







Maps

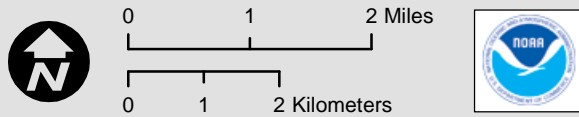
Assessment of Environmental Contaminants Associated with the National Defense Reserve Fleet In Suisun Bay, California

February 2009

Prepared by the
**National Oceanic and Atmospheric Administration,
Office of Response and Restoration**

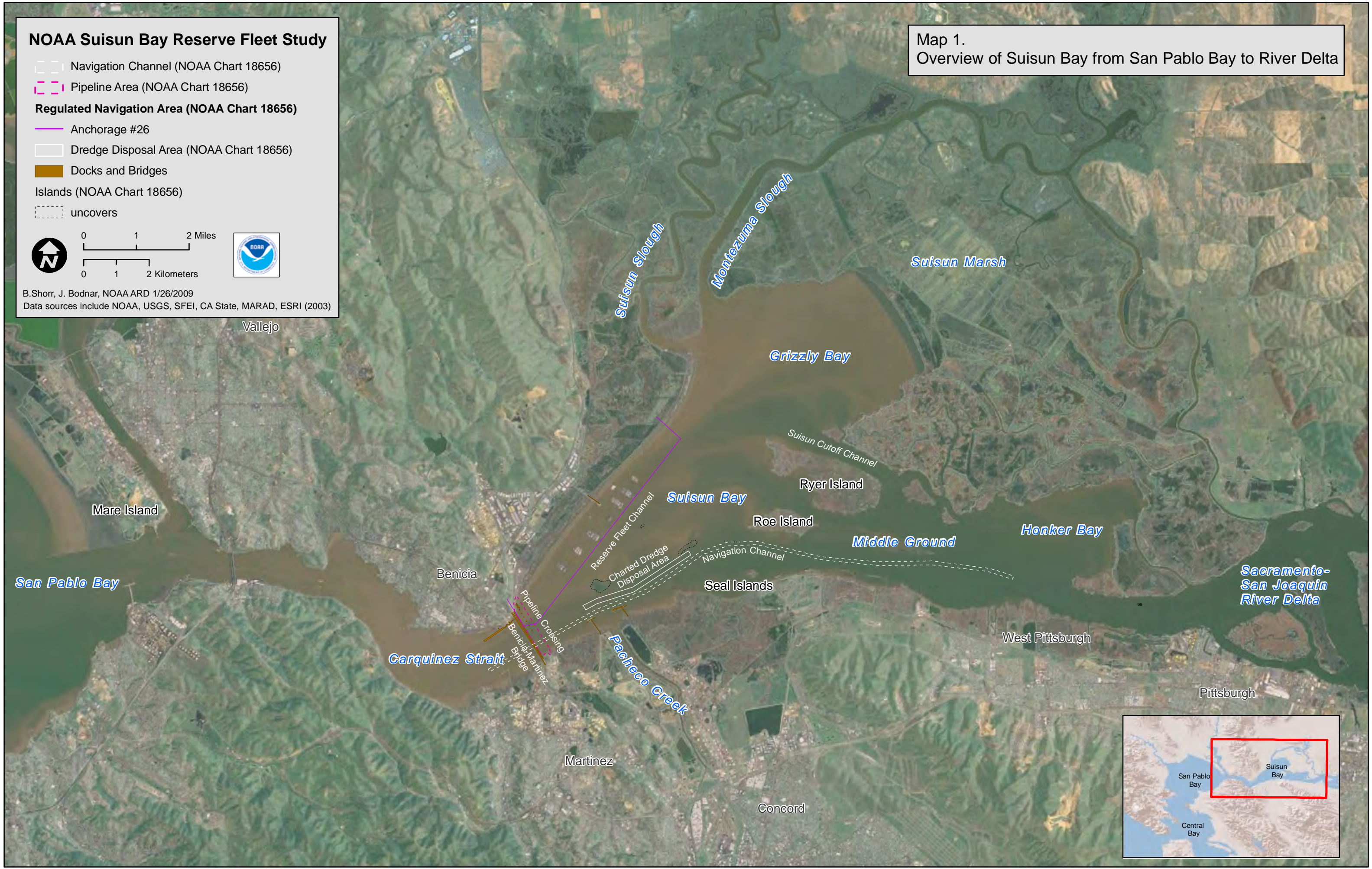
NOAA Suisun Bay Reserve Fleet Study

-  Navigation Channel (NOAA Chart 18656)
-  Pipeline Area (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18656)**
-  Anchorage #26
-  Dredge Disposal Area (NOAA Chart 18656)
-  Docks and Bridges
- Islands (NOAA Chart 18656)
-  uncovers




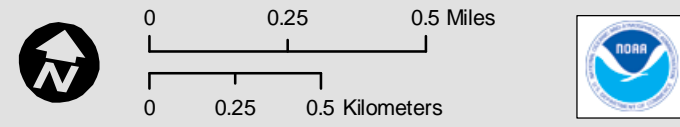
B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

Map 1.
Overview of Suisun Bay from San Pablo Bay to River Delta



NOAA Suisun Bay Reserve Fleet Study

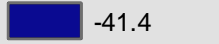
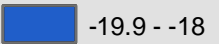
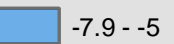
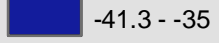

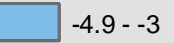
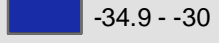
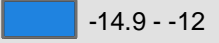
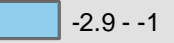
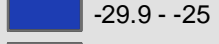

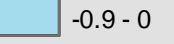
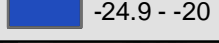
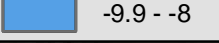

-  Suisun Bay Reserve Fleet 2003 (7 rows)
-  Reserve Fleet 1993 (8 rows)
-  Reserve Fleet 1980 (7 rows)
-  Reserve Fleet 1969 (13 rows)
-  Navigation Channel (NOAA Chart 18656)
-  Regulated Navigation Area (NOAA Chart 18656)
-  Pipeline Area (NOAA Chart 18656)
-  Dredge Disposal Area (NOAA Chart 18656)
-  Docks and Bridges
- Islands (NOAA Chart 18656)
-  uncovers



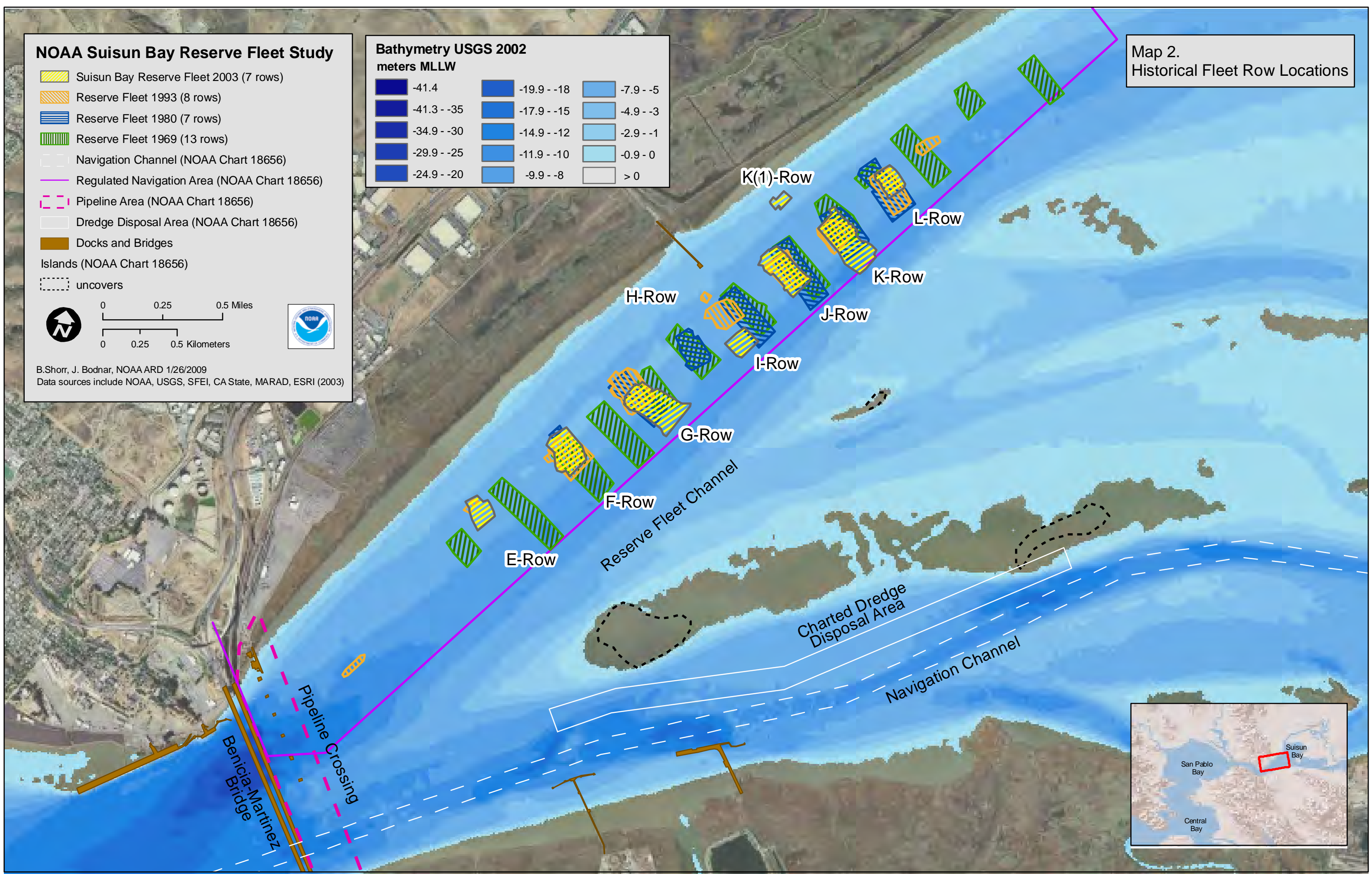
B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

Bathymetry USGS 2002







meters MLLW

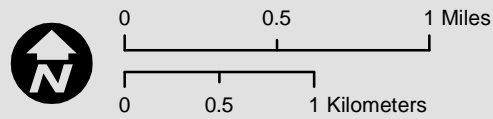
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 -41.3 -- -35	 -17.9 -- -15	 -4.9 -- -3
 -34.9 -- -30	 -14.9 -- -12	 -2.9 -- -1
 -29.9 -- -25	 -11.9 -- -10	 -0.9 -- 0
 -24.9 -- -20	 -9.9 -- -8	 > 0

Map 2.
Historical Fleet Row Locations



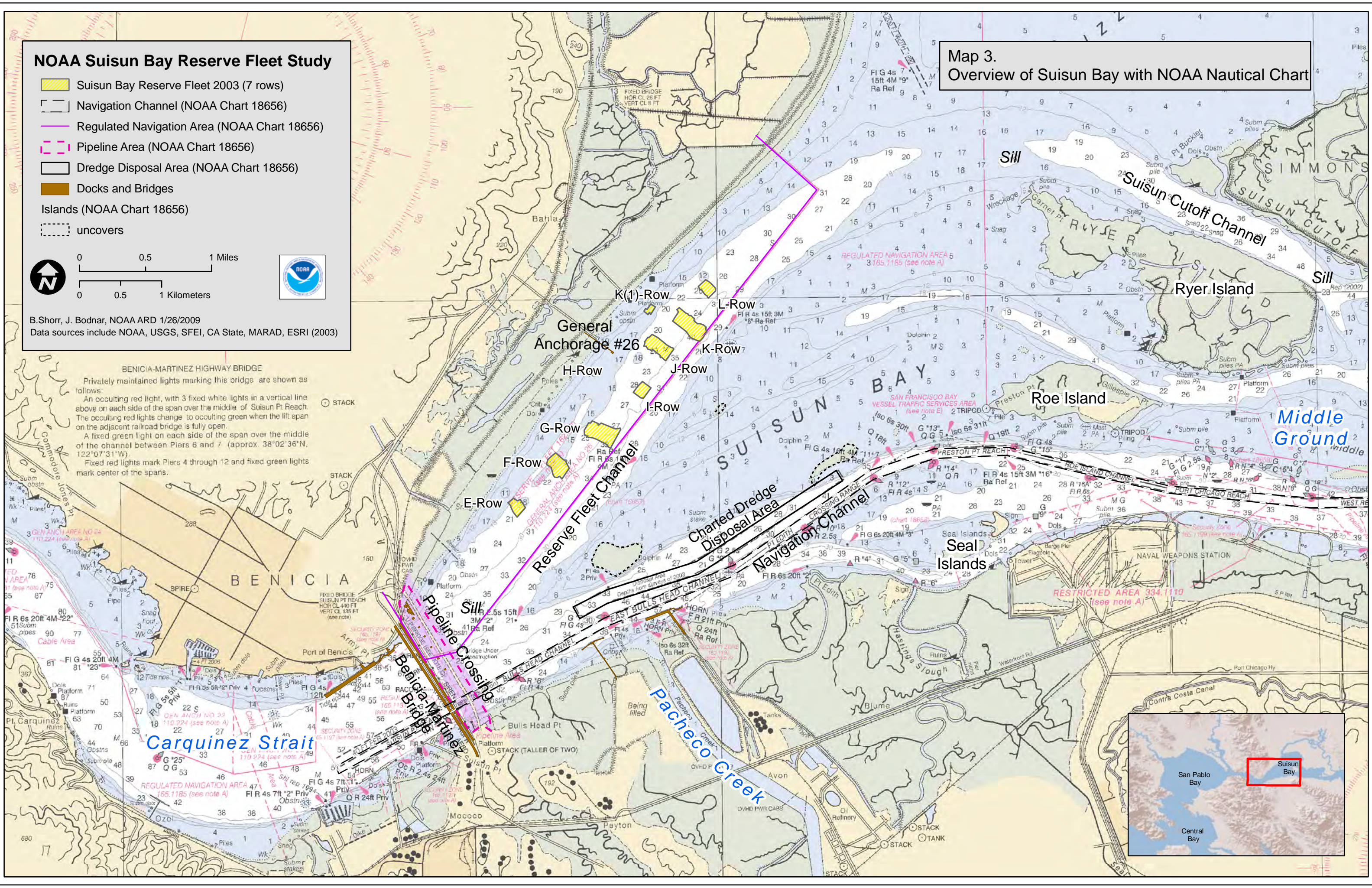
NOAA Suisun Bay Reserve Fleet Study

-  Suisun Bay Reserve Fleet 2003 (7 rows)
-  Navigation Channel (NOAA Chart 18656)
-  Regulated Navigation Area (NOAA Chart 18656)
-  Pipeline Area (NOAA Chart 18656)
-  Dredge Disposal Area (NOAA Chart 18656)
-  Docks and Bridges
-  Islands (NOAA Chart 18656)
-  uncovers



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
 Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

Map 3.
 Overview of Suisun Bay with NOAA Nautical Chart



BENICIA-MARTINEZ HIGHWAY BRIDGE
 Privately maintained lights marking this bridge are shown as follows:
 An occulting red light, with 3 fixed white lights in a vertical line above on each side of the span over the middle of Suisun Pt Reach. The occulting red lights change to occulting green when the lift span on the adjacent railroad bridge is fully open.
 A fixed green light on each side of the span over the middle of the channel between Piers 6 and 7 (approx. 38°02'36"N, 122°07'31"W).
 Fixed red lights mark Piers 4 through 12 and fixed green lights mark center of the spans.



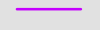



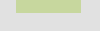


Carquinez Strait

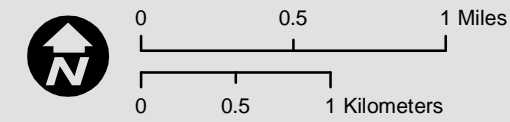
Pacheco Creek

Middle Ground

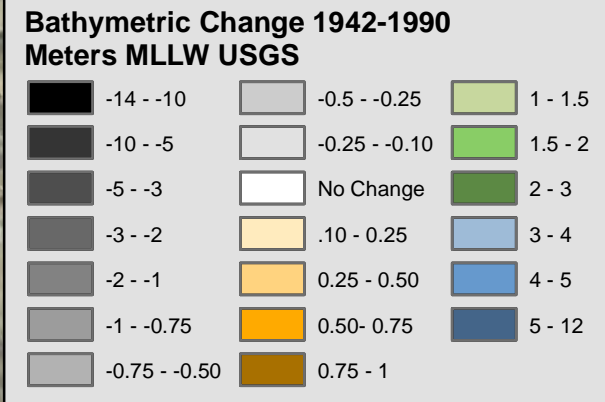


NOAA Suisun Bay Reserve Fleet Study

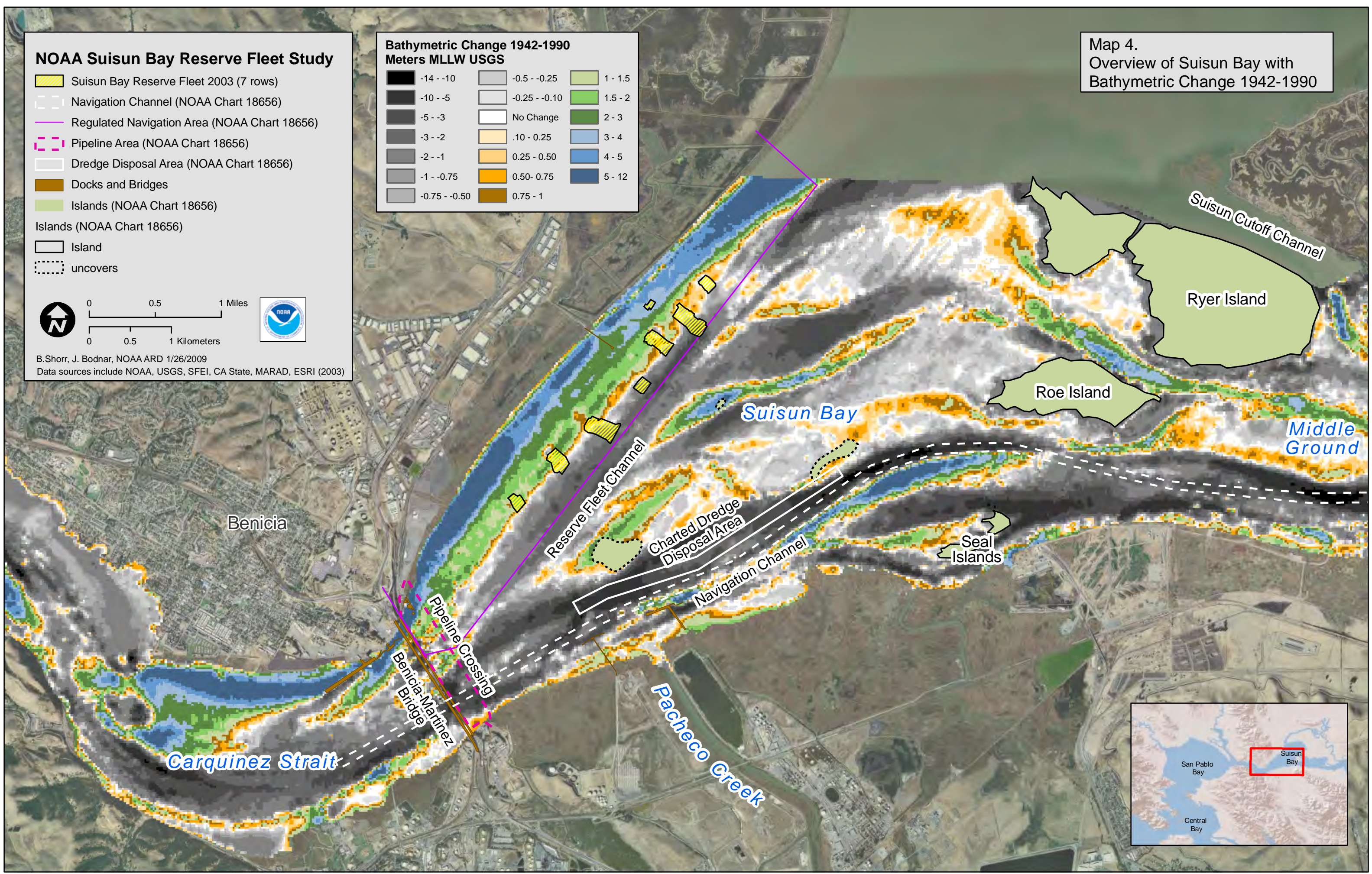
-  Suisun Bay Reserve Fleet 2003 (7 rows)
-  Navigation Channel (NOAA Chart 18656)
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-  Dredge Disposal Area (NOAA Chart 18656)
-  Docks and Bridges
-  Islands (NOAA Chart 18656)
- Islands (NOAA Chart 18656)
-  Island
-  uncovers



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

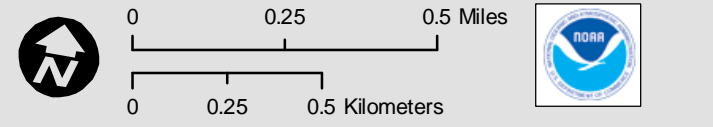


Map 4.
Overview of Suisun Bay with
Bathymetric Change 1942-1990

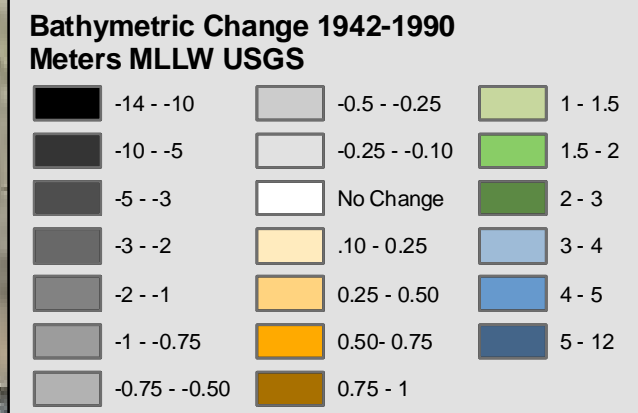


NOAA Suisun Bay Reserve Fleet Study

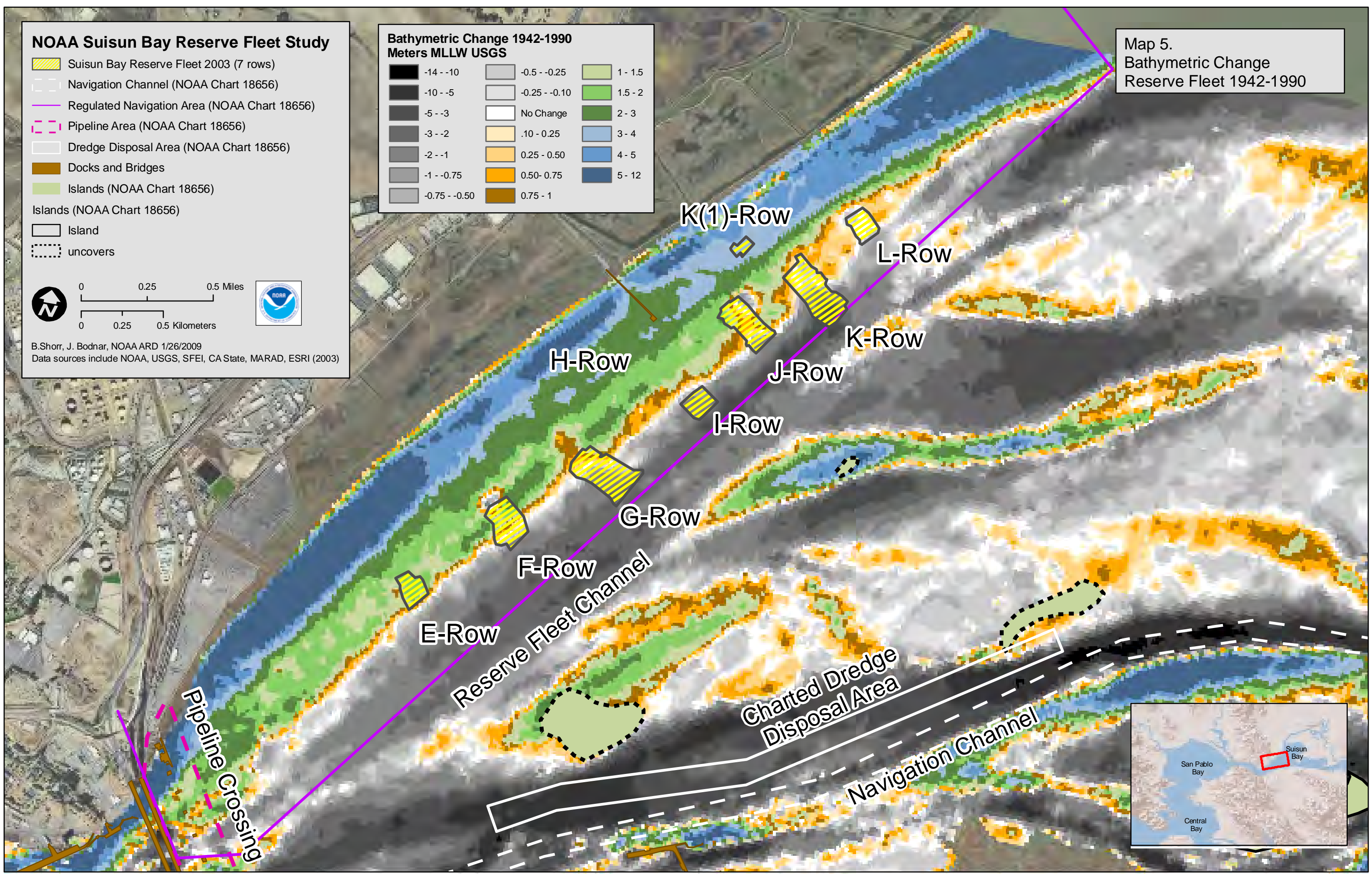
-  Suisun Bay Reserve Fleet 2003 (7 rows)
-  Navigation Channel (NOAA Chart 18656)
-  Regulated Navigation Area (NOAA Chart 18656)
-  Pipeline Area (NOAA Chart 18656)
-  Dredge Disposal Area (NOAA Chart 18656)
-  Docks and Bridges
-  Islands (NOAA Chart 18656)
- Islands (NOAA Chart 18656)
 -  Island
 -  uncovers




B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

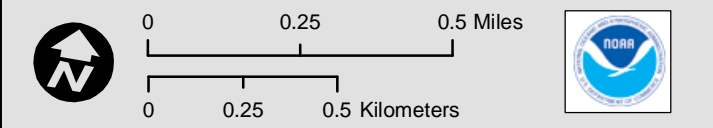


Map 5.
Bathymetric Change
Reserve Fleet 1942-1990

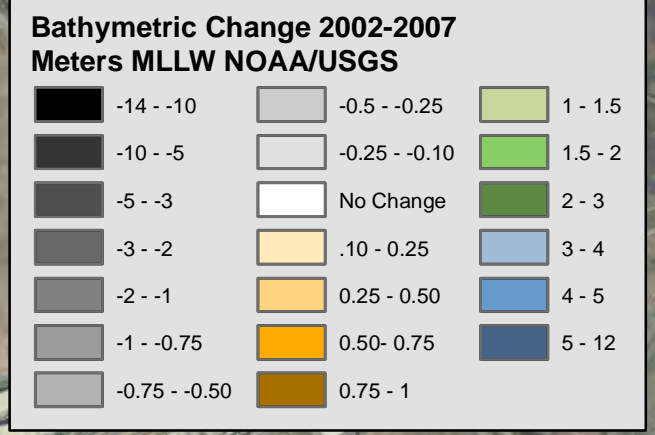


NOAA Suisun Bay Reserve Fleet Study

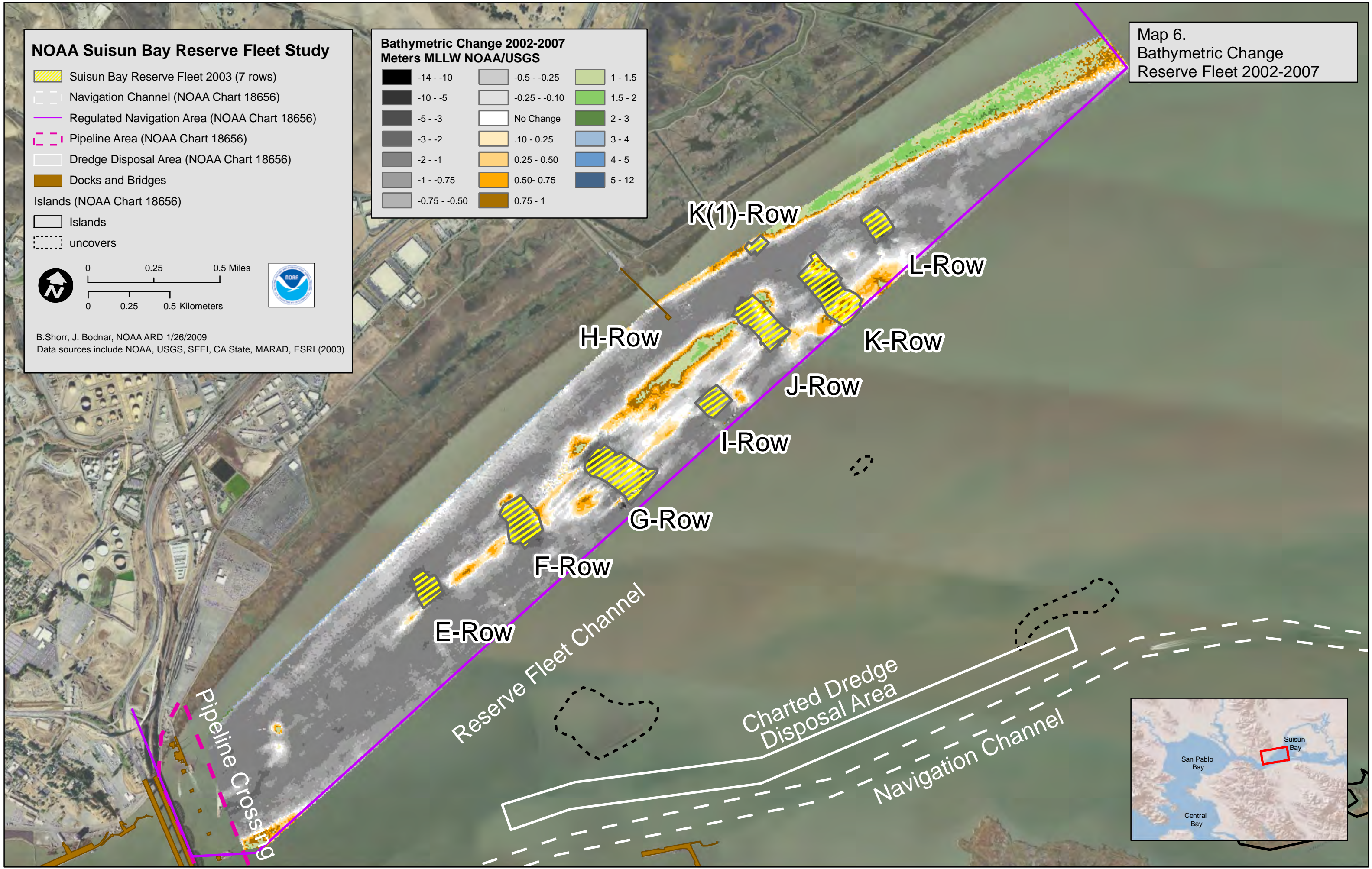
-  Suisun Bay Reserve Fleet 2003 (7 rows)
-  Navigation Channel (NOAA Chart 18656)
-  Regulated Navigation Area (NOAA Chart 18656)
-  Pipeline Area (NOAA Chart 18656)
-  Dredge Disposal Area (NOAA Chart 18656)
-  Docks and Bridges
- Islands (NOAA Chart 18656)
-  Islands
-  uncovers



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)



Map 6.
Bathymetric Change
Reserve Fleet 2002-2007



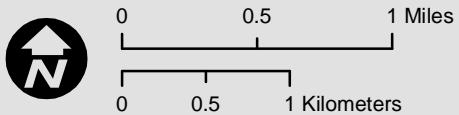
NOAA Suisun Bay Reserve Fleet Study

Sampling Stations

- + Surface Sediment
- + Surface and Subsurface Sediment
- + Subsurface Sediment
- + Surface Sediment; Mytilus
- + Surface and Subsurface Sediment; Mytilus
- + Surface Sediment and Corbula
- + Corbula
- + + + Surface Sediment; Mytilus; Corbula

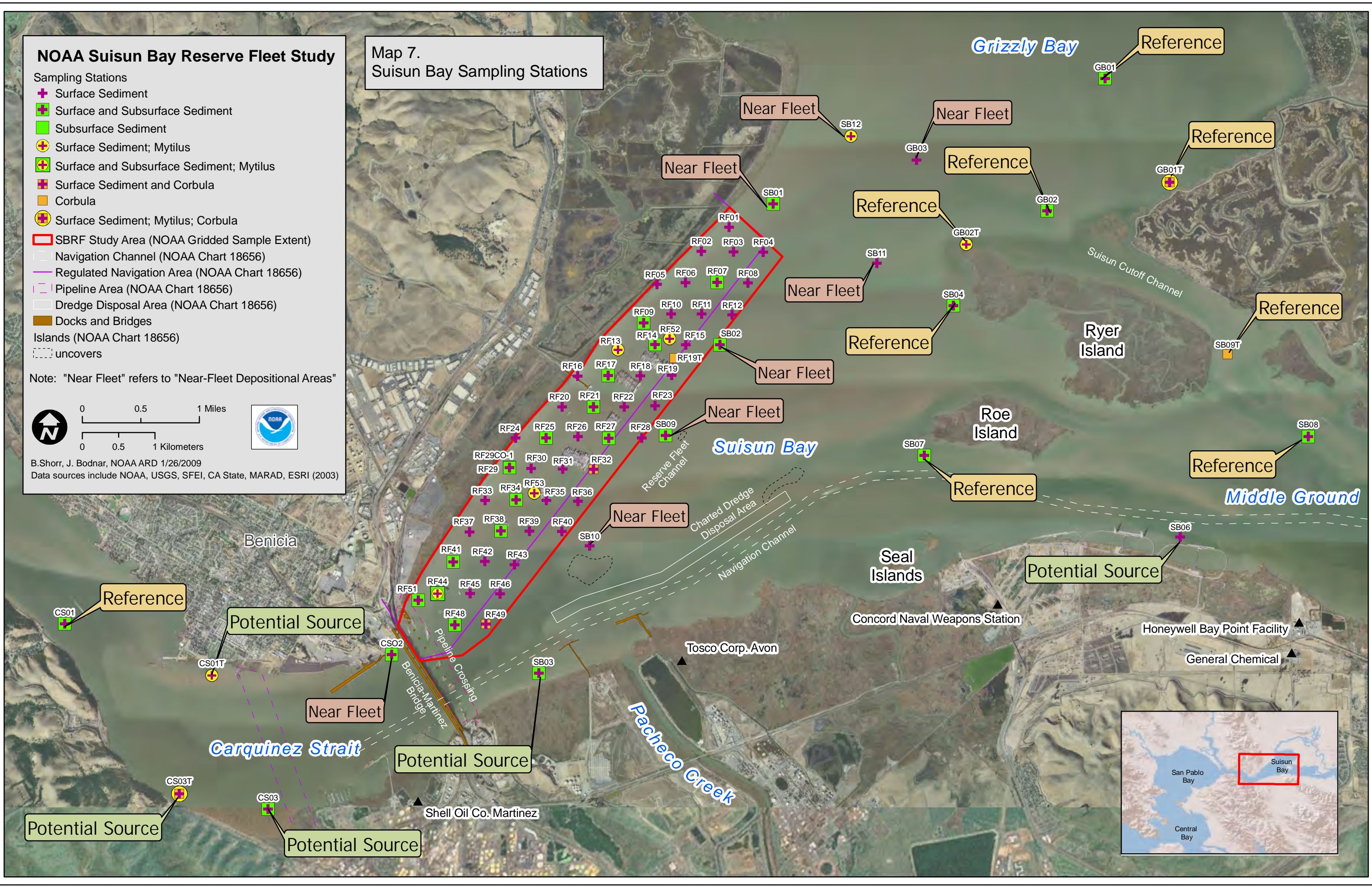
- SBRF Study Area (NOAA Gridded Sample Extent)
- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18656)
- Pipeline Area (NOAA Chart 18656)
- Dredge Disposal Area (NOAA Chart 18656)
- Docks and Bridges
- Islands (NOAA Chart 18656)
- uncovers

Note: "Near Fleet" refers to "Near-Fleet Depositional Areas"



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

Map 7.
Suisun Bay Sampling Stations



NOAA Suisun Bay Reserve Fleet Study

Sampling Stations

- + Surface Sediment
- + Surface and Subsurface Sediment
- Subsurface Sediment
- + Surface Sediment; Mytilus
- + Surface and Subsurface Sediment; Mytilus
- + Surface Sediment and Corbula
- Corbula
- + Surface Sediment; Mytilus; Corbula

SBRF Study Area (NOAA Gridded Sample Extent)

Navigation Channel (NOAA Chart 18656)

Regulated Navigation Area (NOAA Chart 18656)

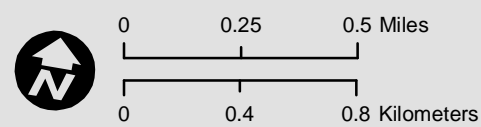
Pipeline Area (NOAA Chart 18656)

Dredge Disposal Area (NOAA Chart 18656)

Docks and Bridges

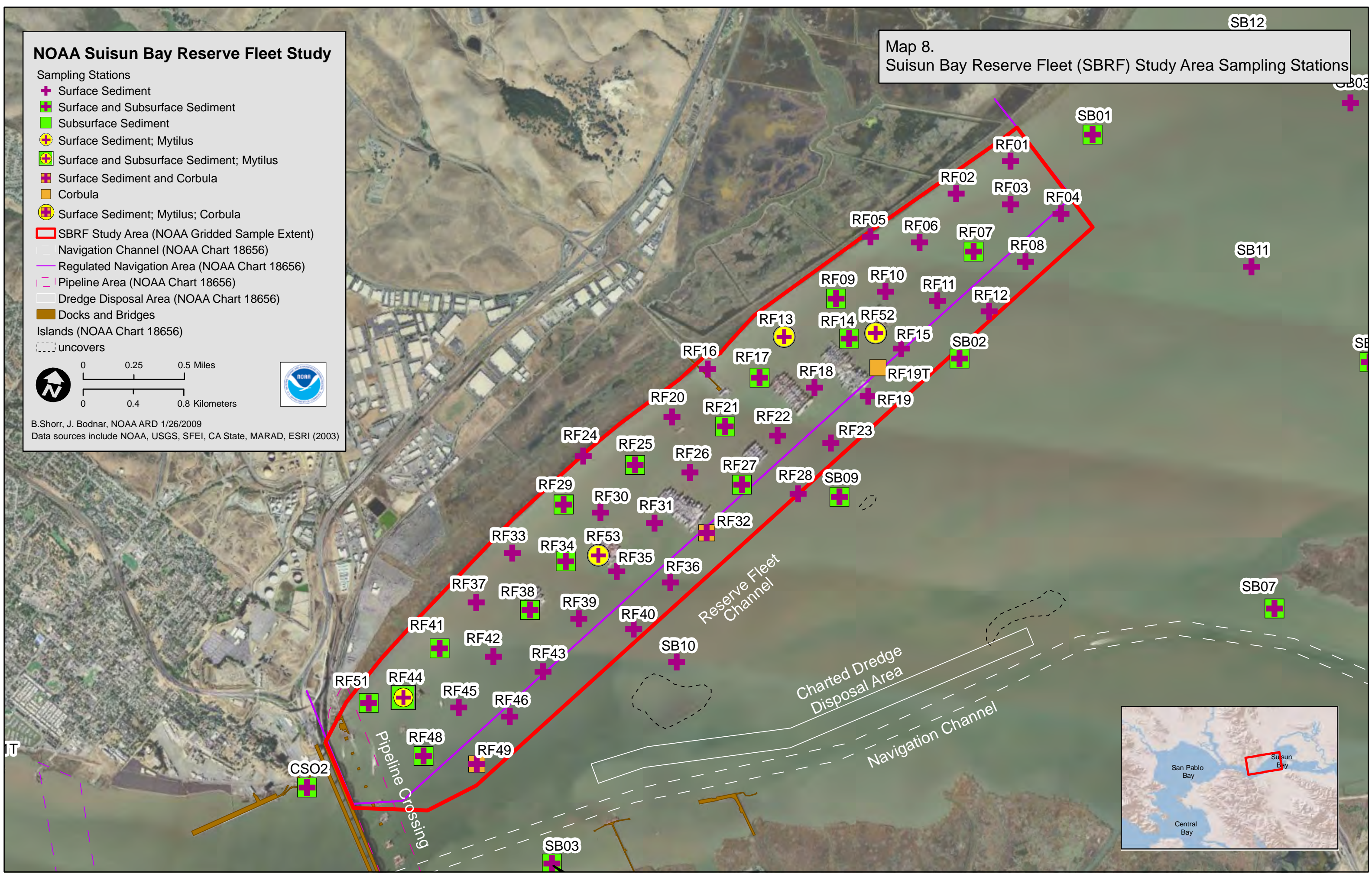
Islands (NOAA Chart 18656)

uncovers



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

Map 8.
Suisun Bay Reserve Fleet (SBRF) Study Area Sampling Stations



NOAA Suisun Bay Reserve Fleet Study

Sampling Stations

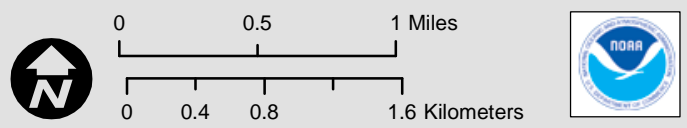
- ⊕ Surface Sediment
- ⊕ Surface and Subsurface Sediment
- ⊕ Subsurface Sediment
- ⊕ Surface Sediment; Mytilus
- ⊕ Surface and Subsurface Sediment; Mytilus
- ⊕ Surface Sediment and Corbula
- ⊕ Corbula
- ⊕ Surface Sediment; Mytilus; Corbula

Full Analysis Suite (PAHs & PCBs)

- ⊕ Surface Sediment
- ⊕ Surface and Subsurface Sediment

- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18656)
- Pipeline Area (NOAA Chart 18656)
- Dredge Disposal Area (NOAA Chart 18656)
- Docks and Bridges
- Islands (NOAA Chart 18656)
- uncovers

Note: Standard analysis suite includes metals, conventionals, butyltins. Full Suite includes Standard plus PAHs and PCBs



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

Map 9.
Overview of Suisun Bay with Sampling Stations and Analysis Suites



NOAA Suisun Bay Reserve Fleet Study

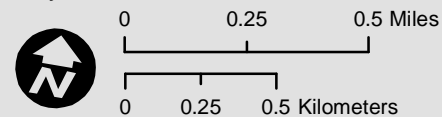
Sampling Stations

- Surface Sediment
- Surface and Subsurface Sediment
- Subsurface Sediment
- Surface Sediment; Mytilus
- Surface and Subsurface Sediment; Mytilus
- Surface Sediment and Corbula
- Corbula
- Surface Sediment; Mytilus; Corbula

Full Analysis Suite (PAHs & PCBs)

- Surface Sediment
- Surface and Subsurface Sediment
- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18656)
- Pipeline Area (NOAA Chart 18656)
- Dredge Disposal Area (NOAA Chart 18656)
- Docks and Bridges
- Islands (NOAA Chart 18656)
- uncovers

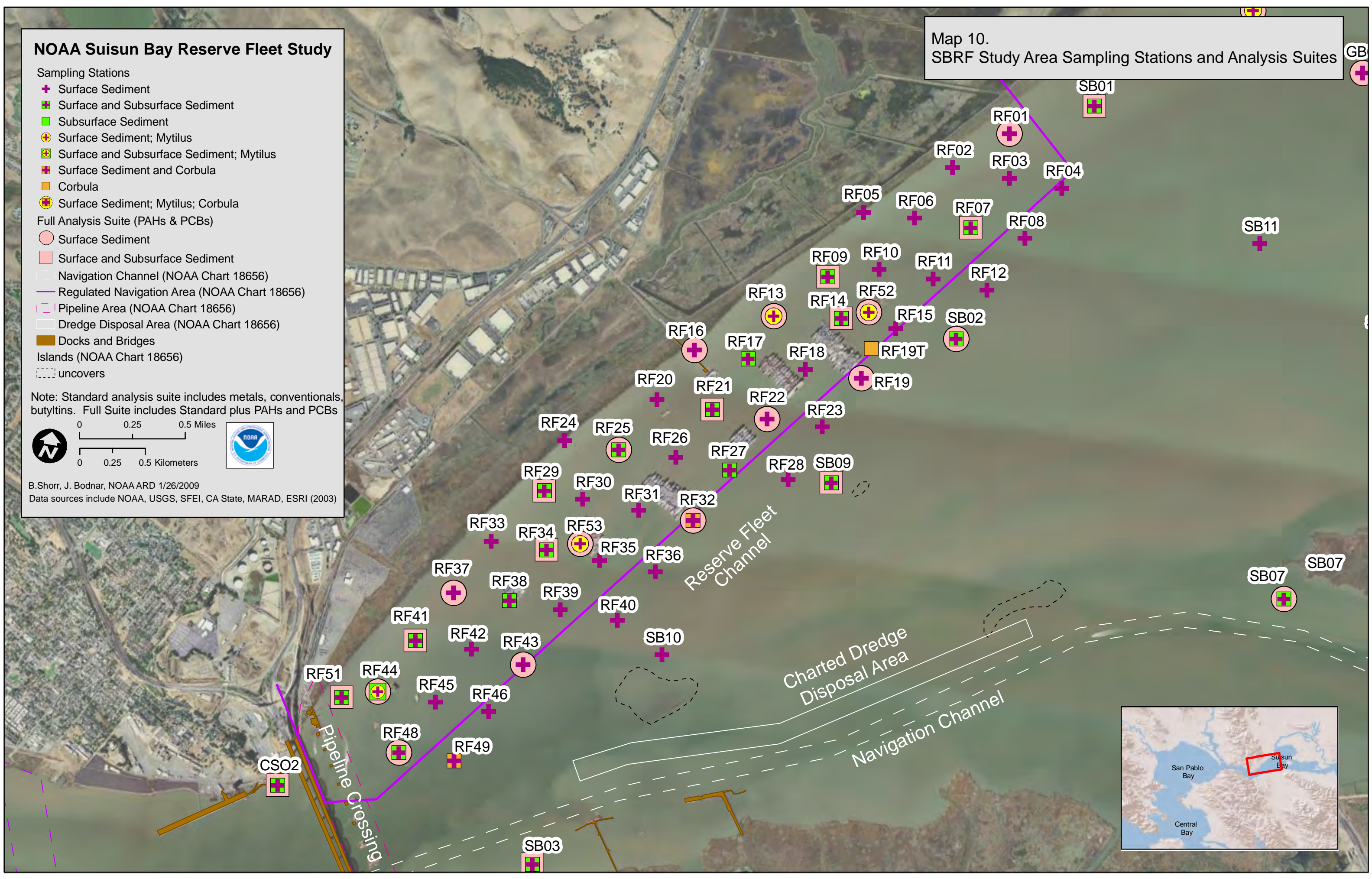
Note: Standard analysis suite includes metals, conventionals, butyltins. Full Suite includes Standard plus PAHs and PCBs



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009

Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

Map 10. SBRF Study Area Sampling Stations and Analysis Suites



NOAA Suisun Bay Reserve Fleet Study

Subsurface Sediment Core Recovery

Maximum Depth Interval

- 0 - 15 cm
- 15 - 30 cm
- 30 - 45 cm
- 45 - 60 cm
- 60 - 90 cm
- 90 - 120 cm
- 120 cm < depth interval < 180 cm
- 180 cm < depth interval < 240 cm

Suisun Bay Reserve Fleet 2003 (7 rows)

Navigation Channel (NOAA Chart 18656)

Regulated Navigation Area (NOAA Chart 18656)

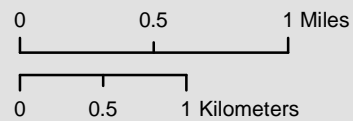
Pipeline Area (NOAA Chart 18656)

Dredge Disposal Area (NOAA Chart 18656)

Docks and Bridges

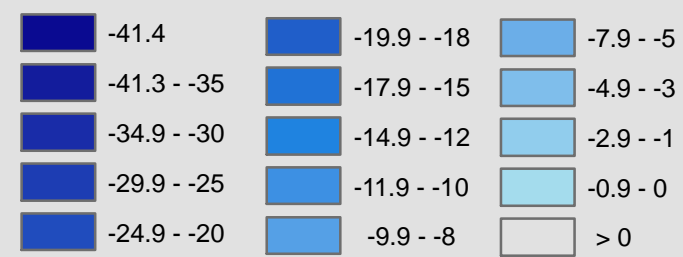
Islands (NOAA Chart 18656)

uncovers

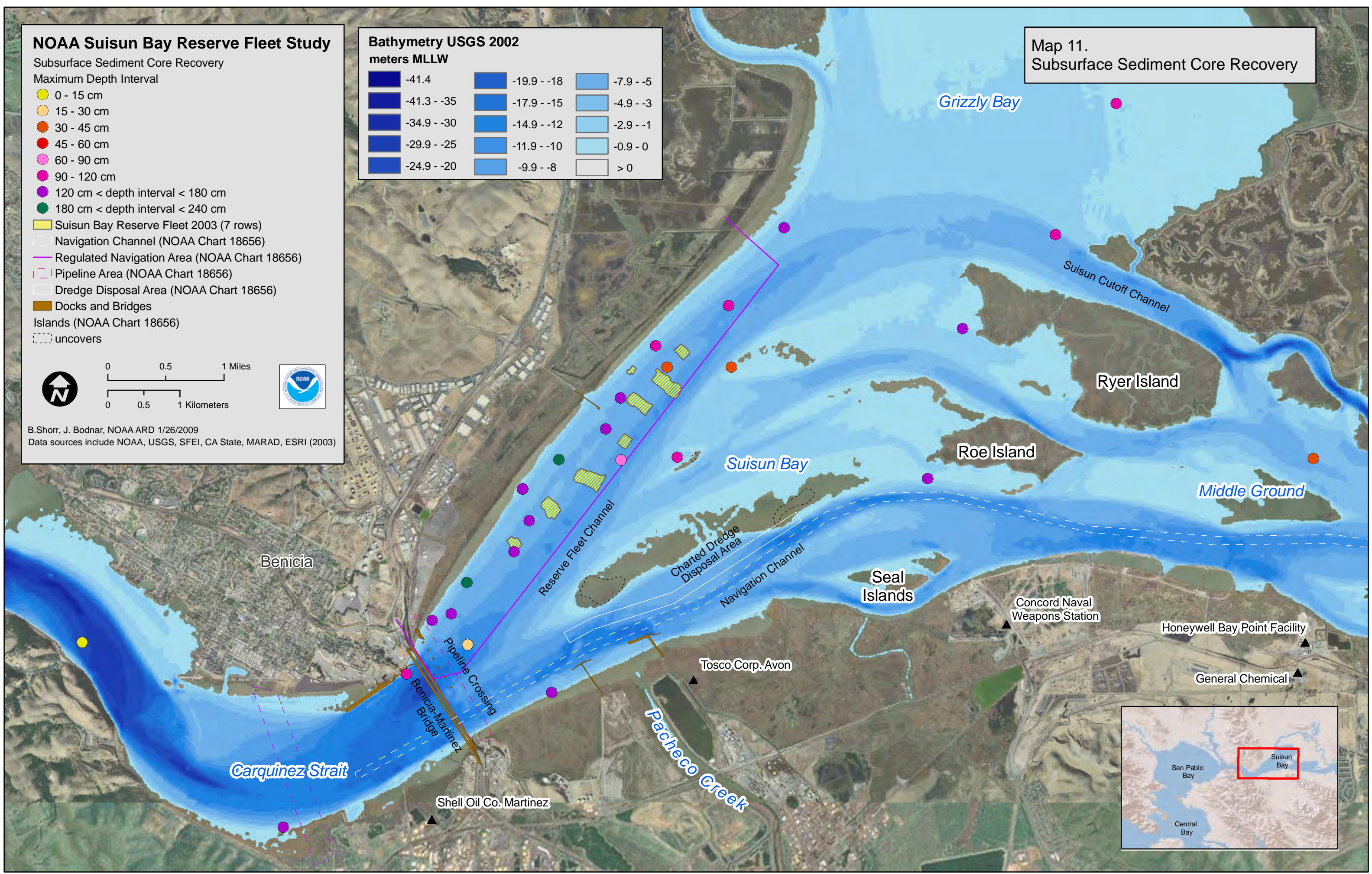


Bathymetry USGS 2002

meters MLLW



Map 11.
Subsurface Sediment Core Recovery



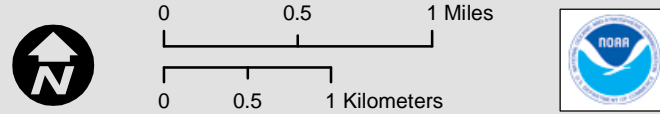
B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

NOAA Suisun Bay Reserve Fleet Study

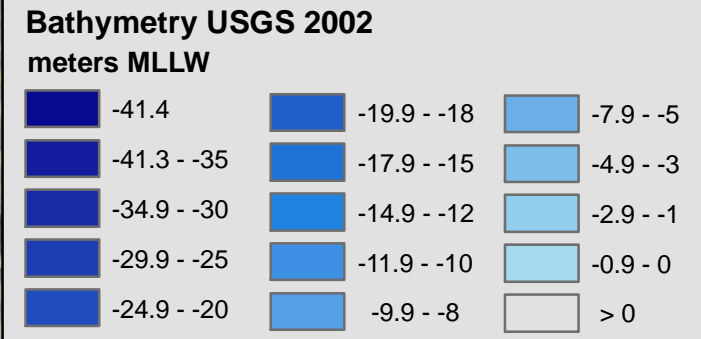
Bivalve Tissue Stations

- *Mytilus* (Deployed June-August 2008)
- *Corbula* (July 2008)
- *Corbula* (September 2008)
- Suisun Bay Reserve Fleet 2003 (7 rows)
- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18656)
- Pipeline Area (NOAA Chart 18656)
- Dredge Disposal Area (NOAA Chart 18656)
- Docks and Bridges
- Islands (NOAA Chart 18656)
- uncovers

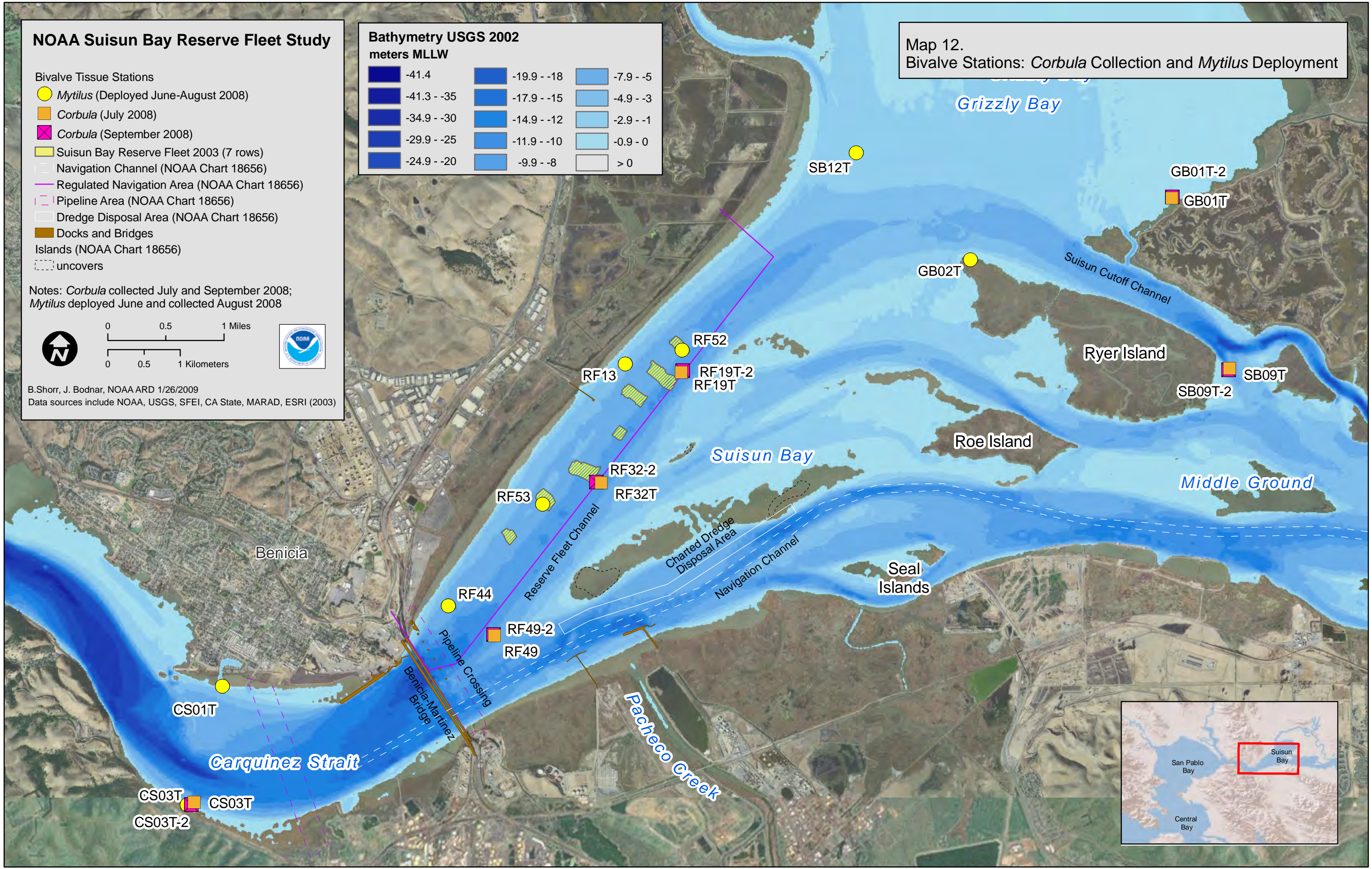
Notes: *Corbula* collected July and September 2008;
Mytilus deployed June and collected August 2008



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
 Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)



Map 12.
 Bivalve Stations: *Corbula* Collection and *Mytilus* Deployment

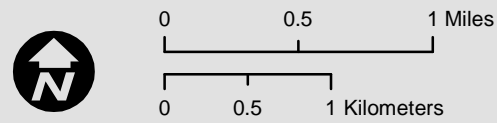


NOAA Suisun Bay Reserve Fleet Study

Surface Sediment Percent Fines (silt+clay)

- 1.5% - 25%
- 25.1% - 50%
- 50.1% - 75%
- 75.1% - 100%

- ▨ Suisun Bay Reserve Fleet 2003 (7 rows)
- ▭ Navigation Channel (NOAA Chart 18656)
- ▭ Regulated Navigation Area (NOAA Chart 18656)
- ▭ Pipeline Area (NOAA Chart 18656)
- ▭ Dredge Disposal Area (NOAA Chart 18656)
- ▭ Docks and Bridges
- ▭ Islands (NOAA Chart 18656)
- ▭ uncovers



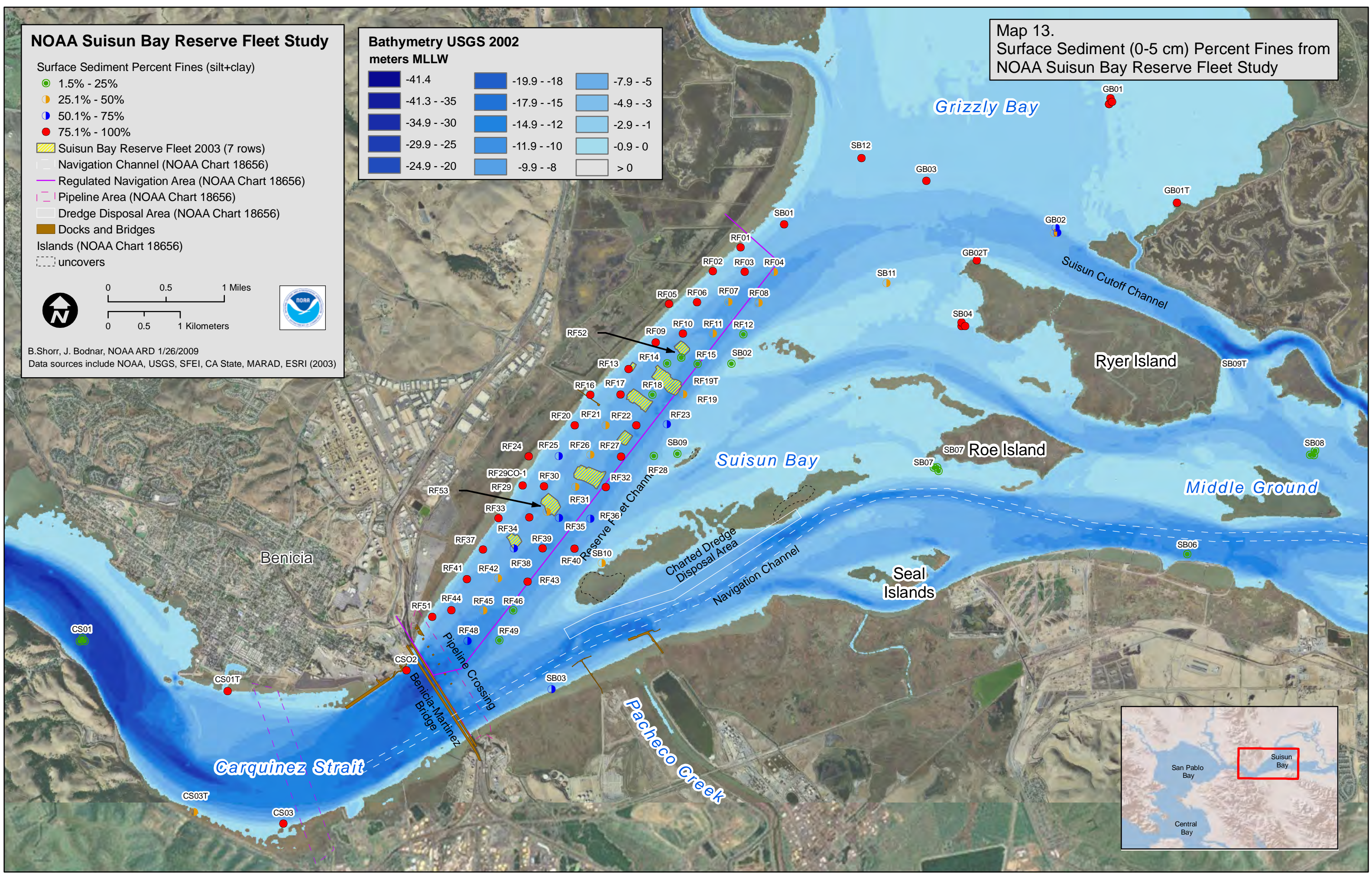
B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
 Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

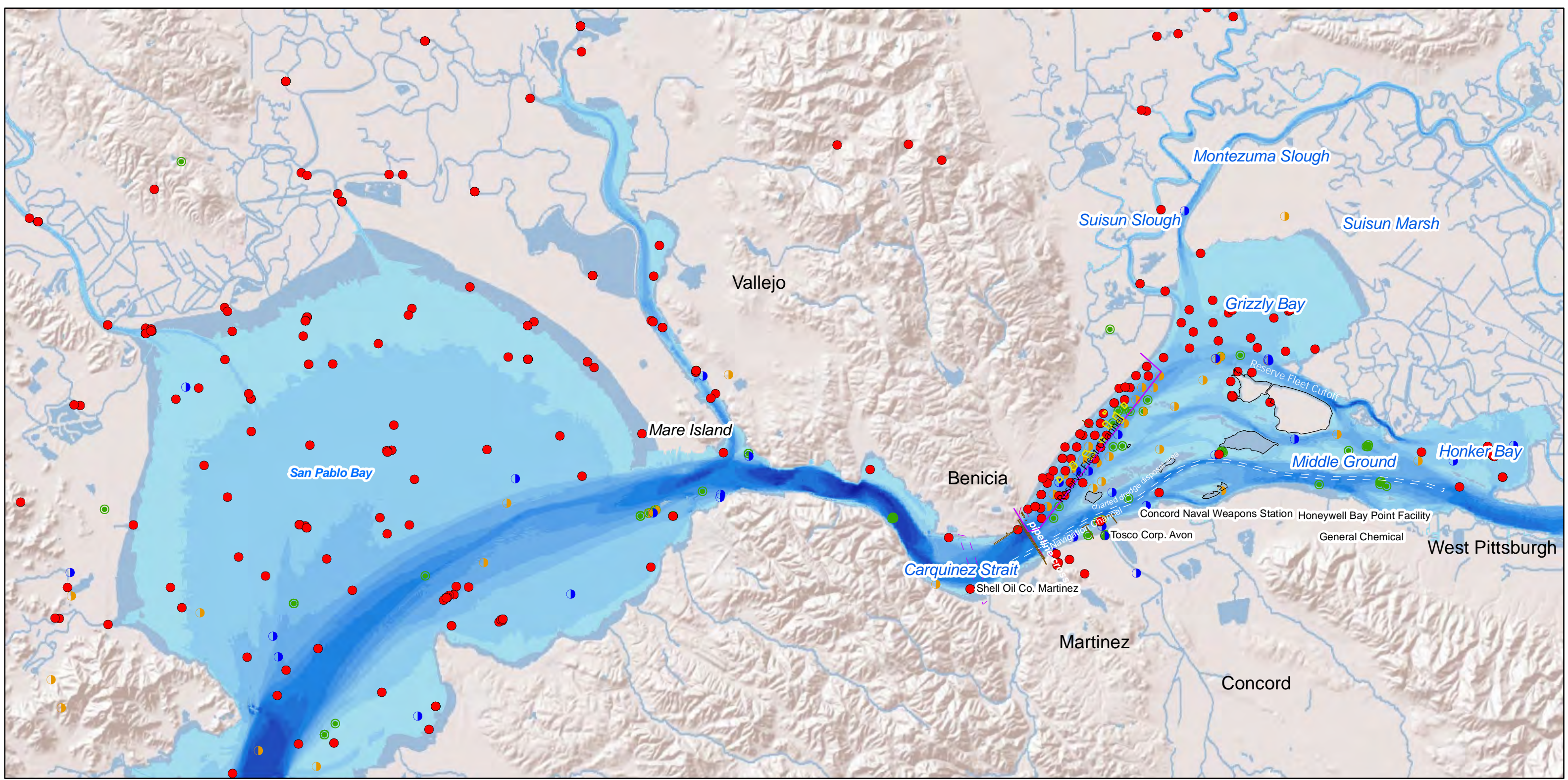
Bathymetry USGS 2002

meters MLLW

-41.4	-19.9 - -18	-7.9 - -5
-41.3 - -35	-17.9 - -15	-4.9 - -3
-34.9 - -30	-14.9 - -12	-2.9 - -1
-29.9 - -25	-11.9 - -10	-0.9 - 0
-24.9 - -20	-9.9 - -8	> 0

Map 13.
 Surface Sediment (0-5 cm) Percent Fines from
 NOAA Suisun Bay Reserve Fleet Study



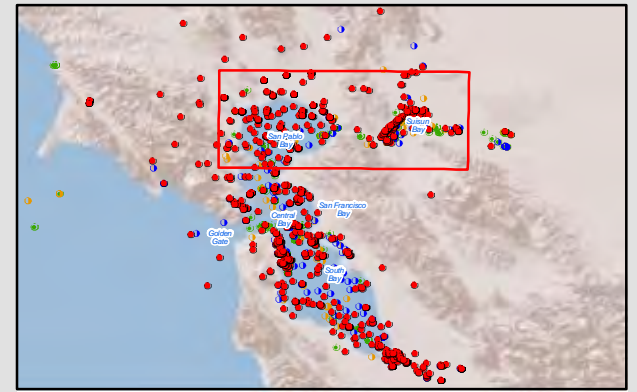
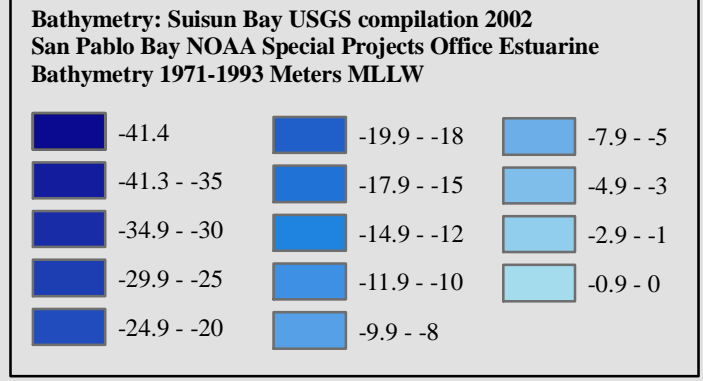


**Map 14. Surface Sediment (0-5 cm)
Percent Fines in Suisun Bay and
San Pablo Bay**



- Surface Sediment**
- Surface Sediment % Fines**
- 0.1% - 25%
 - 25.1% - 50%
 - 50.1% - 75%
 - 75.1% - 100%

- Suisun Bay Reserve Fleet (2003)
- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18652)
- Pipeline Area (NOAA Chart 18656)
- Islands (NOAA Chart 18656)
- Disposal area (NOAA Chart 18656)
- Docks and Bridges



Data sources include NOAA, ESRI (2003)
USGS, SFEI, CA State, MARAD
Contaminant data from MARAD 2006 and NOAA
Query Manager
Northern California including NOAA Suisun Bay
2008 Reserve Fleet Study (update 12/22/2008)
ERL/ERM = Effects Range-Low, Effects Range-
High
NOAA ORR | ARD, B. Shorr 02/02/2009
c:\g\projects\SuisunBay\Suisun_Bay_2009_contaminant.mxd

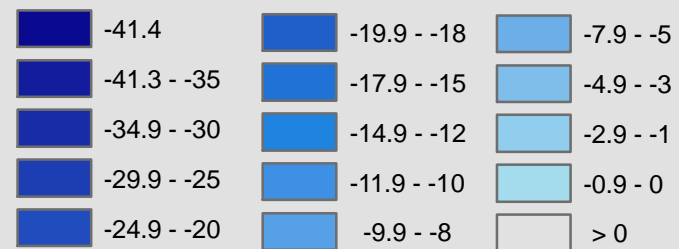
NOAA Suisun Bay Reserve Fleet Study

- Surface Sediment Mercury PPM ERL-ERM
- Non-Detect (DL<ERL)
 - Non-Detect (ERL<DL<ERM)
 - Non-Detect (DL>ERM)
 - < ERL (0.15)
 - ERL - ERM
 - > ERM (0.71)
- ▨ Suisun Bay Reserve Fleet 2003 (7 rows)
 - ▭ Navigation Channel (NOAA Chart 18656)
 - ▭ Regulated Navigation Area (NOAA Chart 18656)
 - ▭ Pipeline Area (NOAA Chart 18656)
 - ▭ Dredge Disposal Area (NOAA Chart 18656)
 - ▭ Docks and Bridges
 - ▭ Islands (NOAA Chart 18656)
 - ▭ uncovers

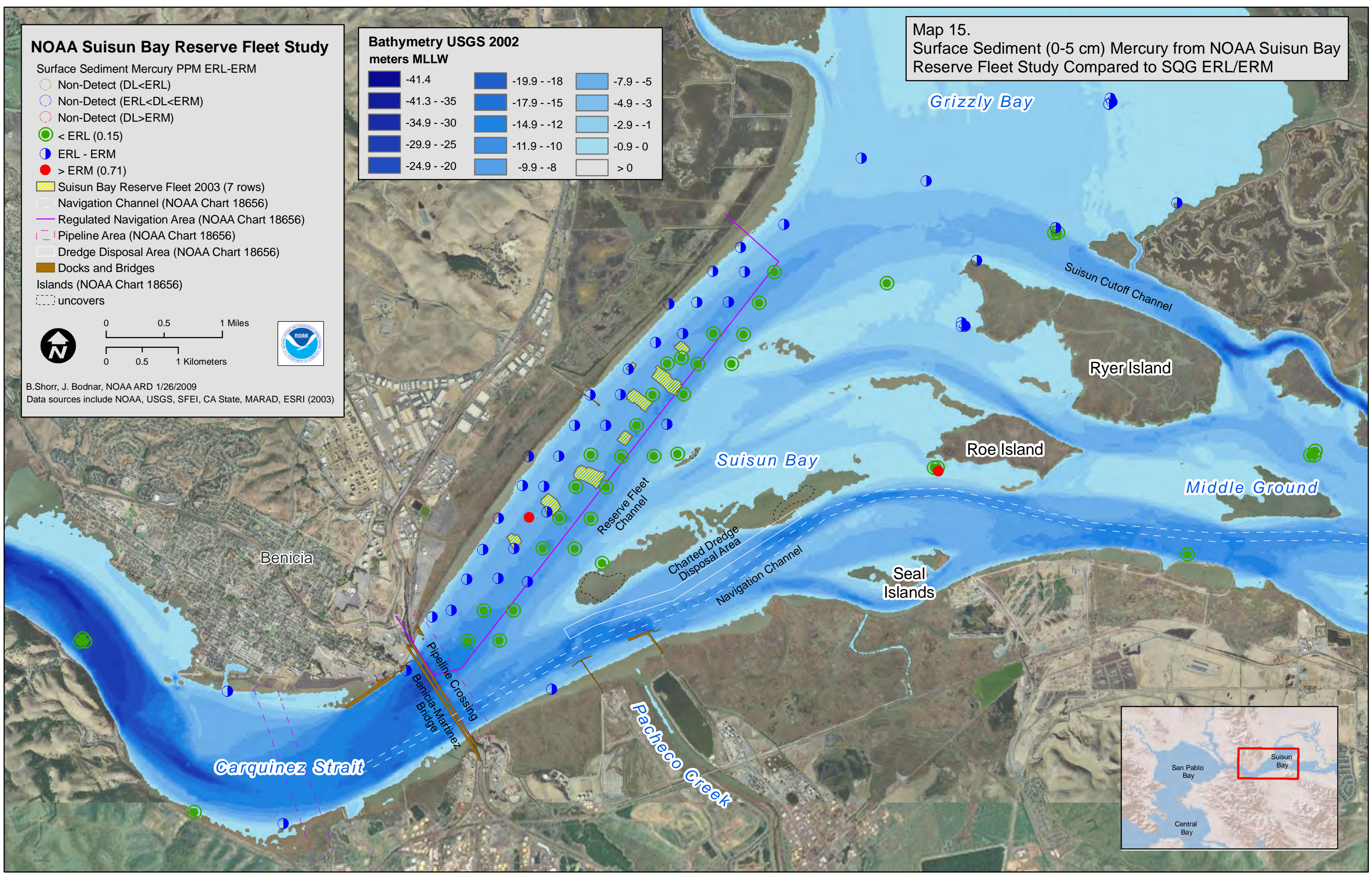


Bathymetry USGS 2002

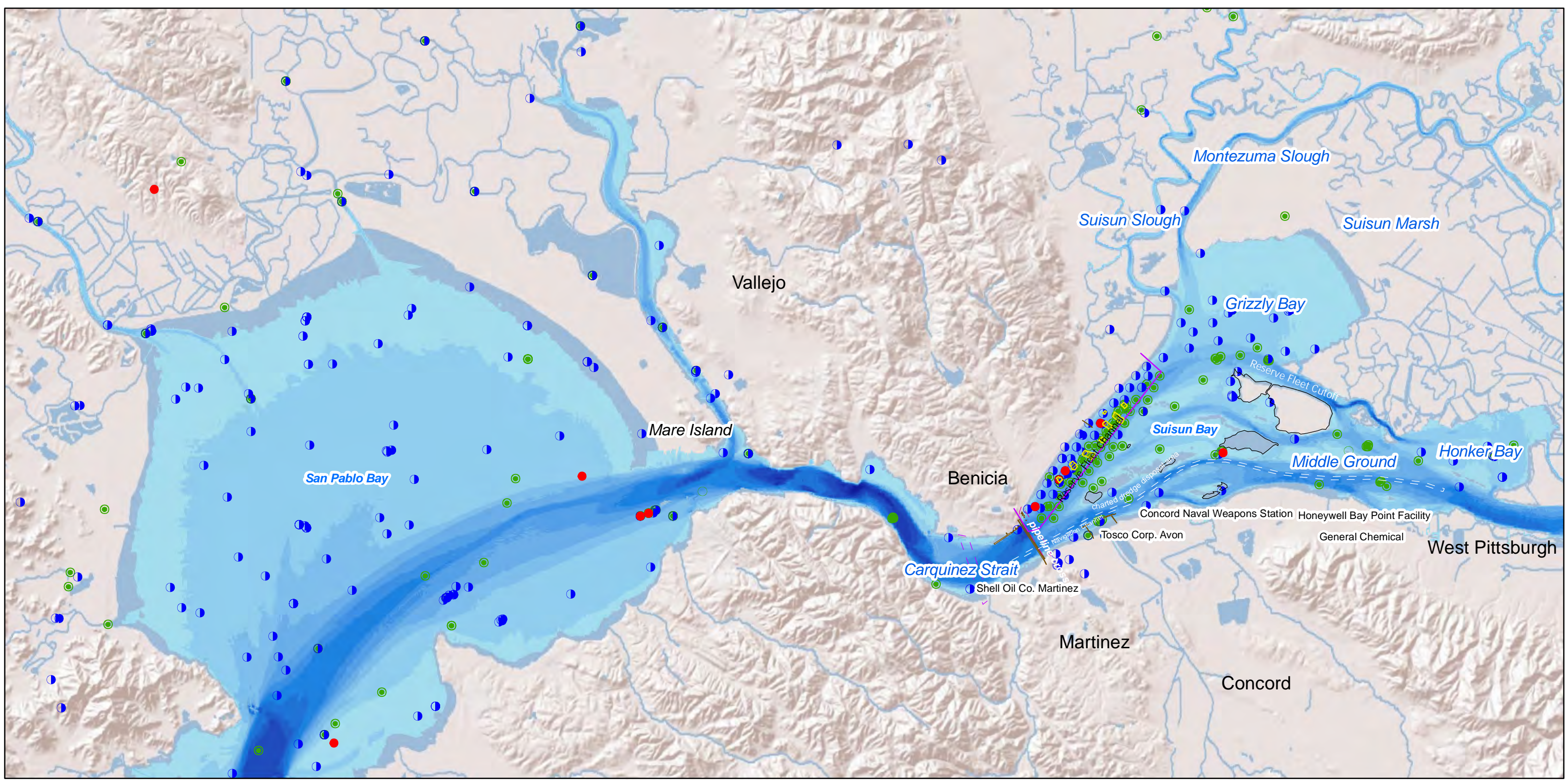
meters MLLW



Map 15.
Surface Sediment (0-5 cm) Mercury from NOAA Suisun Bay Reserve Fleet Study Compared to SQG ERL/ERM



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)



Map 16. Surface Sediment (0-5 cm) Mercury in Suisun Bay and San Pablo Bay Compared to SQG ERL/ERM

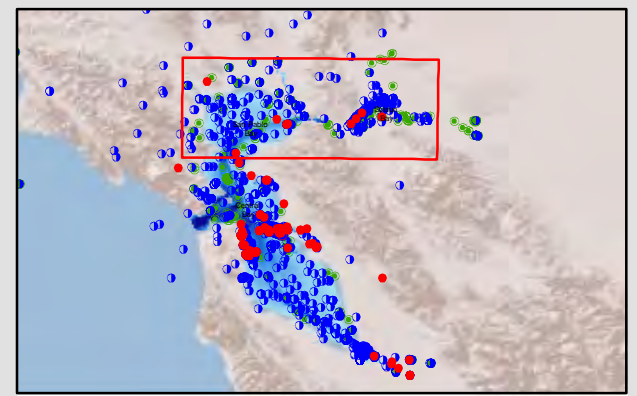
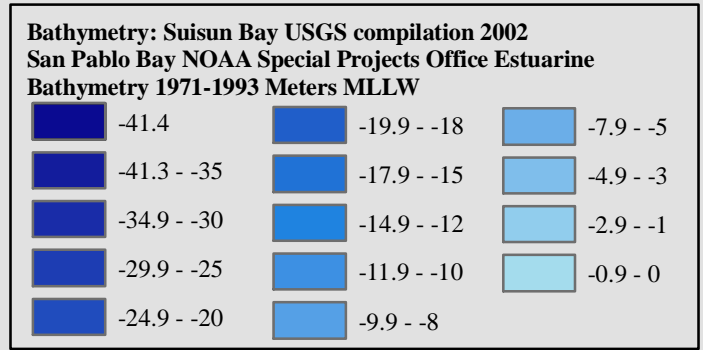


Surface Sediment

Mercury PPM ERL-ERM

- Non-Detect (DL < ERL)
- Non-Detect (ERL < DL < ERM)
- Non-Detect (DL > ERM)
- < ERL (0.15)
- ERL - ERM
- > ERM (0.71)

- ▨ Suisun Bay Reserve Fleet (2003)
- ▭ Navigation Channel (NOAA Chart 18656)
- ▭ Regulated Navigation Area (NOAA Chart 18652)
- ▭ Pipeline Area (NOAA Chart 18656)
- ▭ Islands (NOAA Chart 18656)
- ▭ Dredged disposal area (NOAA Chart 18656)
- ▭ Docks and Bridges



Data sources include NOAA, ESRI (2003)
USGS, SFEL, CA State, MARAD
Contaminant data from MARAD 2006 and NOAA Query Manager
Northern California including NOAA Suisun Bay 2008 Reserve
Fleet Study (update 12/22/2008)
ERL/ERM = Effects Range-Low, Effects Range-Medium

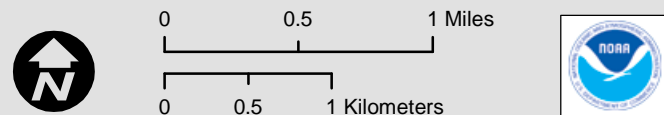
NOAA ORAR | ARD_BDS 01/23/2009
c:\gis\projects\SuisunBay\Suisun_Bay_2009_contaminant.mxd

NOAA Suisun Bay Reserve Fleet Study

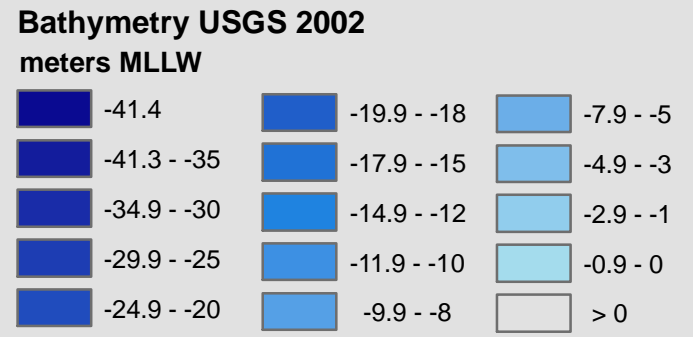
Surface Sediment Lead PPM ERL-ERM

- Non-Detect (DL<ERL)
- Non-Detect (ERL<DL<ERM)
- Non-Detect (DL>ERM)
- < ERL (46.7)
- ERL - ERM
- > ERM (218)

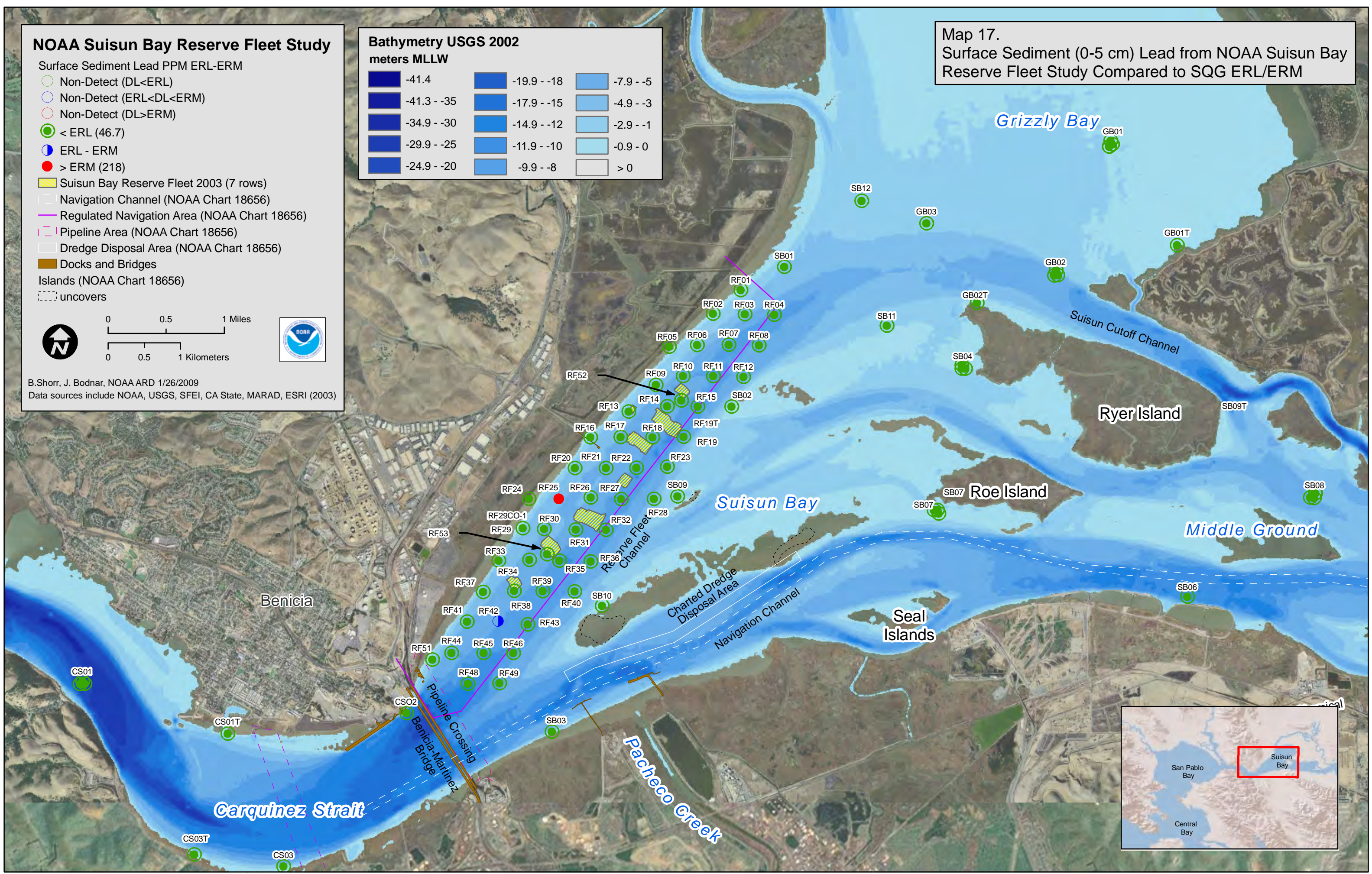
- Suisun Bay Reserve Fleet 2003 (7 rows)
- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18656)
- Pipeline Area (NOAA Chart 18656)
- Dredge Disposal Area (NOAA Chart 18656)
- Docks and Bridges
- Islands (NOAA Chart 18656)
- uncovers

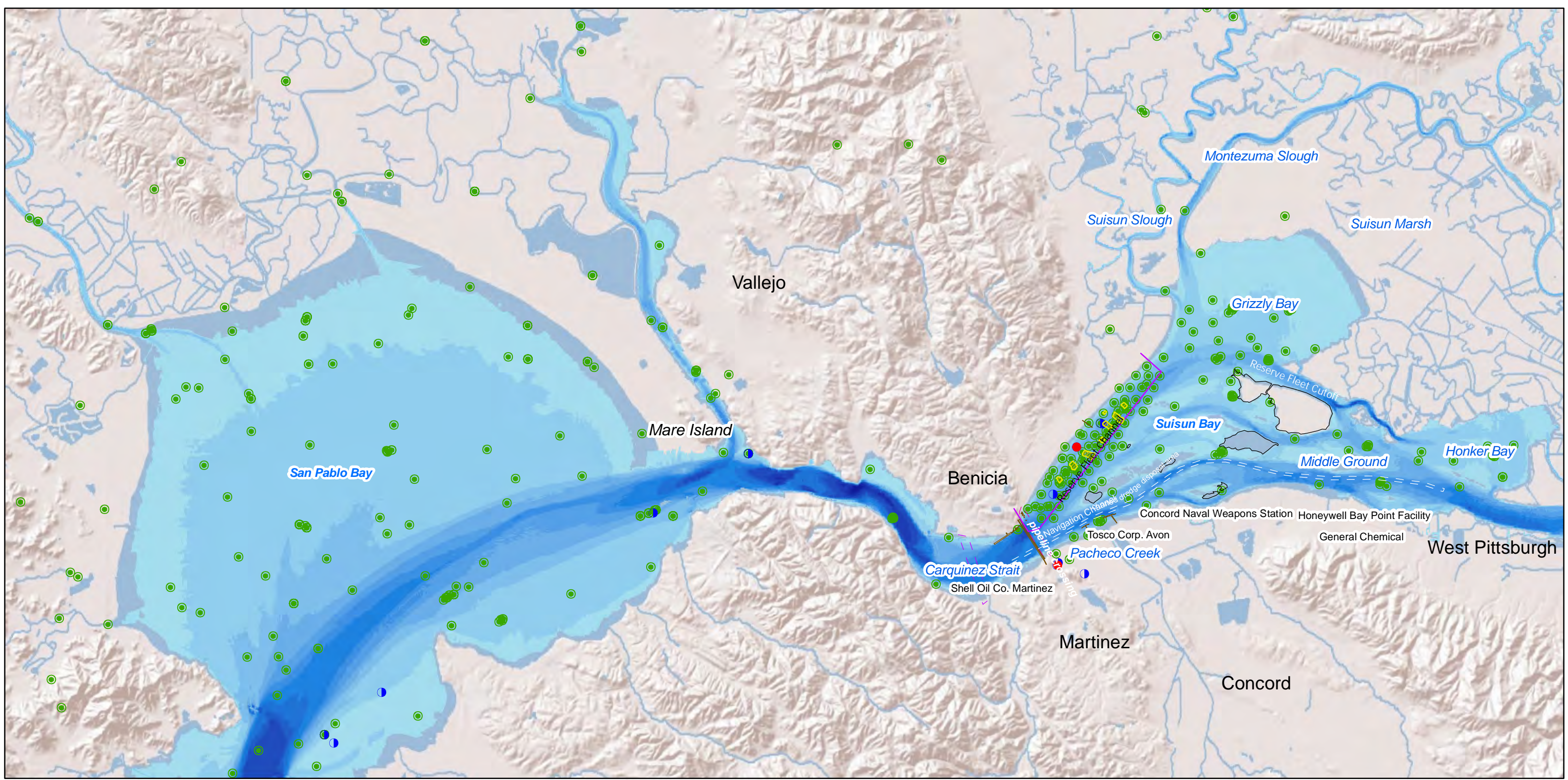


B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

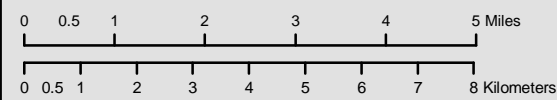


Map 17.
Surface Sediment (0-5 cm) Lead from NOAA Suisun Bay Reserve Fleet Study Compared to SQG ERL/ERM





Map 18. Surface Sediment (0-5 cm) Lead in Suisun Bay and San Pablo Bay Compared to SQG ERL/ERM



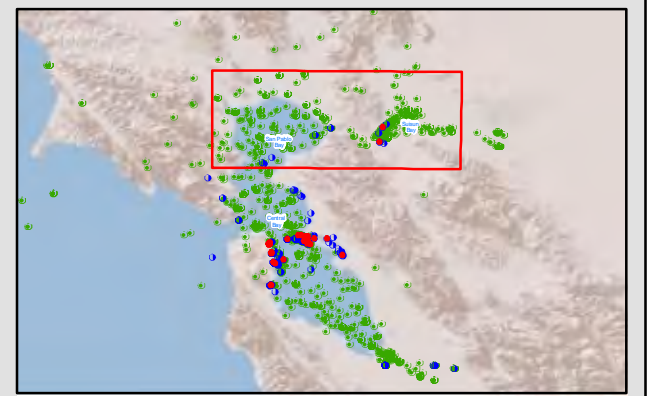
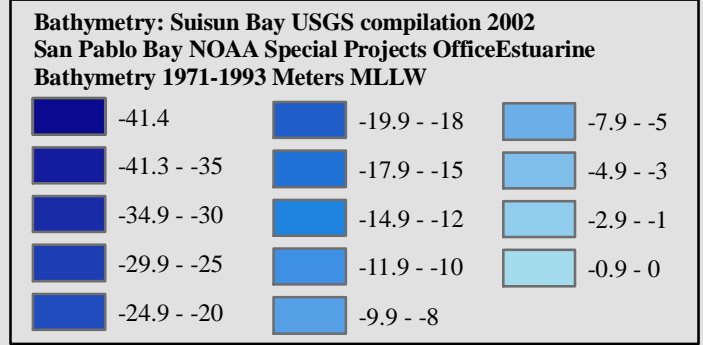
Data sources include NOAA, ESRI (2003), USGS, SFEI, CA State, MARAD. Contaminant data from MARAD 2006 and NOAA Query Manager Northern California including NOAA Suisun Bay 2008 Reserve Fleet Study (update 12/22/2008). ERL/ERM = Effects Range-Low, Effects Range-Medium. NOAA ORAR | ARD, B. Shorr 02/02/2009. c:\gis\projects\SuisunBay\Suisun_Bay_2009_contaminant.mxd

Surface Sediment

Lead PPM ERL-ERM

- Non-Detect (DL < ERL)
- Non-Detect (ERL < DL < ERM)
- Non-Detect (DL > ERM)
- < ERL (46.7)
- ERL - ERM
- > ERM (218)

- Suisun Bay Reserve Fleet (2003)
- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18652)
- Pipeline Area (NOAA Chart 18656)
- Islands (NOAA Chart 18656)
- Dredge disposal area (NOAA Chart 18656)
- Docks and Bridges



NOAA Suisun Bay Reserve Fleet Study

Surface Sediment Copper PPM ERL-ERM

- Non-Detect (DL<ERL)
- Non-Detect (ERL<DL<ERM)
- Non-Detect (DL>ERM)
- < ERL (34)
- ERL - ERM
- > ERM (270)

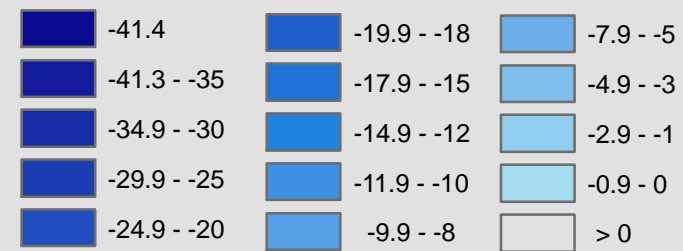
- Suisun Bay Reserve Fleet 2003 (7 rows)
- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18656)
- Pipeline Area (NOAA Chart 18656)
- Dredge Disposal Area (NOAA Chart 18656)
- Docks and Bridges
- Islands (NOAA Chart 18656)
- uncovers



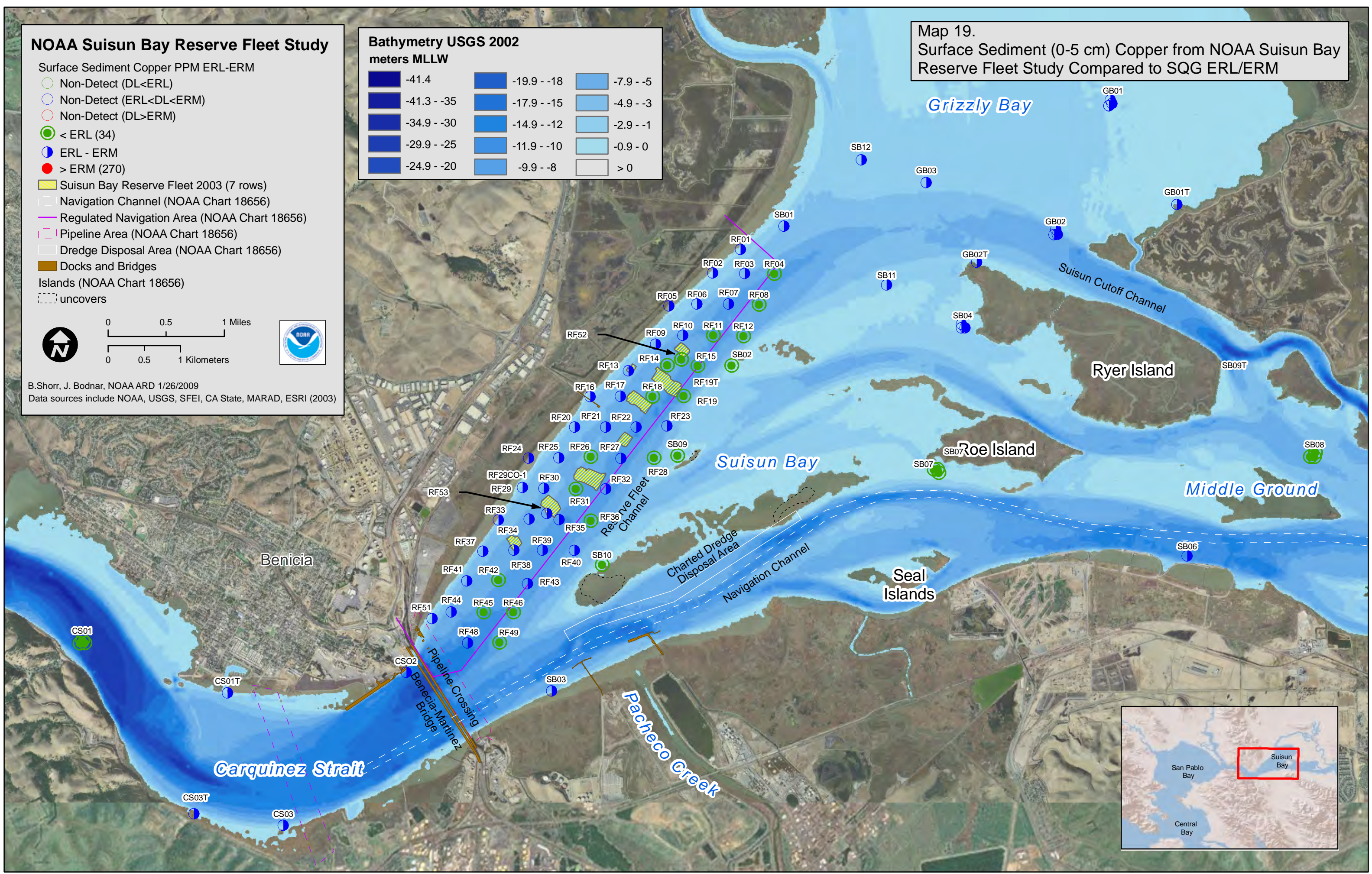
B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

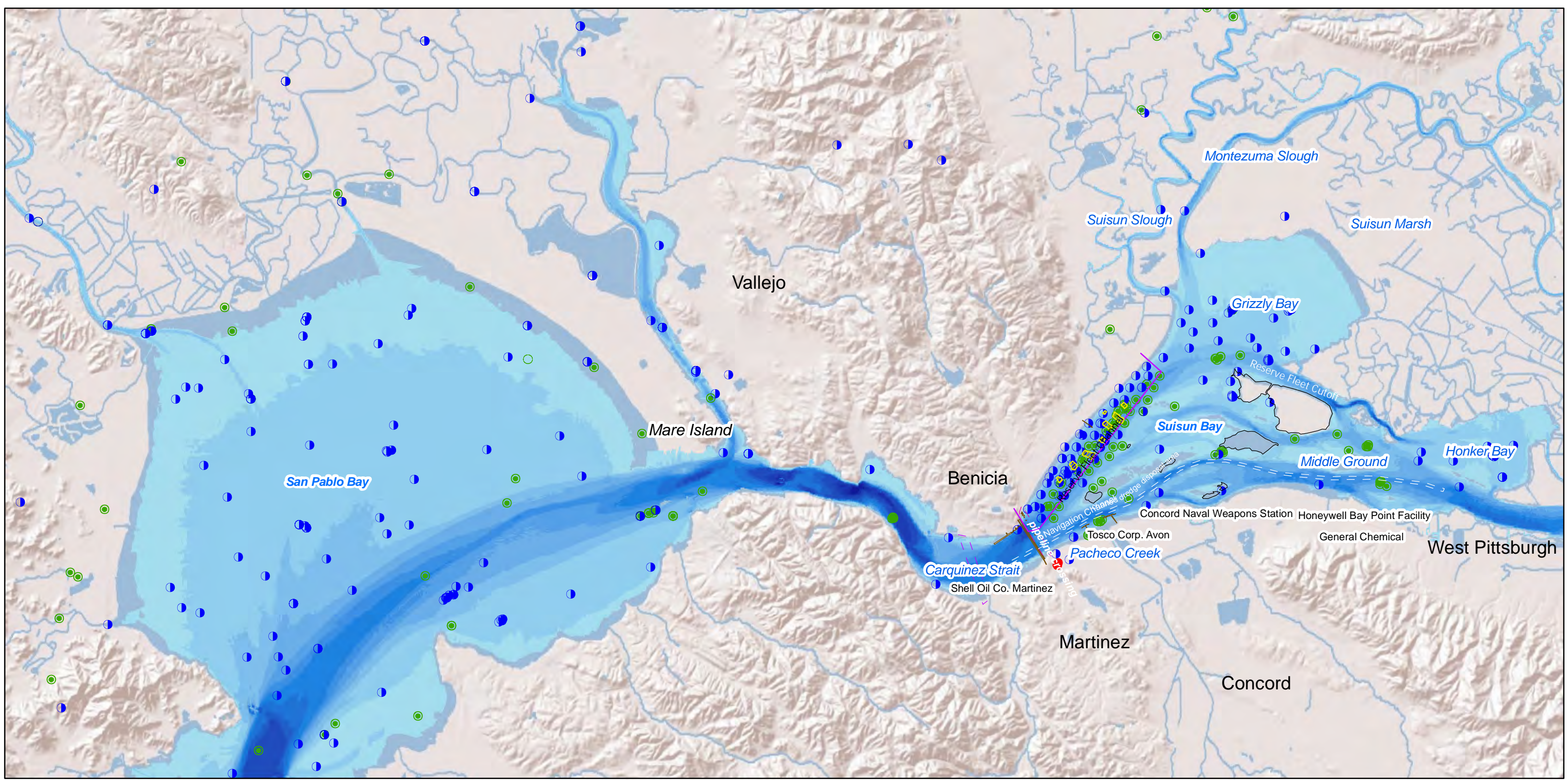
Bathymetry USGS 2002

meters MLLW



Map 19.
Surface Sediment (0-5 cm) Copper from NOAA Suisun Bay Reserve Fleet Study Compared to SQG ERL/ERM





Map 20. Surface Sediment (0-5 cm) Copper in Suisun Bay and San Pablo Bay Compared to SQG ERL/ERM



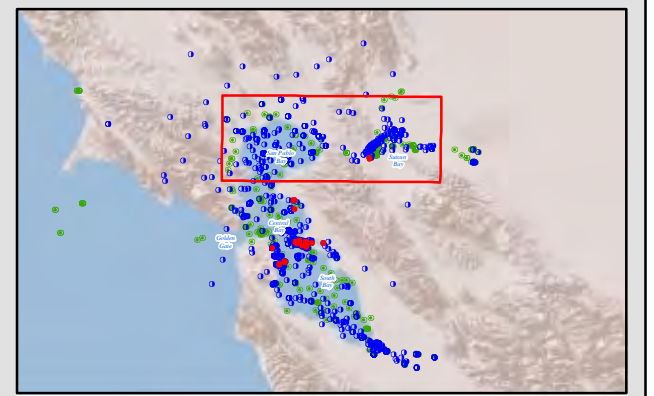
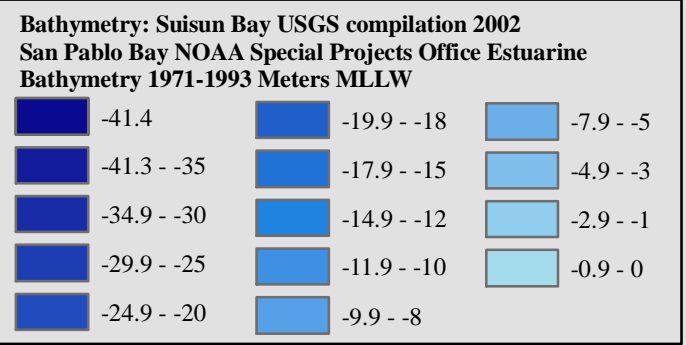
Data sources include NOAA, ESRI (2003), USGS, SFEI, CA State, MARAD. Contaminant data from MARAD 2006 and NOAA Query Manager Northern California including NOAA Suisun Bay 2008 Reserve Fleet Study (update 12/22/2008). ERL/ERM = Effects Range-Low, Effects Range-Medium. NOAA OR&R | ARD B. Sherr 02/02/2009. ©:gis/projects/SuisunBay/Suisun_Bay_2009_contaminant.mxd

Surface Sediment

Copper PPM ERL-ERM

- Non-Detect (DL < ERL)
- Non-Detect (ERL < DL < ERM)
- Non-Detect (DL > ERM)
- < ERL (34)
- ERL - ERM
- > ERM (270)

- ▨ Suisun Bay Reserve Fleet (2003)
- ▭ Navigation Channel (NOAA Chart 18656)
- ▭ Regulated Navigation Area (NOAA Chart 18652)
- ▭ Pipeline Area (NOAA Chart 18656)
- ▭ Islands (NOAA Chart 18656)
- ▭ Dredged material disposal area (NOAA Chart 18656)
- ▭ Docks and Bridges



NOAA Suisun Bay Reserve Fleet Study

Total Chromium PPM ERL-ERM

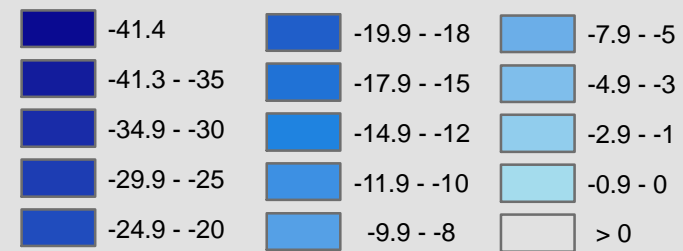
- Non-Detect (DL<ERL)
- Non-Detect (ERL<DL<ERM)
- Non-Detect (DL>ERM)
- < ERL (81)
- ERL - ERM
- > ERM (370)

- ▨ Suisun Bay Reserve Fleet 2003 (7 rows)
- ▭ Navigation Channel (NOAA Chart 18656)
- ▭ Regulated Navigation Area (NOAA Chart 18656)
- ▭ Pipeline Area (NOAA Chart 18656)
- ▭ Dredge Disposal Area (NOAA Chart 18656)
- ▭ Islands (NOAA Chart 18656)
- ▭ uncovers
- ▭ Docks and Bridges

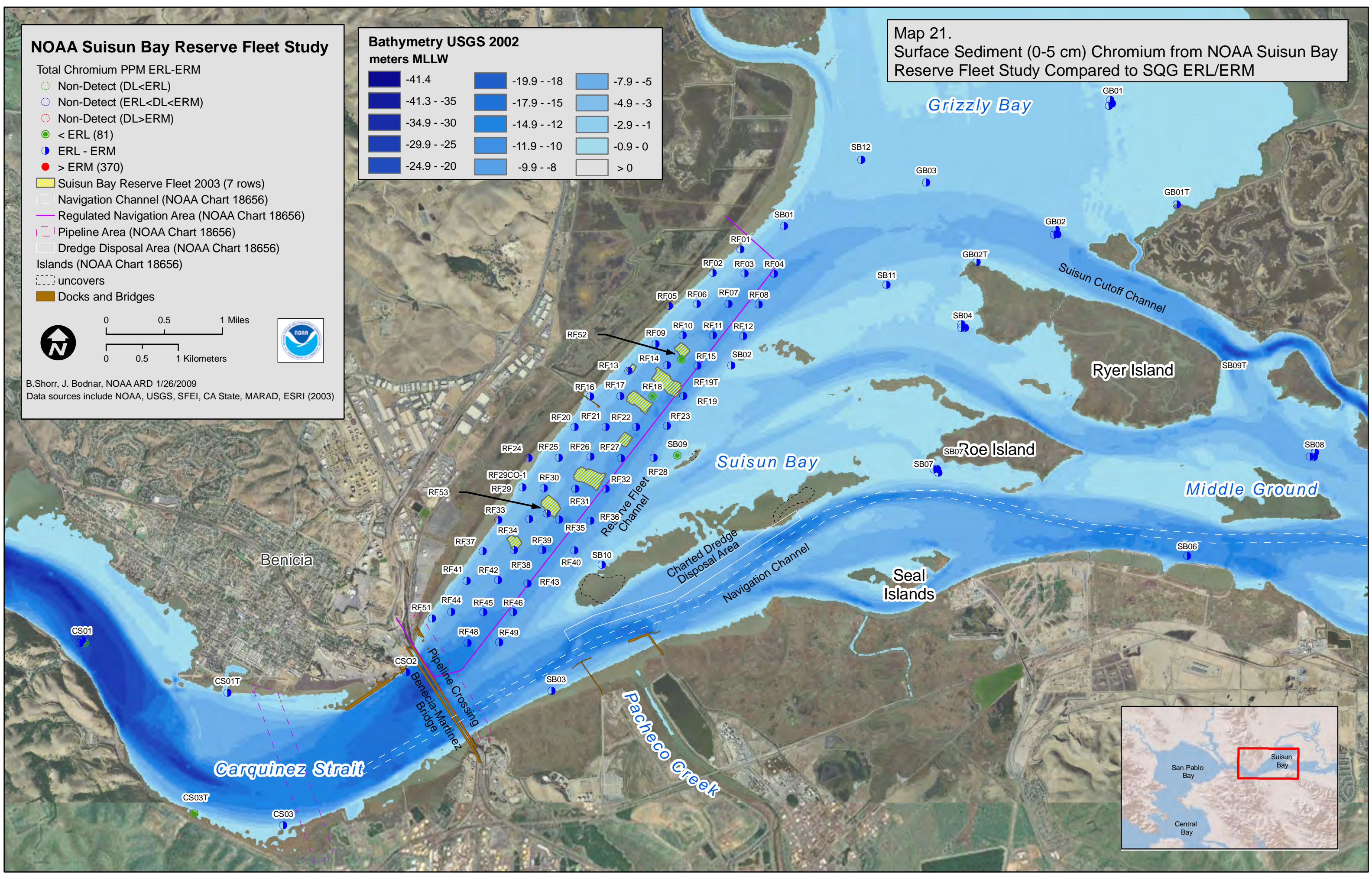


Bathymetry USGS 2002

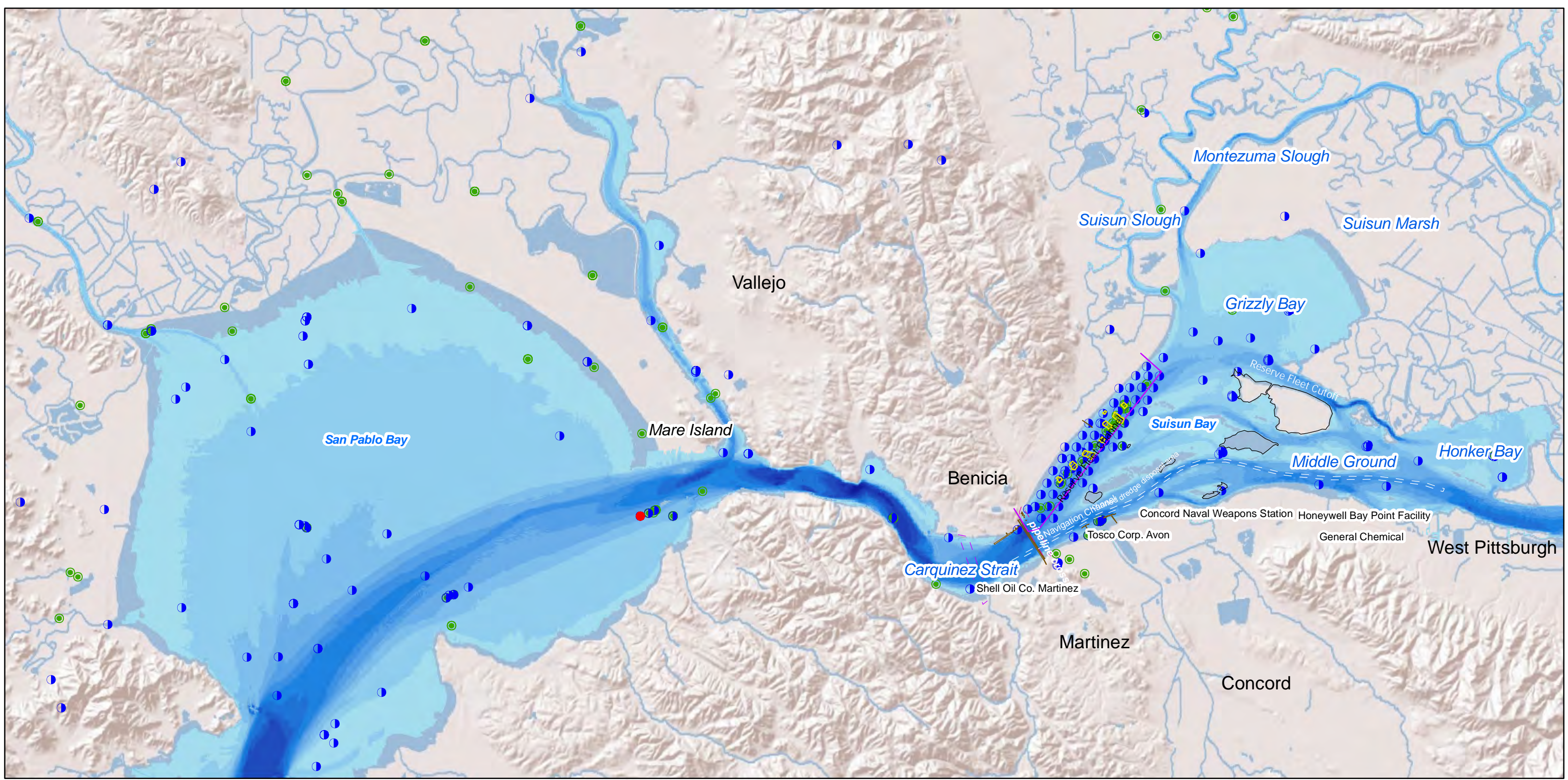
meters MLLW



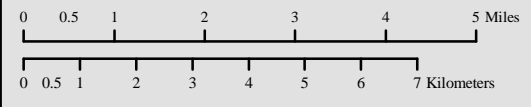
Map 21.
Surface Sediment (0-5 cm) Chromium from NOAA Suisun Bay Reserve Fleet Study Compared to SQG ERL/ERM



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)



**Map 22. Surface Sediment (0-5 cm)
Chromium in Suisun Bay and San Pablo Bay
Compared to SQG ERL/ERM**

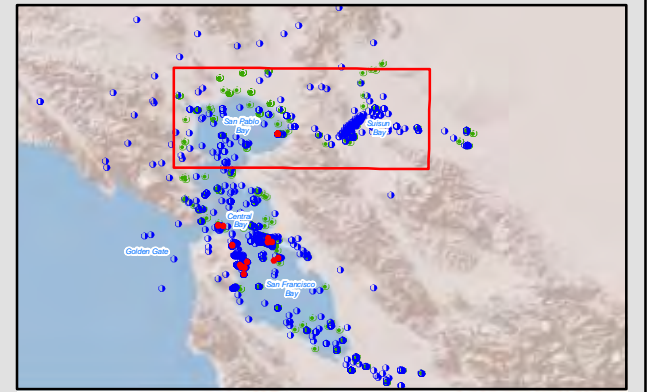
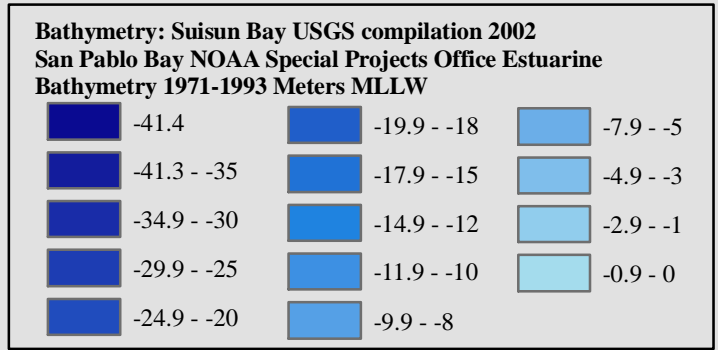


Surface Sediment

Total Chromium PPM ERL-ERM

- Non-Detect (DL < ERL)
- Non-Detect (ERL < DL < ERM)
- Non-Detect (DL > ERM)
- < ERL (81)
- ERL - ERM
- > ERM (370)

- ▨ Suisun Bay Reserve Fleet (2003)
- ▭ Navigation Channel (NOAA Chart 18656)
- ▭ Regulated Navigation Area (NOAA Chart 18652)
- ▭ Pipeline Area (NOAA Chart 18656)
- ▭ Islands (NOAA Chart 18656)
- ▭ Disposal area (NOAA Chart 18656)
- ▭ Docks and Bridges



Data sources include NOAA, ESRI (2003)
USGS, SFEI, CA State, MARAD
Contaminant data from NOAA Query Manager
SF Bay including NOAA Suisun Bay 2008 (update 12/22/2008)
and MARAD 2006
ERL/ERM = Effects Range-Low, Effects Range-Medium
NOAA OR&R | ARD_BDS 01/23/2009
c:\g\projects\SuisunBay\Suisun_Bay_2009_contaminant.mxd

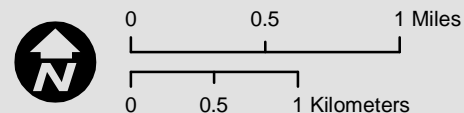
NOAA Suisun Bay Reserve Fleet Study

Mercury Max Concentration (ERL/ERM)

PPM

- < 0.15 (ERL)
- 0.15-0.71 (ERL-ERM)
- > 0.71 (ERM)

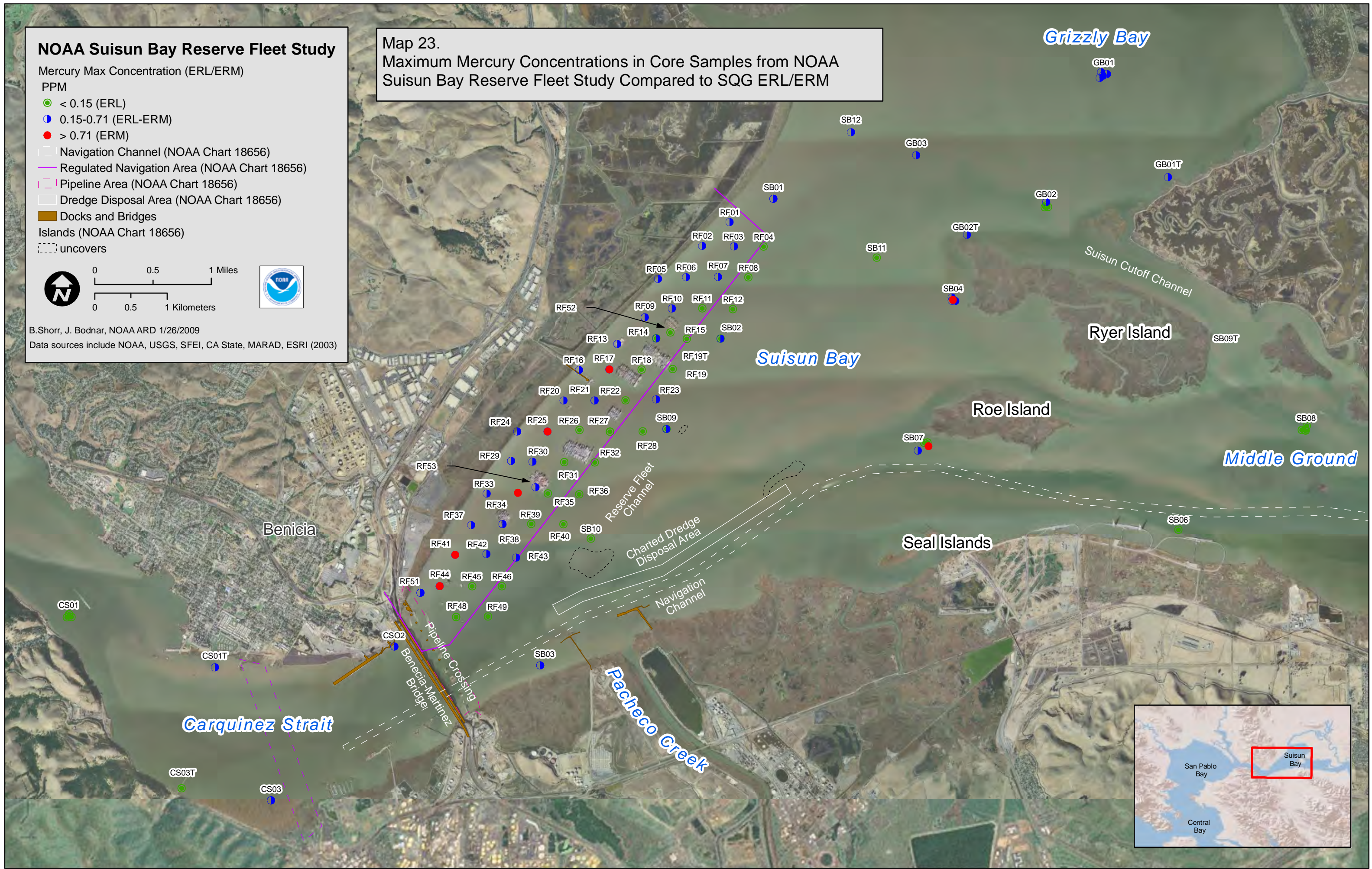
- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18656)
- Pipeline Area (NOAA Chart 18656)
- Dredge Disposal Area (NOAA Chart 18656)
- Docks and Bridges
- Islands (NOAA Chart 18656)
- uncovered



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009

Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

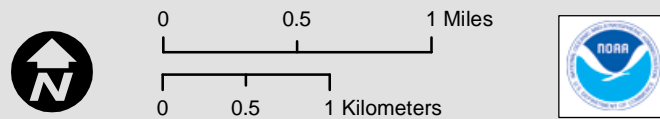
Map 23.
Maximum Mercury Concentrations in Core Samples from NOAA Suisun Bay Reserve Fleet Study Compared to SQG ERL/ERM



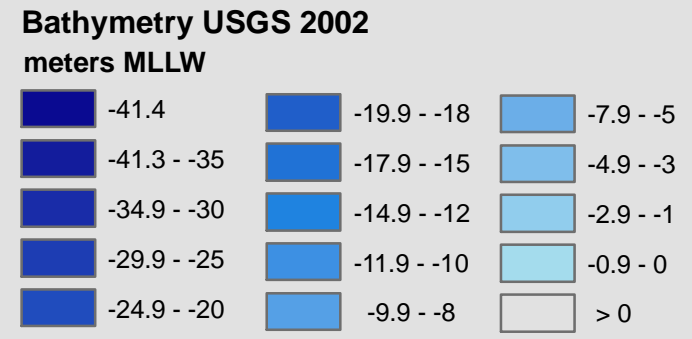
NOAA Suisun Bay Reserve Fleet Study

- Surface Sediment Tributyltin (as TBT cation)
 PPB OC Normalized
- 124.6 - 6000.0
 - 6000.1 - 43000.0
 - ▨ Suisun Bay Reserve Fleet 2003 (7 rows)
 - ▭ Navigation Channel (NOAA Chart 18656)
 - ▭ Regulated Navigation Area (NOAA Chart 18656)
 - ▭ Pipeline Area (NOAA Chart 18656)
 - ▭ Dredge Disposal Area (NOAA Chart 18656)
 - ▭ Docks and Bridges
 - ▭ Islands (NOAA Chart 18656)
 - ▭ uncovers

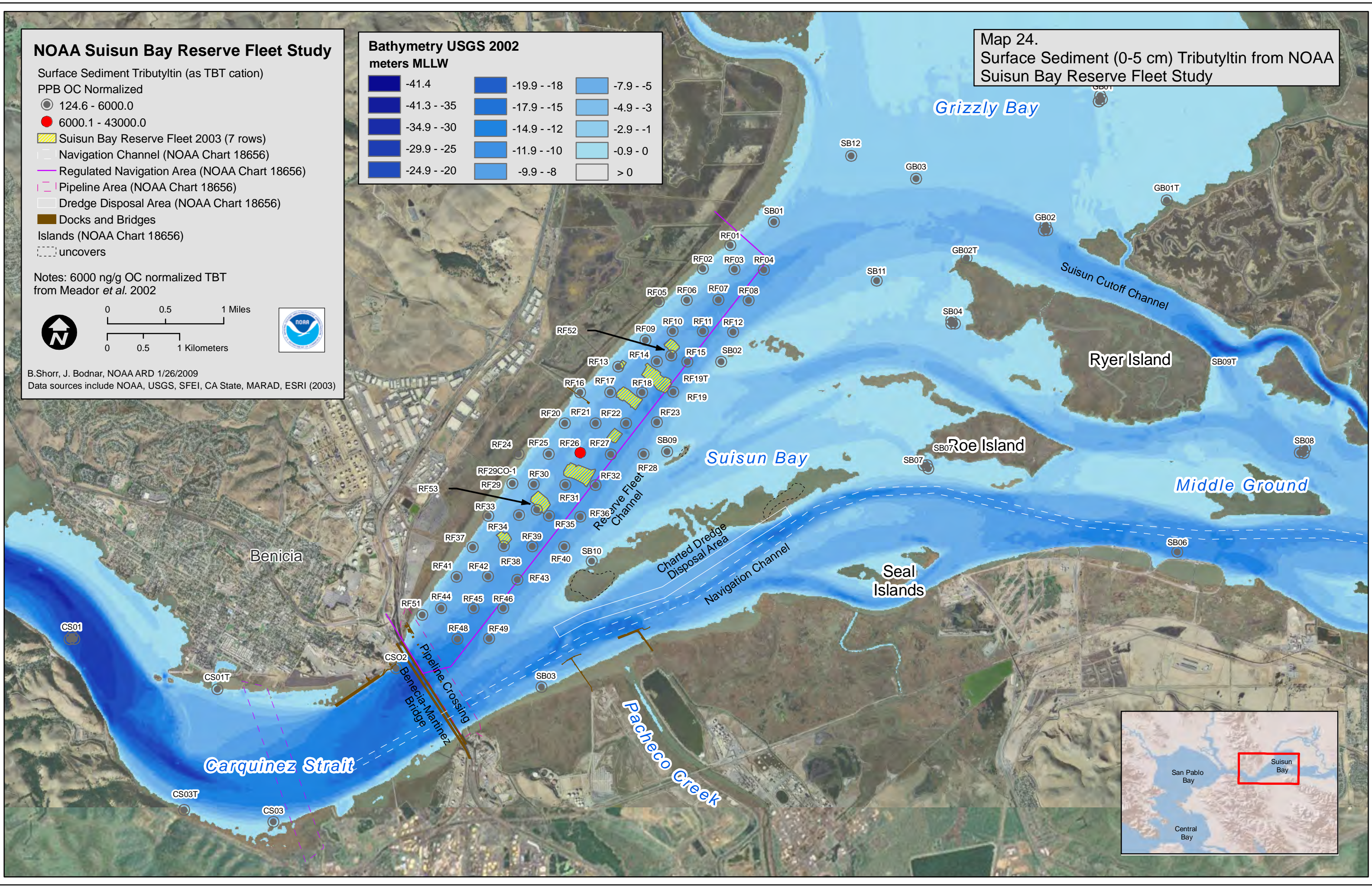
Notes: 6000 ng/g OC normalized TBT from Meador *et al.* 2002



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
 Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)



Map 24.
 Surface Sediment (0-5 cm) Tributyltin from NOAA Suisun Bay Reserve Fleet Study



NOAA Suisun Bay Reserve Fleet Study

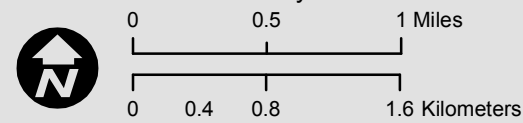
Surface Sediment
Mean Σ ERM Quotient

- 0.08 - 0.11 (Category 1)
- 0.12 - 0.5 (Category 2)
- 0.51 - 1.5 (Category 3)
- > 1.5 (Category 4)

- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18656)
- Pipeline Area (NOAA Chart 18656)
- Dredge Disposal Area (NOAA Chart 18656)
- Docks and Bridges
- Islands (NOAA Chart 18656)
- uncovered

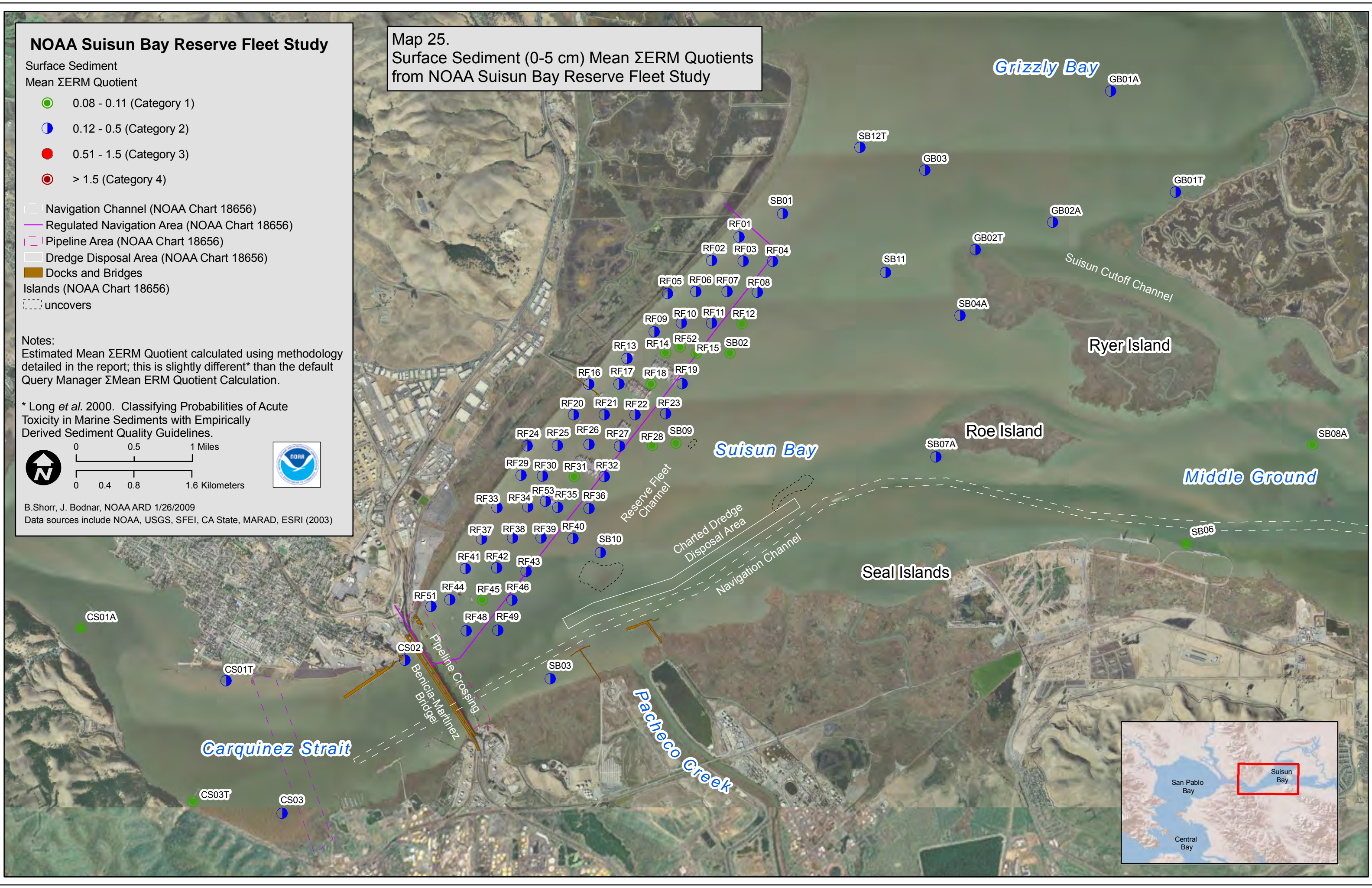
Notes:
Estimated Mean Σ ERM Quotient calculated using methodology detailed in the report; this is slightly different* than the default Query Manager Σ Mean ERM Quotient Calculation.

* Long *et al.* 2000. Classifying Probabilities of Acute Toxicity in Marine Sediments with Empirically Derived Sediment Quality Guidelines.



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

Map 25.
Surface Sediment (0-5 cm) Mean Σ ERM Quotients
from NOAA Suisun Bay Reserve Fleet Study



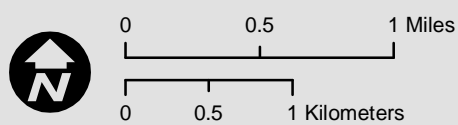
NOAA Suisun Bay Reserve Fleet Study

Surface Sediment

Observed Paint Chips/Metal Debris

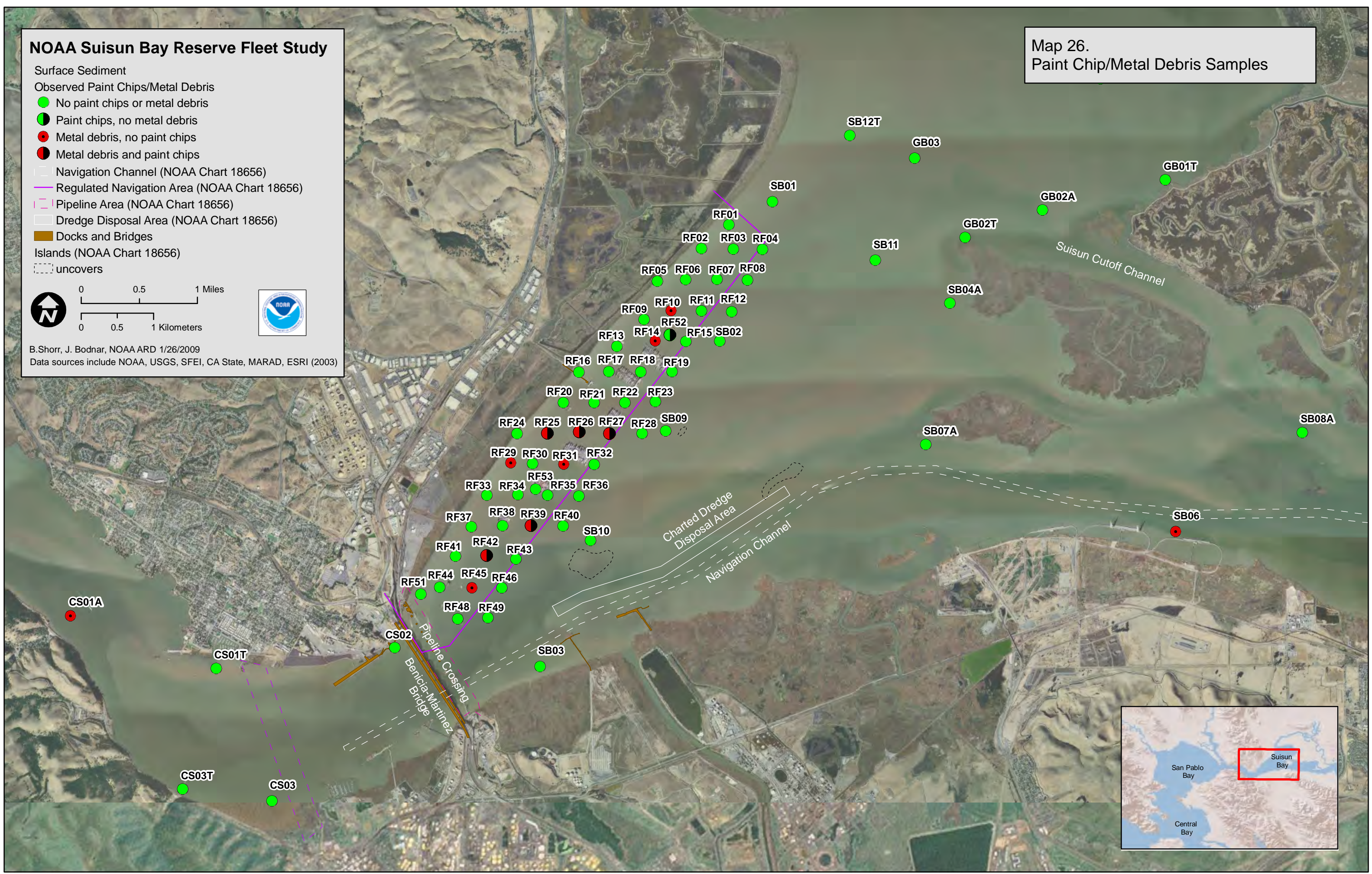
- No paint chips or metal debris
- Paint chips, no metal debris
- Metal debris, no paint chips
- Metal debris and paint chips

- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18656)
- Pipeline Area (NOAA Chart 18656)
- Dredge Disposal Area (NOAA Chart 18656)
- Docks and Bridges
- Islands (NOAA Chart 18656)
- uncovers



B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
 Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

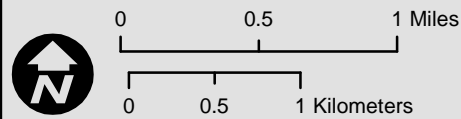
Map 26.
 Paint Chip/Metal Debris Samples



NOAA Suisun Bay Reserve Fleet Study

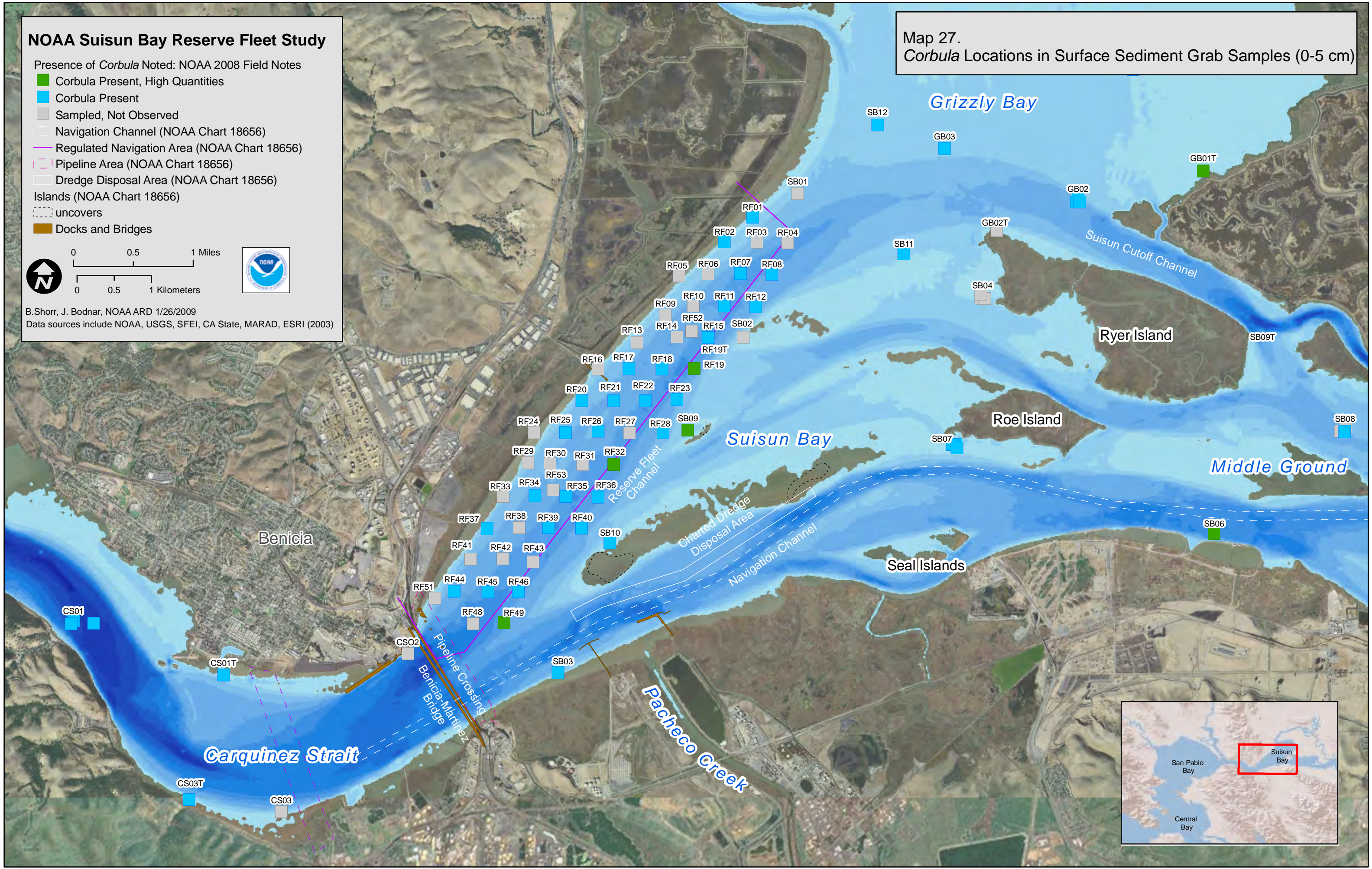
Presence of *Corbula* Noted: NOAA 2008 Field Notes

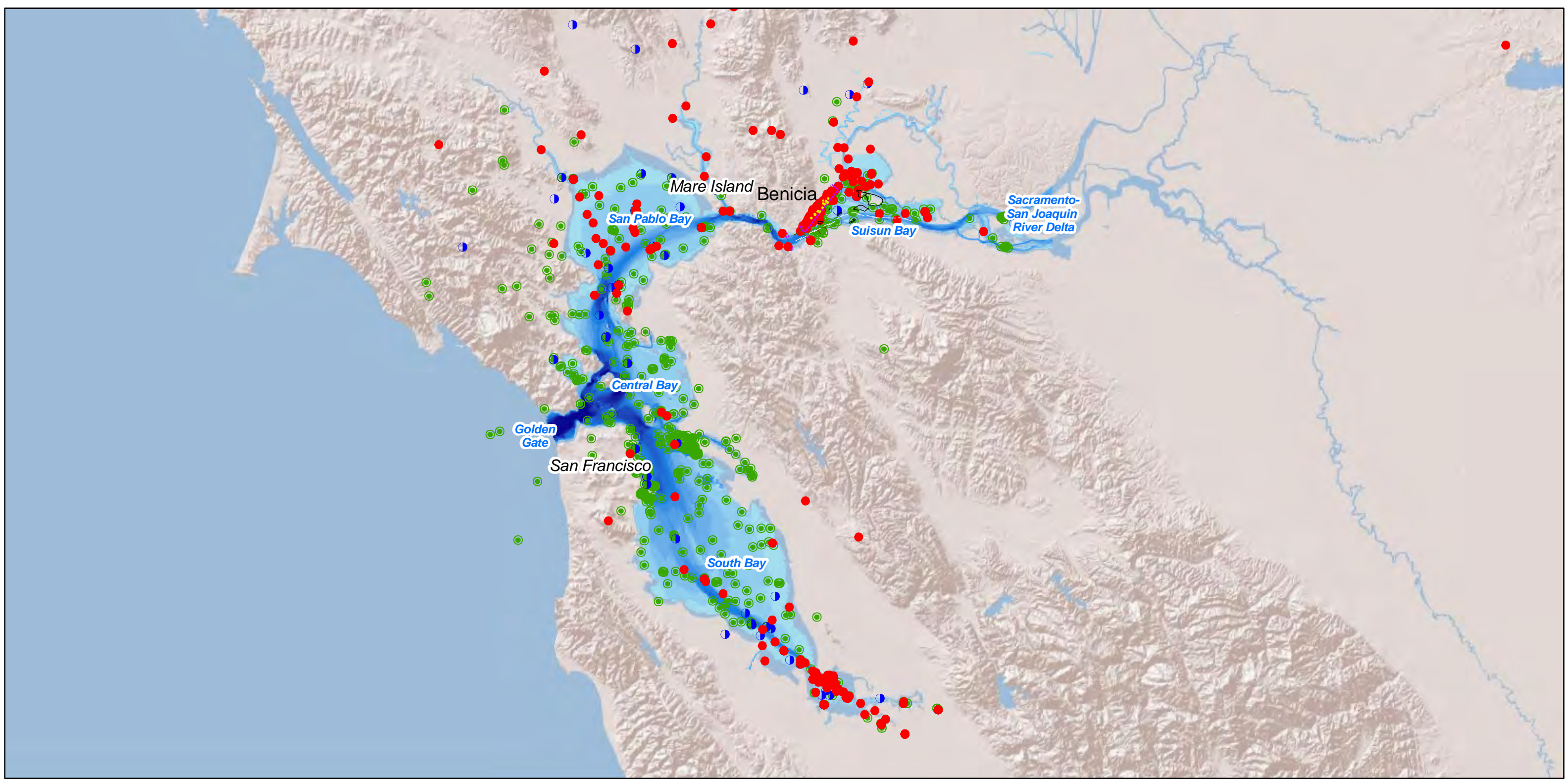
- *Corbula* Present, High Quantities
- *Corbula* Present
- Sampled, Not Observed
- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18656)
- Pipeline Area (NOAA Chart 18656)
- Dredge Disposal Area (NOAA Chart 18656)
- Islands (NOAA Chart 18656)
- uncovers
- Docks and Bridges



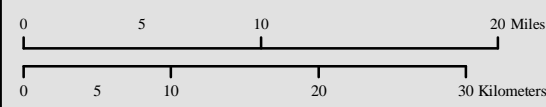
B. Shorr, J. Bodnar, NOAA ARD 1/26/2009
Data sources include NOAA, USGS, SFEI, CA State, MARAD, ESRI (2003)

Map 27.
Corbula Locations in Surface Sediment Grab Samples (0-5 cm)





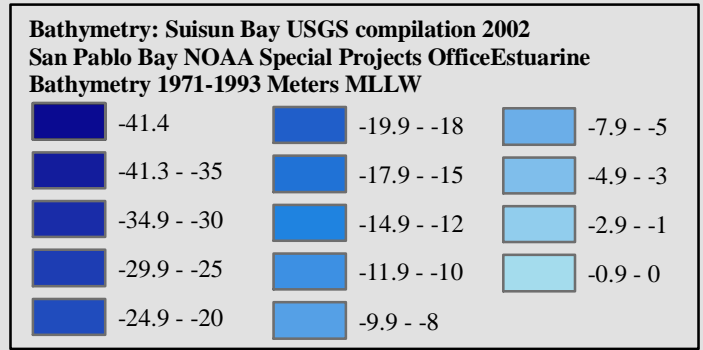
Map 28. Surface Sediment (0-5 cm) Manganese in San Francisco Bay



Surface Sediment Manganese PPM

- Non-Detect ($DL < 733$)
- Non-Detect ($733 < DL < 827$)
- Non-Detect ($DL > 827$)
- < 733
- $733-827$
- > 827

- Suisun Bay Reserve Fleet (2003)
- Navigation Channel (NOAA Chart 18656)
- Regulated Navigation Area (NOAA Chart 18652)
- Pipeline Area (NOAA Chart 18656)
- Islands (NOAA Chart 18656)
- Dredged Disposal area (NOAA Chart 18656)
- Docks and Bridges



Data sources include NOAA, ESRI (2003), USGS, SFEI, CA State, MARAD. Contaminant data from NOAA Query Manager SF Bay including NOAA Suisun Bay 2008 (update 12/22/2008) and MARAD 2006. 733 PPM = Suisun Bay NOAA 2008 "Reference Areas" mean surface sediment. 827 PPM = Suisun Bay NOAA 2008 "Reference Areas" mean surface sediment. NOAA OR&R | ARD | BDS | 02/02/2009 | c:\gs\projects\SuisunBay\Suisun_Bay_2009_contaminant.mxd

