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APPENDIX C

MATCs, EECs, and CHRONIC EFFECTS PROBABILITIES

FOR

COPPER, CADMIUM, AND LEAD

TABLE C-1
CUMULATIVE PROBABILITY THAT THE EXPECTED EXPOSURE CONCENTRATION WILL EXCEED THE COPPER MATC FOR THE PARTICULAR TAXON.

NEW BEDFORD HARBOR
ECOLOGICAL RISK ASSESSMENT

HARBOR ZONE	MARINE FISH	CRUSTACEA	MOLLUSCA	POLYCHAETA	ALGA
1, Water Column	0.03	0.19	0.09	0.01	0.00
2, Water Column	0.04	0.22	0.15	0.02	0.03
3, Water Column	0.04	0.22	0.15	0.02	0.03
4, Water Column	0.03	0.19	0.10	0.01	0.02
5, Water Column	0.01	0.12	0.03	0.00	0.00
1, Pore Water	0.02	0.11	0.05	0.02	0.04
2, Pore Water	0.01	0.08	0.04	0.02	0.03
3, Pore Water	0.02	0.11	0.05	0.02	0.04
4, Pore Water	0.01	0.08	0.02	0.00	0.01
5, Pore Water	0.00	0.04	0.00	0.00	0.00

Notes:

Probabilities calculated as the area under a normally-distributed curve defined by a particular Z score, where Z = (Mean EEC - BM) / (Var EEC + Var BM)^2. Equation presented by Suter et al., 1986.

EEC = Expected Environmental Concentration

BM = Bench Mark, which in this application are the MATCs developed by extrapolation, in the case of Marine Fish, Crustaceans, Mollusks, and Polychaetes. For Alga, the bench mark was based on available chronic toxicity data.

TABLE C-2
CUMULATIVE PROBABILITY THAT THE EXPECTED EXPOSURE CONCENTRATION WILL EXCEED THE CADMIUM MATC FOR THE PARTICULAR TAXON.

NEW BEDFORD HARBOR
ECOLOGICAL RISK ASSESSMENT

HARBOR ZONE	MARINE FISH	CRUSTACEA	MOLLUSCA	POLYCHAETA	ALGA
1, Water Column	0.01	0.11	0.00	0.00	0.00
2, Water Column	0.01	0.14	0.00	0.00	0.00
3, Water Column	0.00	0.10	0.00	0.00	0.00
4, Water Column	0.00	0.08	0.00	0.00	0.00
5, Water Column	0.00	0.05	0.00	0.00	0.00
1, Pore Water	0.01	0.12	0.00	0.00	0.00
2, Pore Water	0.03	0.13	0.00	0.00	0.00
3, Pore Water	0.01	0.09	0.00	0.00	0.00
4, Pore Water	0.00	0.06	0.00	0.00	0.00
5, Pore Water	0.00	0.03	0.00	0.00	0.00

Notes:

Probabilities calculated as the area under a normally-distributed curve defined by a particular Z score, where Z = (Mean EEC - BM) / (Var EEC + Var BM)^2. Equation presented by Suter et al., 1986.

EEC = Expected Environmental Concentration

BM = Bench Mark, which in this application are the MATCs developed by extrapolation, in the case of Marine Fish, Crustaceans, Mollusks, and Polychaetes. For Alga, the bench mark was based on available chronic toxicity data.

TABLE C-3
CUMULATIVE PROBABILITY THAT THE EXPECTED EXPOSURE CONCENTRATION WILL EXCEED THE LEAD MATC FOR THE PARTICULAR TAXON.

NEW BEDFORD HARBOR
ECOLOGICAL RISK ASSESSMENT

HARBOR ZONE	MARINE FISH	CRUSTACEA	MOLLUSCA	POLYCHAETA	ALGA
1, Water Column	0.03	0.18	0.00	0.00	0.01
2, Water Column	0.02	0.17	0.00	0.00	0.01
3, Water Column	0.02	0.13	0.00	0.00	0.01
4, Water Column	0.01	0.08	0.00	0.00	0.00
5, Water Column	0.01	0.06	0.00	0.00	0.00
1, Pore Water	0.04	0.18	0.01	0.00	0.03
2, Pore Water	0.03	0.13	0.01	0.00	0.02
3, Pore Water	0.02	0.14	0.00	0.00	0.01
4, Pore Water	0.00	0.06	0.00	0.00	0.00
5, Pore Water	0.01	0.10	0.00	0.00	0.01

Notes:

Probabilities calculated as the area under a normally-distributed curve defined by a particular Z score, where Z = (Mean EEC - BM) / (Var EEC + Var BM)^2. Equation presented by Suter et al., 1986.

EEC = Expected Environmental Concentration

BM = Bench Mark, which in this application are the MATCs developed by extrapolation, in the case of Marine Fish, Crustaceans, Mollusks, and Polychaetes. For Alga, the bench mark was based on available chronic toxicity data.

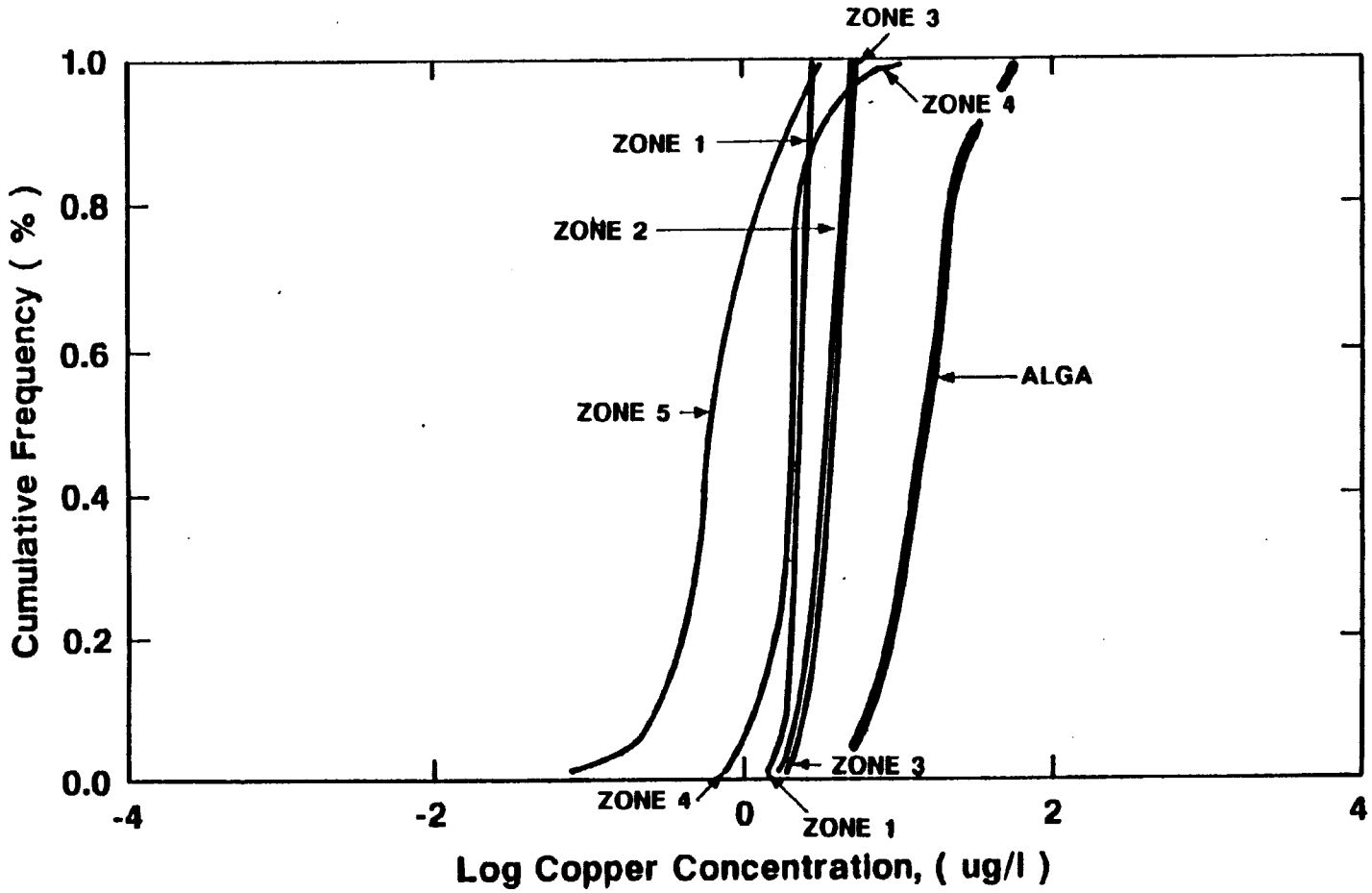

FIGURE C-1
MATC FOR ALGA AND
EECs FOR ALL ZONES, COPPER, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

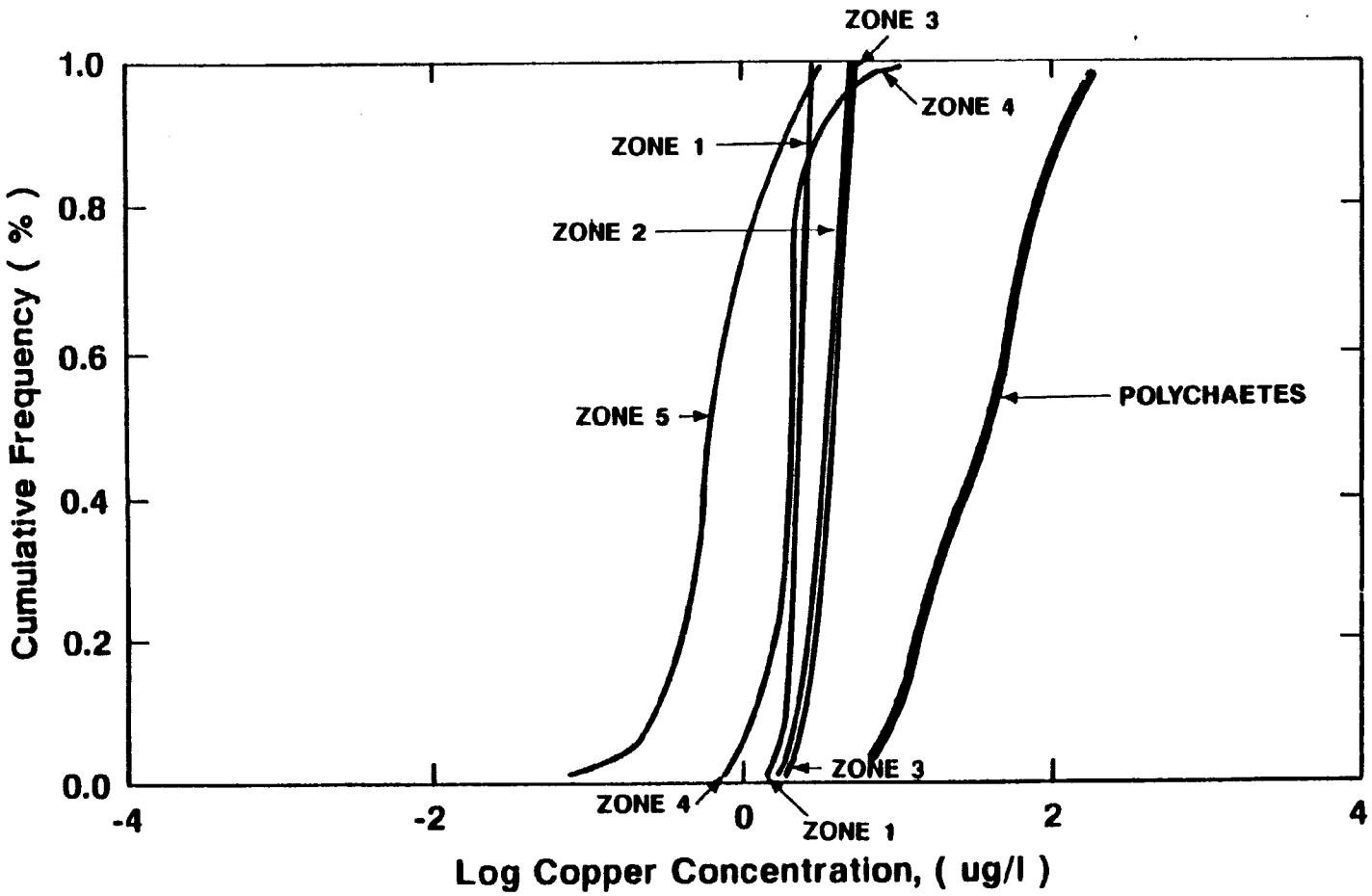

FIGURE C-2
MATC FOR POLYCHAETES AND
EECs FOR ALL ZONES, COPPER, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

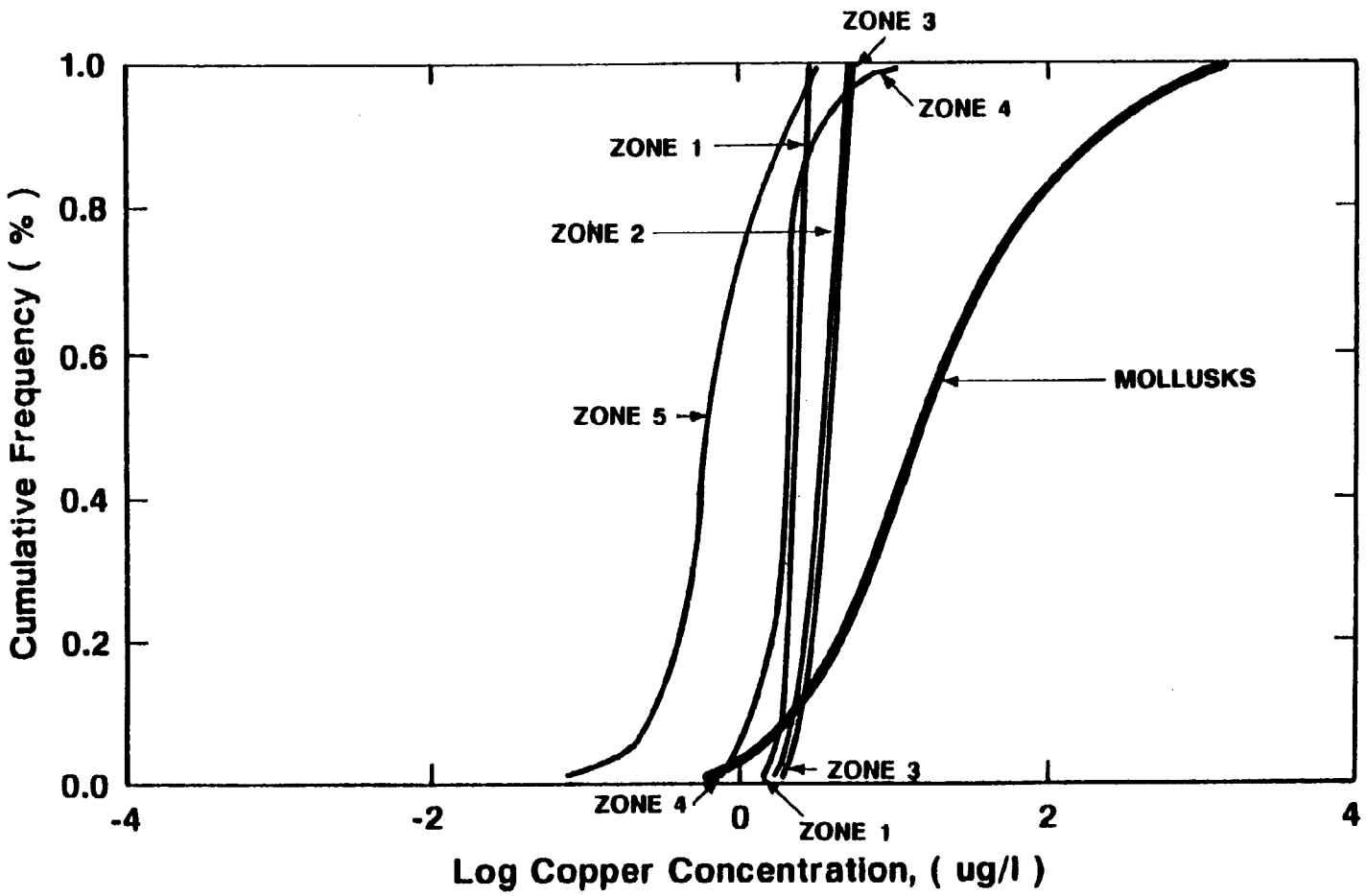

FIGURE C-3
MATC FOR MOLLUSKS AND
EECs FOR ALL ZONES, COPPER, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

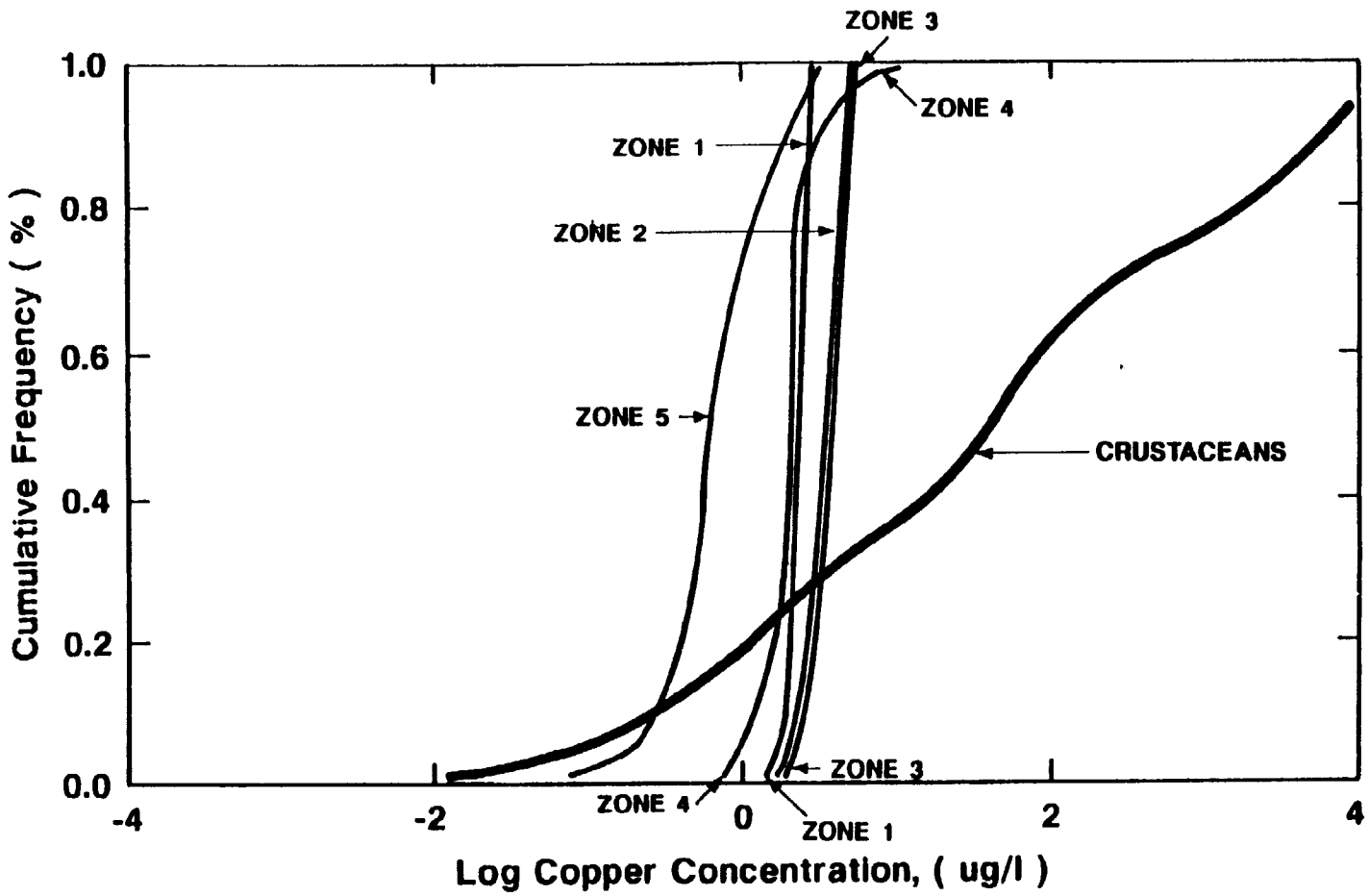

FIGURE C-4
MATC FOR CRUSTACEANS AND
EECs FOR ALL ZONES, COPPER, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

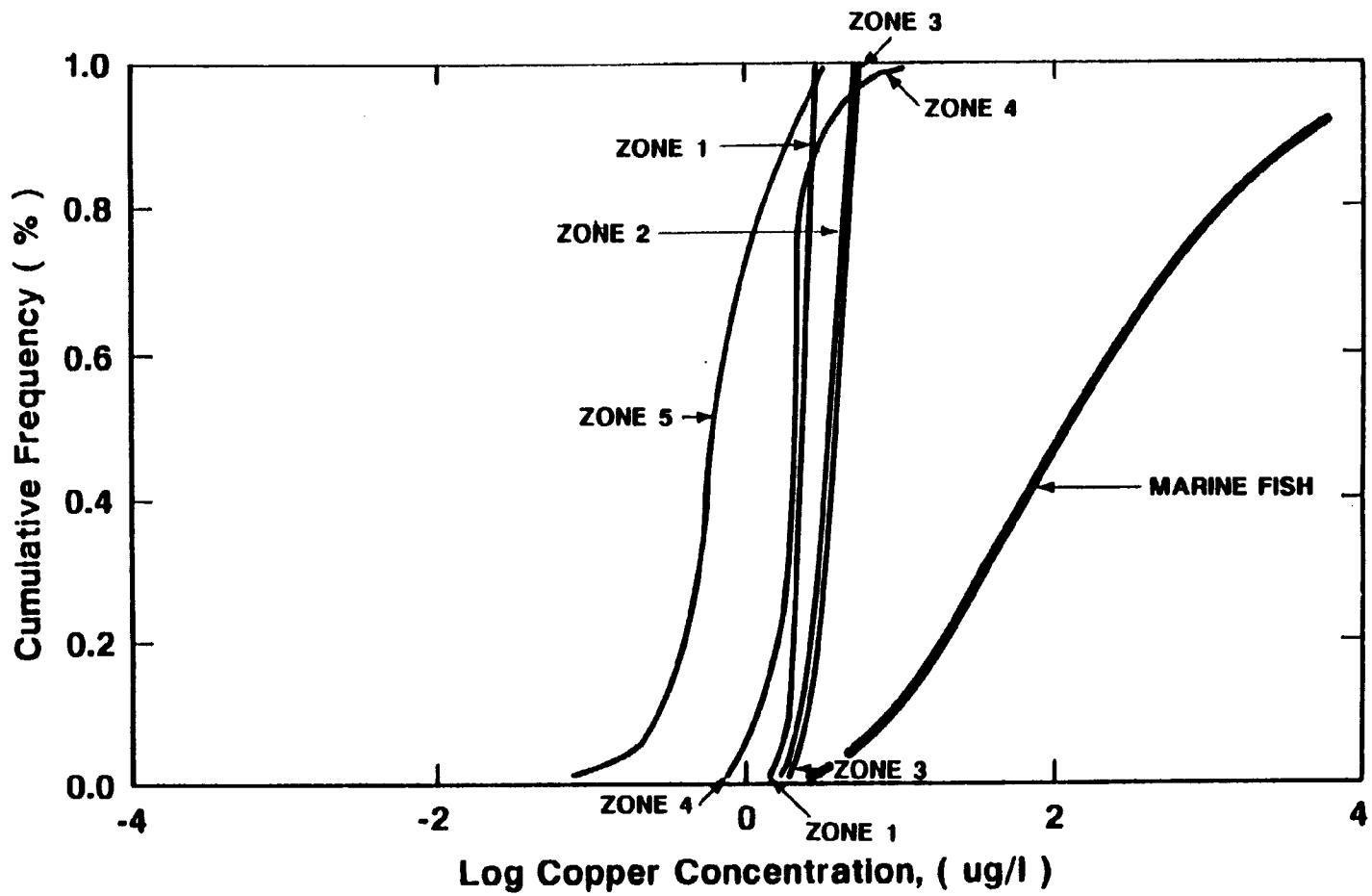

FIGURE C-5
MATC FOR MARINE FISH AND
EECs FOR ALL ZONES, COPPER, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

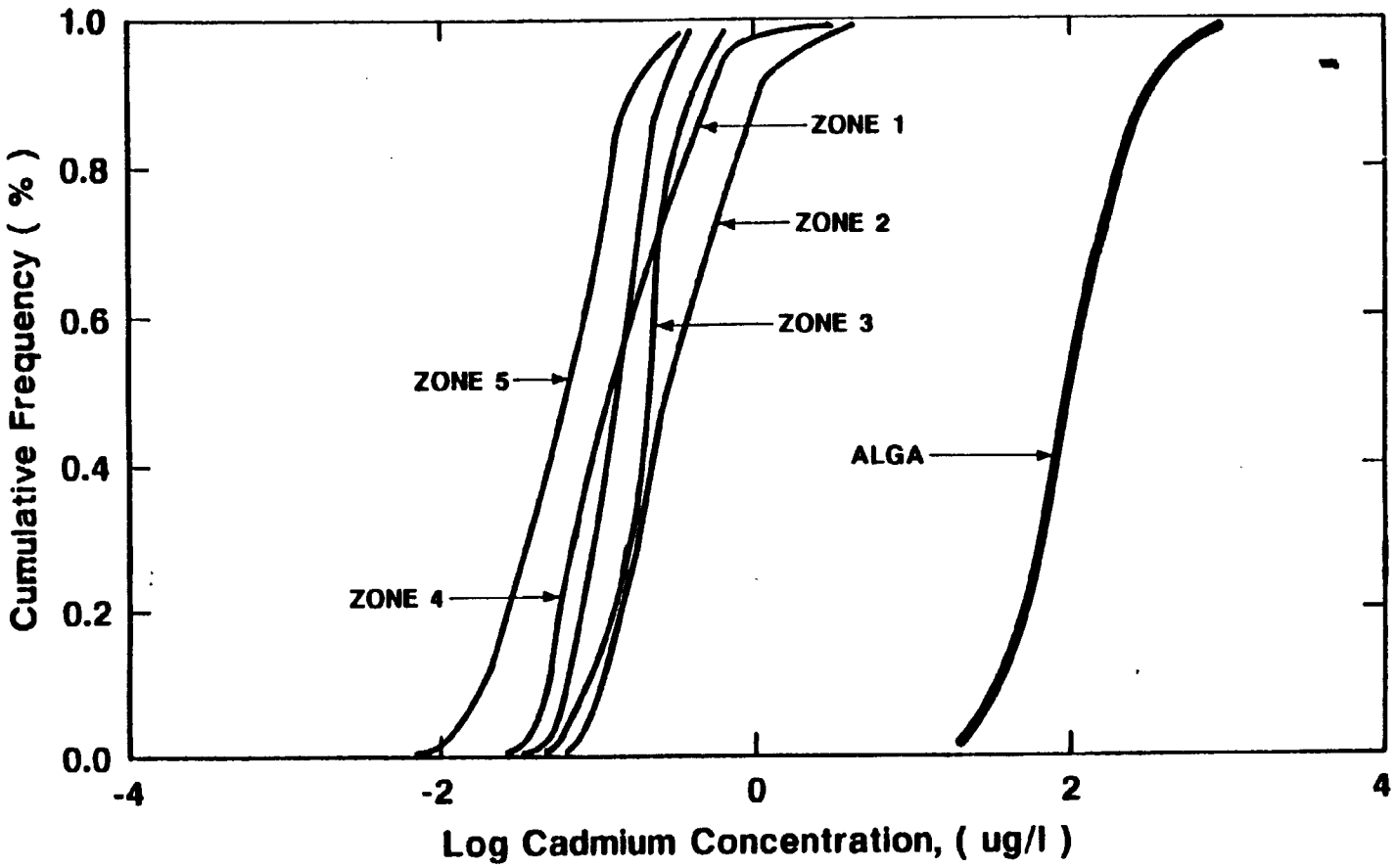

FIGURE C-6
MATC FOR ALGA AND
EECs FOR ALL ZONES, CADMIUM, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

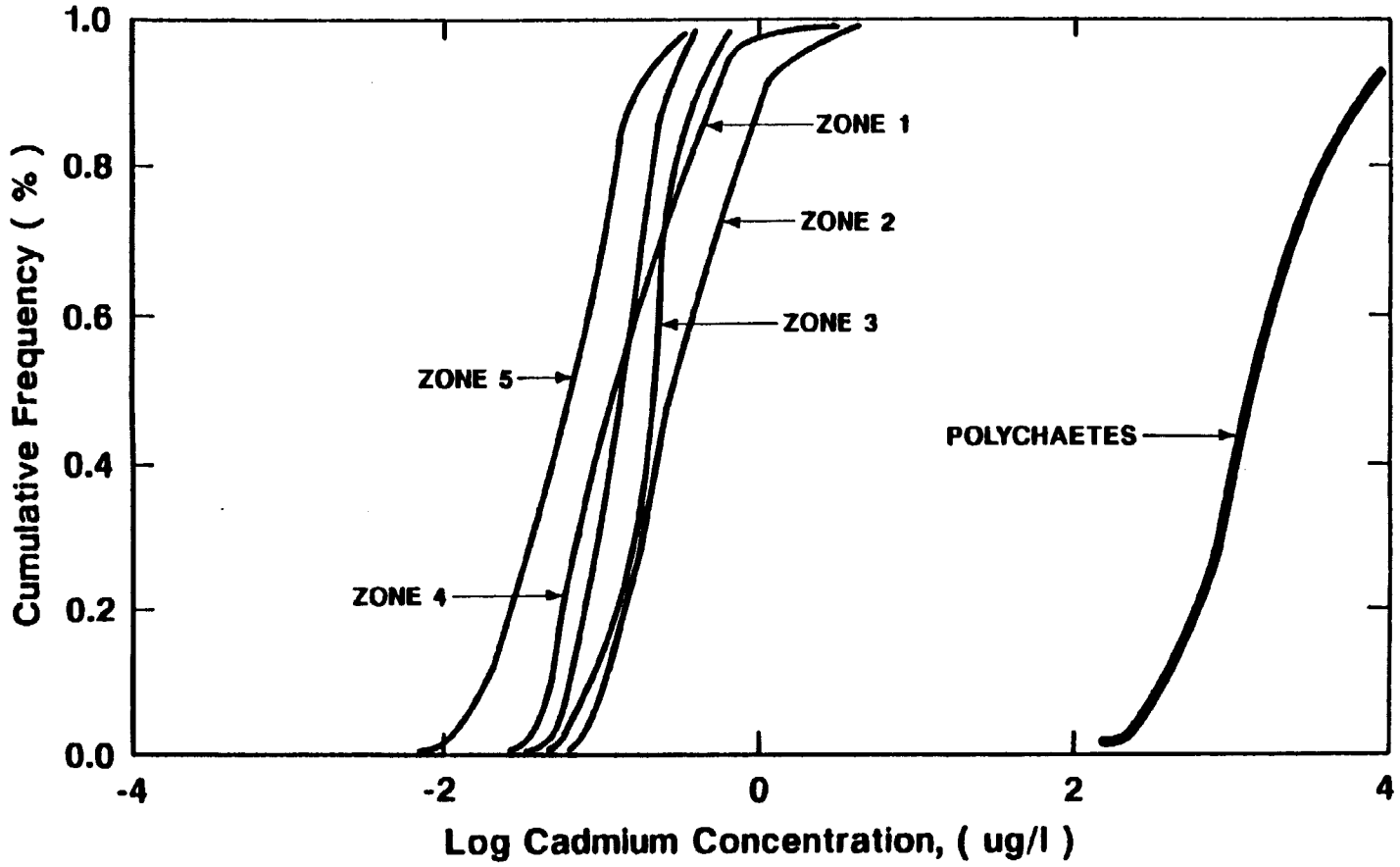

FIGURE C-7
MATC FOR POLYCHAETES AND
EECs FOR ALL ZONES, CADMIUM, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

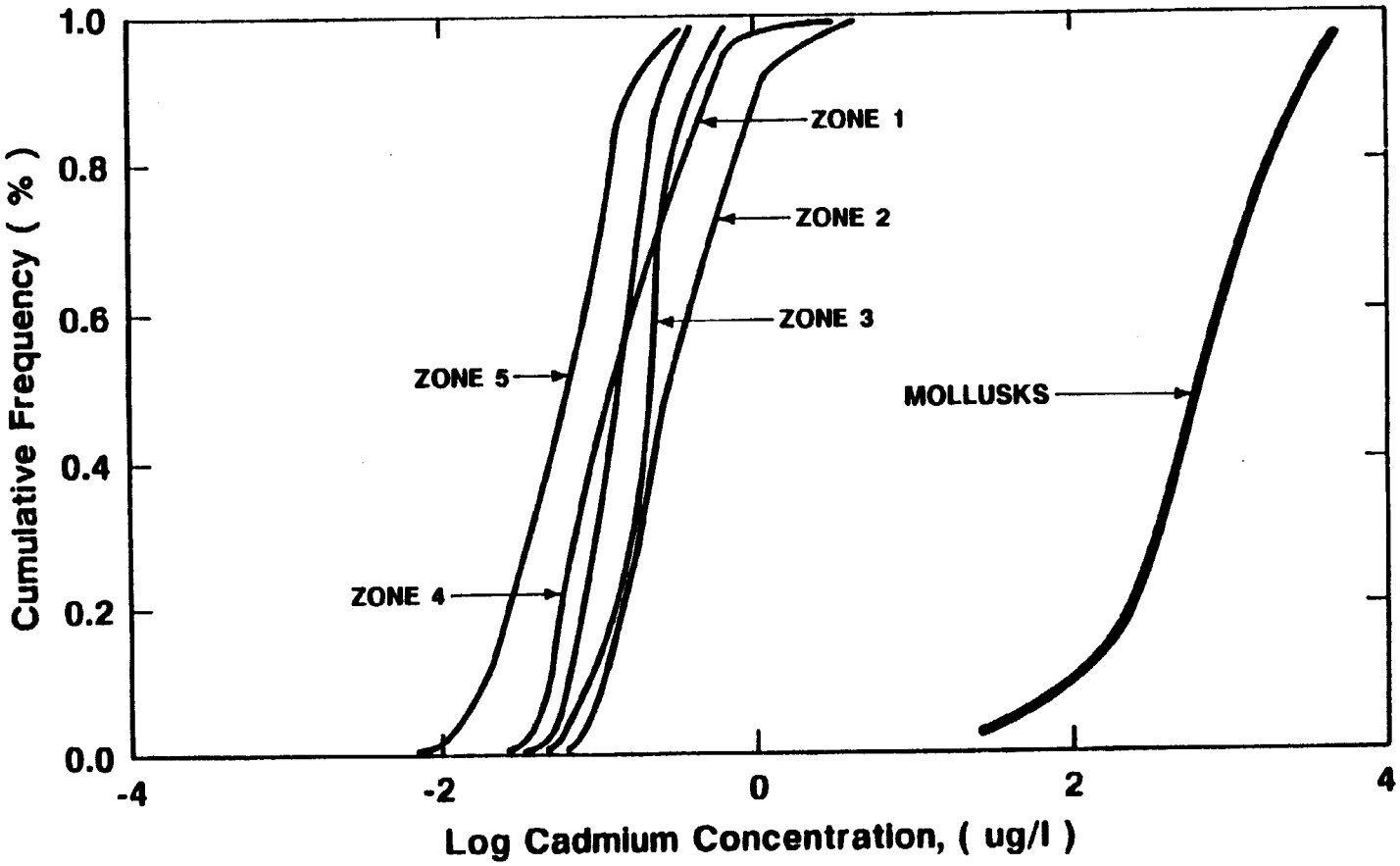

FIGURE C-8
MATC FOR MOLLUSKS AND
EECs FOR ALL ZONES, CADMIUM, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

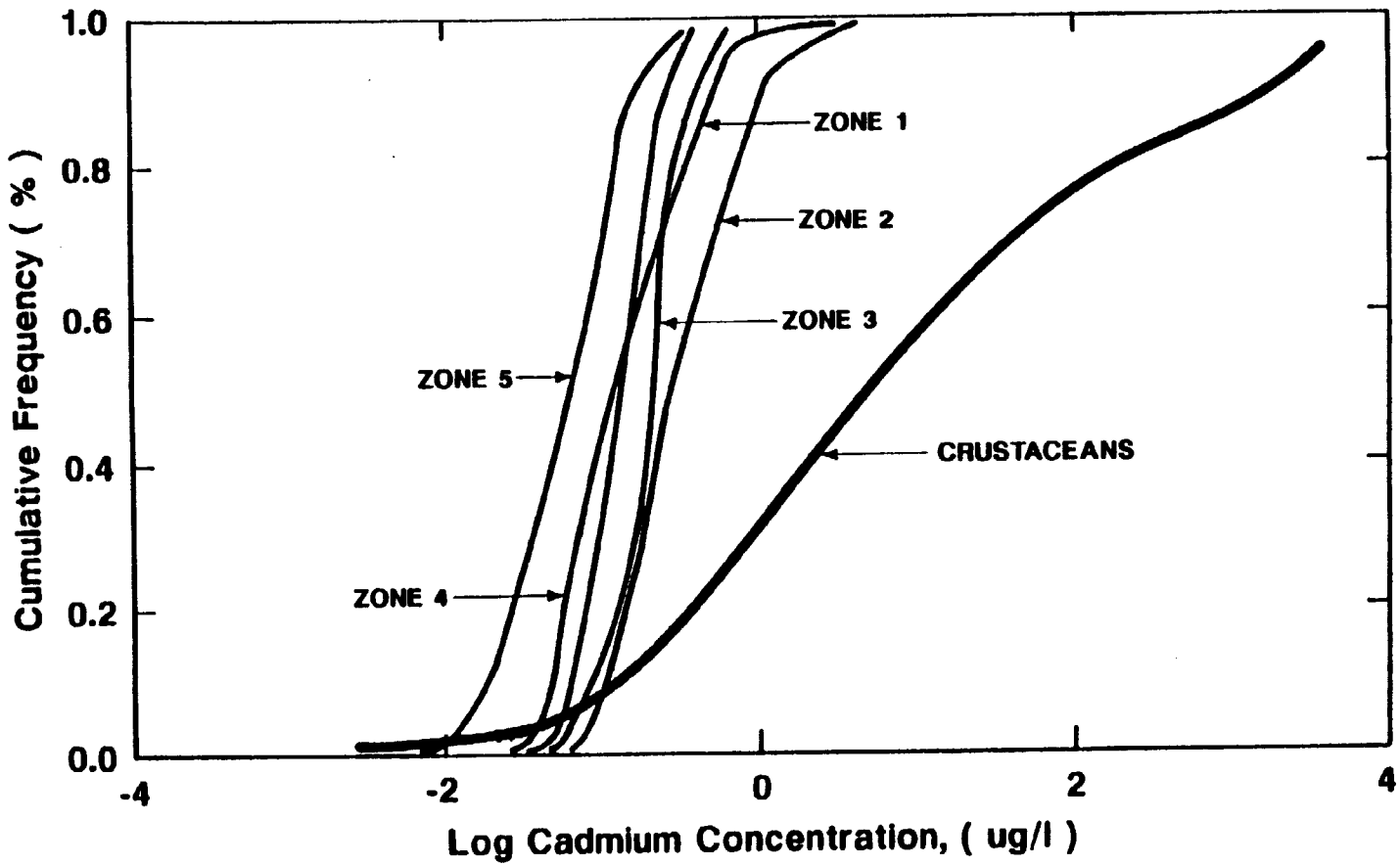

FIGURE C-9
MATC FOR CRUSTACEANS AND
EECs FOR ALL ZONES, CADMIUM, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

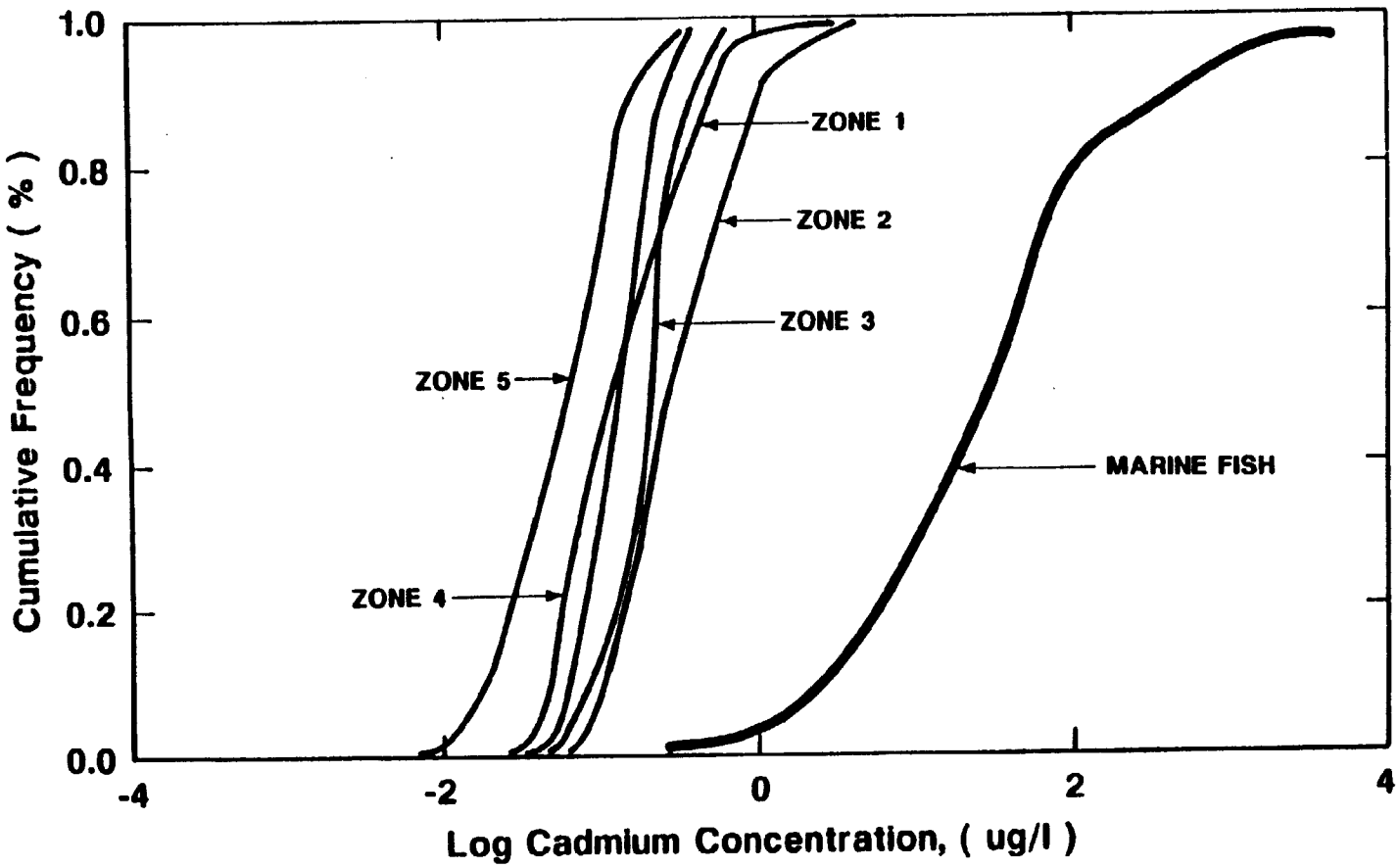

FIGURE C-10
MATC FOR MARINE FISH AND
EECs FOR ALL ZONES, CADMIUM, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

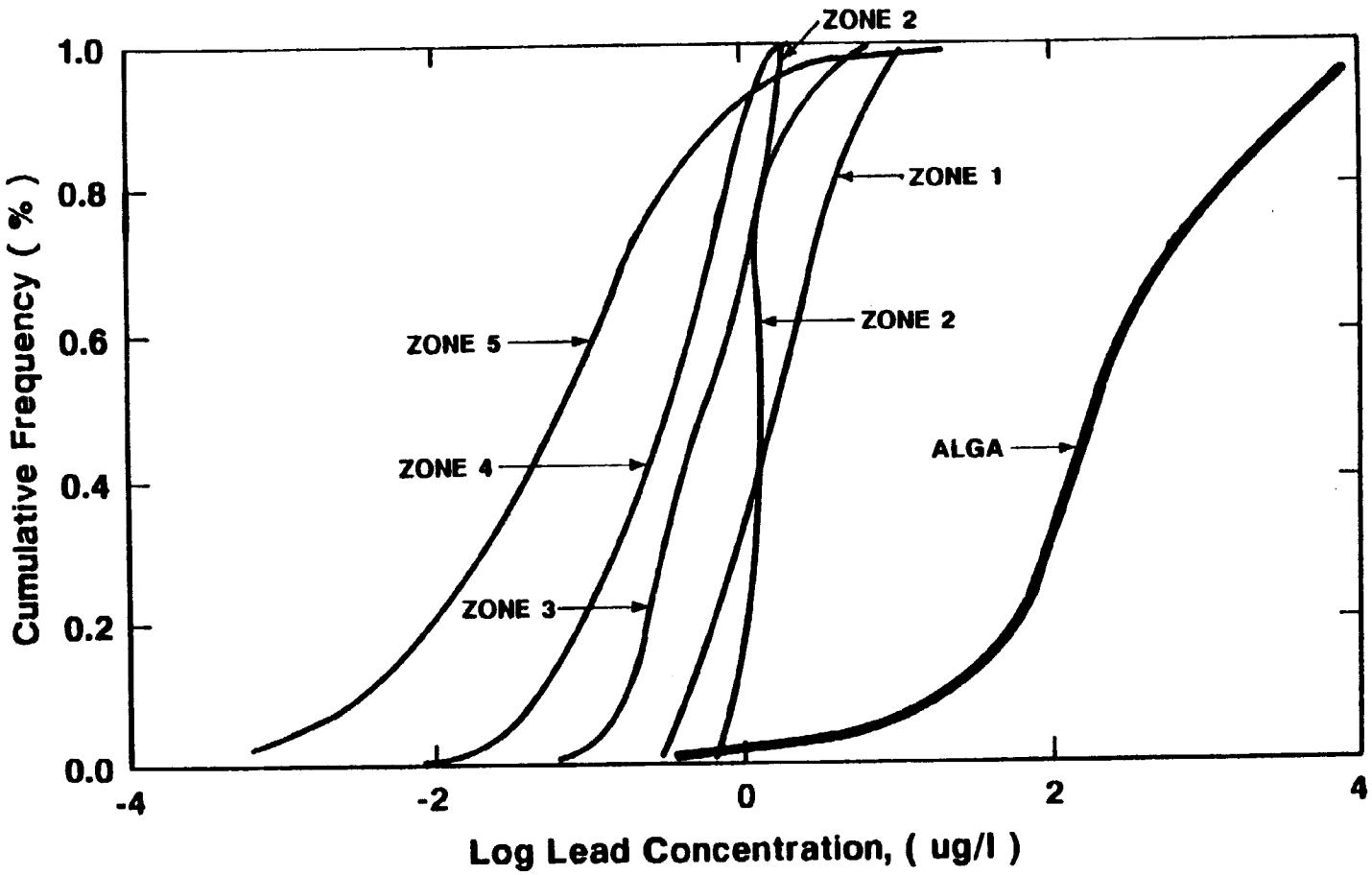

FIGURE C-11
MATC FOR ALGA AND
EECs FOR ALL ZONES, LEAD, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

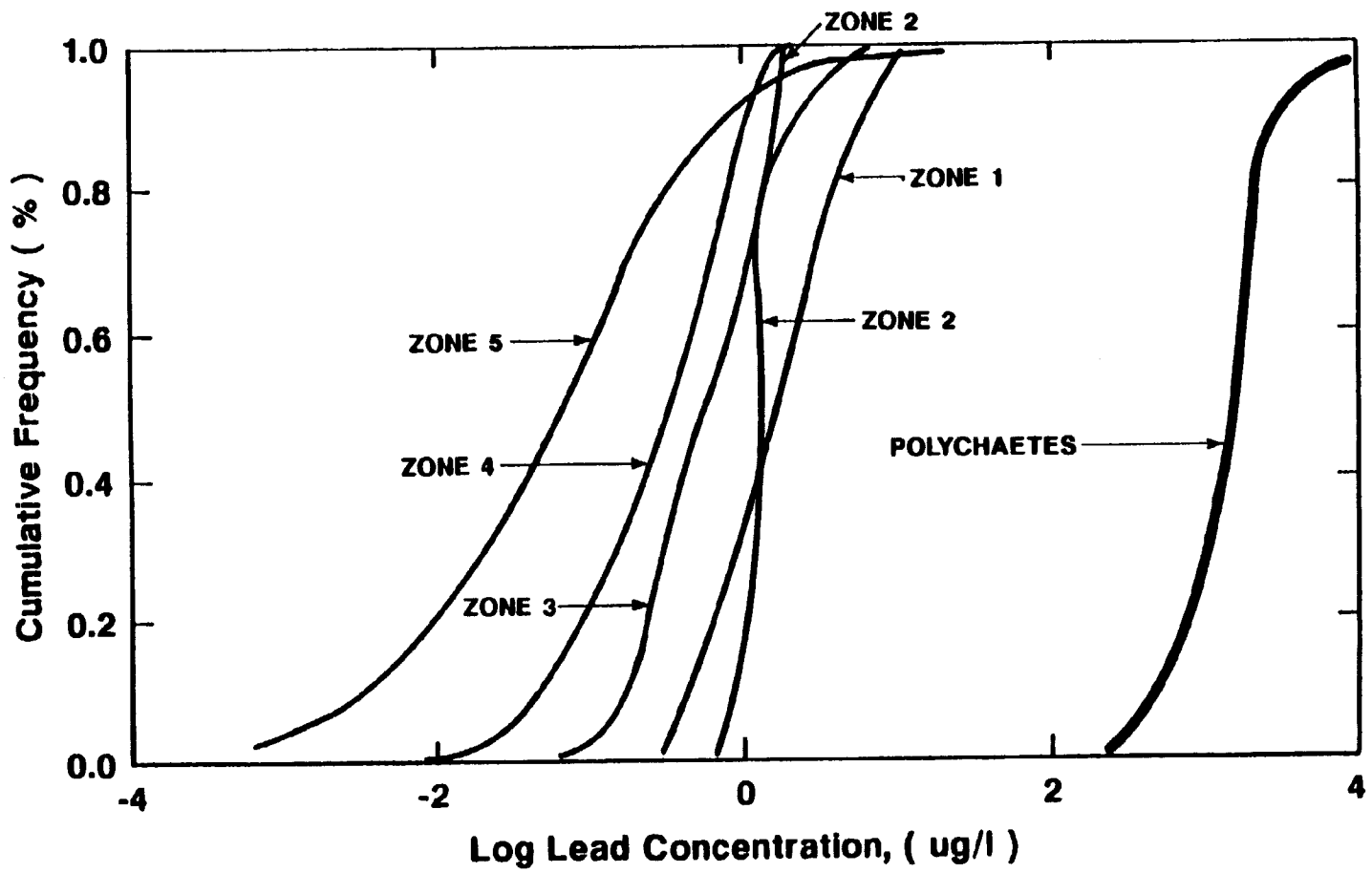

FIGURE C-12
MATC FOR POLYCHAETES AND
EECs FOR ALL ZONES, LEAD, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

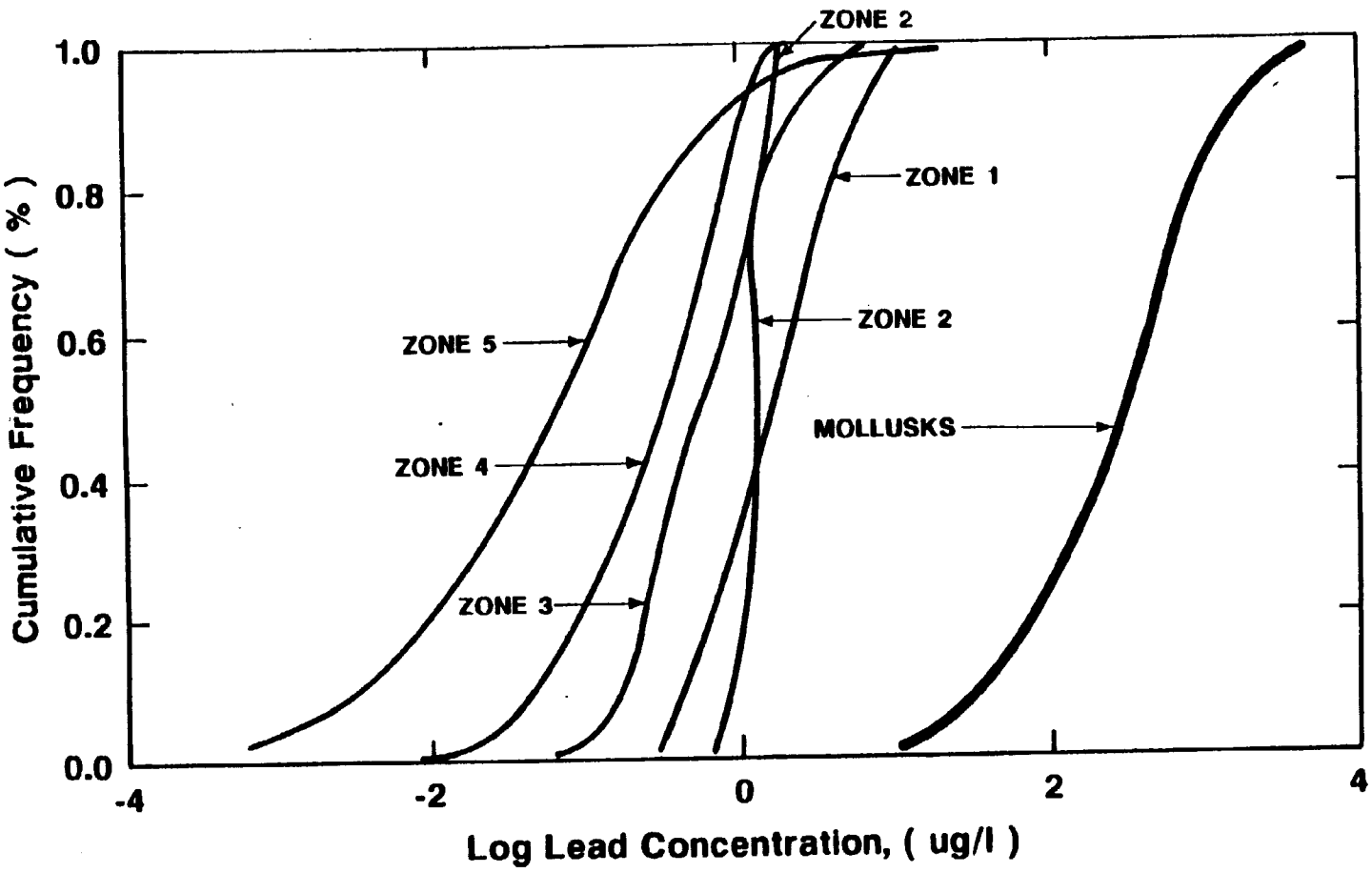

FIGURE C-13
MATC FOR MOLLUSKS AND
EECs FOR ALL ZONES, LEAD, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

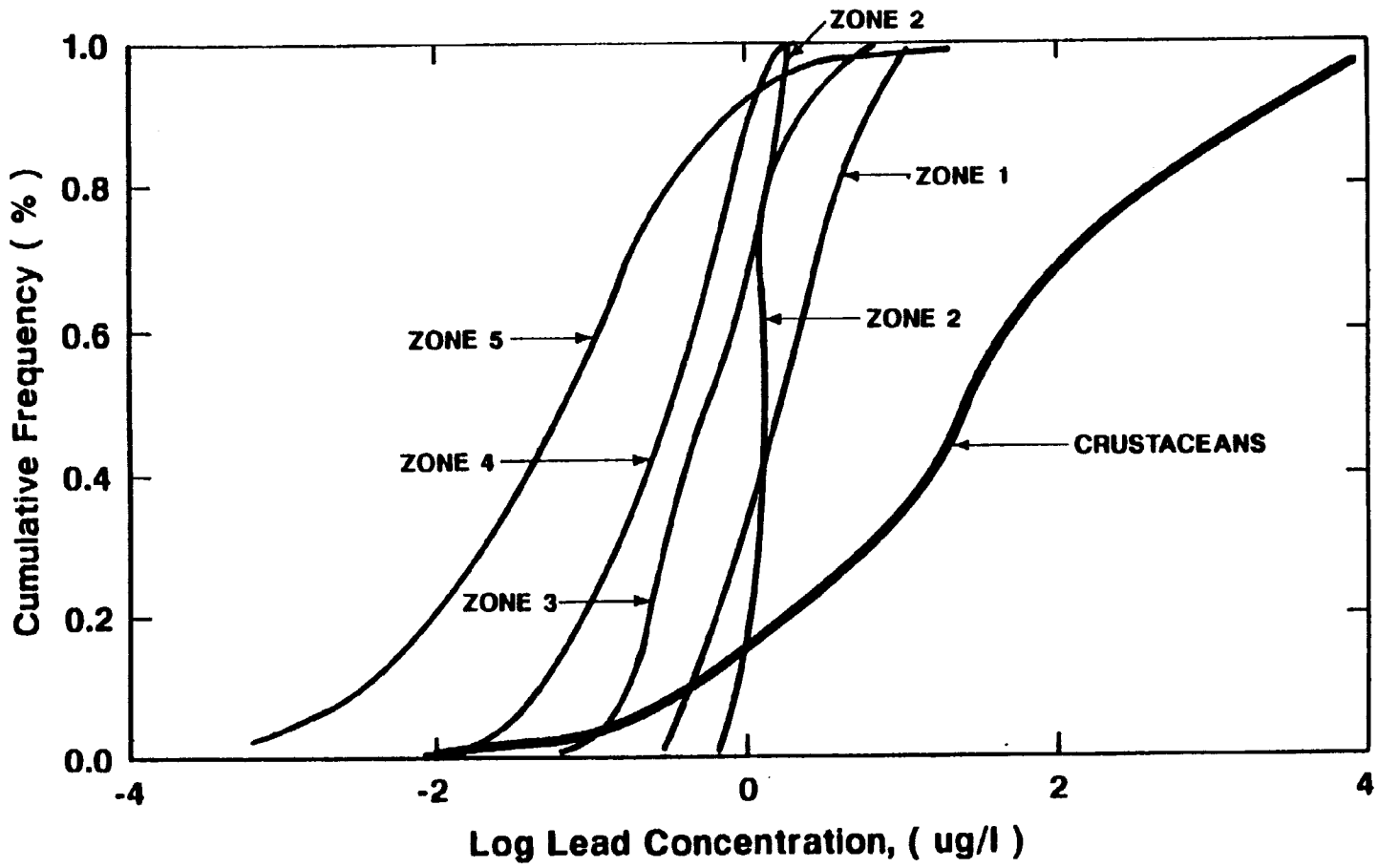

FIGURE C-14
MATC FOR CRUSTACEANS AND
ECCs FOR ALL ZONES, LEAD, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

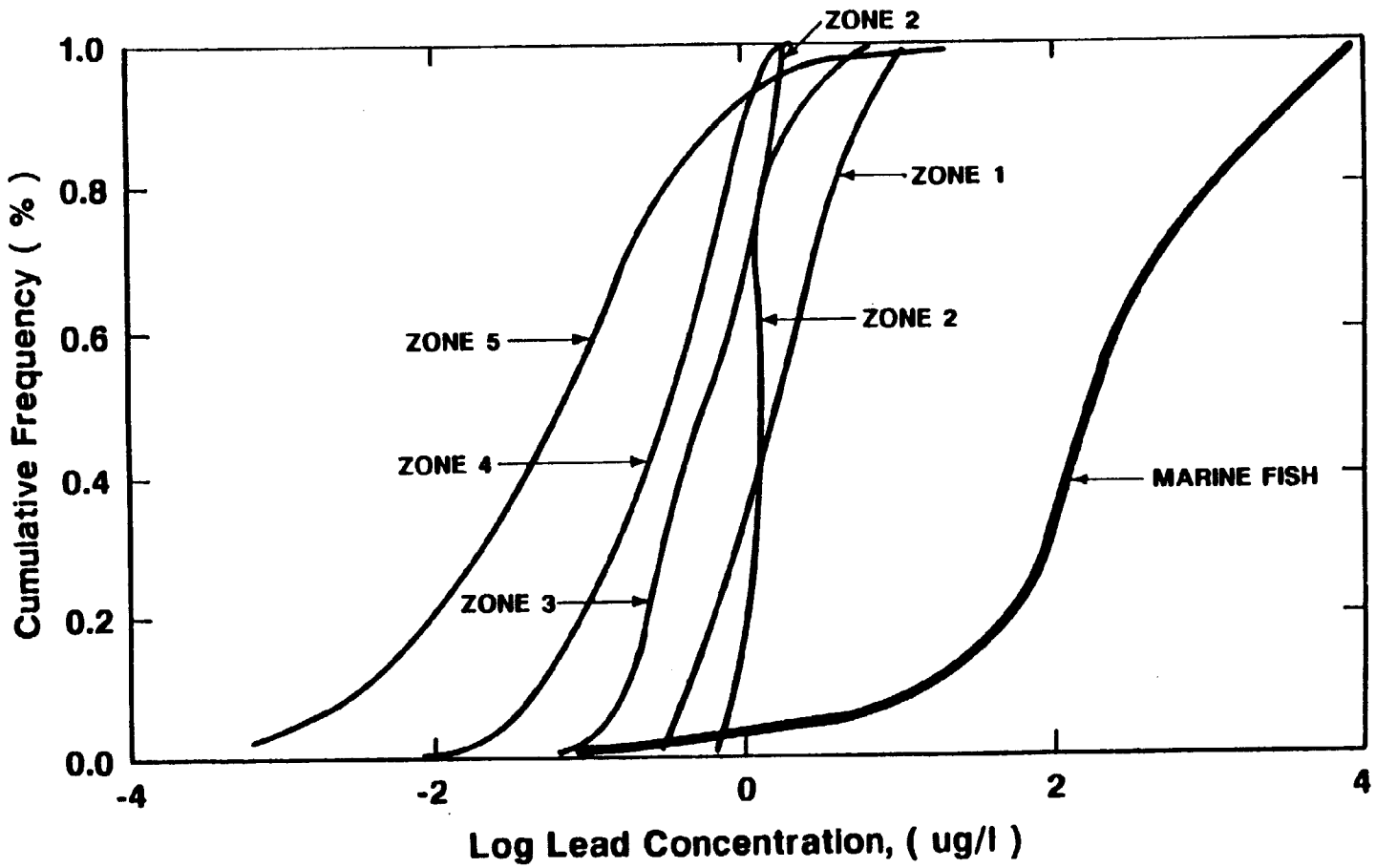

FIGURE C-15
MATC FOR MARINE FISH AND
EECs FOR ALL ZONES, LEAD, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

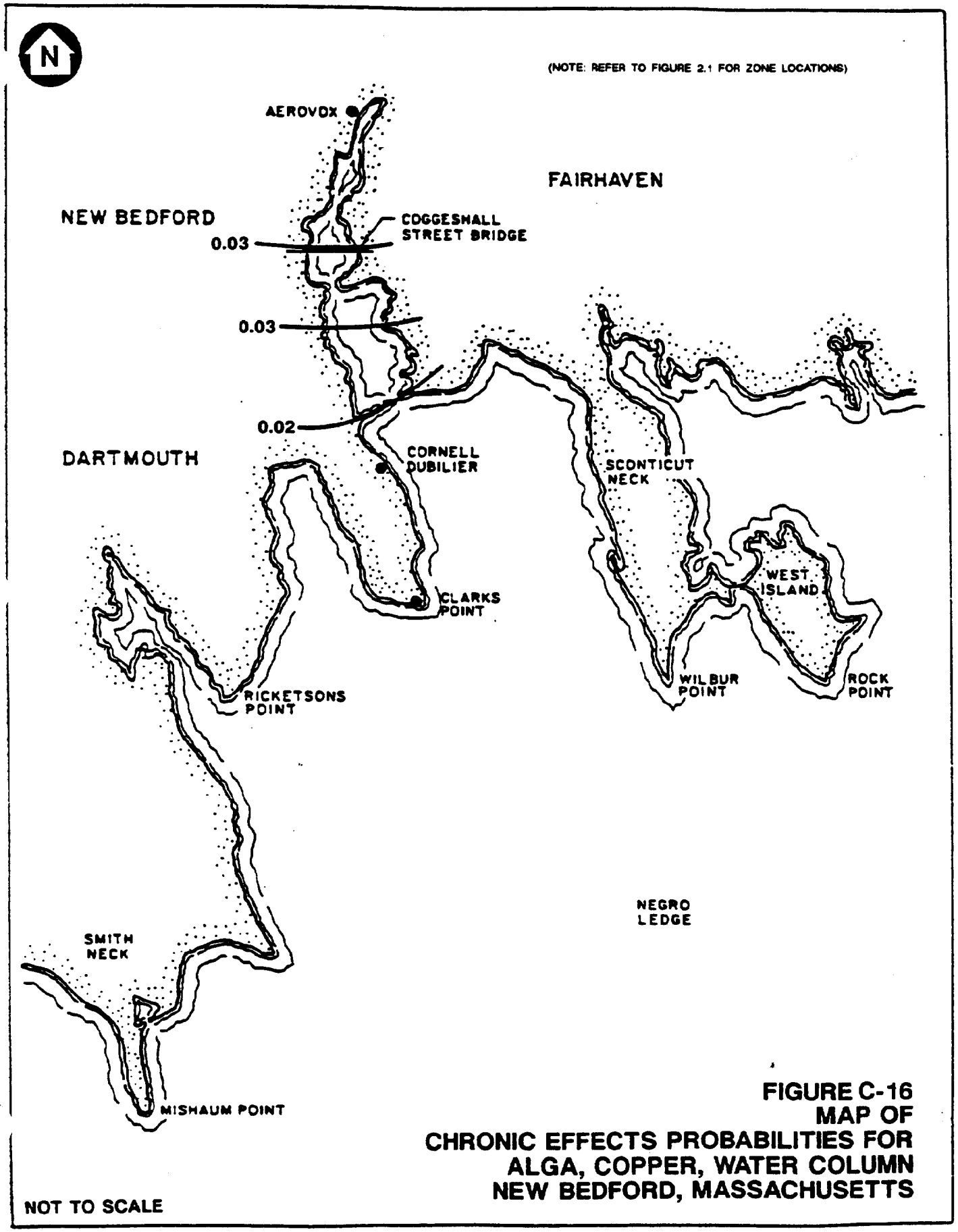

FIGURE C-16
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
ALGA, COPPER, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

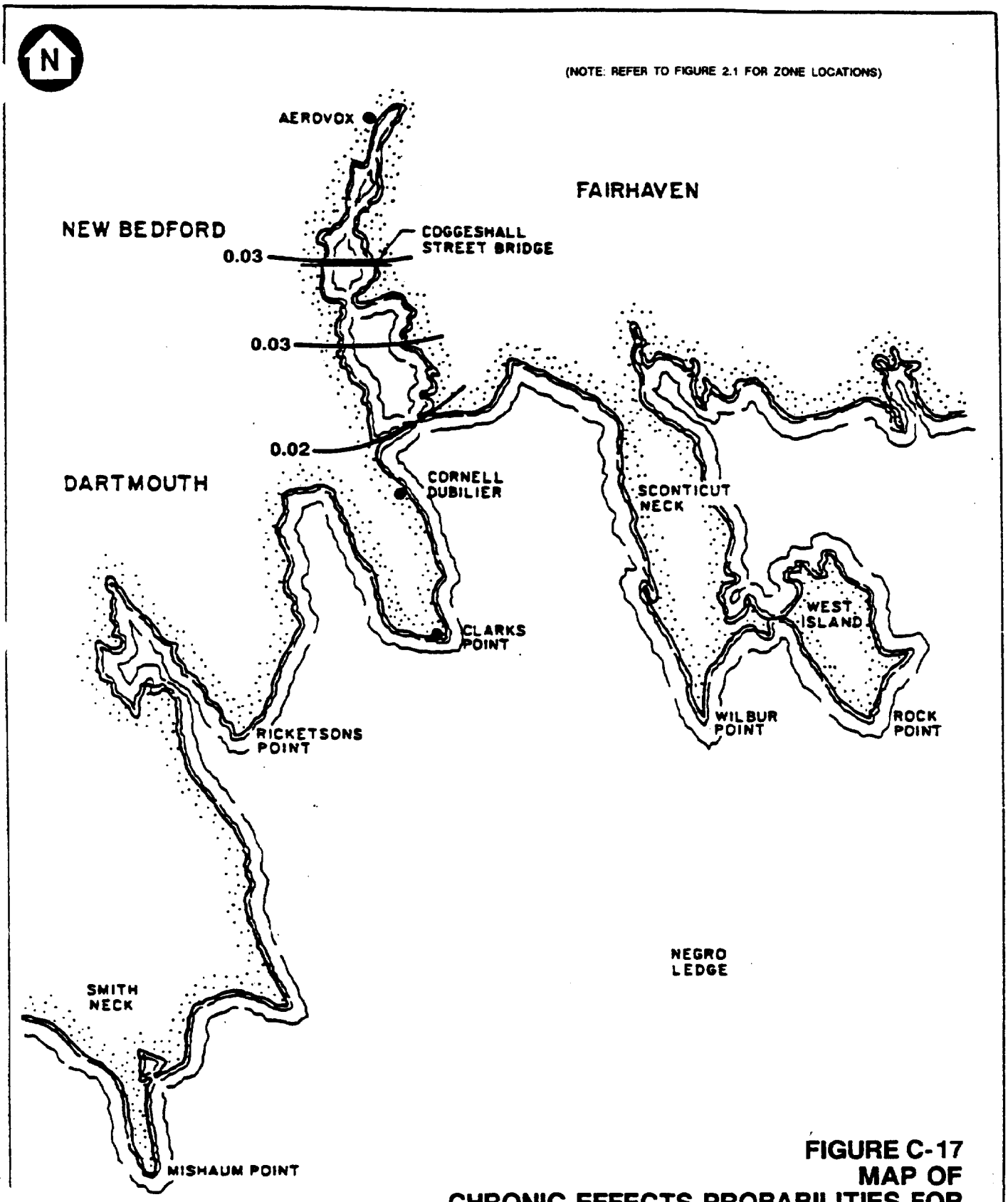

FIGURE C-17
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR POLYCHAETES, COPPER, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

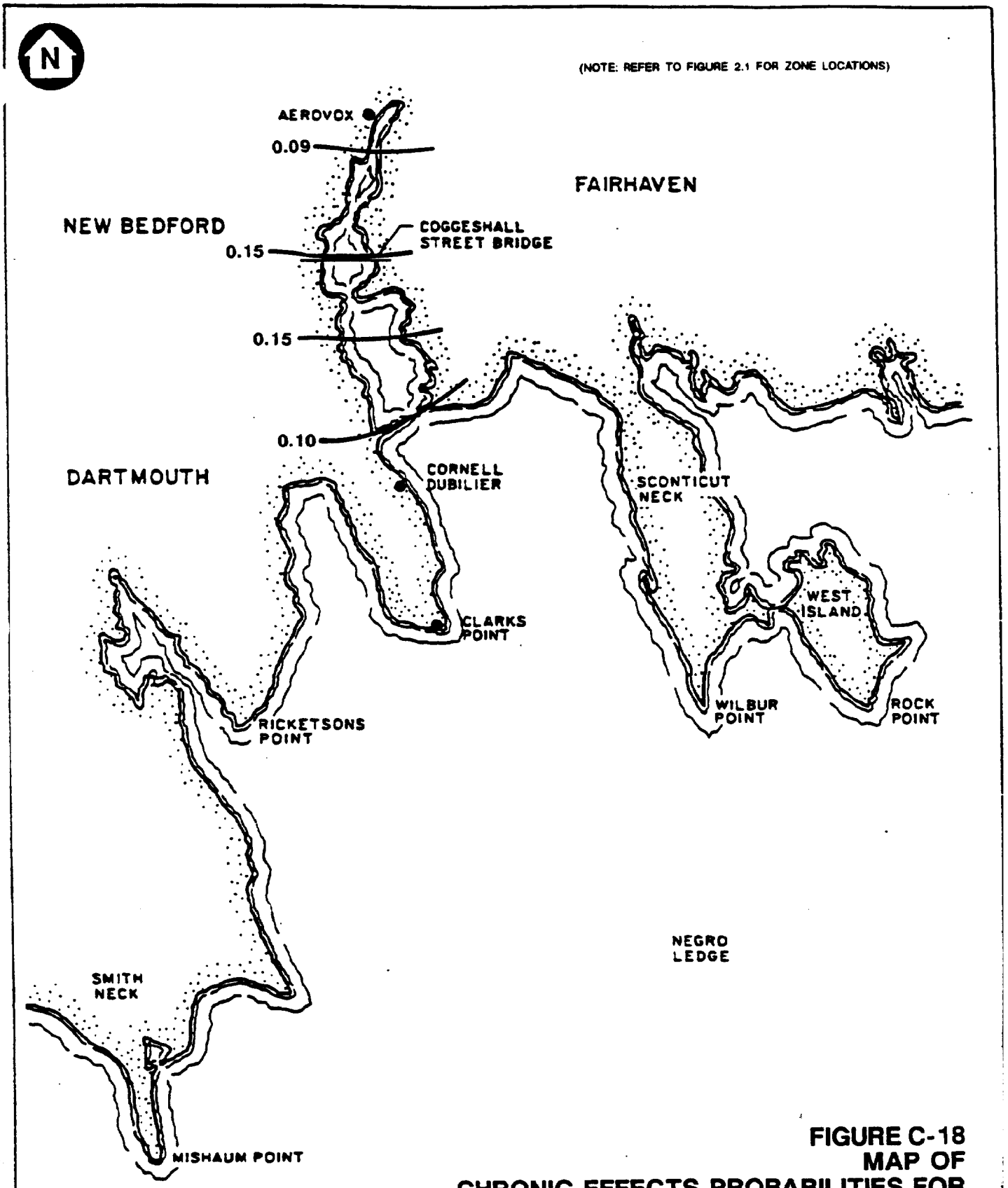

FIGURE C-18
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR MOLLUSKS, COPPER, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

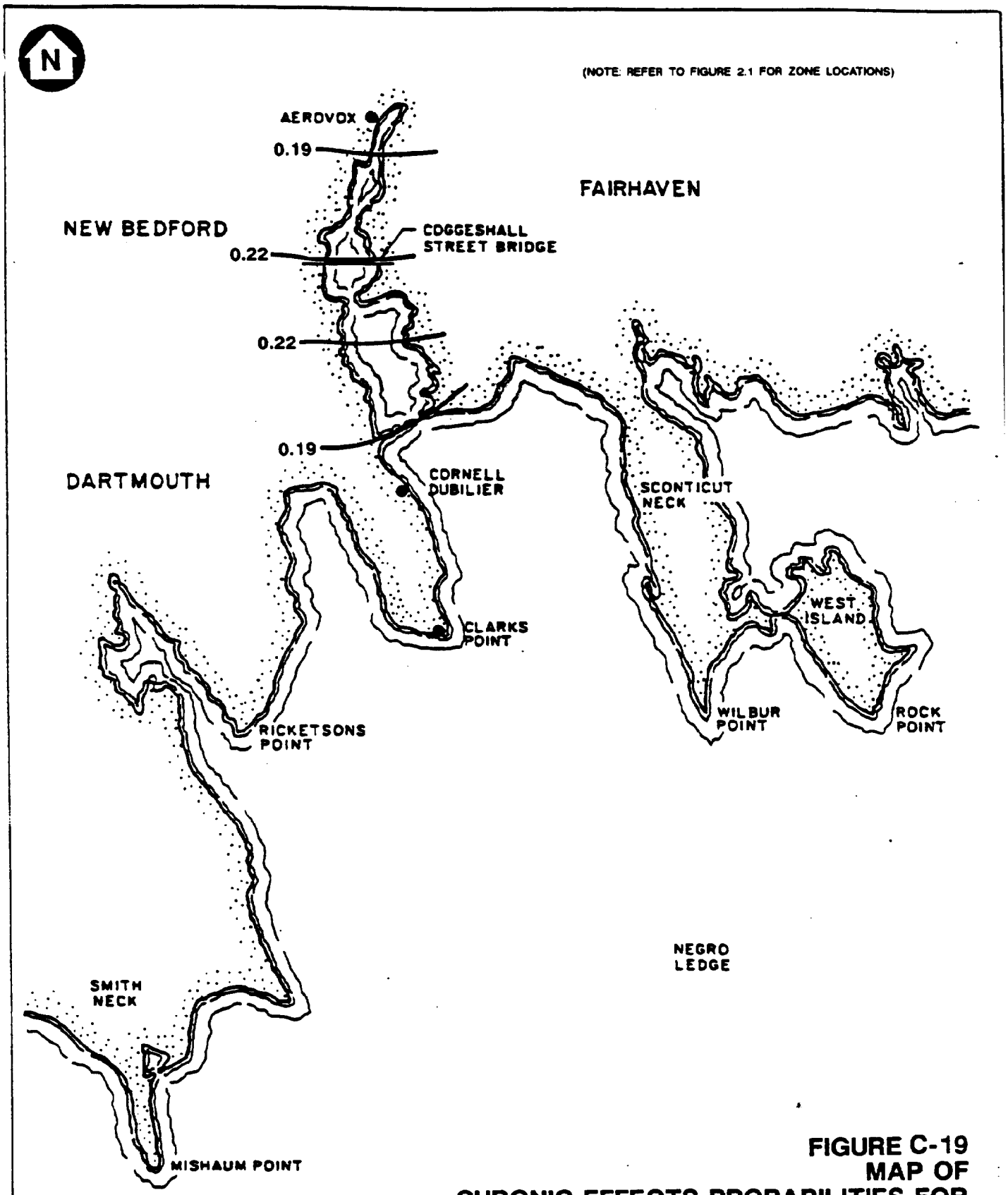

FIGURE C-19
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
CRUSTACEANS, COPPER, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

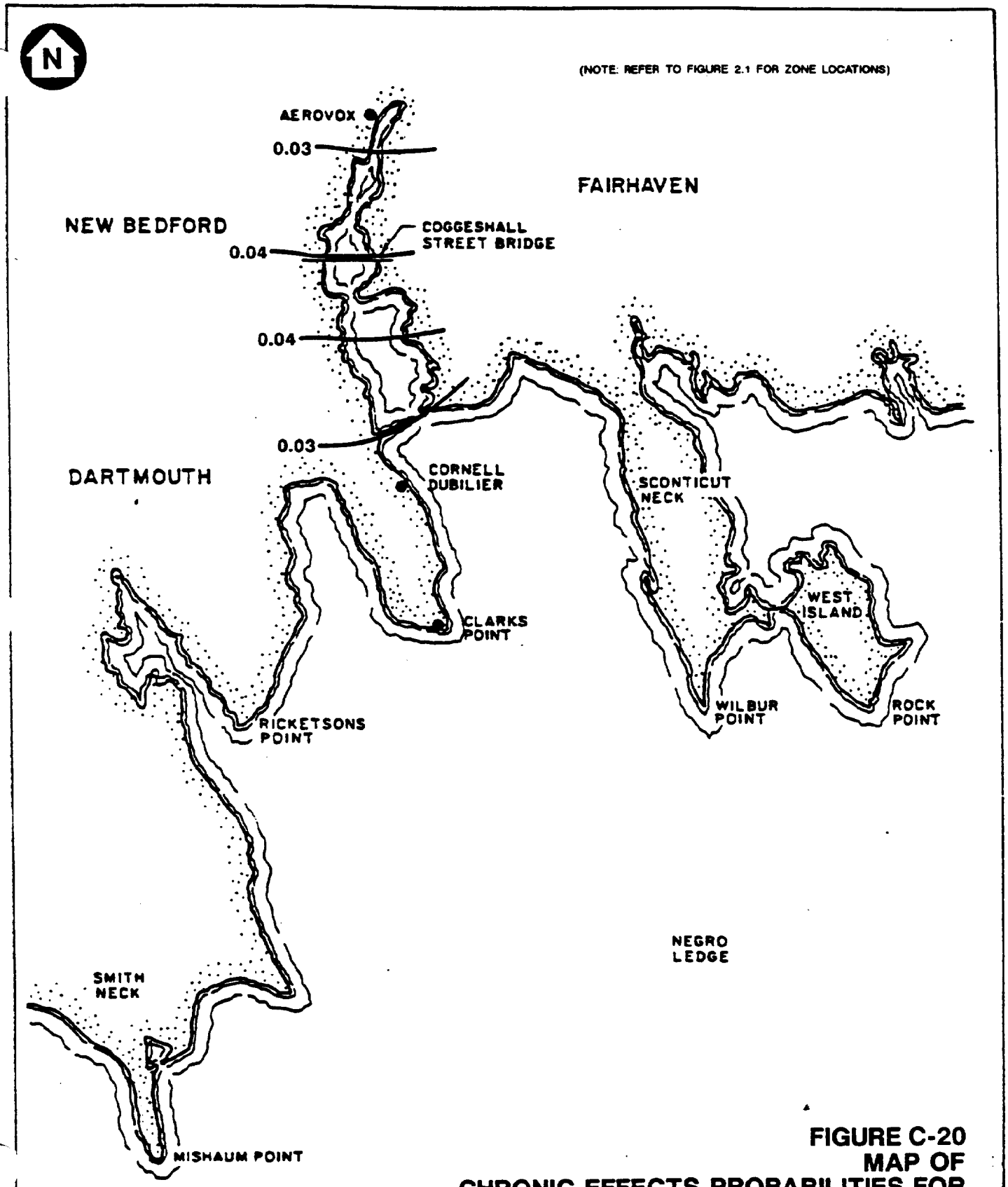

FIGURE C-20
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
MARINE FISH, COPPER, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

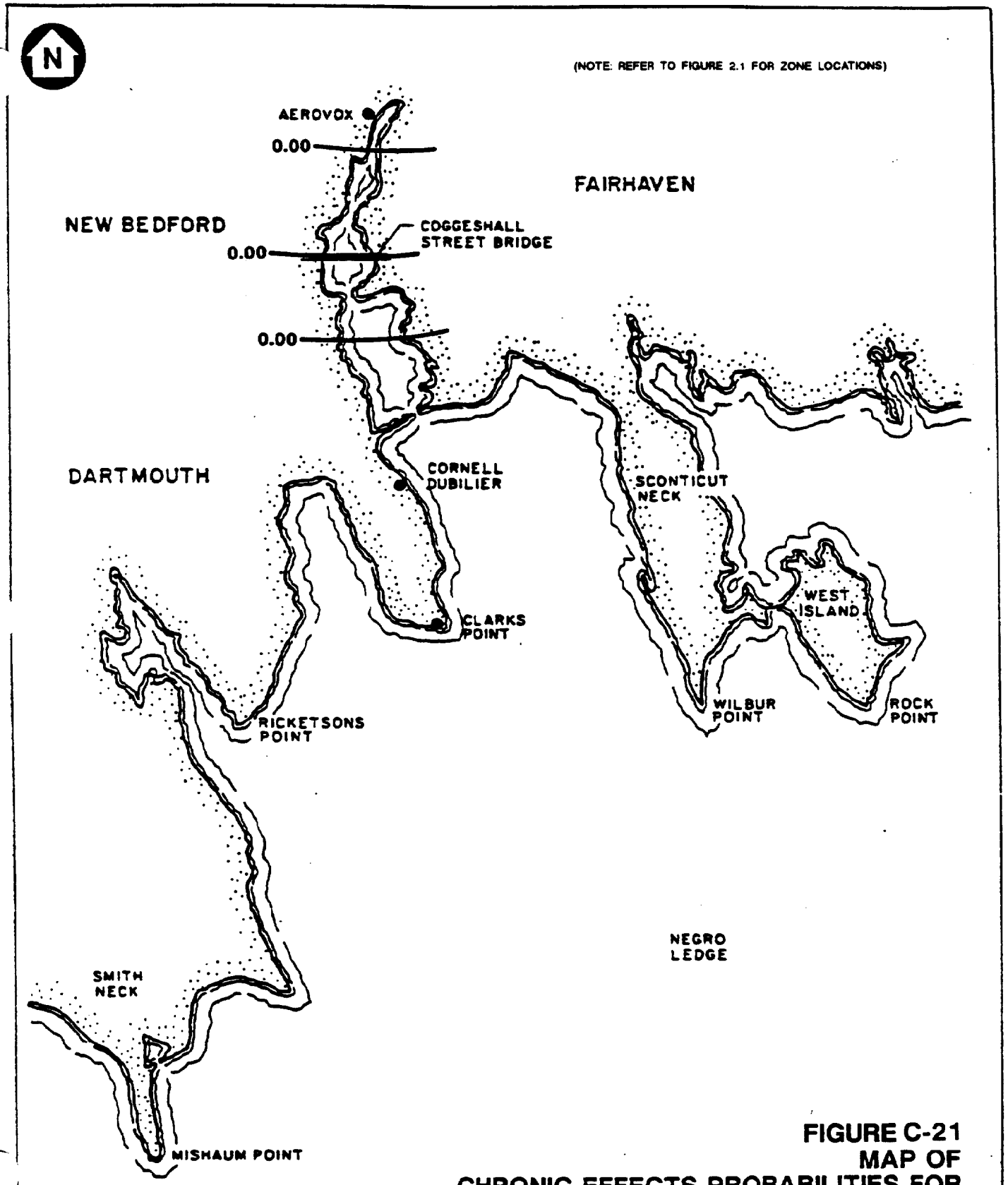

FIGURE C-21
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
ALGA, CADMIUM, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

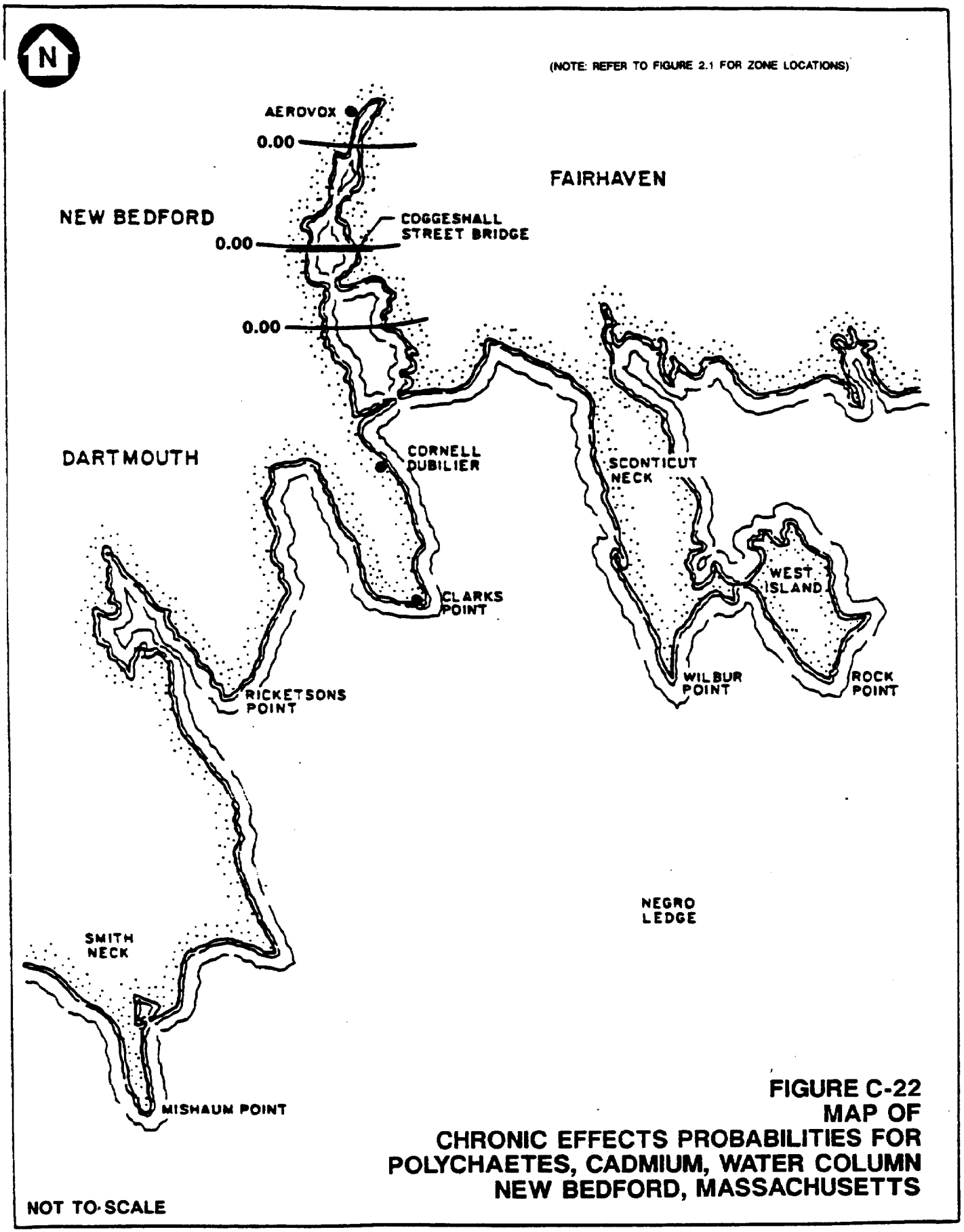

FIGURE C-22
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR POLYCHAETES, CADMIUM, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

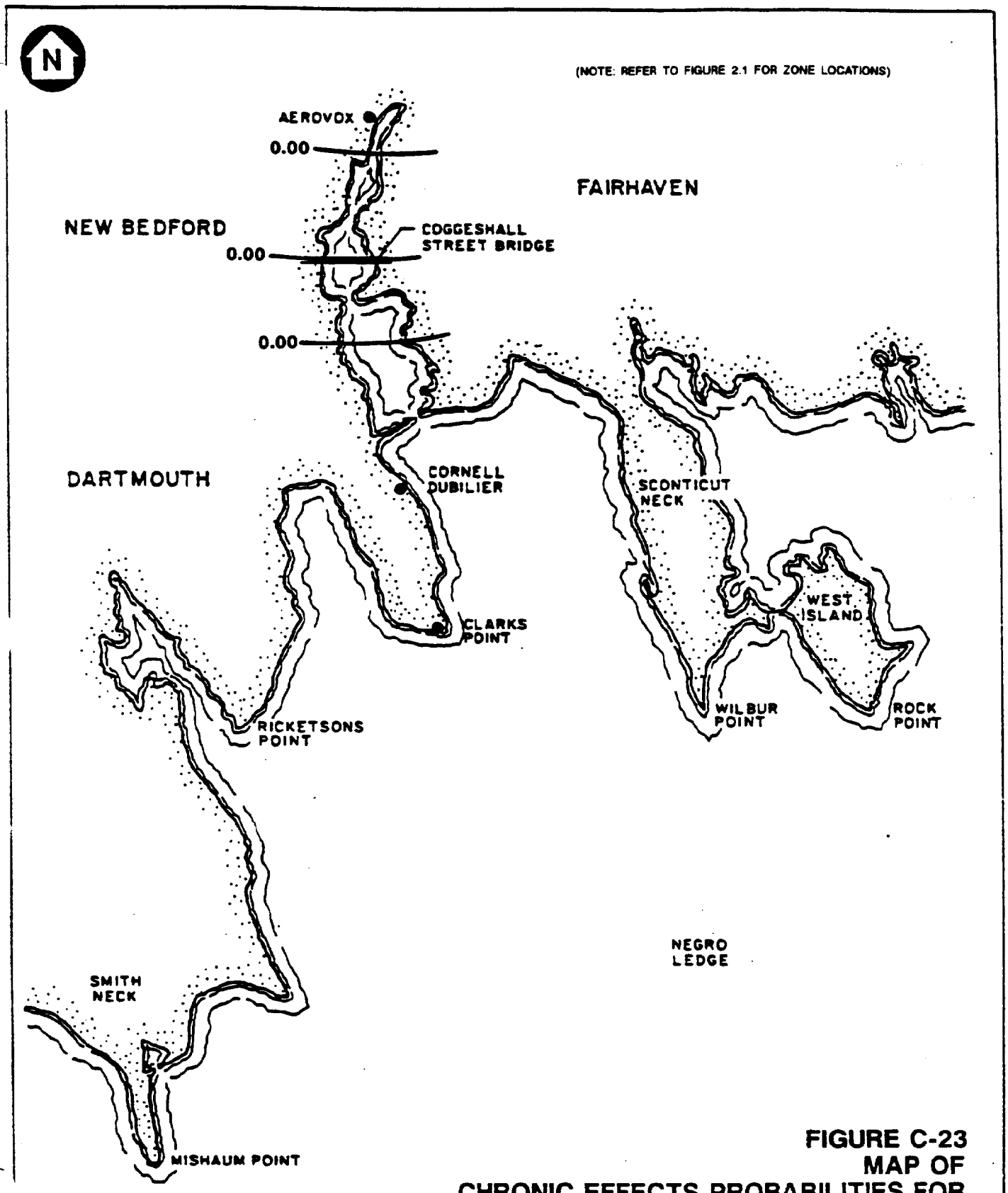

FIGURE C-23
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
MOLLUSKS, CADMIUM, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

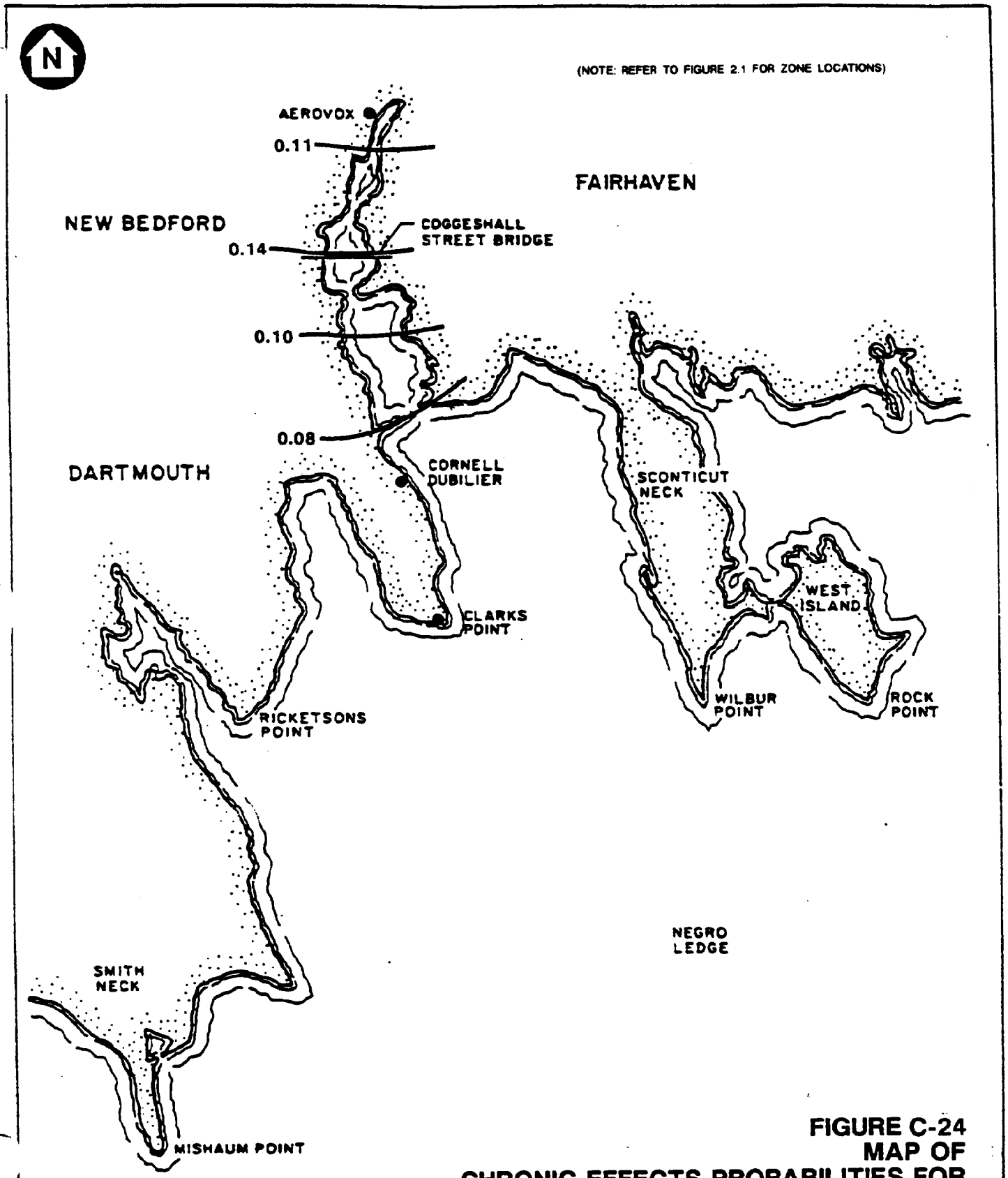

FIGURE C-24
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
CRUSTACEANS, CADMIUM, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

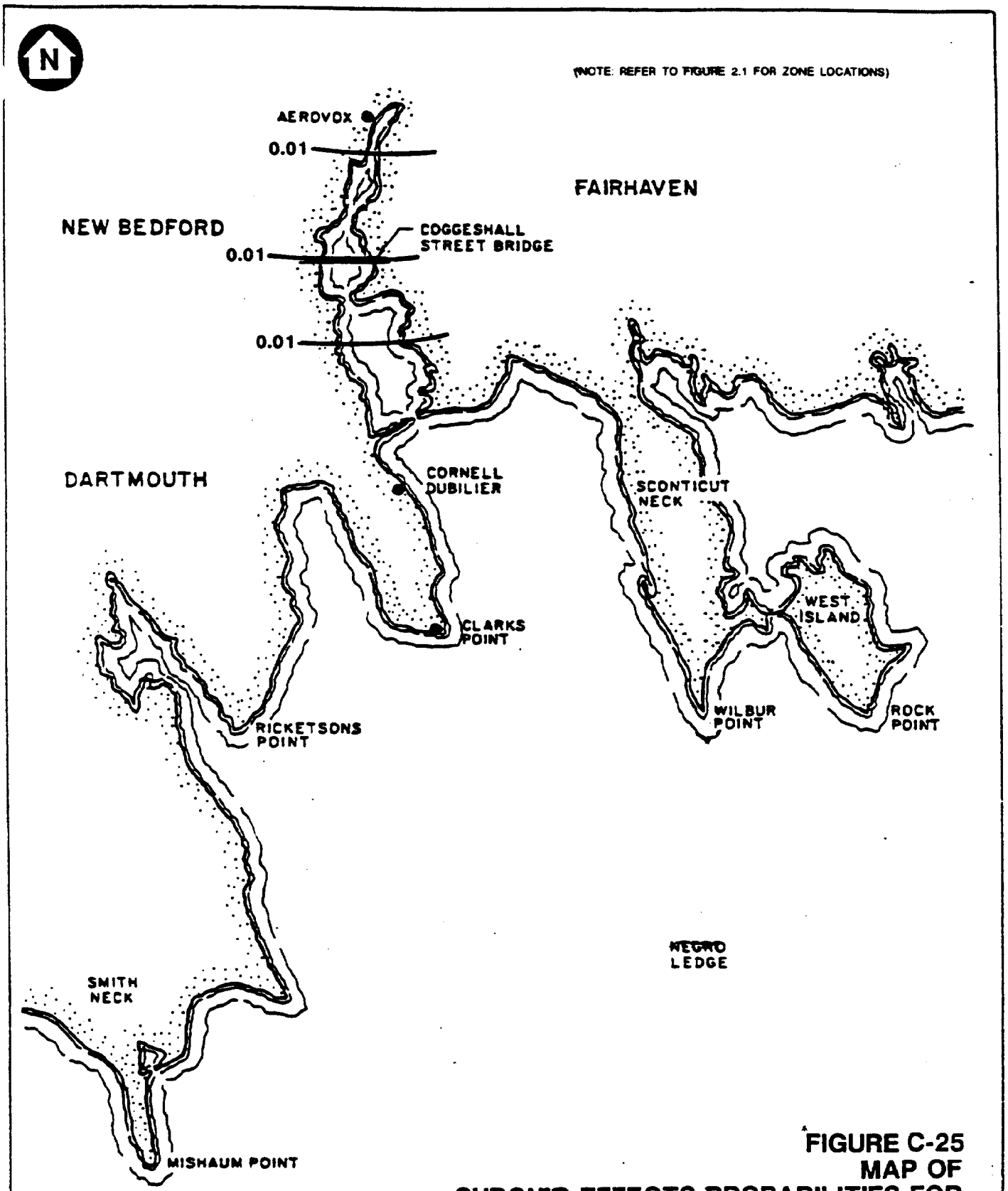

FIGURE C-25
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
MARINE FISH, CADMIUM, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

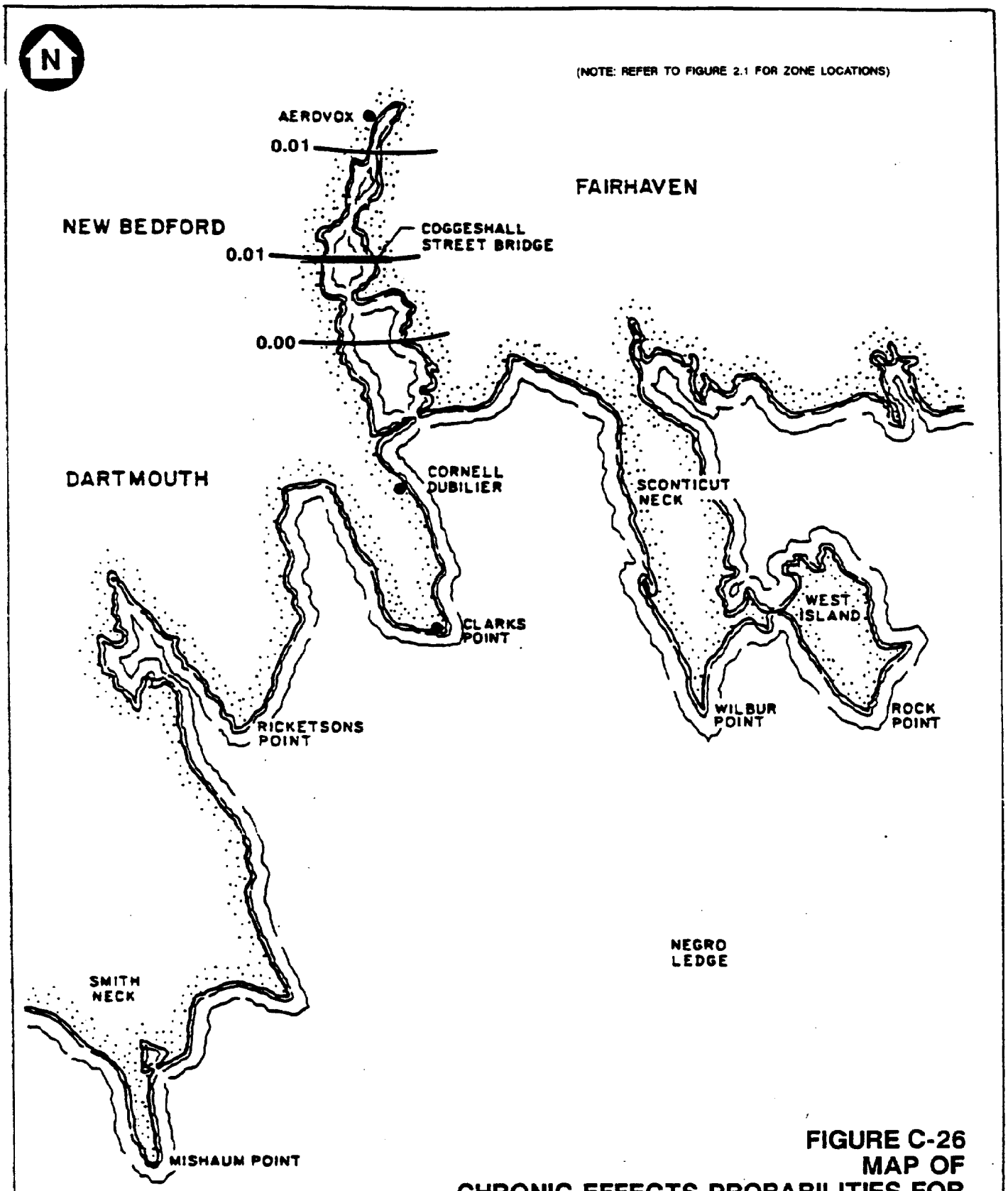

FIGURE C-26
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
ALGA, LEAD, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

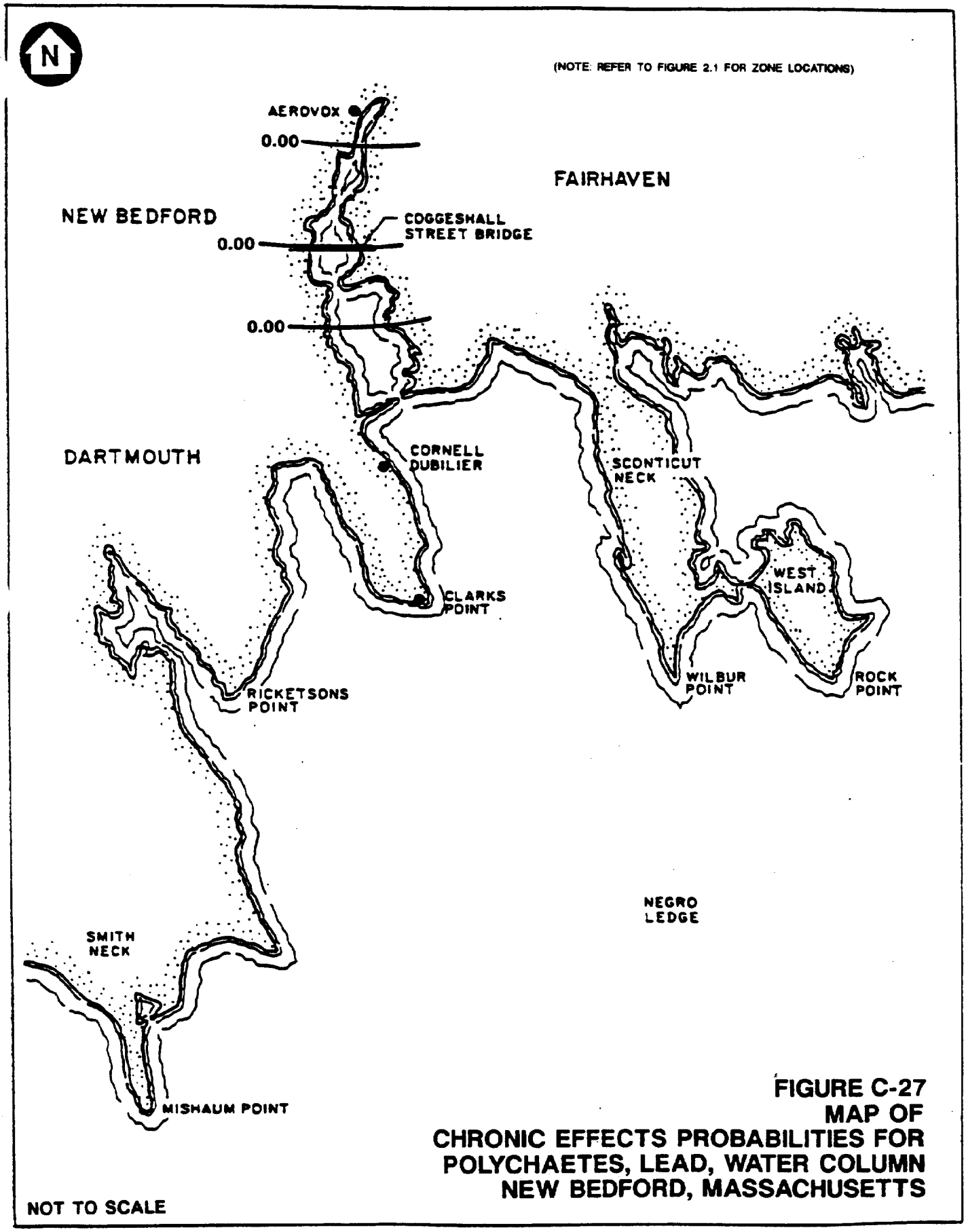

FIGURE C-27
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
POLYCHAETES, LEAD, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

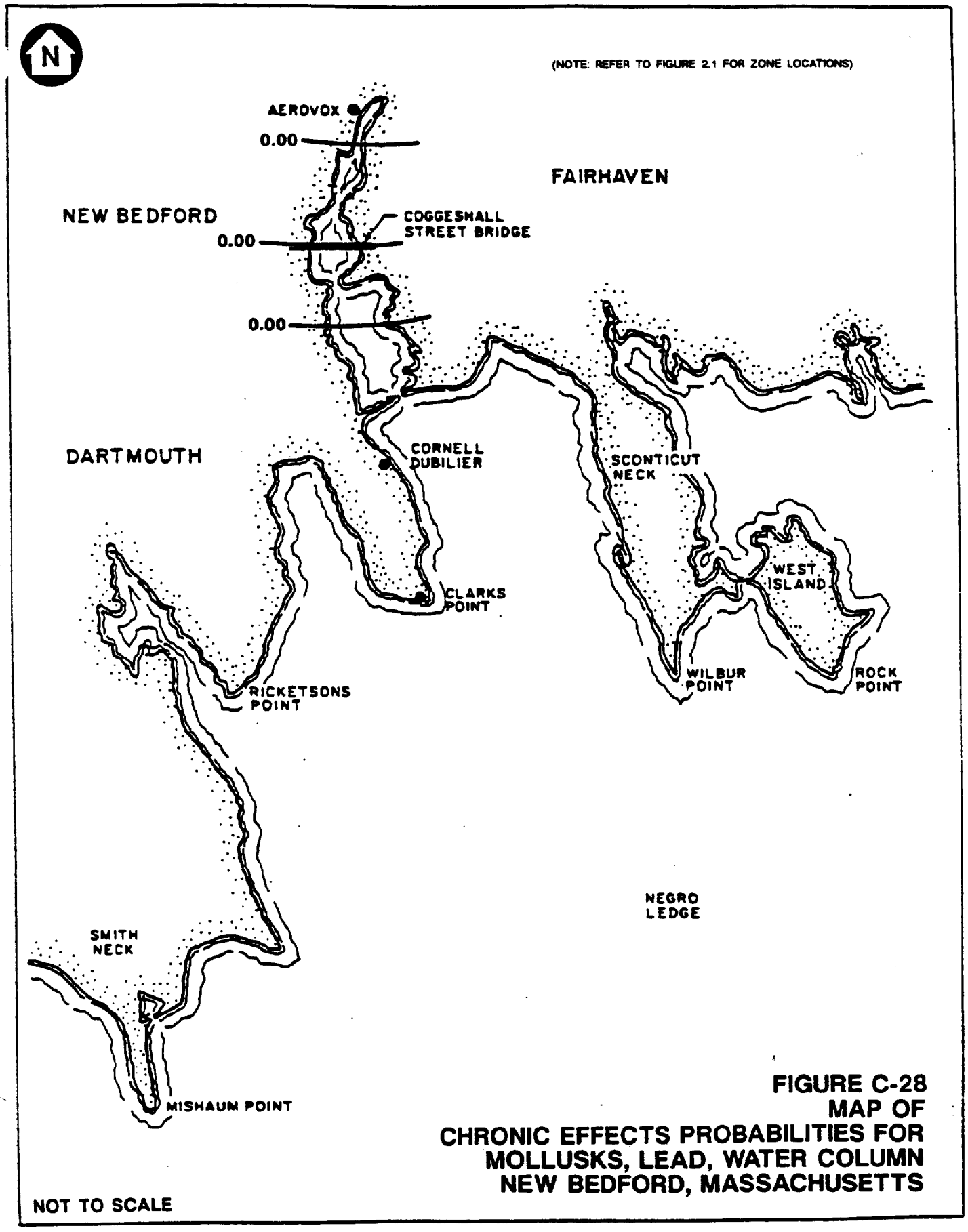

FIGURE C-28
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
MOLLUSKS, LEAD, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

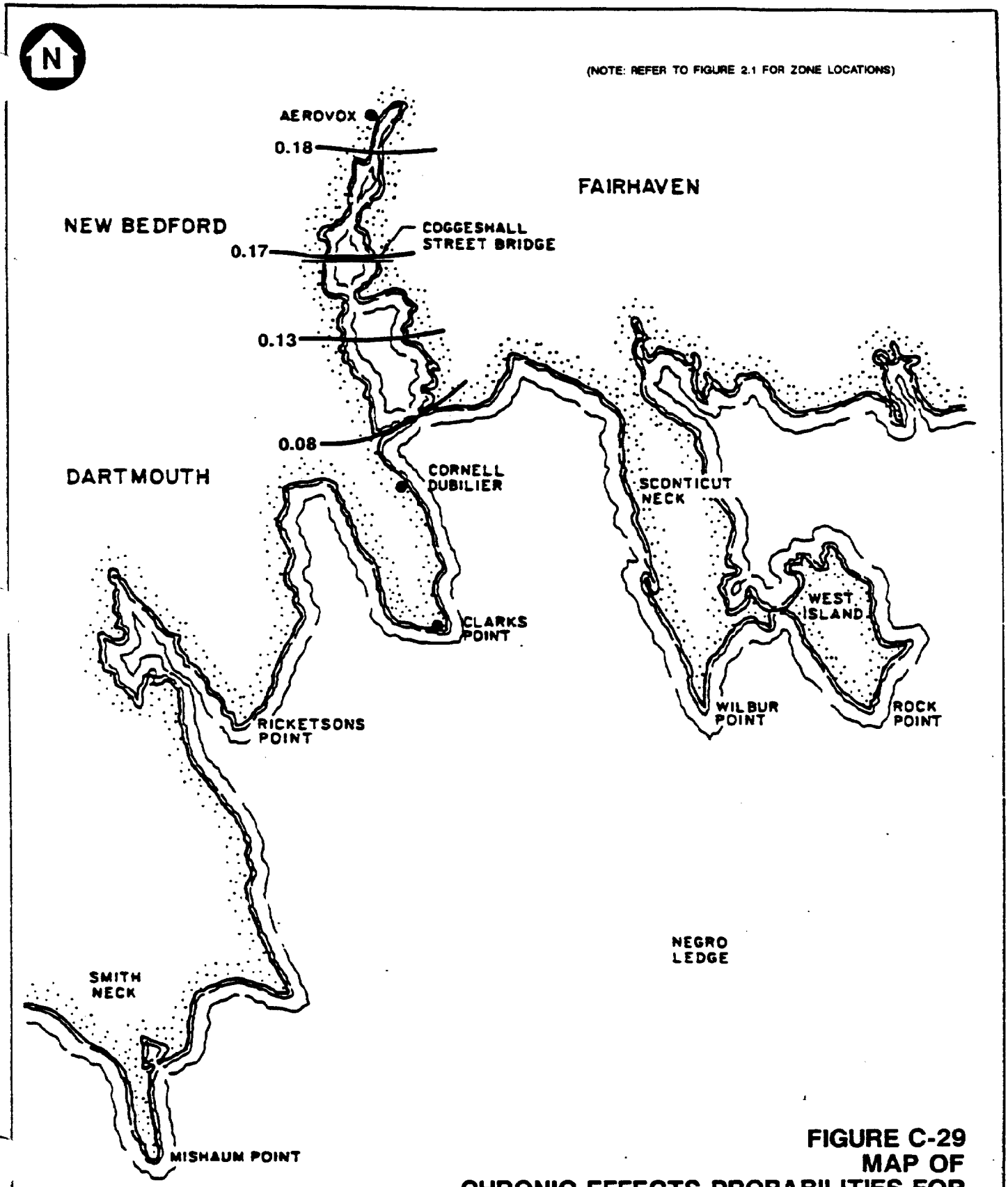

FIGURE C-29
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
CRUSTACEANS, LEAD, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

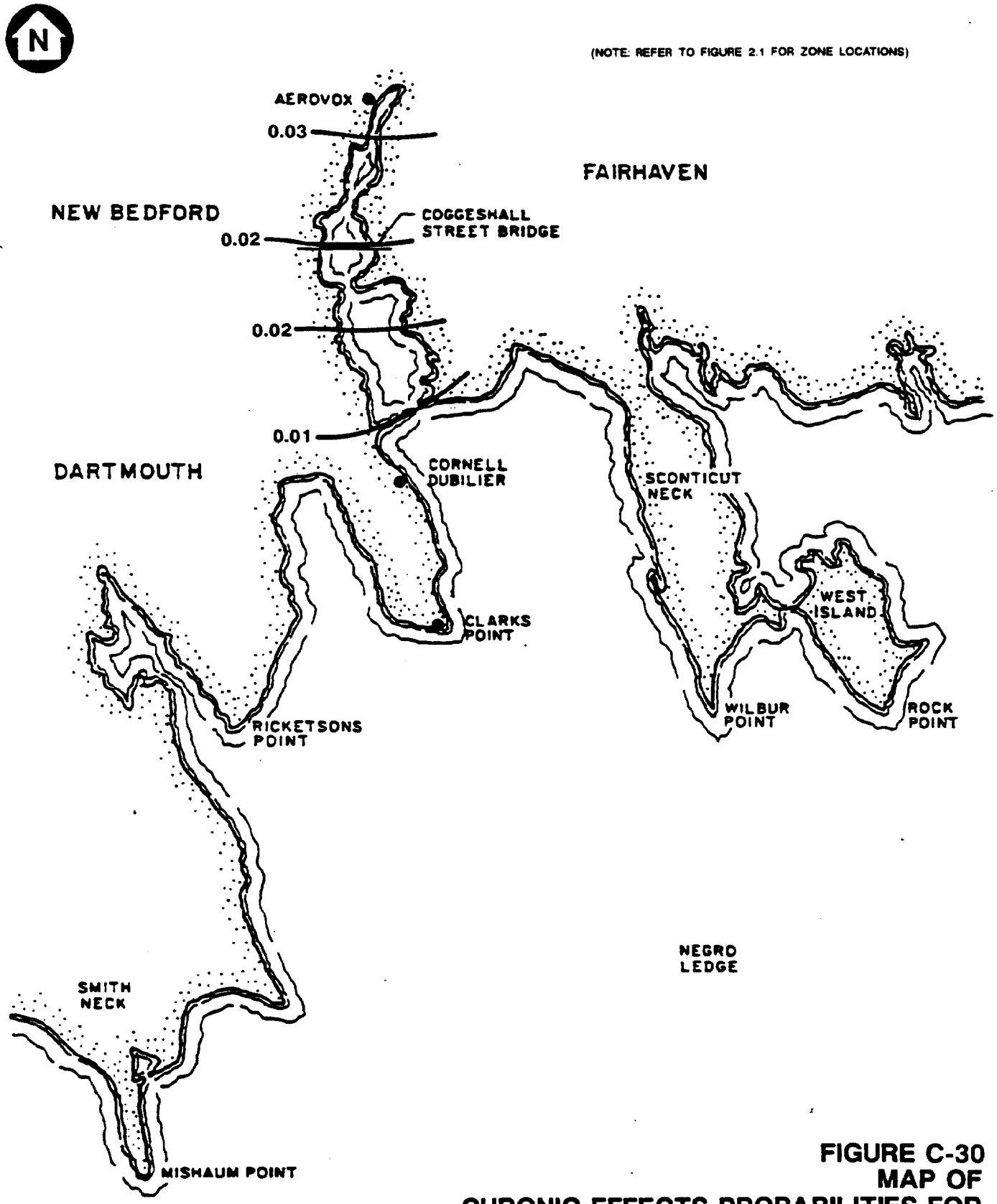

FIGURE C-30
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
MARINE FISH, LEAD, WATER COLUMN
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

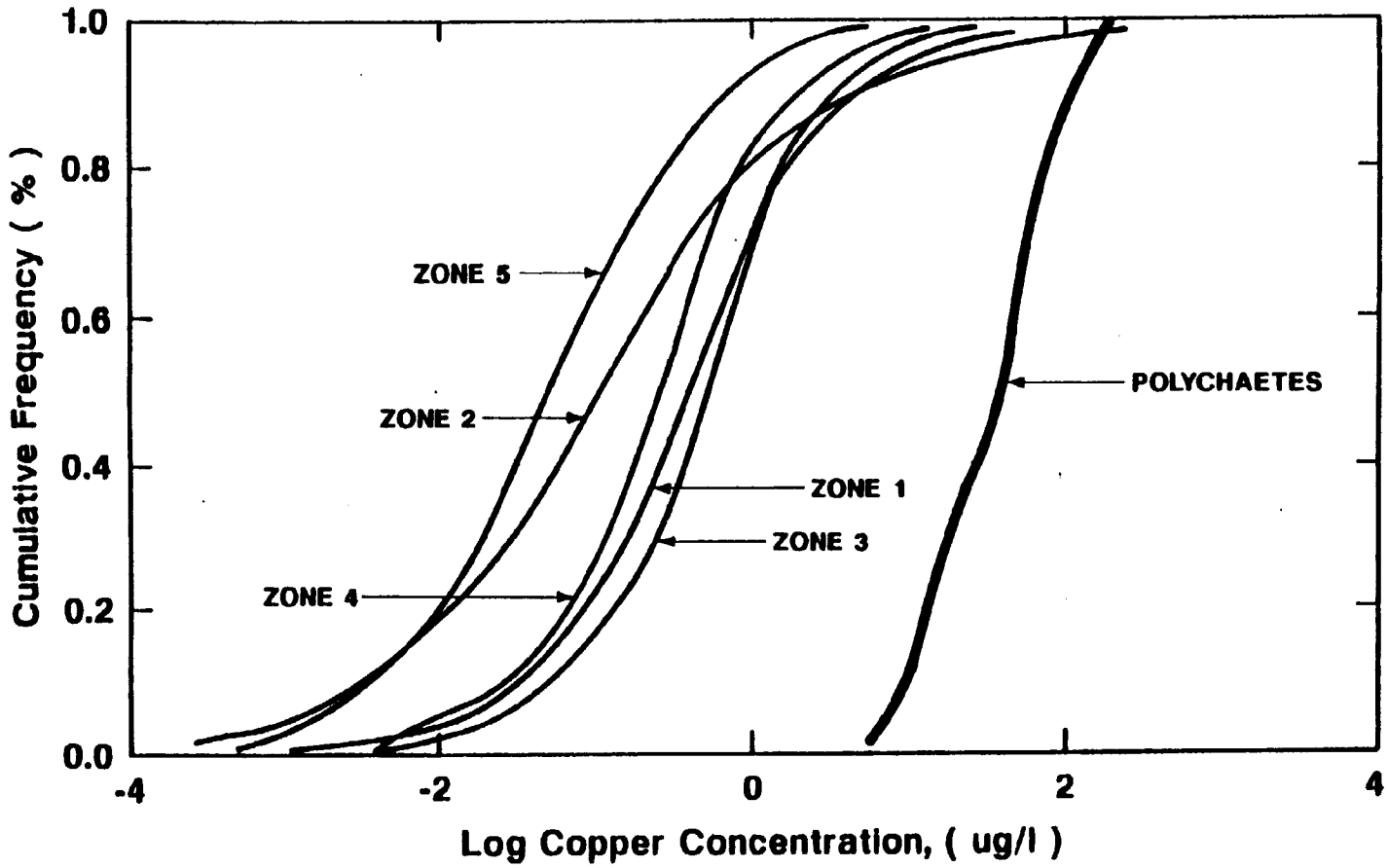

FIGURE C-31
MATC FOR POLYCHAETES AND
EECs FOR ALL ZONES, COPPER, PORE WATER
NEW BEDFORD, MASSACHUSETTS

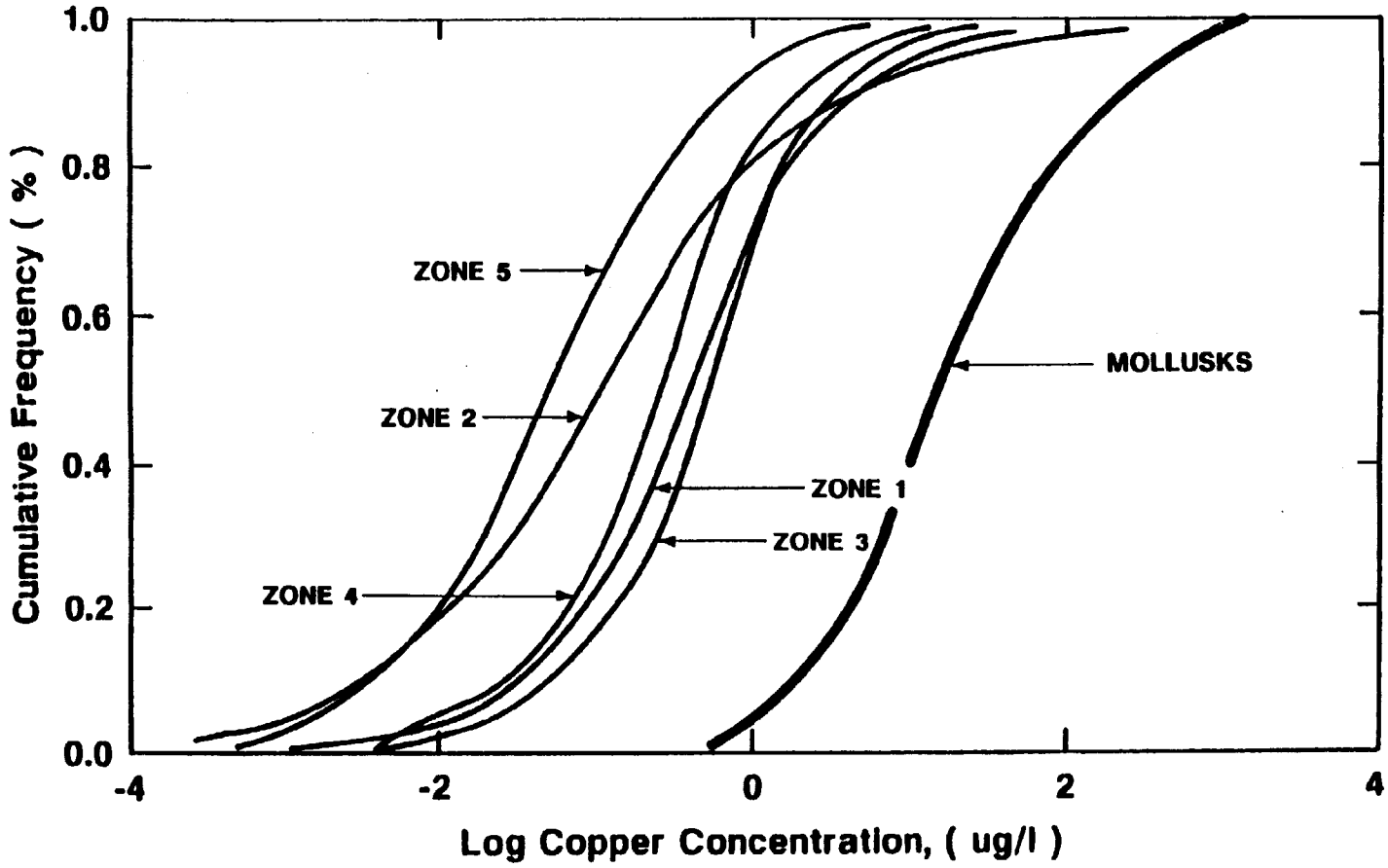

FIGURE C-32
MATC FOR MOLLUSKS AND
EECs FOR ALL ZONES, COPPER, PORE WATER
NEW BEDFORD, MASSACHUSETTS

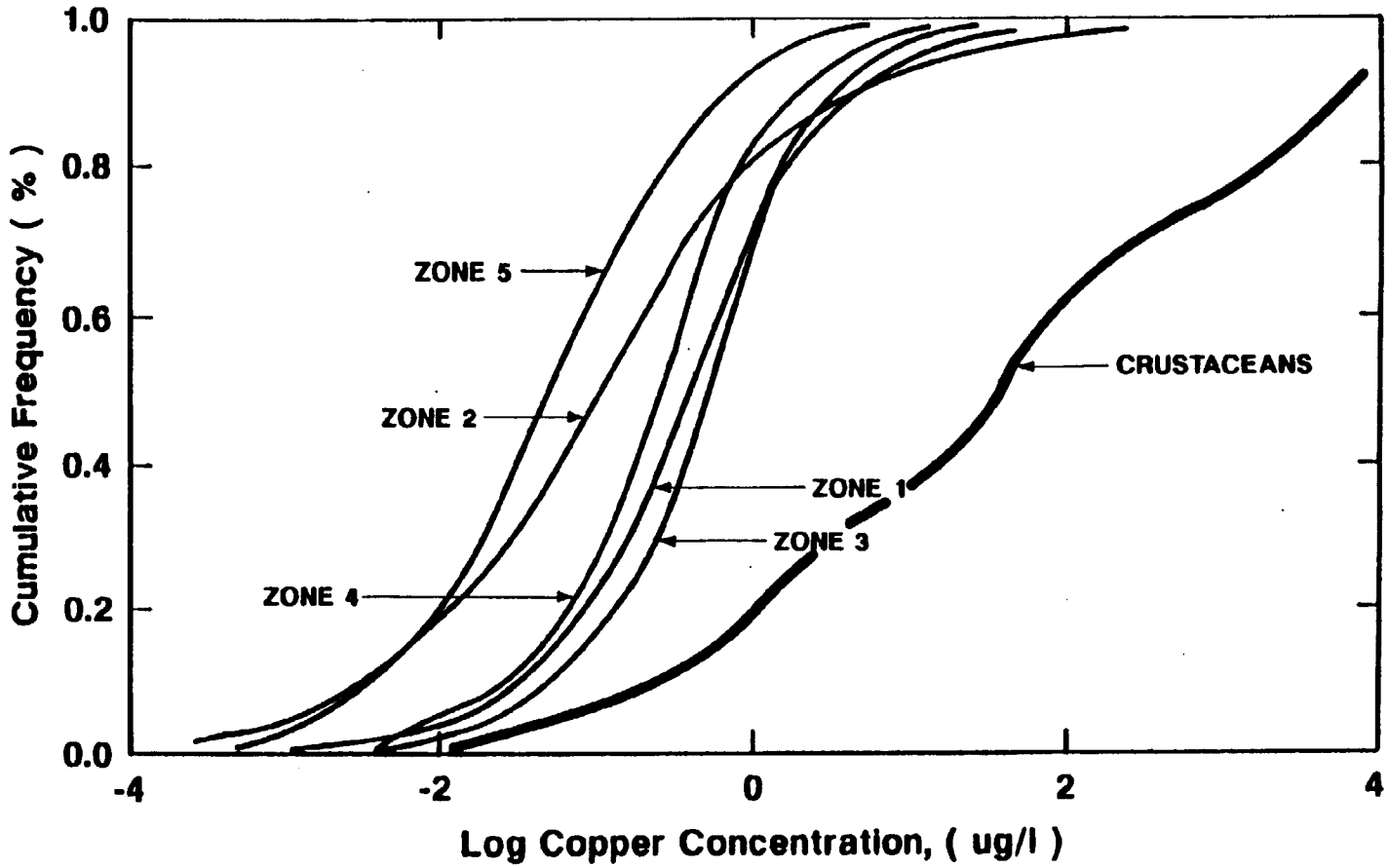

FIGURE C-33
MATC FOR CRUSTACEANS AND
EECs FOR ALL ZONES, COPPER, PORE WATER
NEW BEDFORD, MASSACHUSETTS

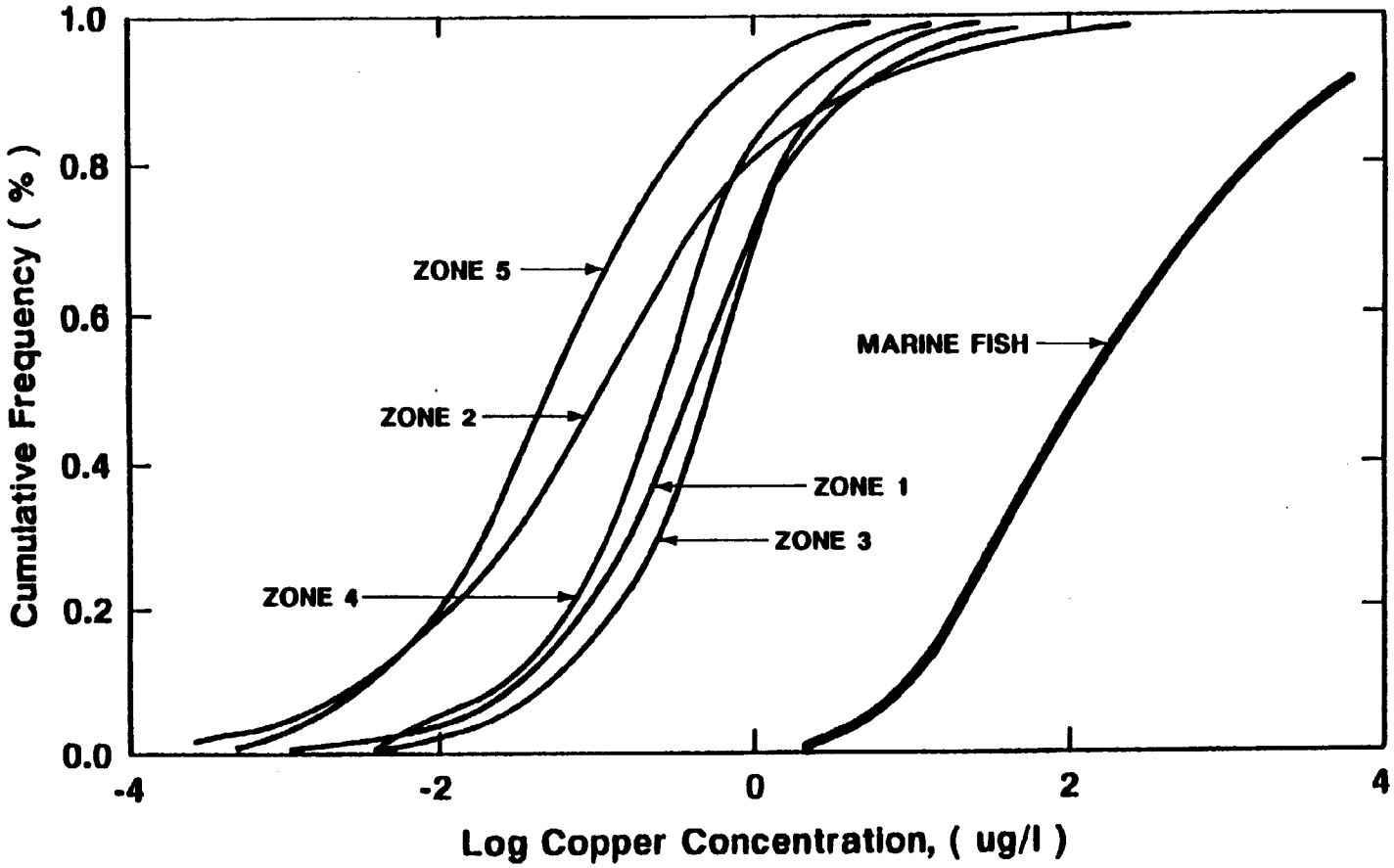

FIGURE C-34
MATC FOR MARINE FISH AND
EECs FOR ALL ZONES, COPPER, PORE WATER
NEW BEDFORD, MASSACHUSETTS

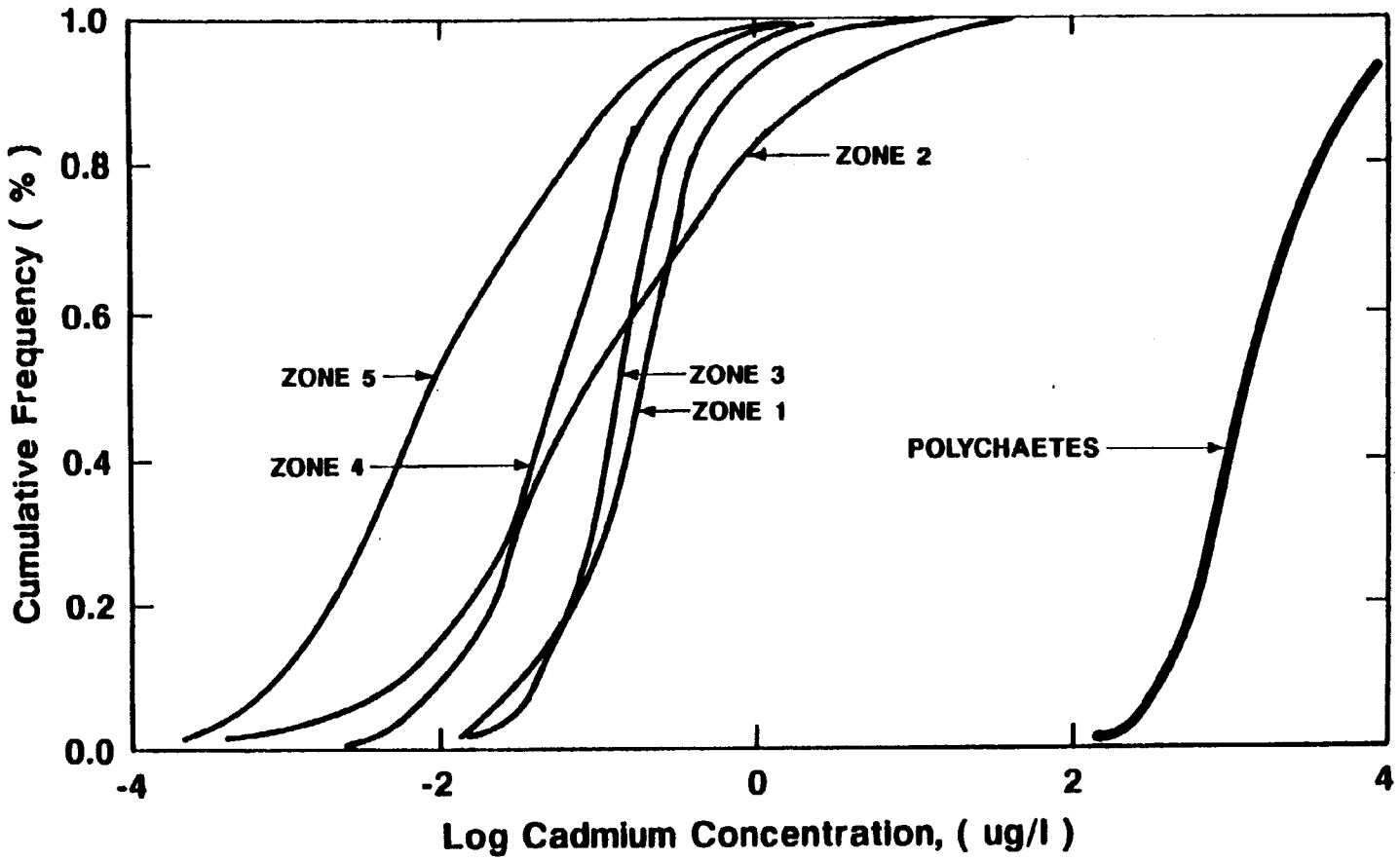

FIGURE C-35
MATC FOR POLYCHAETES AND
EECs FOR ALL ZONES, CADMIUM, PORE WATER
NEW BEDFORD, MASSACHUSETTS

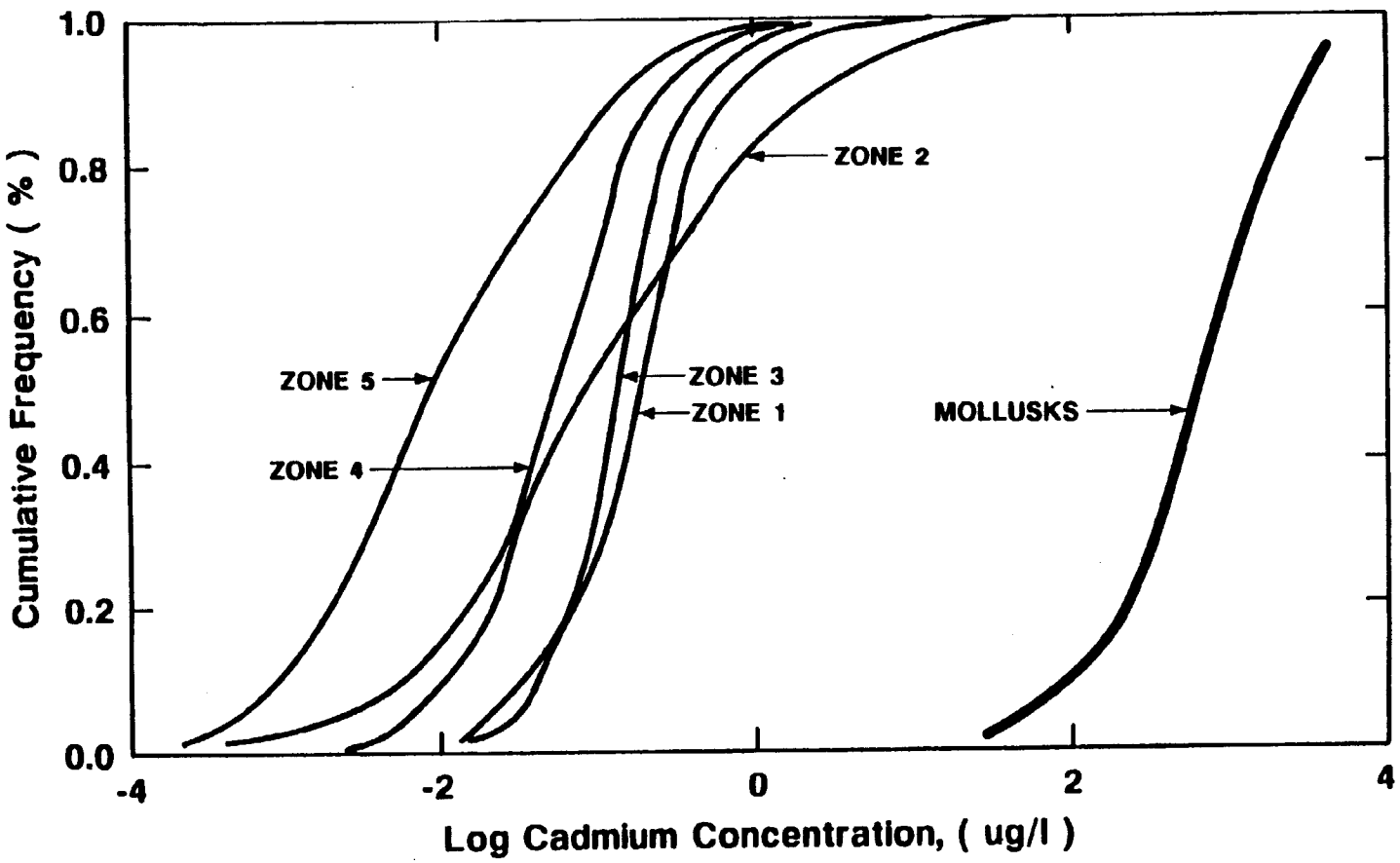

FIGURE C-36
MATC FOR MOLLUSKS AND
EECs FOR ALL ZONES, CADMIUM, PORE WATER
NEW BEDFORD, MASSACHUSETTS

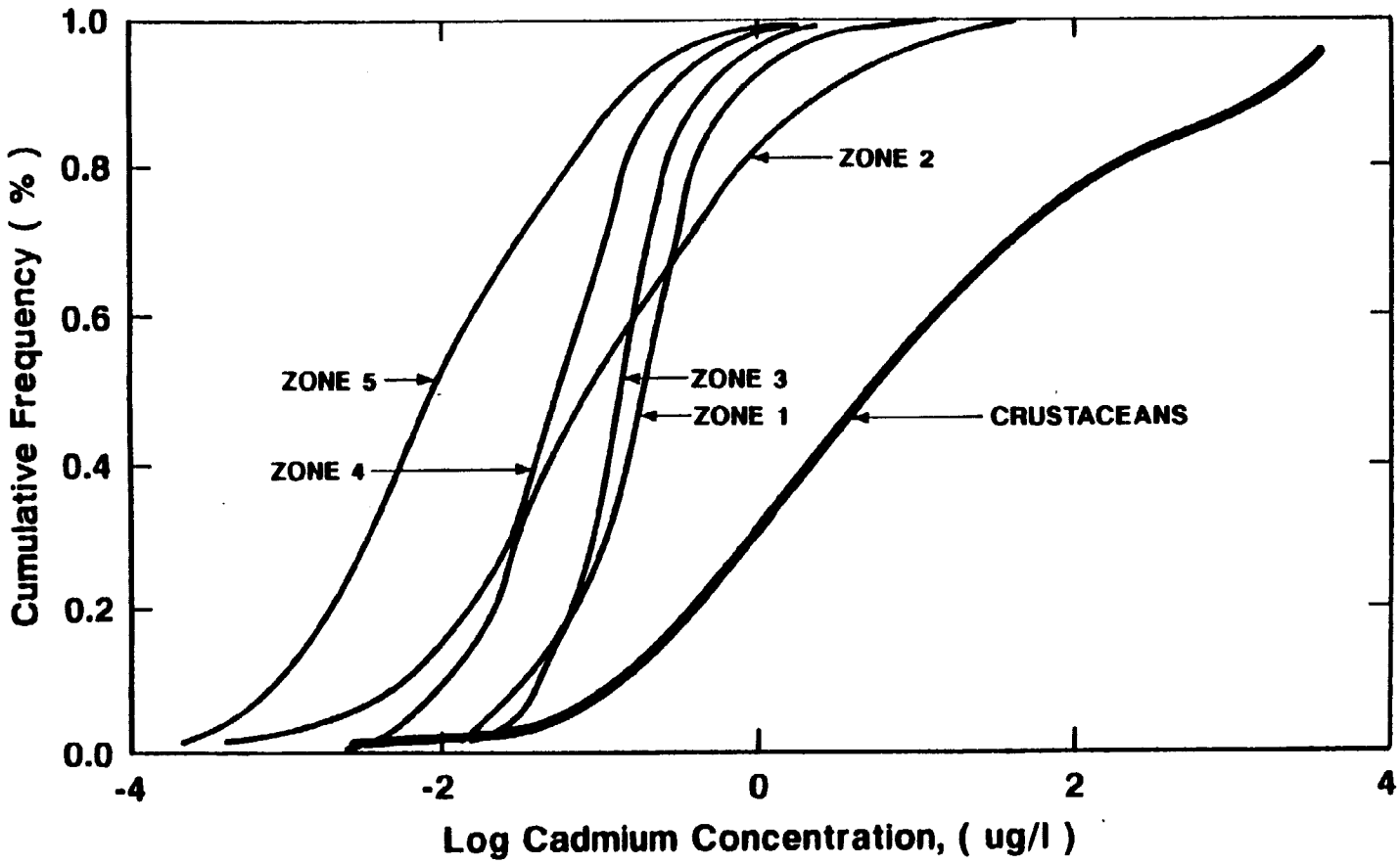

FIGURE C-37
MATC FOR CRUSTACEANS AND
EECs FOR ALL ZONES, CADMIUM, PORE WATER
NEW BEDFORD, MASSACHUSETTS

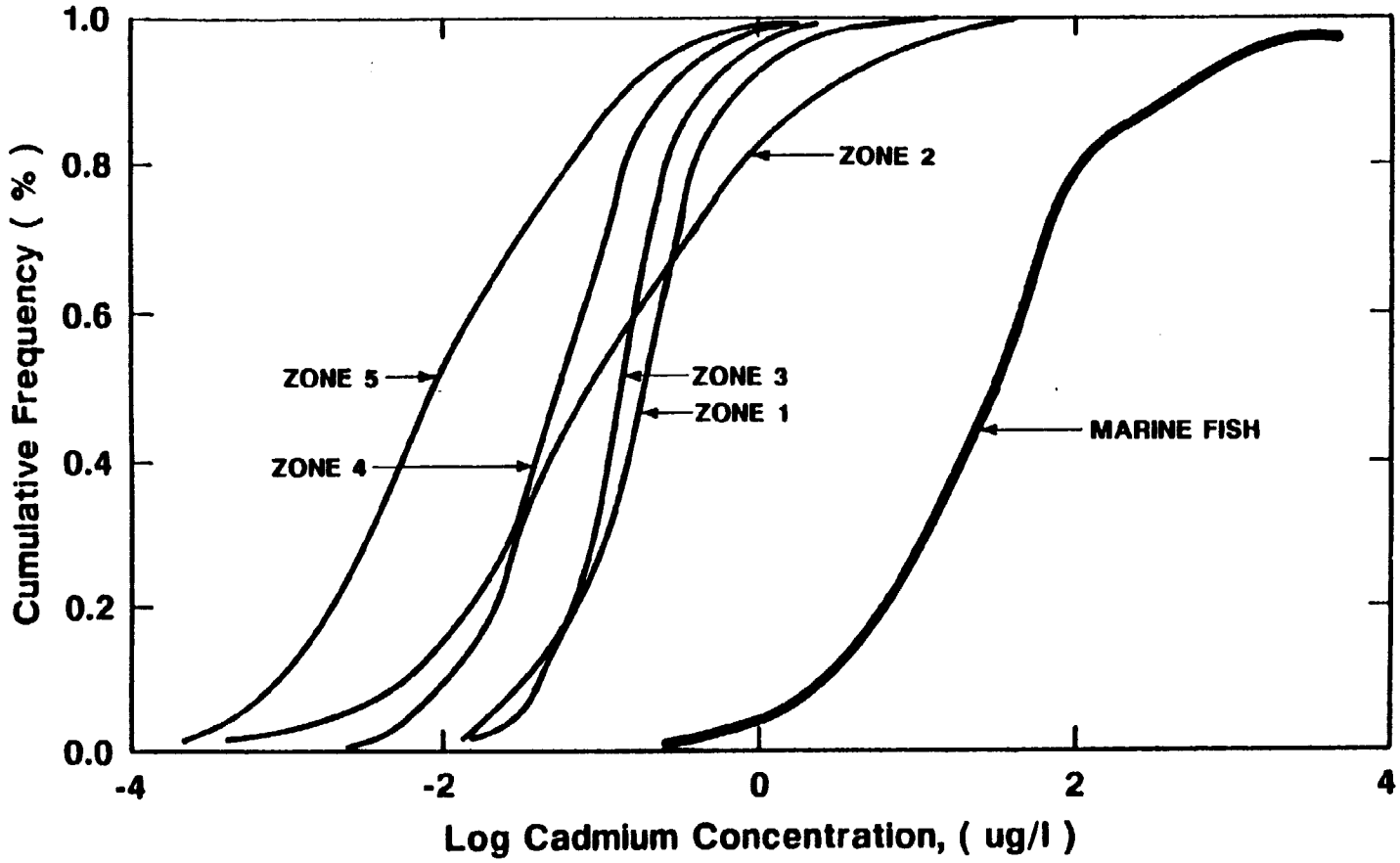

FIGURE C-38
MATC FOR MARINE FISH AND
EECs FOR ALL ZONES, CADMIUM, PORE WATER
NEW BEDFORD, MASSACHUSETTS

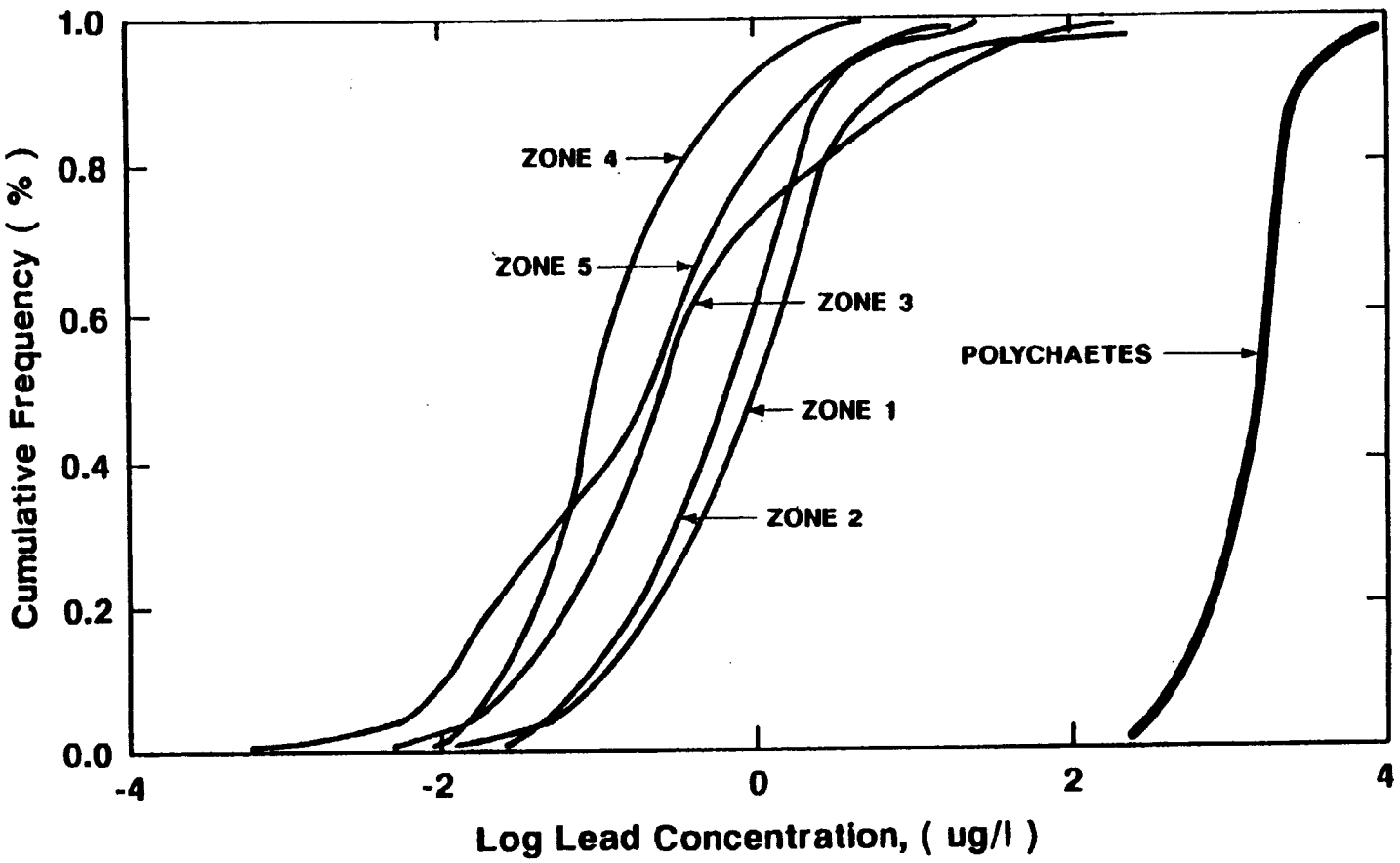

FIGURE C-39
MATC FOR POLYCHAETES AND
EECs FOR ALL ZONES, LEAD, PORE WATER
NEW BEDFORD, MASSACHUSETTS

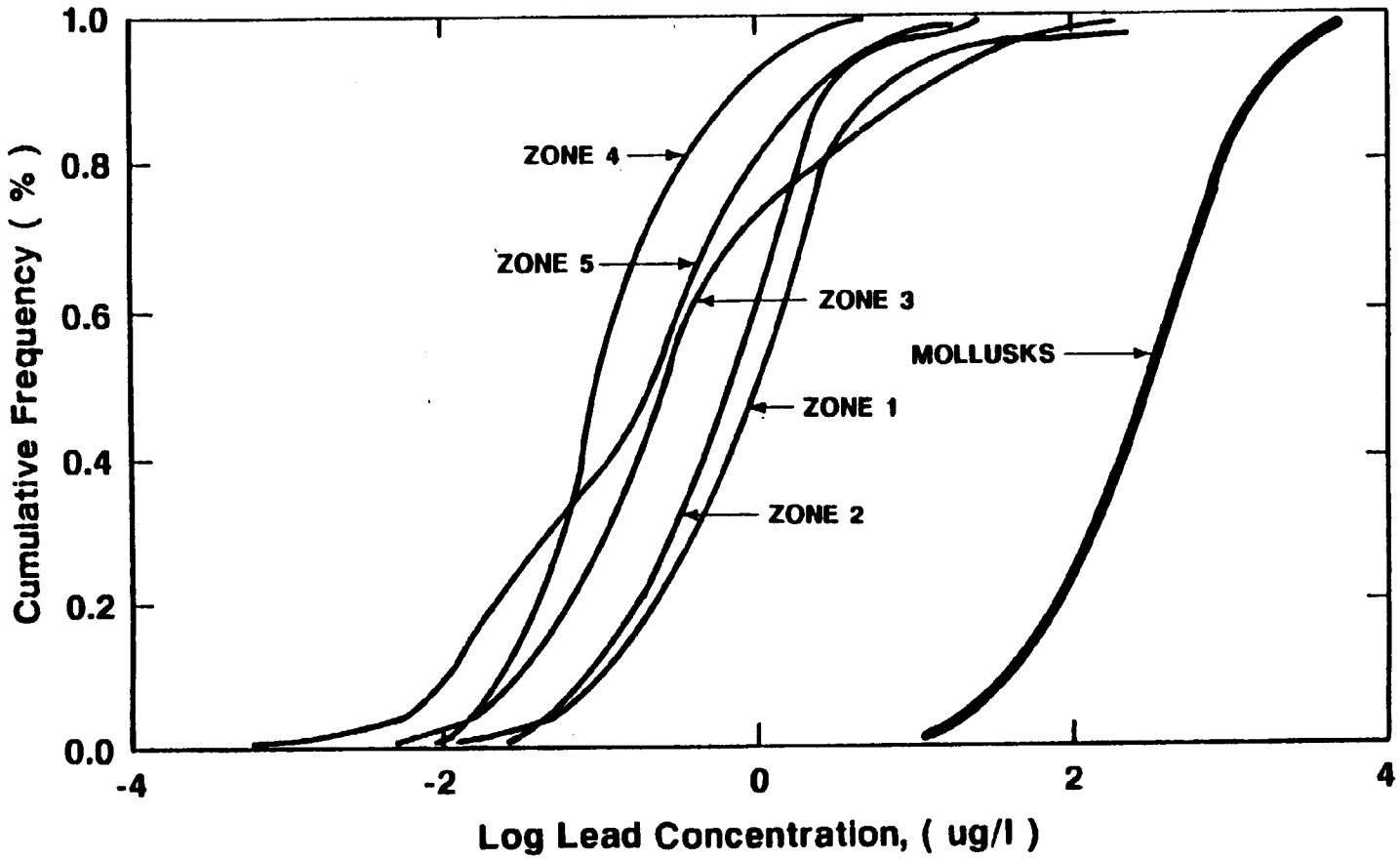

FIGURE C-40
MATC FOR MOLLUSKS AND
EECs FOR ALL ZONES, LEAD, PORE WATER
NEW BEDFORD, MASSACHUSETTS

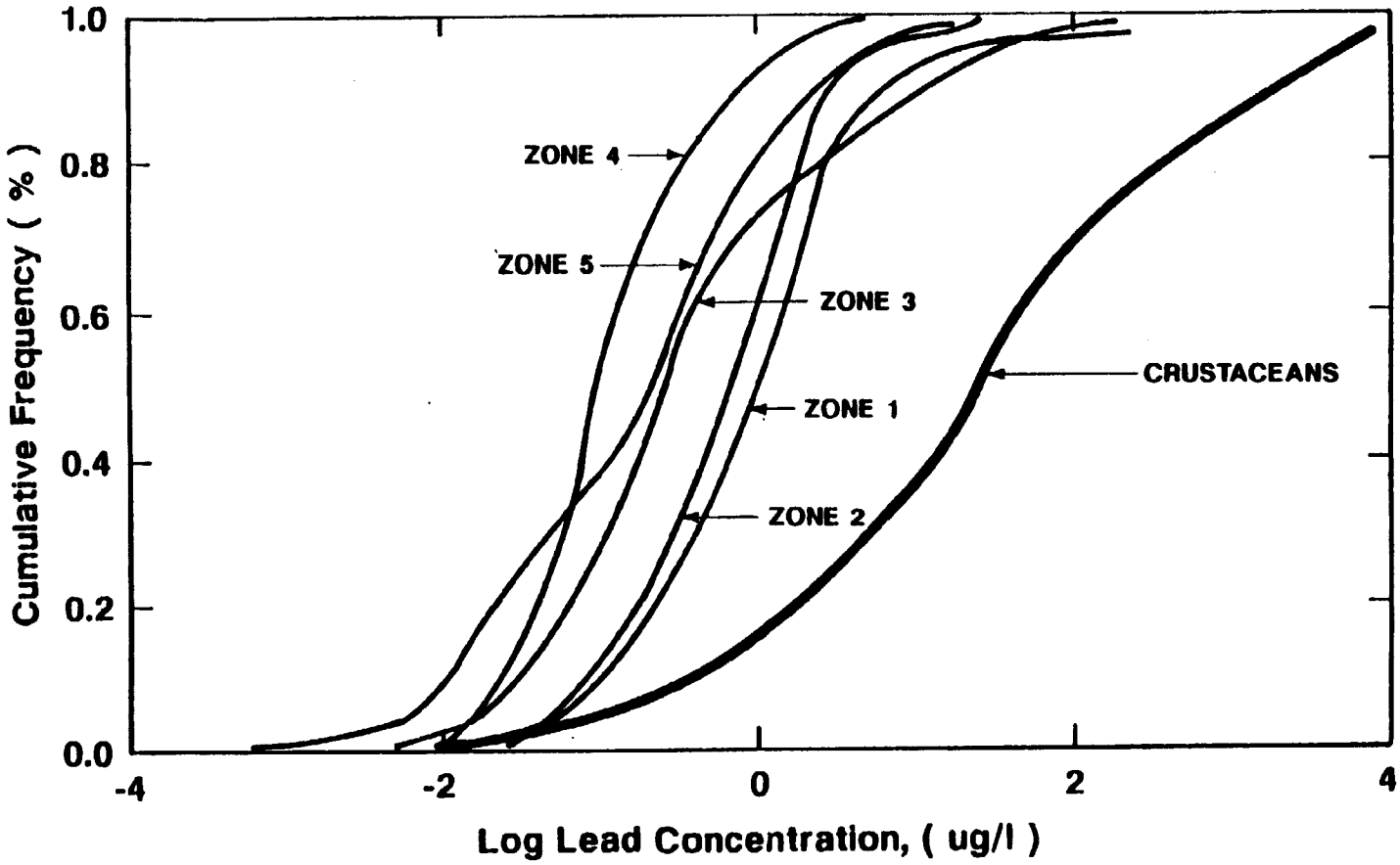

FIGURE C-41
MATC FOR CRUSTACEANS AND
EECs FOR ALL ZONES, LEAD, PORE WATER
NEW BEDFORD, MASSACHUSETTS

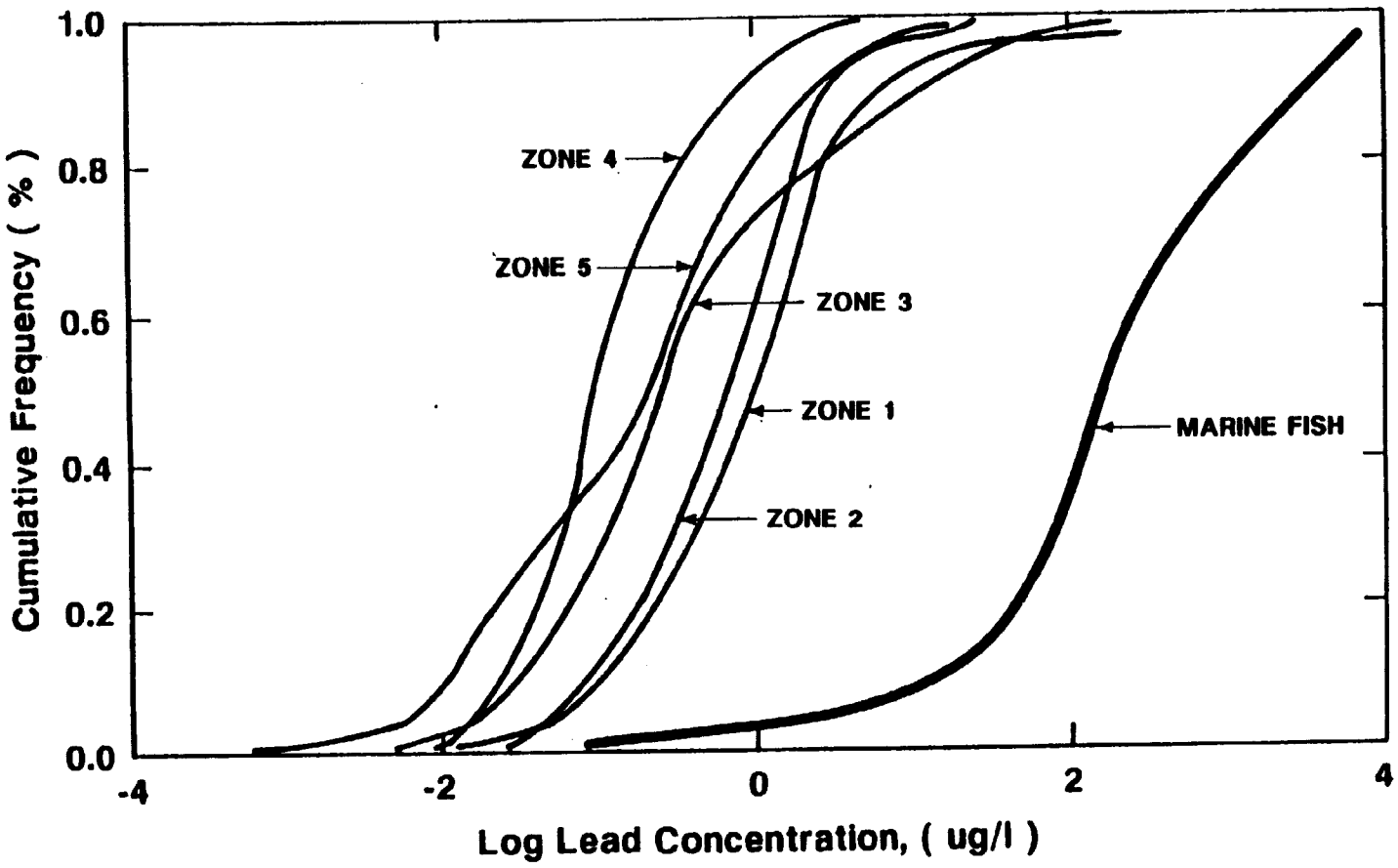

FIGURE C-42
MATC FOR MARINE FISH AND
EECs FOR ALL ZONES, LEAD, PORE WATER
NEW BEDFORD, MASSACHUSETTS

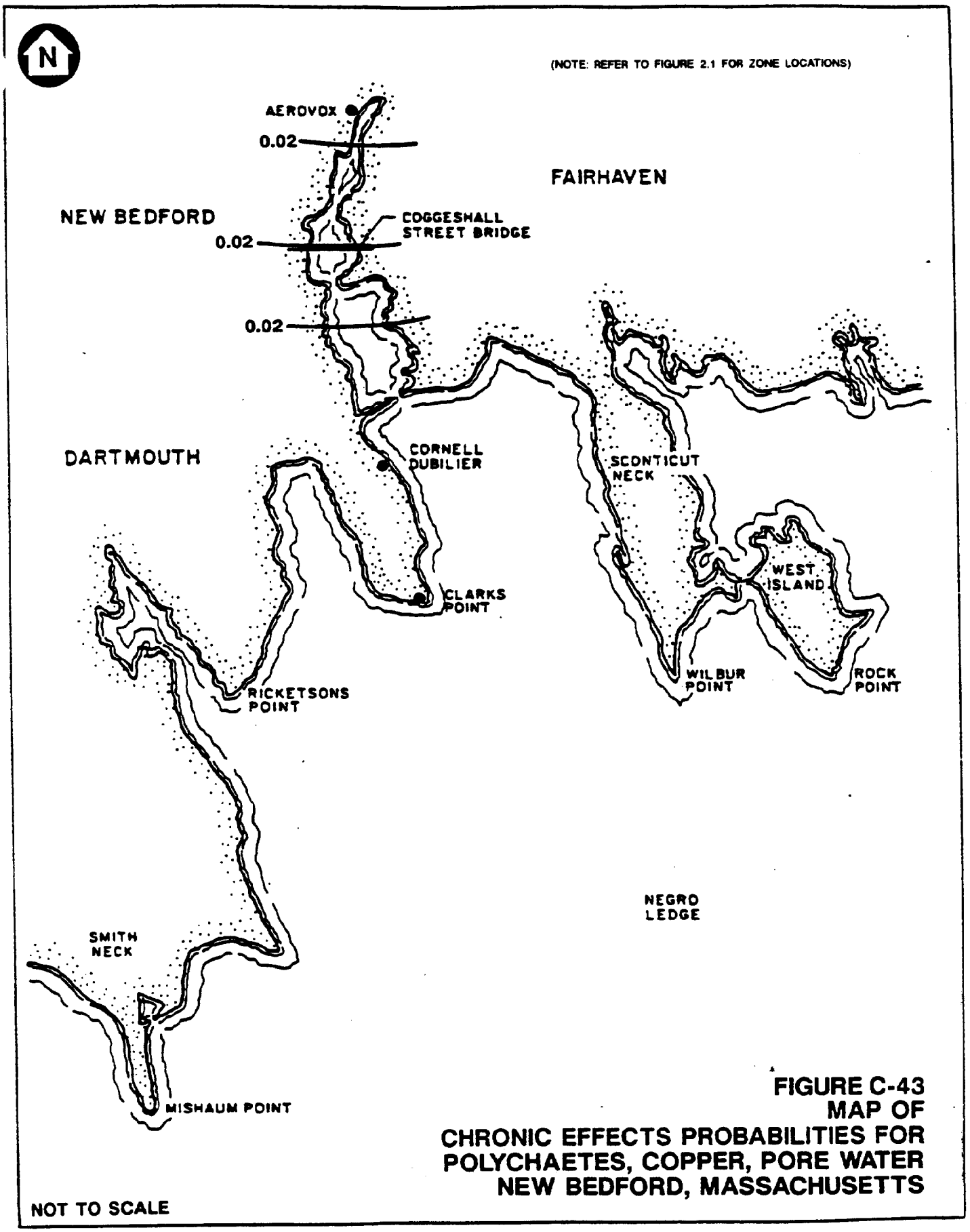

FIGURE C-43
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR POLYCHAETES, COPPER, PORE WATER
NEW BEDFORD, MASSACHUSETTS

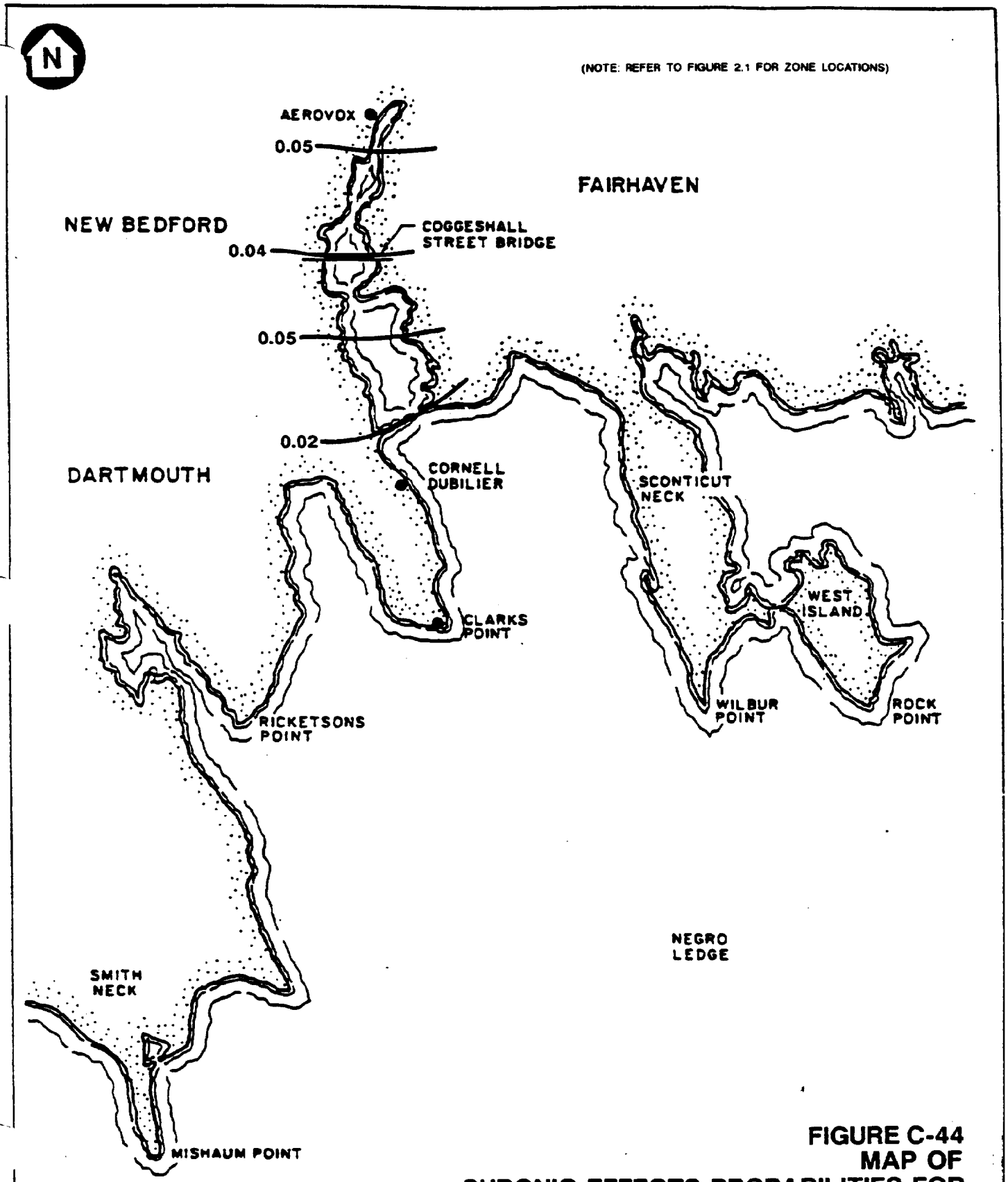

FIGURE C-44
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
MOLLUSKS, COPPER, PORE WATER
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

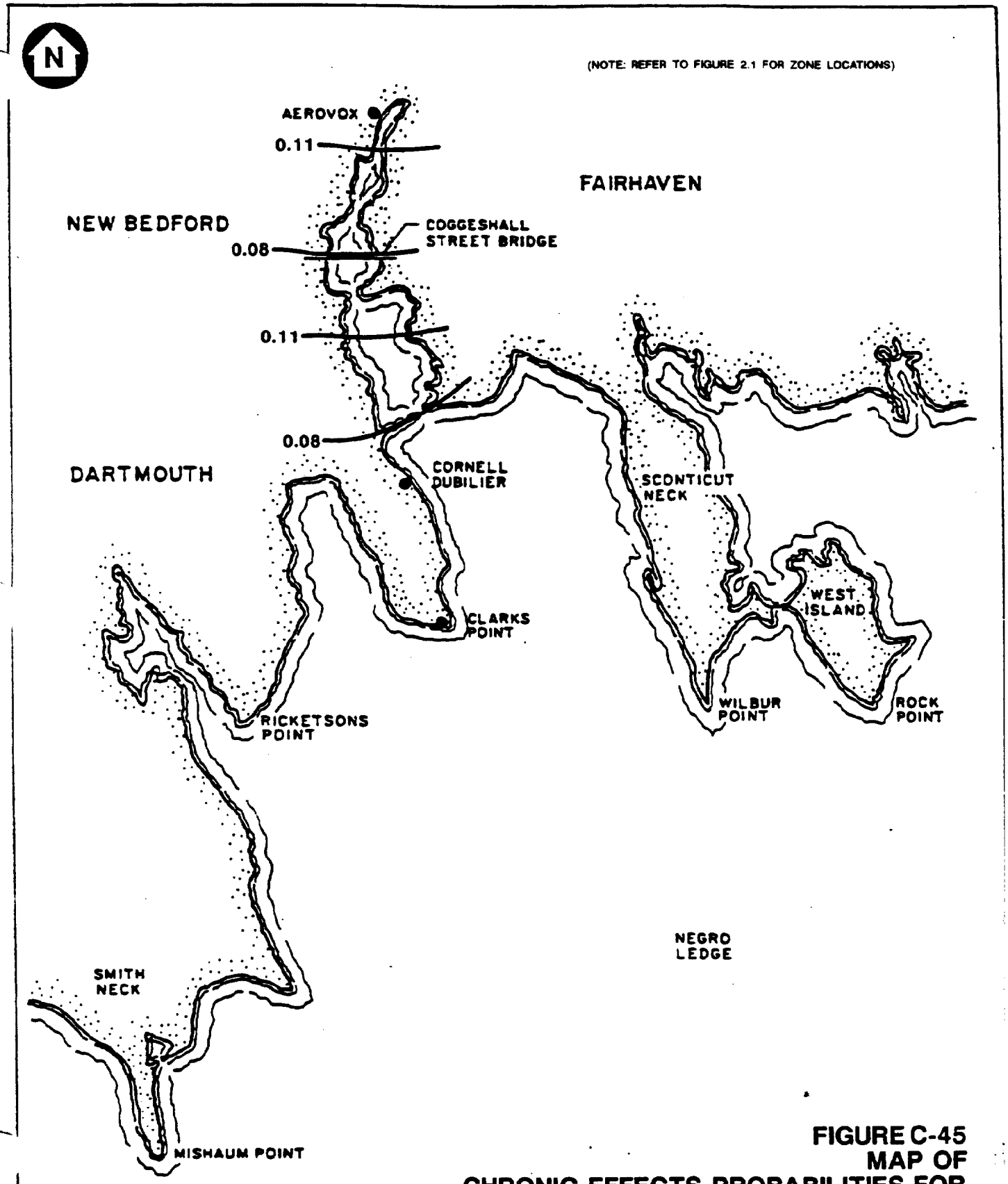

FIGURE C-45
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
CRUSTACEANS, COPPER, PORE WATER
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

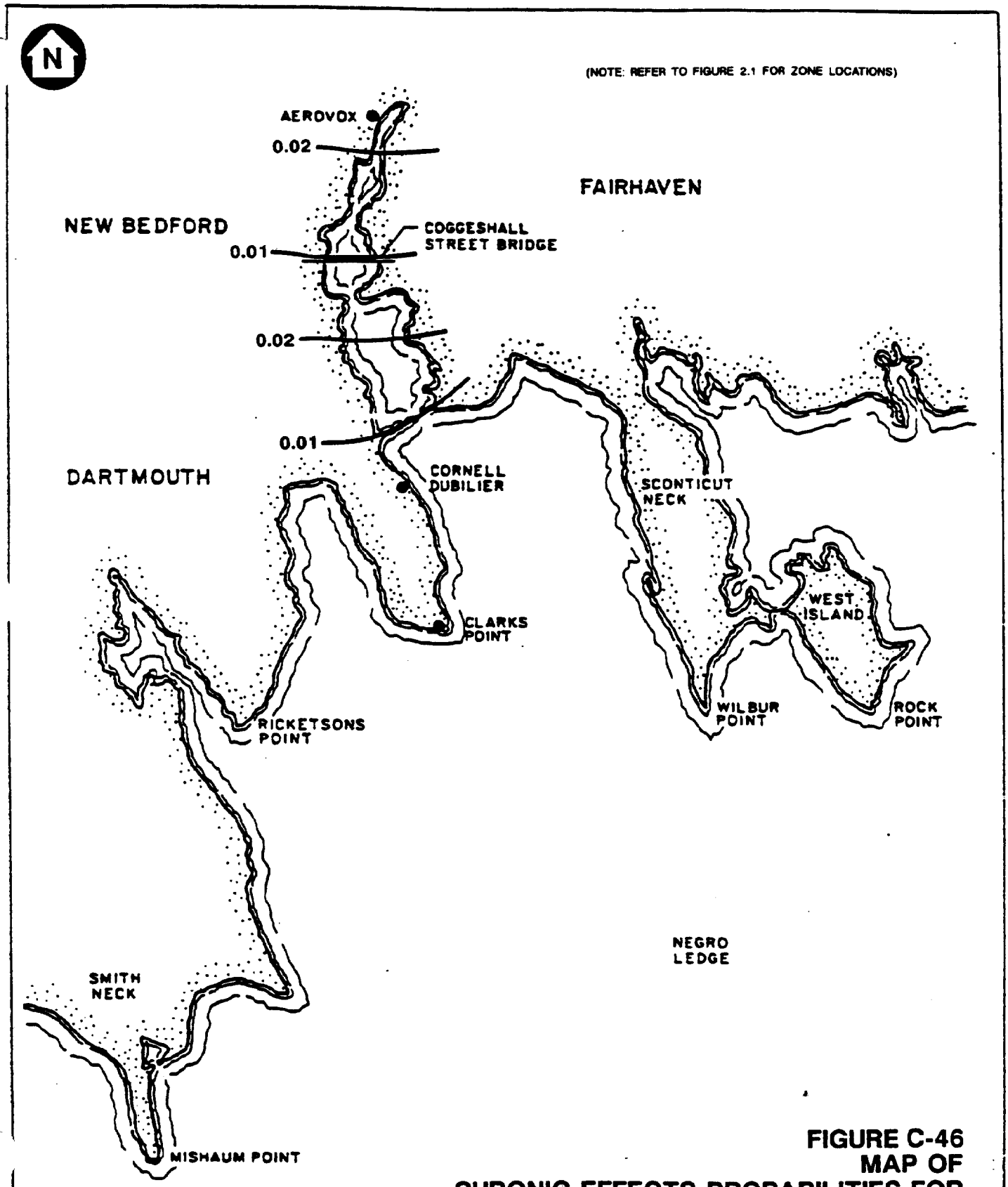

FIGURE C-46
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
MARINE FISH, COPPER, PORE WATER
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

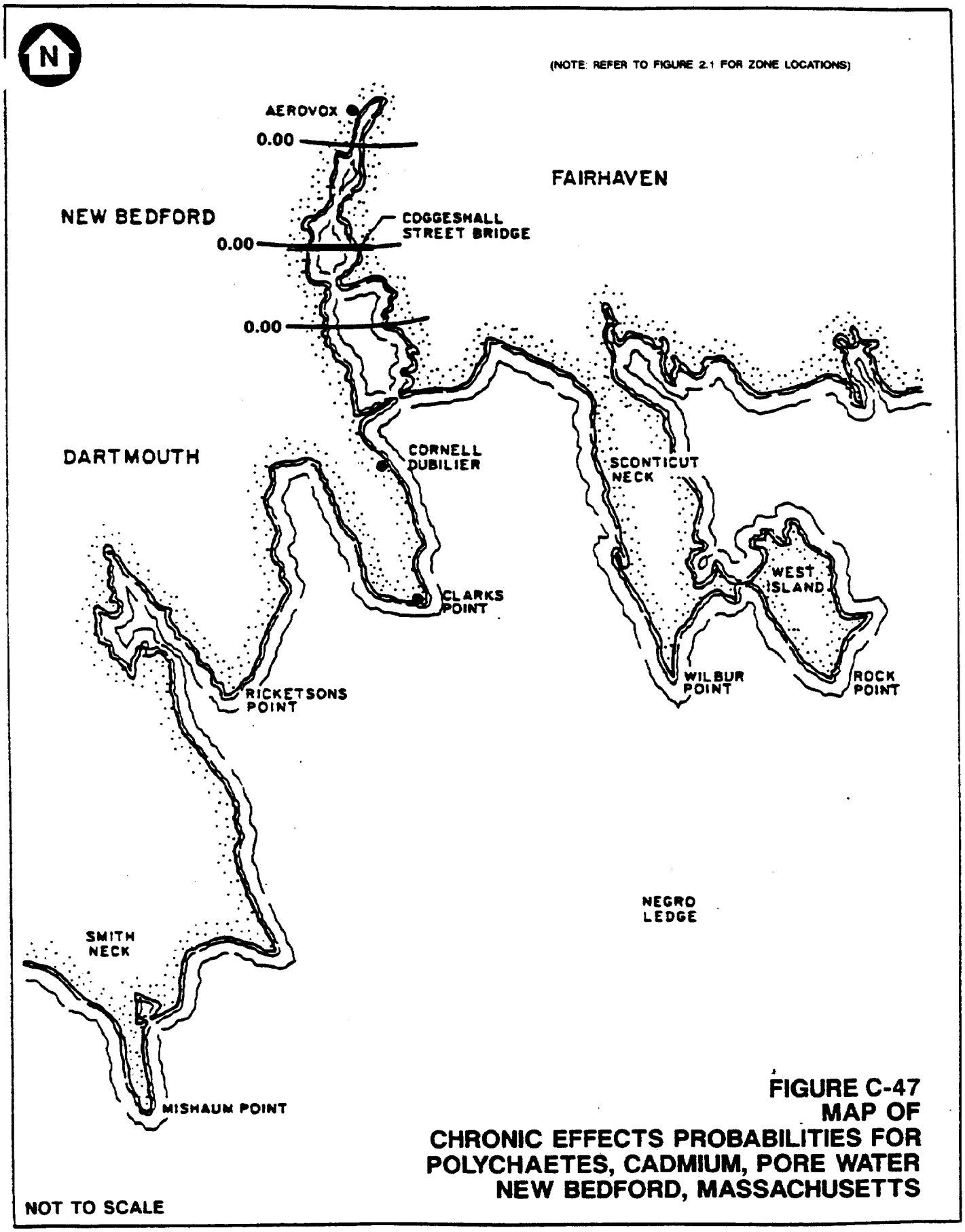

FIGURE C-47
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR POLYCHAETES, CADMIUM, PORE WATER
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

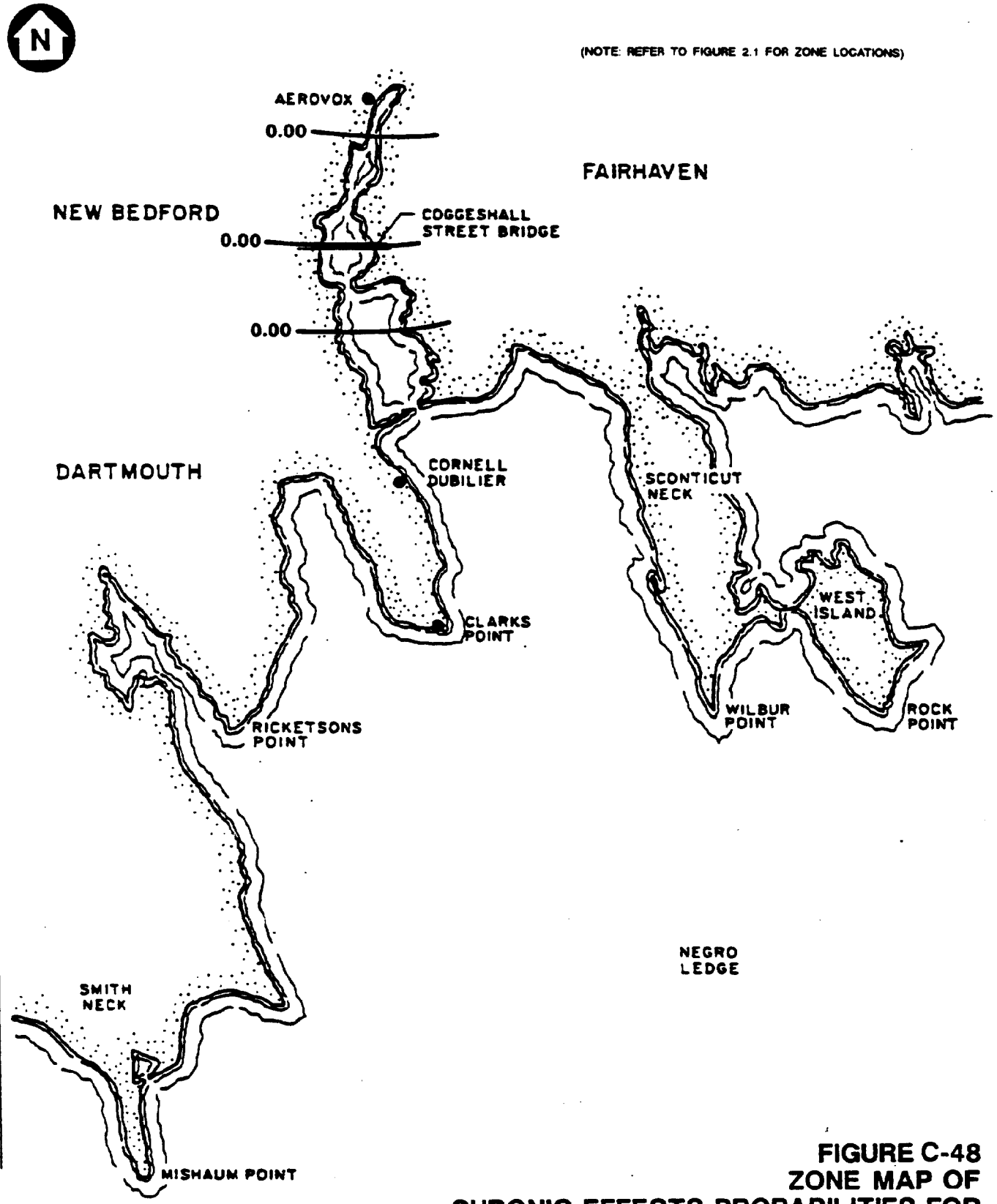

FIGURE C-48
ZONE MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
MOLLUSKS, CADMIUM, PORE WATER
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

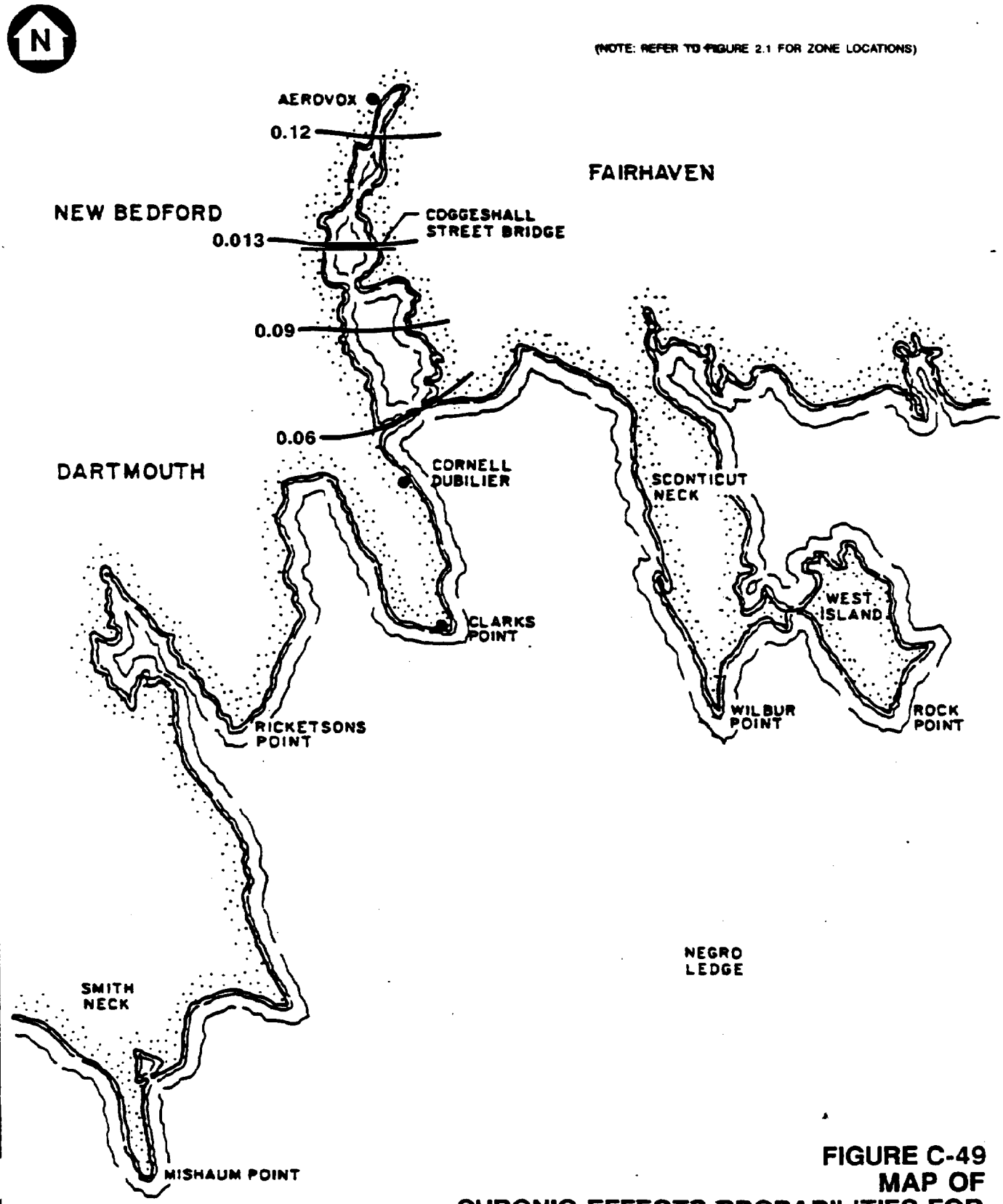

FIGURE C-49
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
CRUSTACEANS, CADMIUM, PORE WATER
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

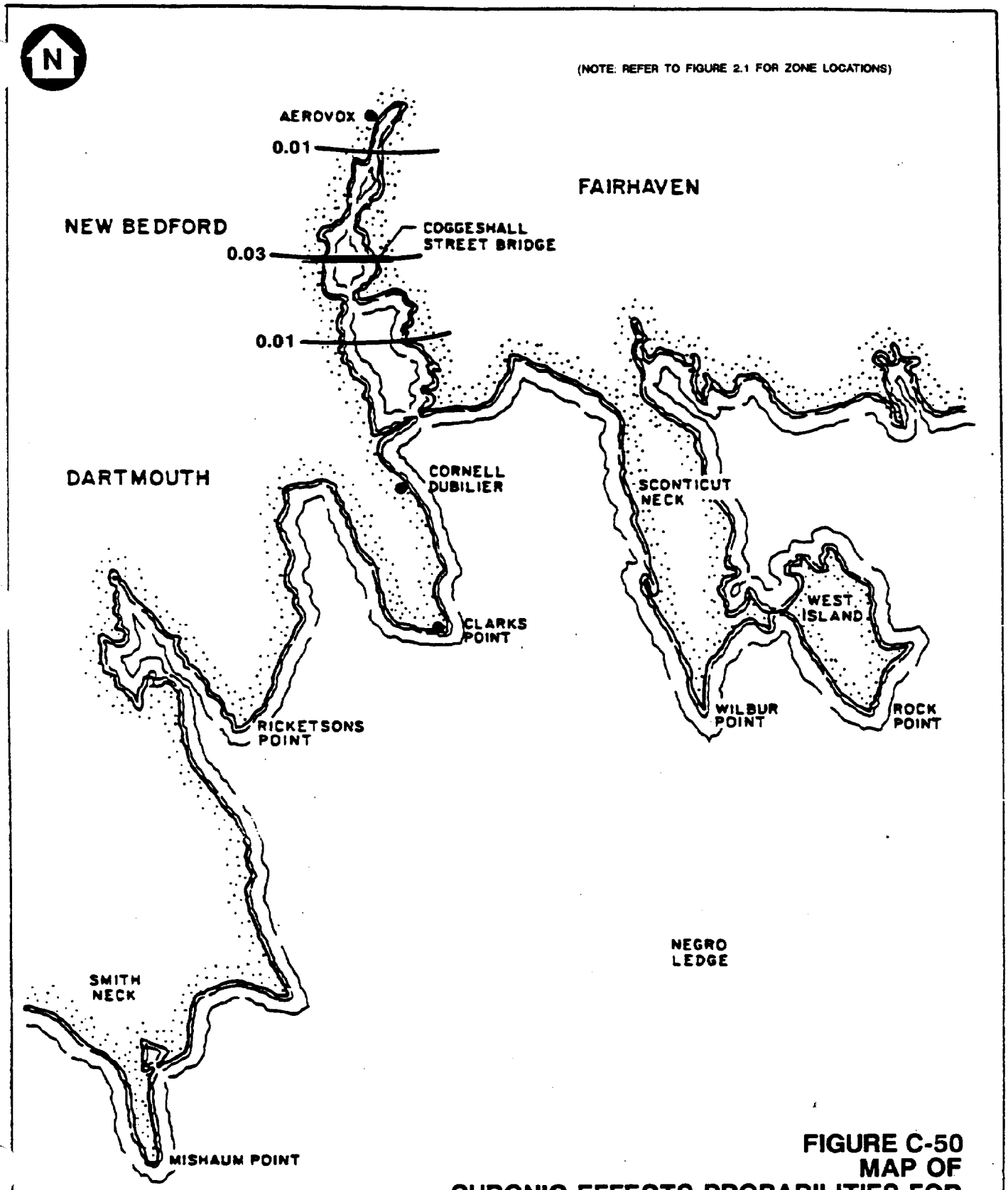

FIGURE C-50
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
MARINE FISH, CADMIUM, PORE WATER
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

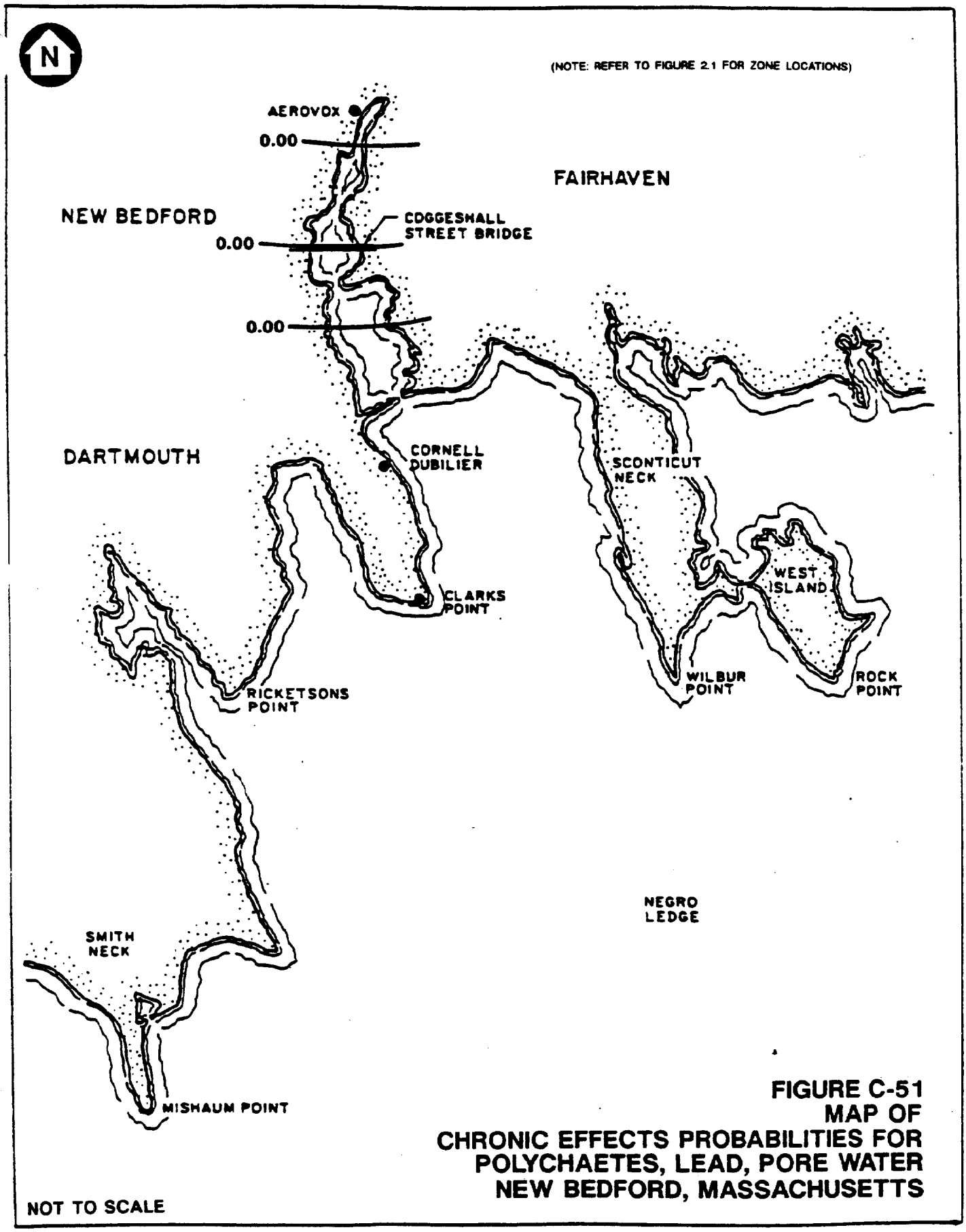

FIGURE C-51
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
POLYCHAETES, LEAD, PORE WATER
NEW BEDFORD, MASSACHUSETTS

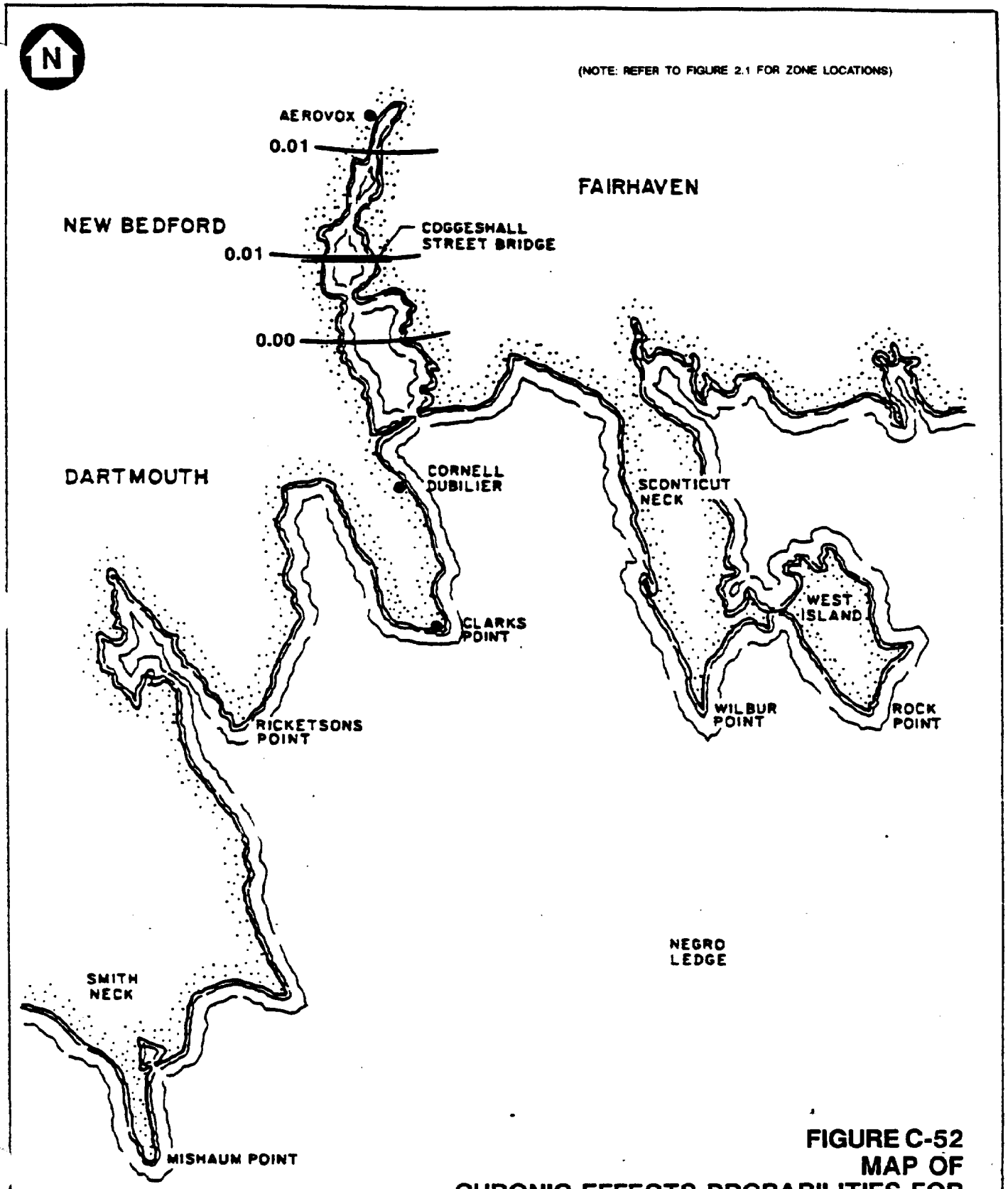

FIGURE C-52
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
MOLLUSKS, LEAD, PORE WATER
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

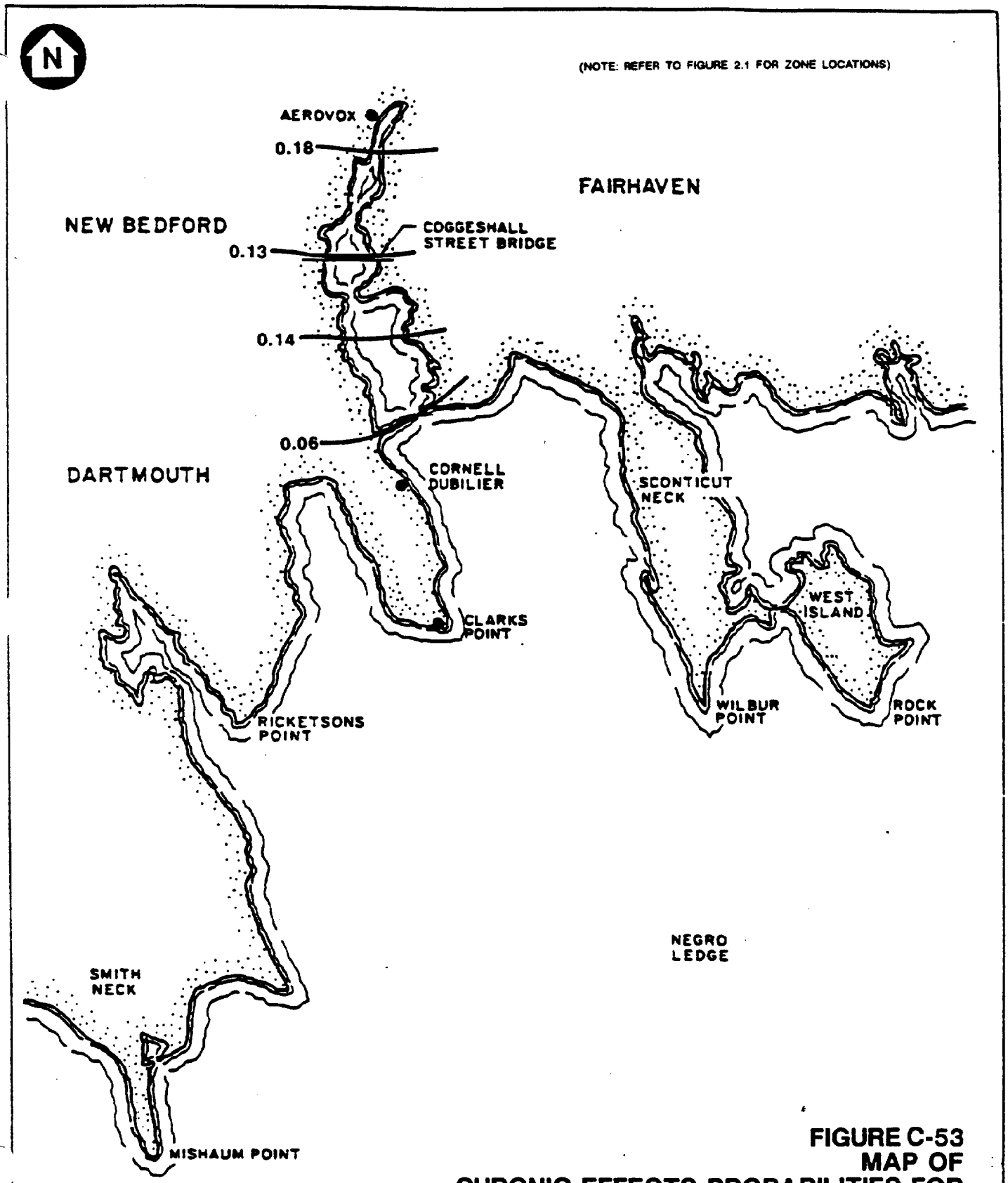

FIGURE C-53
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
CRUSTACEANS, LEAD, PORE WATER
NEW BEDFORD, MASSACHUSETTS

NOT TO SCALE

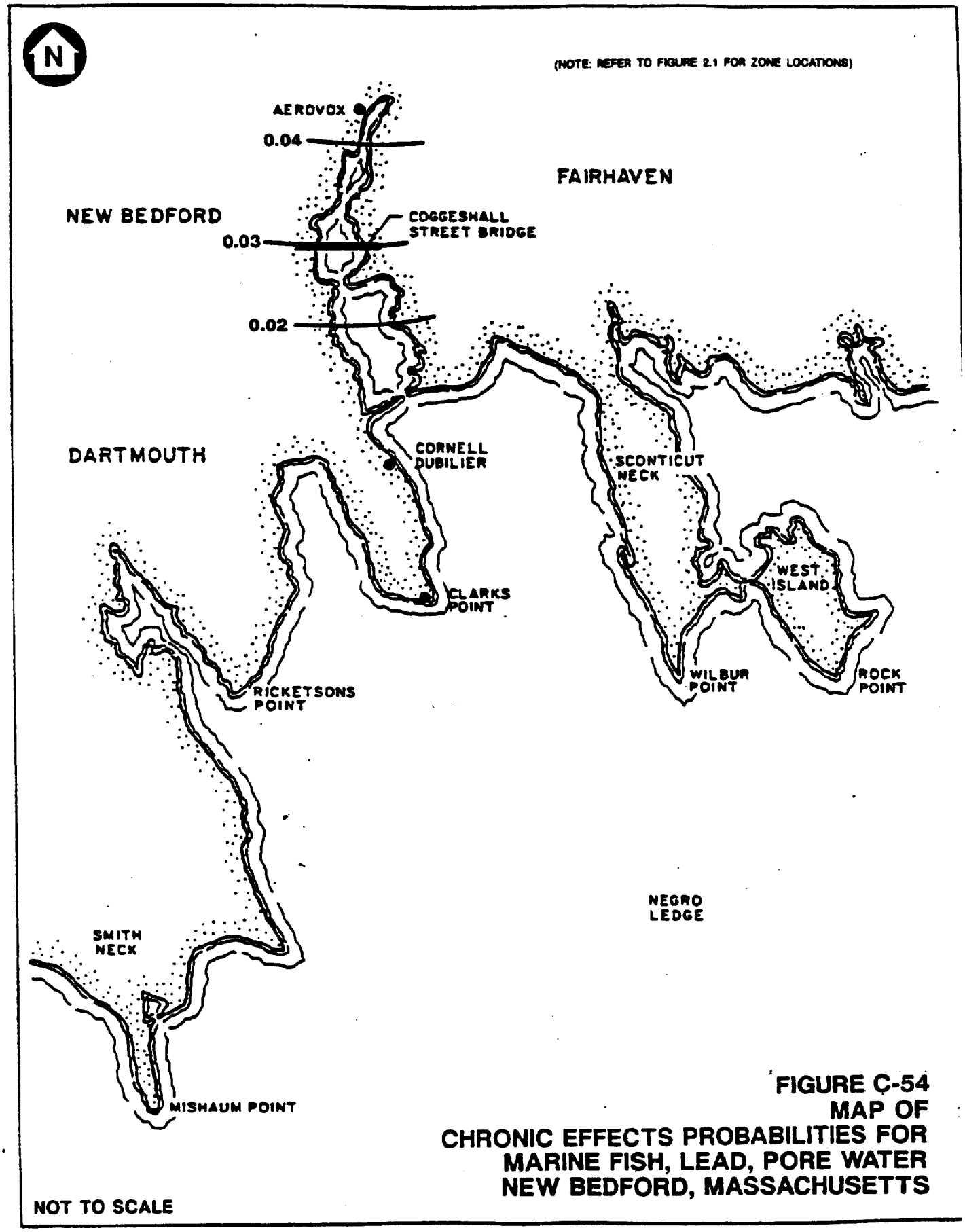

FIGURE C-54
MAP OF
CHRONIC EFFECTS PROBABILITIES FOR
MARINE FISH, LEAD, PORE WATER
NEW BEDFORD, MASSACHUSETTS