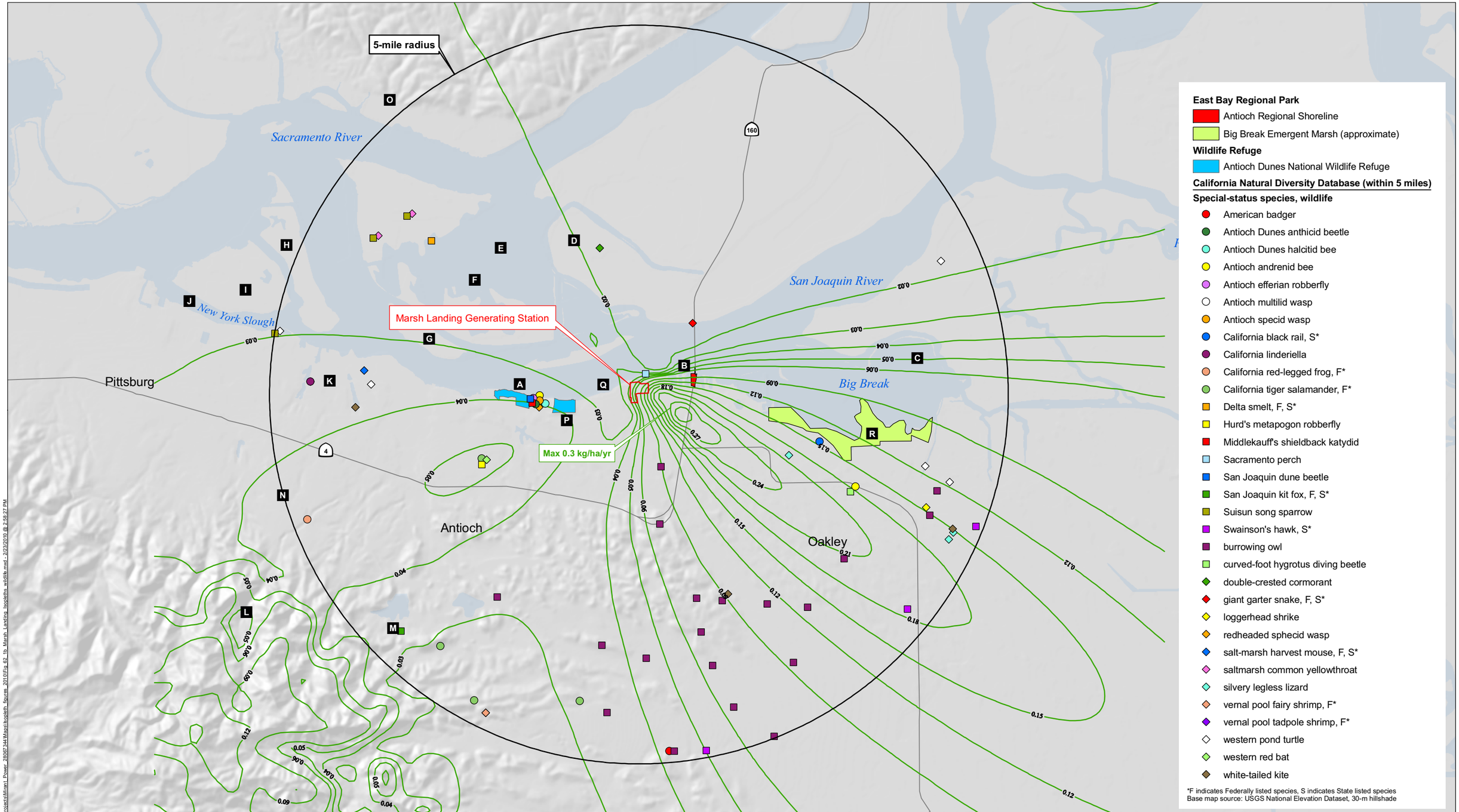
REVISED FIGURE 62-1a

URS corp., Oakland, CA., B. Jacobsen, L:\Projects\Mirant, Power 28067344\Maps\Isopleth, figures 2010\Fig. 62- 1a. Marsh Landing, Isopleths vegetation.mxd, 2/23/2010 @ 2:56:24 PM



Areas of Concern

A Antioch Dunes NWR	G Kimball Island	M Contra Loma Regional Park & Reservoir
B Antioch Shoreline	H Winter Island	N Mouth of Contra Costa Channel
C Big Break	I Browns Island	O Montezuma Habitat Enhancement Site
D Sherman Island	J New York Slough	P Sardis Unit of the Antioch Dunes National Wildlife Refuge
E Sherman Lake	K DOW Wetlands Preserve	Q Antioch Sand Dunes
F Sherman Island Water Flow Management Area	L Black Diamond Mines Regional Preserve	R Big Break Emergent Marsh Supporting CA Black Rail

Isopleth Contour (kg/ha/yr)

N

0 1 2 MILES

Nitrogen Deposition Isopleth Map (kg/ha/yr)-Wildlife

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Marsh Landing Generating Station
Mirant Marsh Landing, LLC
Contra Costa County, California

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REVISED FIGURE 62-1b

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DATA REQUEST

100 Please provide an isopleth graphic over USGS 7.5-minute map(s) (or equally detailed map) of the direct nitrogen deposition rates caused by the project that graphically depicts the results.

RESPONSE

Revised Figures 62-1a and 62-1b provide the isopleths for nitrogen deposition rates due to the proposed project. Revised Figure 62-1a shows the federal and state listed special-status vegetation species. Revised Figure 62-1b shows the federal and state listed wildlife special-status species.

DATA REQUEST

101 Please update the cumulative impact analysis (Tables 9-1 and 9-2) in Responses to Data Request Set #1 – data request #9 – with nitrogen deposition values in kg/ha/yr. Provide an isopleth graphic over USGS 7.5-minute maps (or equally detailed map) of the direct nitrogen deposition values in the cumulative analysis.

RESPONSE

Table 63-1 and Revised Table 63-2 are updated versions of Response to Data Request 9, Tables 9-1 and 9-2, respectively. Table 63-1 is an update to Table 9-1 that now includes NH_3 emissions. Revised Table 63-2 includes the maximum annual modeled NH_3 concentration from all cumulative sources listed in Table 63-1, as well as the maximum predicted nitrogen deposition rate in kg/ha/yr. Maximum modeled concentrations from NO_2 and NH_3 were combined and converted into maximum modeled nitrogen deposition rates using a deposition rate of 2 cm/sec.

Revised Figures 63-1a and 63-1b provide the isopleths for nitrogen deposition rates in kg/ha/yr due to all cumulative sources listed in Revised Table 63-1. Revised Figure 63-1a shows the federal and state listed special-status vegetation species. Revised Figure 63-1b shows the federal and state listed special-status wildlife species.

As seen in Revised Figures 63-1a and 63-1b, the maximum cumulative nitrogen deposition value occurs approximately 0.5 mile southeast of the MLGS facility. The maximum nitrogen deposition rate for all cumulative sources is estimated to be 5.0 kg/ha/yr (without background) in this area. This area would exceed the benchmark of 5 kg/ha/yr with background, but it is not considered sensitive to nitrogen deposition because sands or serpentine soils are not known to be present. Almost all of the highest nitrogen deposition rates in this area are caused by nitrous oxide and NH_3 emissions from the Gateway Generating Station.

The area with the next highest value is in the hills south of Pittsburg, more than 9 miles southwest of the MLGS project site near the Ameresco Keller Canyon LLC facility. The estimated maximum cumulative nitrogen deposition rate is 3.4 kg/ha/yr without background or 5 kg/ha/yr with background. The elevated nitrogen deposition values in this area are largely associated with emissions from sources at the Ameresco Keller Canyon LLC facility, which includes two landfill gas-fired internal combustion engines and a waste gas flare. This area is not considered sensitive to nitrogen deposition because sands or serpentine soils are not known to be present.

Elevated nitrogen deposition occurs in the following two areas:

- An area near the Black Diamond Mines Regional Preserve (Area L on the figures); and
- An area around the Freedom High School Generator.

However, the cumulative nitrogen deposition in these areas is estimated to be below 5 kg/ha/yr with background. Cumulative nitrogen deposition values in the hills near Black Diamond Mines Regional Preserve (Area L on the figures) are largely associated with emissions of NH_3 and nitrogen oxides from the Gateway Generating Station. The maximum value in this area without background is 1.1 kg/ha/yr. The other localized nitrogen deposition area is the region around the Freedom High School generator set. The localized maximum value near the Freedom High School generator set is 1.7 kg/ha/yr without background.

Based on regional soils information (Jones & Stokes, 2006 and USDA, 1977), the area in the vicinity of the Ameresco Keller Canyon LLC facility, the Black Diamond Mines Regional

Preserve, and the Freedom High School Generator areas are not mapped as sands and are not considered nutrient limited areas.

With respect to serpentine-derived soils, it is reasonable to assume that they would be restricted to areas where serpentinite (an ultramafic rock type) outcrops at the surface. Geologic maps (Wagner et al., 1991; Graymer et al., 1994) indicate that the nearest surface exposure of a serpentinite body is in the vicinity of Mt. Diablo, approximately 10 miles and 8.5 miles from the MLGS and the Willow Pass Generating Station, respectively, in an area unaffected by nitrogen deposition from these and nearby sources. The occurrence of Brewer's western flax near the Black Diamond Mines Regional Preserve (Area L on the figures) suggests that there may be serpentine soils present at this location. However, based on available geology and soil mapping information described above and the California Natural Diversity Database records for Brewer's western flax, serpentine soil does not appear to be present in this area.

The estimated cumulative nitrogen deposition values in the Big Break Regional and Antioch Regional Shoreline areas are well below the 5 kg/ha/yr with background threshold (i.e., approximately 3 and 2.2 kg/ha/yr, respectively). Big Break Regional Shoreline (Area R on the figures) occurs in an area mapped as sands (Jones & Stokes, 2006 and USDA, 1977); however, this area is not expected to be nutrient limited. Big Break Regional Shoreline consists primarily of tidal sloughs and marshes. Tidal marshes have high biomass production and accumulation, in addition to tidal processes that help control nutrient fluxes. They also have nitrogen fluxes an order of magnitude higher than many other systems and are not particularly sensitive to nitrogen deposition (Rozema et al., 2000). The Antioch Regional Shoreline (Area B on the figures) consists of a 4.5-acre meadow, picnic facilities, and fishing pier. The area is landscaped and maintained, and does not contain any sensitive plant resources. The area is also heavily used by the public for fishing, picnicking, and other recreational activities. Due to the lack of sensitive resources in this area and the current level of disturbance and maintenance, cumulative impacts to this area will not be significant.

As explained above, only an area southeast of the MLGS and an area near the Ameresco Keller Canyon LLC facility with no known nitrogen-poor soils or species sensitive to nitrogen deposition would have nitrogen deposition at or exceeding 5 kg/ha/yr (with background). Therefore, cumulative impacts from nitrogen deposition on nitrogen-sensitive biological resources would be less than significant.

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Table 63-1
Cumulative Sources for Marsh Landing Generating Station and Willow Pass Generating Station

Source Name	Address	Type of Source	Distance to Willow Pass Generating Station (miles)	Distance to Marsh Landing Generating Station (miles)	Emissions (tons/year)						Stack Parameters				UTM Coordinates NAD83 zone 10		Notes
					VOC	NO_X	NH_3[1]	SO_X	CO	PM_{10}	Diameter (m)	Height (m)	Exit velocity (m/sec)	Temp (K)	Easting (km)	Northing (km)	
Calpine Natural Gas	South End of Nichols Road Bay Point, CA 94565	Calpine Natural Gas Ryer Island Station – 70 Barrel Water/ Condensate Storage Tank	5.13	12.2	1.39	0.162	**0**	0	0.041	0.004	0.05	3.66	1.94	295.9	588.848	4210.009	Emissions and stack parameters provided by BAAQMD
Silgan Containers Manufacturing Corporation	2200 Wilbur Avenue, Antioch, CA 94509	Silgan Containers Mfg Corp Thermal Oxidizer Modification	6.12	1.28	0	1.922	**0**	0.006	7.688	0.072	0.65	14.63	8.8	616.5	606.519	4207.724	Emissions and stack parameters provided by BAAQMD
Ameresco Keller Canyon LLC	901 Bailey Road, Pittsburg, CA 94565	Ameresco Keller Canyon LLC 2 LFG-Fired Internal Combustion Engines	3.19	9.67	9.64	31.02	**0**	8.637	95	5.17	0.51	10.67	40.68	740.4	592.879	4207.727	Emissions and stack parameters provided by BAAQMD
		Ameresco Keller Canyon LLC TSA Waste Gas Flare	3.19	9.67	0.603	2.168	**0**	1.805	20.796	1.212	1.52	9.14	4.57	1144.3	592.879	4207.727	Emissions and stack parameters provided by BAAQMD
United Spiral Pipe LLC Manufacturing Plant	900 E 3rd Street, Pittsburg, CA 94565	United Spiral Pipe LLC Manufacturing Plant welding, cleaning, misc.	1.44	5.8	4.584	0	**0**	0	0	4.781	0.26	12.19	73.89	294.3	599.2	4209.7	Emissions and stack parameters provided by BAAQMD
Freedom High School	1050 Neroly Road Oakley, CA 94561	Freedom High School Generator set	10.41	3.98	1.67	1.67	**0**	0	1.67	0.083	0.08	3.66	21.03	416.5	612.095	4203.127	Emissions and stack parameters provided by BAAQMD
Contra Costa Power Plant	3201 Wilbur Avenue, Antioch, CA 94509	CCPP Natural Gas Boiler 9 and 10 Stack Units 6 and 7	7.39	0.24	18.966	21.043	**21.7**	1.0863	144.83	13.104	5.7	137.16	28.7	411	608.825	4208.561	Emissions from 2005-2007 CEMS data
Gateway Generating Station	3223 Wilbur Avenue, Antioch, CA 94509	Gateway Natural Gas Boiler A	7.44	0.27	23.3	87.15	**122.06**	18.5	277.15	50.85	5.11	59.44	19.92	355.2	608.9	4208.454	From BAAQMD Engineering Evaluation For Proposed Amended Authority to Construct and Draft PSD Permit, June 2008
Gateway Generating Station	3223 Wilbur Avenue, Antioch, CA 94509	Gateway Natural Gas Boiler B	7.45	0.27	23.3	87.15	**122.06**	18.5	277.15	50.85	5.11	59.44	19.92	355.2	608.9	4208.413	From BAAQMD Engineering Evaluation For Proposed Amended Authority to Construct and Draft PSD Permit, June 2008
Pittsburg Power Plant	696 West 10th Street, Pittsburg, CA 94565	PPP Natural Gas Boiler 5	0.12	7.26	20.438	17.558	**27.4**	1.1705	156.07	14.121	4.18	137.16	32.64	403	597.003	4210.849	Emissions from 2005-2007 CEMS data
Pittsburg Power Plant	696 West 10th Street, Pittsburg, CA 94565	PPP Natural Gas Boiler 6	0.14	7.28	11.803	11.266	**14.2**	0.676	90.129	8.1546	4.18	137.16	32.64	403	596.974	4210.856	Emissions from 2005-2007 CEMS data
Pittsburg Power Plant	696 West 10th Street, Pittsburg, CA 94565	PPP Natural Gas Boiler 7	0.15	7.33	7.3935	11.292	**0**	0.4234	56.46	5.1083	6.1	137.16	25	398	596.862	4210.726	Emissions from 2005-2007 CEMS data

Notes:

BAAQMD = Bay Area Air Quality Management District
CCPP = Contra Costa Power Plant
CEMS = continuous emissions monitoring system
CO = carbon monoxide
K = Kelvin
km = kilometers
m = meters
m/sec = meters per second
NH_3 = ammonia
NO_X = nitrogen oxides
PM_{10} = particulate matter less than or equal to 10 microns in diameter
PPP = Pittsburg Power Plant
PSD = Prevention of Significant Deterioration
SO_X = sulfur oxides
UTM = Universal Transverse Mercator
VOC = volatile organic compound

[1] Table 63-1 is the same as Response to Data Request 9, Table 9-1 with column for NH_3 now added.

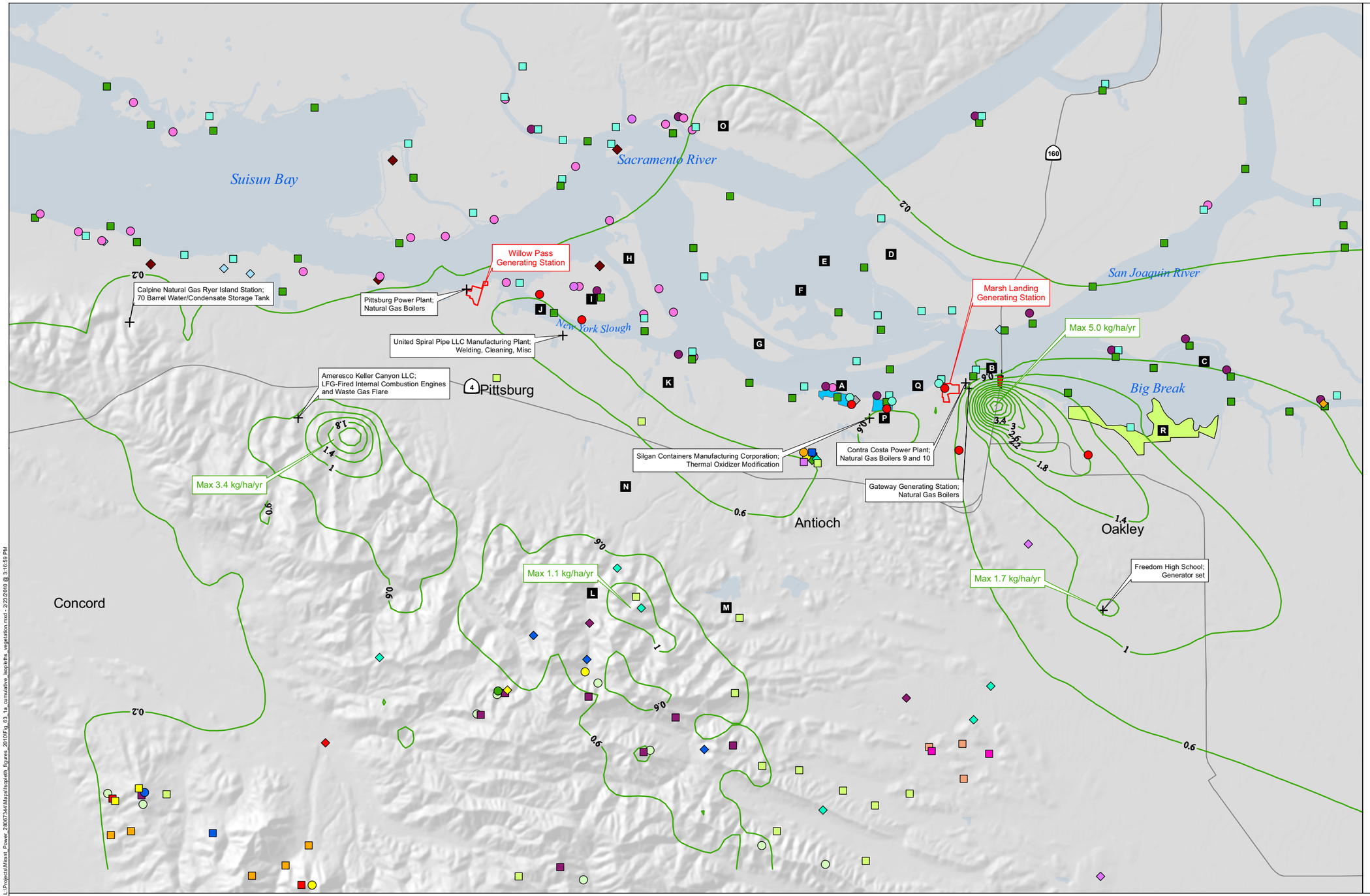
Revised Table 63-2
AERMOD Cumulative Impact Modeling Result[1]

Pollutant	Averaging Period	Maximum Modeled Impact (mg/m^3)	Background (mg/m^3)2	Maximum Total Predicted Concentration (mg/m^3)	Most Stringent AAQS (mg/m^3)	Maximum Predicted Nitrogen Deposition rate (kg/ha/yr)	UTM Coordinates NAD27	
							East (m)	North (m)
CO	1 hour	410.78	4,715	5,126	23,000	**N/A**	593,500	4,207,000
	8 hour	264.36	2,222	2,486	10,000	**N/A**	593,500	4,207,000
NH_3	**Annual[3]**	**0.76**	**N/A[4]**	**0.76**	**N/A**	**3.95**	**609,600**	**4,207,800**
NO_2	1 hour[4]	94.72	122.1	217	339	**N/A**	593,500	4,207,000
	Annual[4]	1.65	22.4	24	57	**3.17**	593,825	4,207,000
PM_{10}	24 hour[5,6]	5.76	84	90	50	**N/A**	599,500	4,209,500
	Annual[5,6]	0.99	22	23	20	**N/A**	599,500	4,209,500
$PM_{2.5}$	24 hour[5,6]	5.76	74	80	35	**N/A**	599,500	4,209,500
	Annual[5,6]	0.99	12	13	12	**N/A**	599,500	4,209,500
SO_2	1 hour	37.06	235.8	273	655	**N/A**	593,500	4,207,000
	3 hour	30.83	114.4	145	1,300	**N/A**	593,500	4,207,000
	24 hour	8.62	26.3	35	105	**N/A**	593,500	4,206,800
	Annual	0.51	5.3	6	80	**N/A**	593,825	4,207,000

Notes:

AAQS = ambient air quality standard
AERMOD = American Meteorological Society and Environmental Protection Agency preferred atmospheric dispersion model
CO = carbon monoxide
m = meters
kg/ha/yr = kilograms per hectare per year
mg/m^3 = milligrams per cubic meter
N/A = not applicable
NH_3 = ammonia
NO_2 = nitrogen dioxide
PM_{10} = particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter. All particulate matter emissions during operation were assumed to be $PM_{2.5}$
SO_2 = sulfur dioxide
UTM = Universal Transverse Mercator

1 Values highlighted in **bold** represent values not included in Table 9-2.
2 Background represents the maximum values measured at the monitoring stations in Marsh Landing AFC
3 NH_3 modeled for nitrogen deposition calculation only. No background value used for NH_3.
4 Results for NO_2 used ozone limiting method with ambient ozone data collected at Bethel Island monitoring station for the years 2000-2002 and 2004-2005
5 PM_{10} and $PM_{2.5}$ background levels exceed ambient standards.
6 All PM_{10} emissions from project sources were also considered to be $PM_{2.5}$.



East Bay Regional Park

- Antioch Regional Shoreline
- Big Break Emergent Marsh (approximate)

Wildlife Refuge

- Antioch Dunes National Wildlife Refuge

California Natural Diversity Database

Special-status species, vegetation

- Antioch Dunes evening-primrose, F, S*
- Bolander's water-hemlock
- Brandegee's eriastrum
- Brewer's western flax
- Contra Costa goldfields, F*
- Contra Costa manzanita
- Contra Costa wallflower, F, S*
- Delta mudwort
- Delta tule pea
- Diablo helianthella
- Hall's bush-mallow
- Hoover's cryptantha
- Lime Ridge navarretia
- Mason's lilaeopsis, S*
- Mt. Diablo buckwheat
- Mt. Diablo fairy-lantern
- Mt. Diablo manzanita
- San Joaquin spearscale
- Suisun Marsh aster
- big tarplant
- brittlescale
- caper-fruited tropidocarpum
- chaparral ragwort
- diamond-petaled California poppy
- large-flowered fiddleneck, F, S*
- round-leaved filaree
- showy golden madia
- soft bird's-beak, F, S*
- stinkbells
- woolly rose-mallow
- Coastal Brackish Marsh
- Stabilized Interior Dunes

*F indicates Federally listed species, S indicates State listed species
Base map source: USGS National Elevation Dataset, 30-m hillshade

Areas of Concern

A Antioch Dunes NWR
B Antioch Shoreline
C Big Break
D Sherman Island
E Sherman Lake
F Sherman Island Water Flow Management Area
G Kimball Island
H Winter Island
I Browns Island
J New York Slough
K DOW Wetlands Preserve
L Black Diamond Mines Regional Preserve
M Contra Loma Regional Park & Reservoir
N Mouth of Contra Costa Channel
O Montezuma Habitat Enhancement Site
P Sardis Unit of the Antioch Dunes National Wildlife Refuge
Q Antioch Sand Dunes
R Big Break Emergent Marsh Supporting CA Black Rail

Isopleth Contour (kg/ha/yr)

N

0 2 MILES

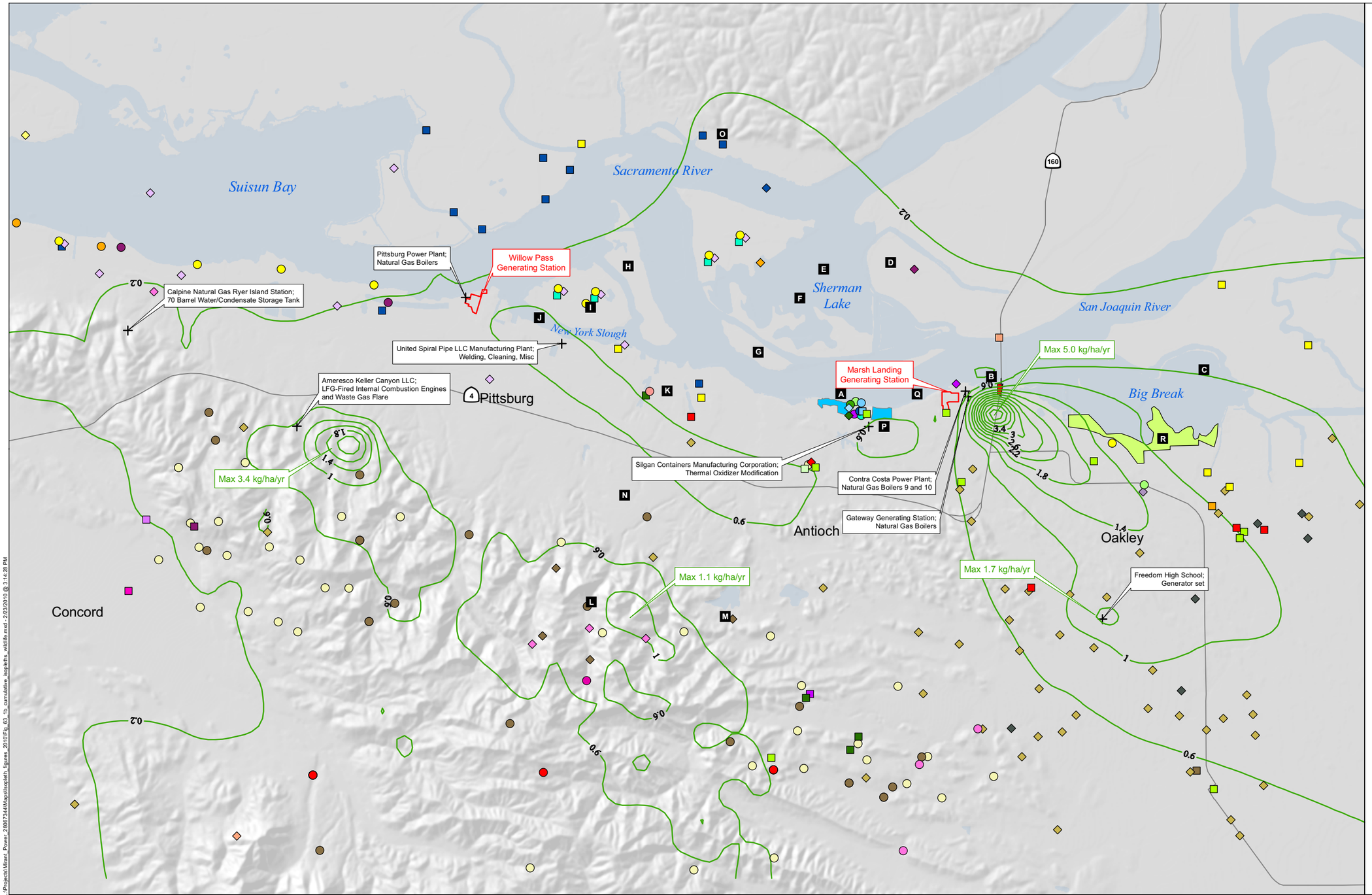
Cumulative Sources Nitrogen Deposition Isopleths(kg/ha/yr)-Vegetation

February 2010 — Marsh Landing Generating Station
28067344 — Mirant Marsh Landing, LLC Contra Costa County, California

URS

REVISED FIGURE 63-1a

URS Corp., Oakland, CA. B. Jacobsen L:\Projects\Mirant_Power_28067344\Maps\Isopleth_figures_2010\Fig_63_1a_cumulative_isopleths_vegetation.mxd - 2/23/2010 @ 3:16:59 PM



East Bay Regional Park

- Antioch Regional Shoreline
- Big Break Emergent Marsh (approximate)

Wildlife Refuge

- Antioch Dunes National Wildlife Refuge

California Natural Diversity Database

Special-status species, wildlife

- Alameda whipsnake, F, S*
- American badger
- Antioch Dunes anthicid beetle
- Antioch Dunes halcitid bee
- Antioch andrenid bee
- Antioch efferian robberfly
- Antioch multilid wasp
- Antioch specid wasp
- Blennosperma vernal pool andrenid bee
- California black rail, S*
- California clapper rail, F, S*
- California least tern, F, S*
- California linderiella
- California red-legged frog, F*
- California tiger salamander, F*
- Delta smelt, F, S*
- Hurd's metapogon robberfly
- Lange's metalmark butterfly, F*
- Middlekauff's shieldback katydid
- Sacramento perch
- Sacramento splittail
- San Joaquin dune beetle
- San Joaquin kit fox, F, S*
- San Joaquin pocket mouse
- Suisun song sparrow
- Swainson's hawk,S*
- burrowing owl
- coast (California) horned lizard
- curved-foot hygrotus diving beetle
- double-crested cormorant
- ferruginous hawk
- giant garter snake, F, S*
- golden eagle
- loggerhead shrike
- molestan blister beetle
- pallid bat
- redheaded sphecid wasp
- salt-marsh harvest mouse, F, S*
- saltmarsh common yellowthroat
- silvery legless lizard
- vernal pool fairy shrimp, F*
- vernal pool tadpole shrimp, F*
- western pond turtle
- western red bat
- white-tailed kite

*F indicates Federally listed species, S indicates State listed species
Base map source: USGS National Elevation Dataset, 30-m hillshade

Areas of Concern

A Antioch Dunes NWR	G Kimball Island	M Contra Loma Regional Park & Reservoir
B Antioch Shoreline	H Winter Island	N Mouth of Contra Costa Channel
C Big Break	I Browns Island	O Montezuma Habitat Enhancement Site
D Sherman Island	J New York Slough	P Sardis Unit of the Antioch Dunes National Wildlife Refuge
E Sherman Lake	K DOW Wetlands Preserve	Q Antioch Sand Dunes
F Sherman Island Water Flow Management Area	L Black Diamond Mines Regional Preserve	R Big Break Emergent Marsh Supporting CA Black Rail

Isopleth Contour (kg/ha/yr)

N

0 2 MILES

Cumulative Sources Nitrogen Deposition Isopleths(kg/ha/yr)-Wildlife

February 2010 — Marsh Landing Generating Station
28067344 — Mirant Marsh Landing, LLC Contra Costa County, California

URS

REVISED FIGURE 63-1b

URS Corp., Oakland, CA - B. Jacobsen, I:\Projects\Mirant_Power_28067344\Maps\Isopleth_figures_2010\Fig_63_1b_cumulative_isopleths_wildlife.mxd - 2/23/2010 @ 3:14:28 PM

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE MARSH LANDING GENERATING STATION

DOCKET NO. 08-AFC-3

PROOF OF SERVICE
(REVISED 11/30/2009)

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DECLARATION OF SERVICE

I, Catherine Short , declare that on February 23, 2010, I served and filed copies of the attached Responses to Data Request Set 3b: (#99-101). The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/marshlanding/index.html]**. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

For service to all other parties:

__X__ sent electronically to all email addresses on the Proof of Service list;

__X__ by personal delivery or by depositing in the United States mail at San Francisco, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

_X___ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION

Attn: Docket No. 08-AFC-3
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

C Short

_____