Coastal Alaska Monitoring and Assessment Program (AKMAP) Benthic Habitat Transect Methods – Aleutian Islands

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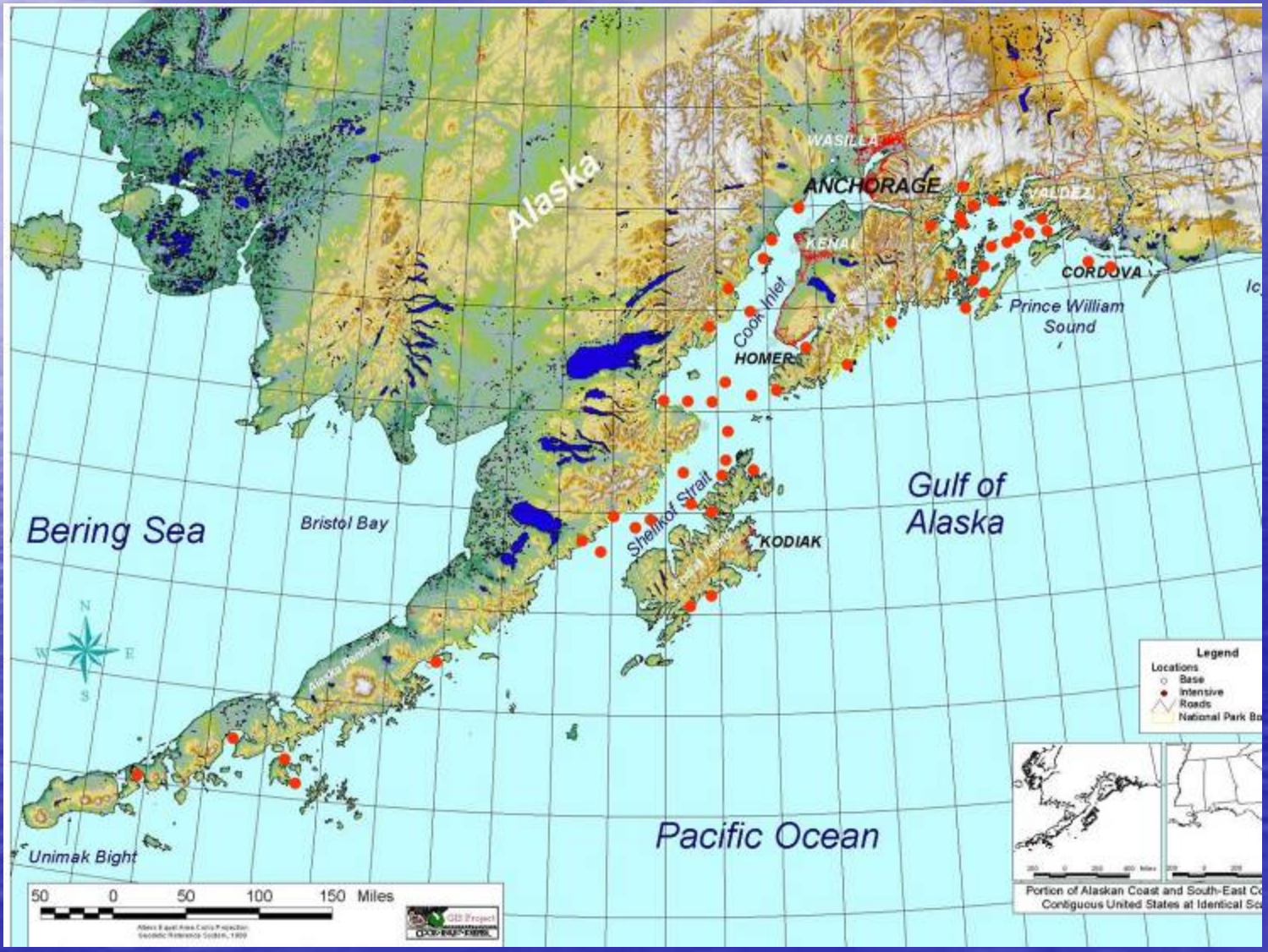
Coastal Alaska Monitoring and Assessment Program (AKMAP)

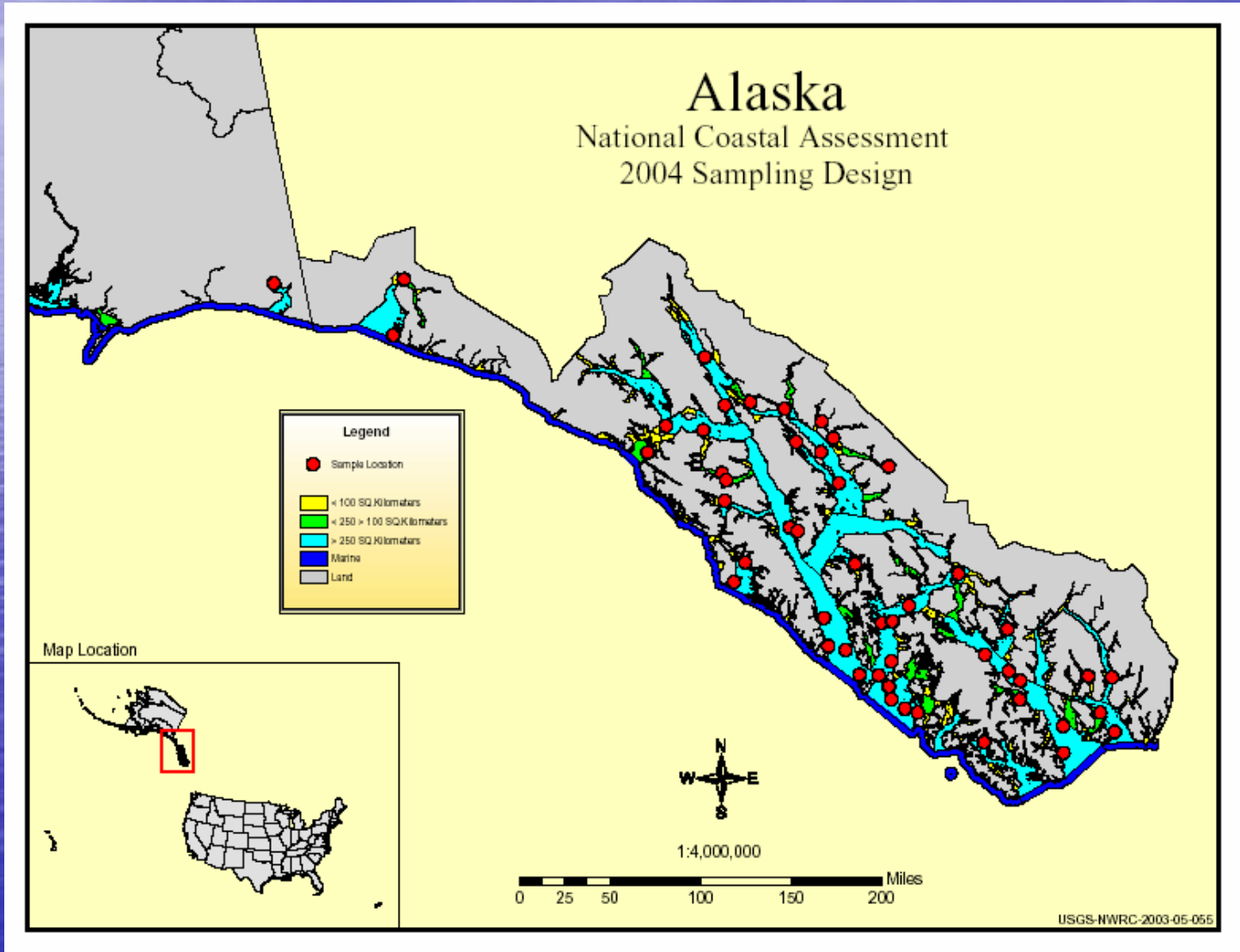
US Environmental Marine Assessment Program (EMAP) – National Coastal Assessment

Focus:
- Regional coverage each decade
- Benthic Environment
- Contaminants
- Biological assemblages

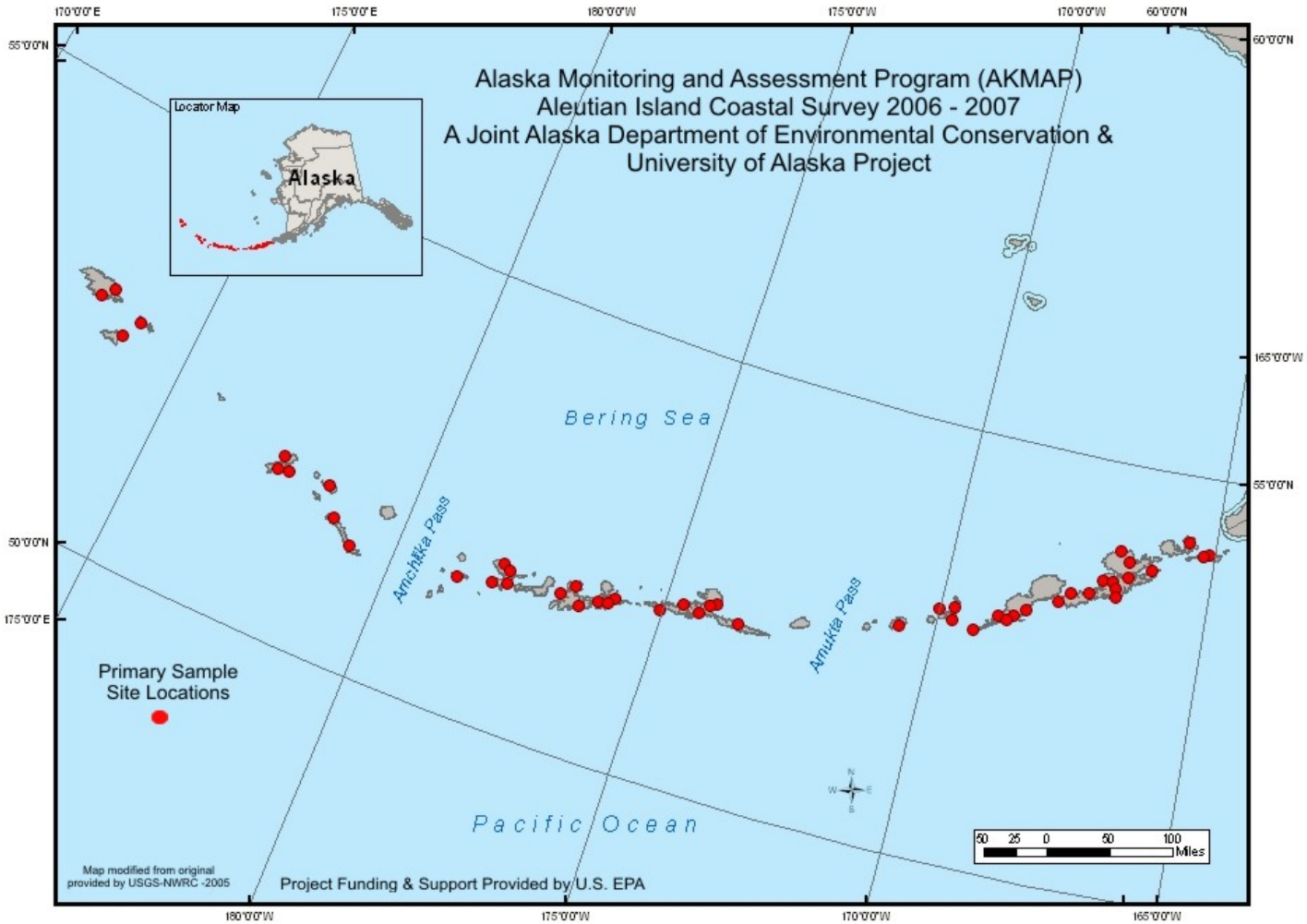
Southcentral Alaska Coastal AKMAP 2002



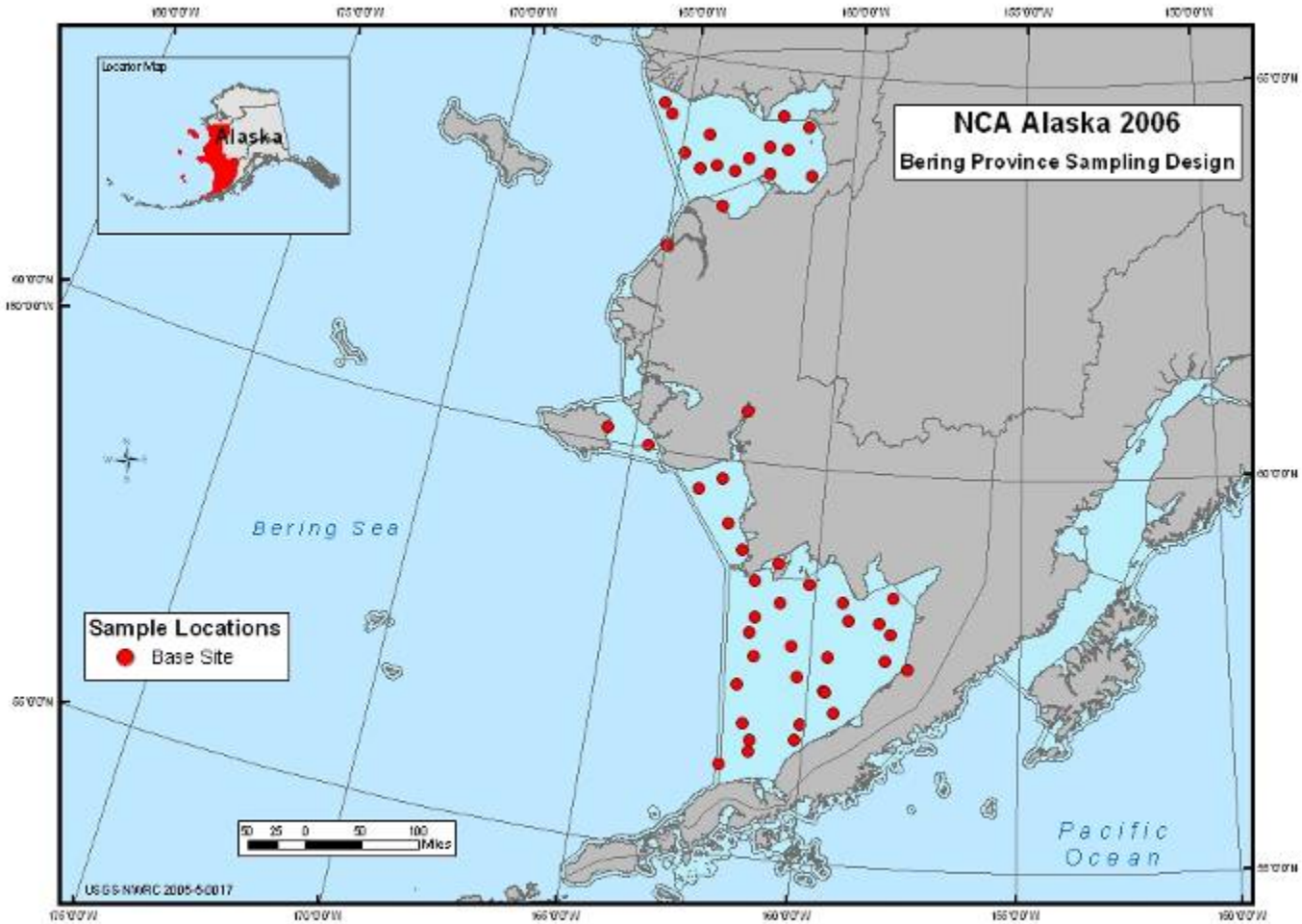
Southeast Alaska Coastal AKMAP 2004



Aleutian Islands Coastal AKMAP 2006-07

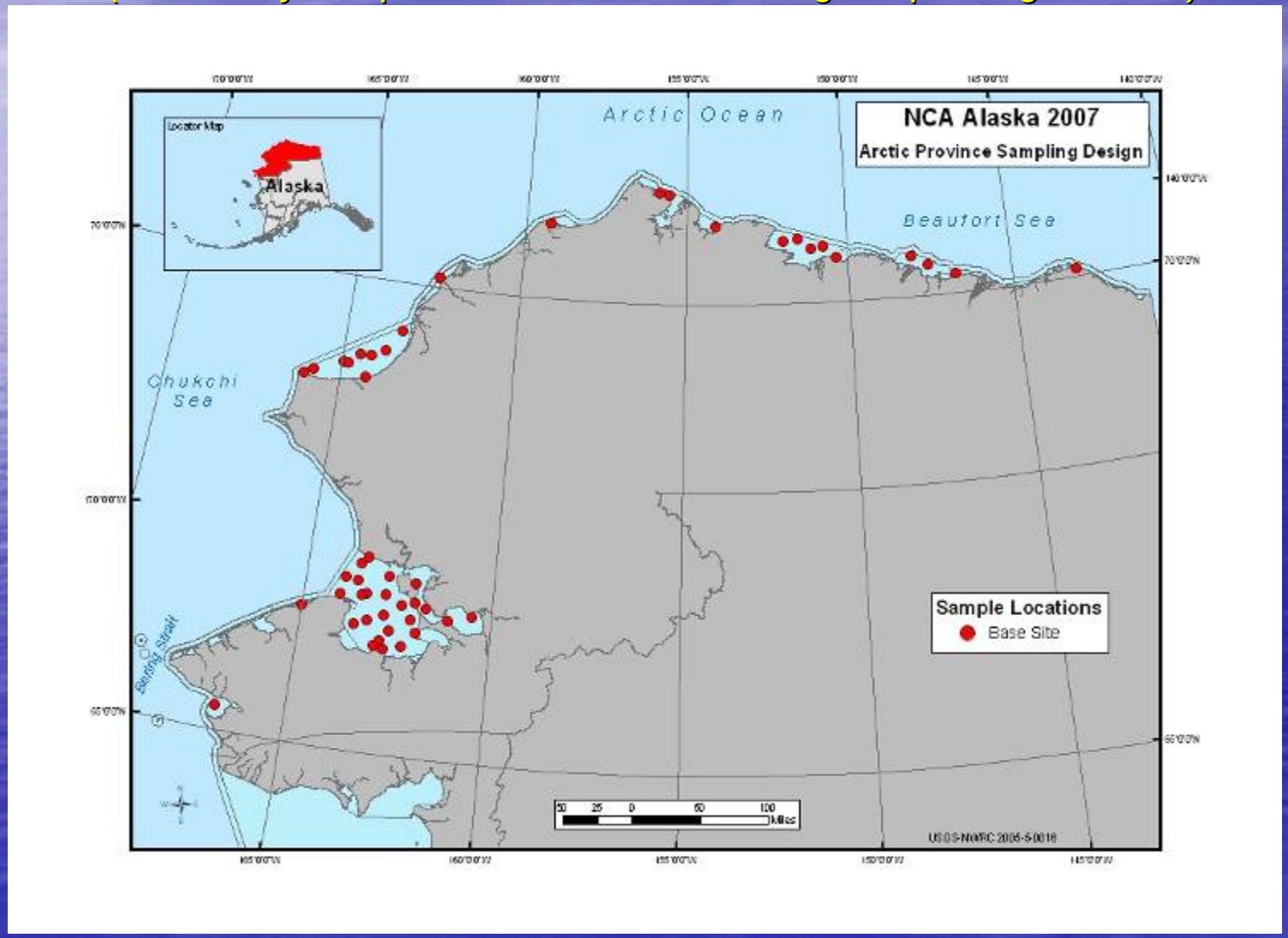


Alaska Eastern Bering Sea Coastal AKMAP

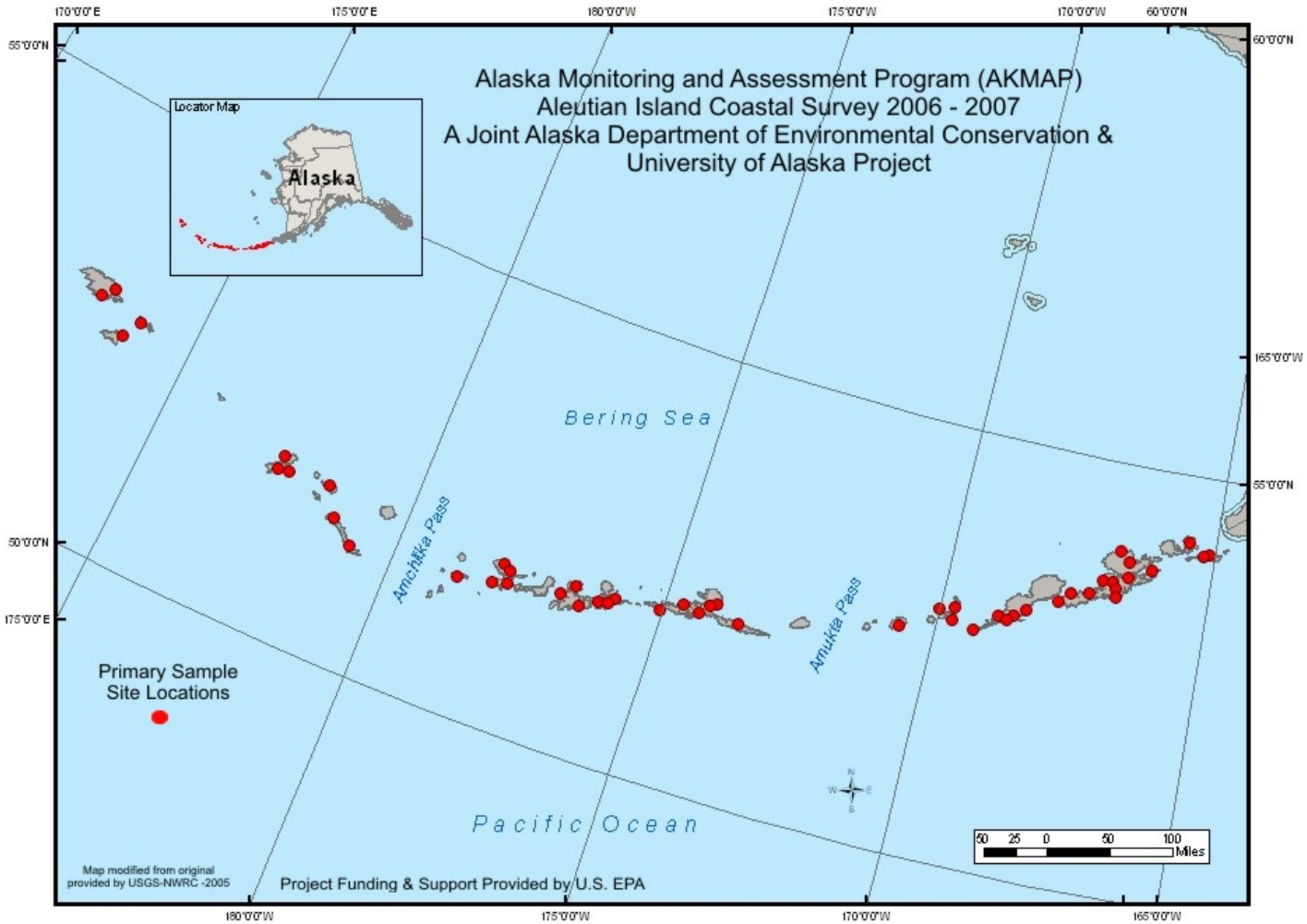


Alaska Arctic Coastal AKMAP IPY Project

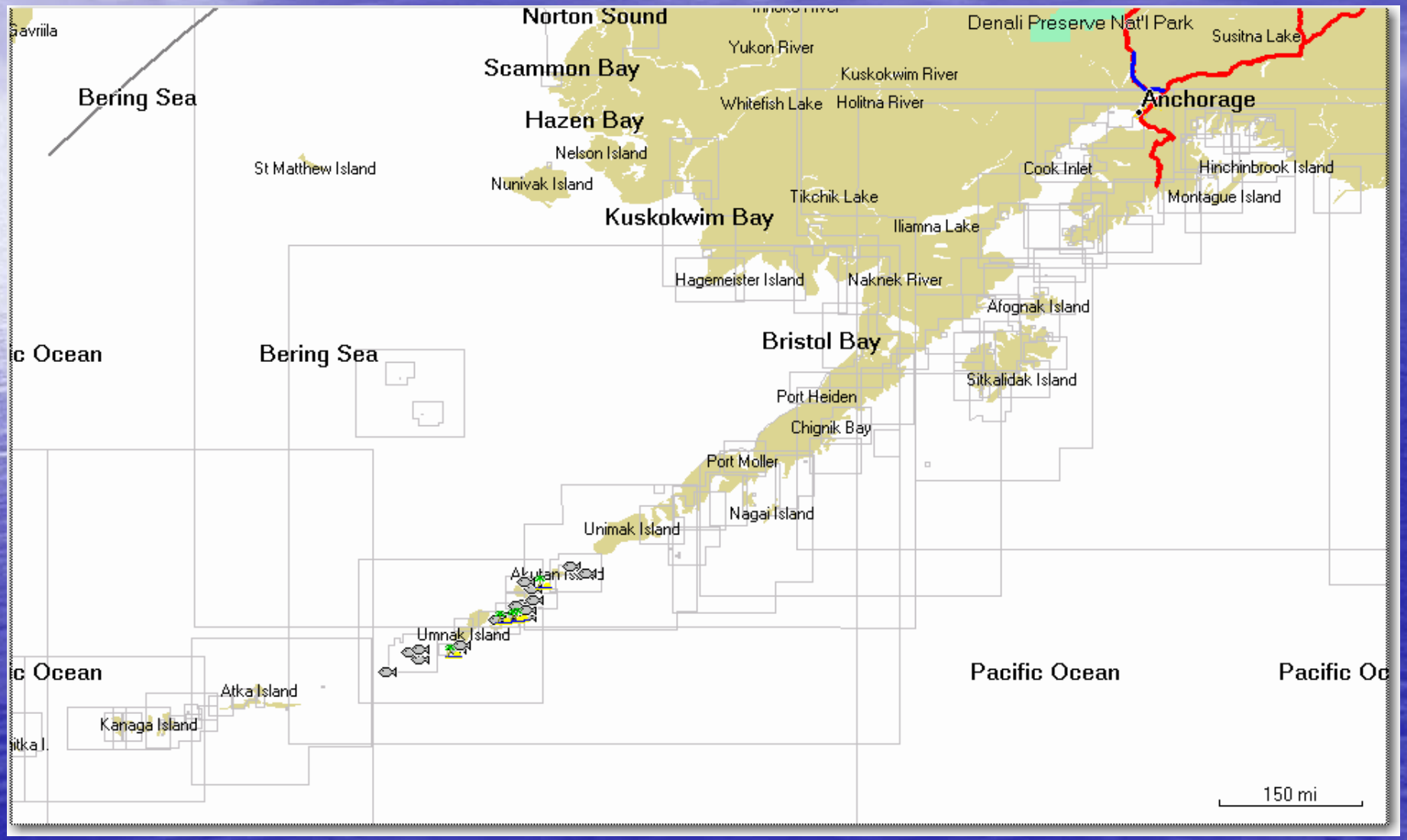
(Preliminary Sample Site Locations – Funding still pending for 2008)



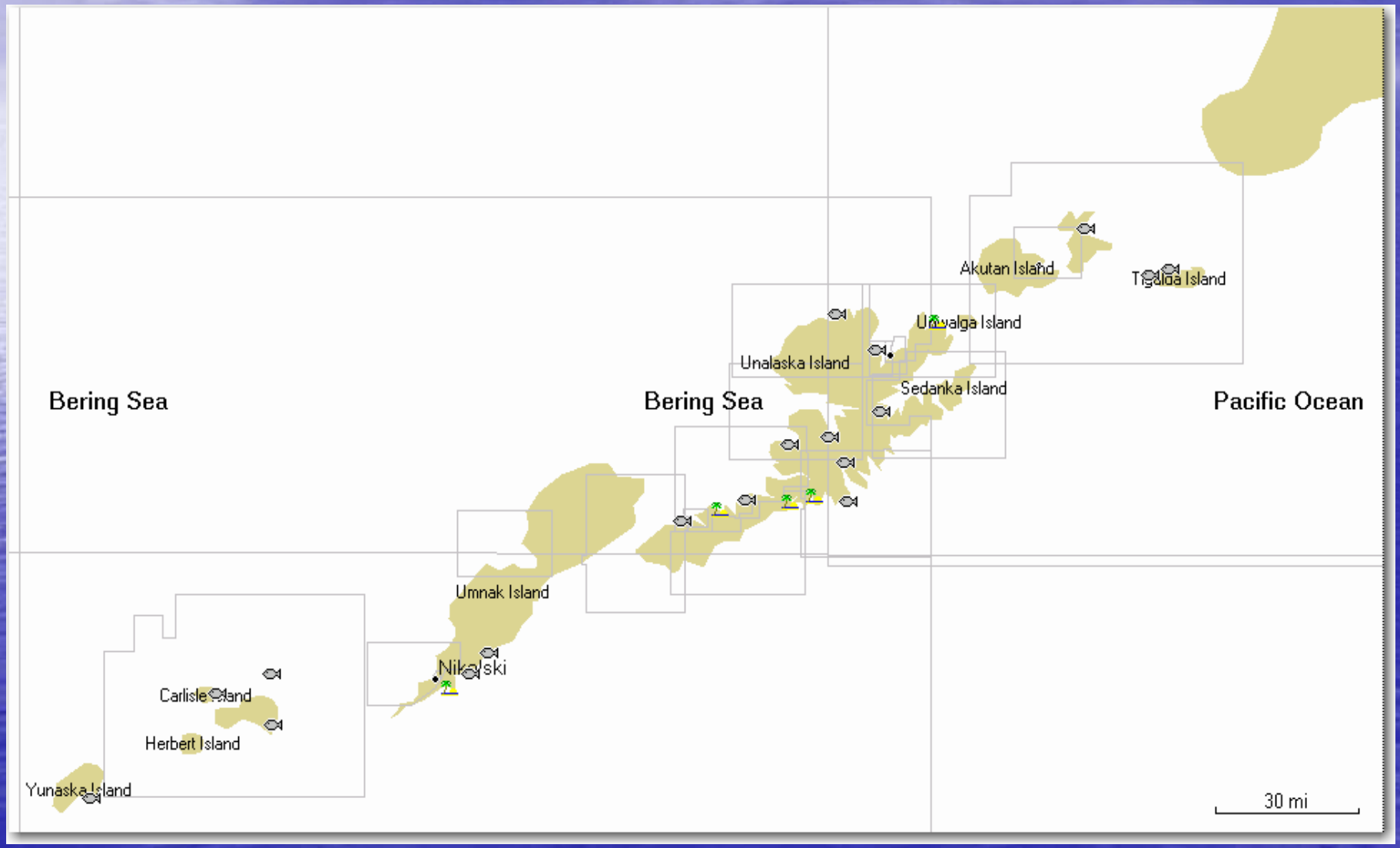
Aleutian Islands Coastal AKMAP 2006-07



2006 E. Aleutian Sampling Sites



2006 E. Aleutian Sampling Sites

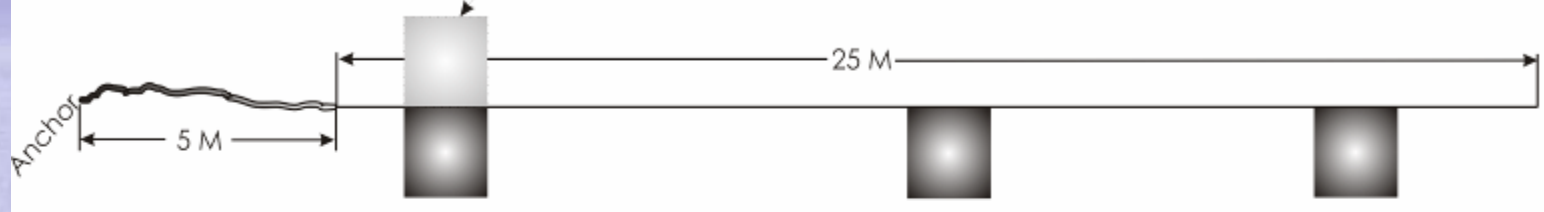


Is one methodology applicable to assess all coastlines?

- Sediment quality triad analysis is not applicable to nearly 50% of the Alaska coastal biogeographical provinces.
- Another methodology needed to be developed for sampling hard substrates.

Sampling Schematic via SCUBA

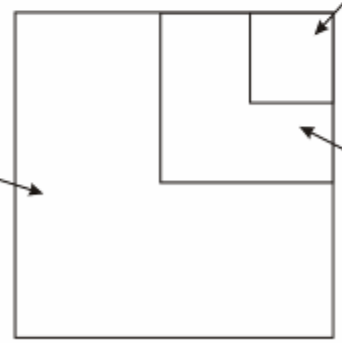
Sediment Quadrat For Contaminant Assessment
On the first sediment quadrat encountered an opposite one meter square in shore quadrat is placed and sampled for organic contaminants, trace metals, total organic carbon, sediment toxicity, grain size and radionuclides.



The first quadrat is set randomly within the first one to fifteen meters the remaining two quadrats set at 5 and 10 meters respectively from the edge the first quadrat.

0.0625 Square meter quadrat
Within the frame all flat horizontal surfaces are scraped of flora and fauna. Macroalgae is removed and collected in the mesh dive bag. Material greater than 1 mm are collected with a air lift system into a mesh bag attached to the end of the air lift

One Square Meter Quadrat
A photographic record is made of the quadrat, with the 0.25 and 0.0625 square meter quadrats set within the left [diver facing from inshore position] legs against the meter square quadrat. All macro-phytes and conspicuous macrofauna (> 2cm in length) are identified in situ and either counted or an estimate of percent cover made. Counts are made of solitary macroflora and macrofauna, while per cent cover is used for those species whose individuals cannot be identified.



0.25 square meter quadrat
A photographic record is made immediately prior to and after sampling. All macroalgae is removed, except for the 0.0625 square meter area.

Sampling Soft Substrate via SCUBA

Sampling Hard Substrate via SCUBA

SITE DATE	AKALE06-0026 4-Jul-06		
1 x 1 m Quadrats	1	2	3
OVERSTORY % COVER - Kelps	**70**	**60**	**55**
Laminaria yezoensis	0	0	5
Laminaria longipi	0	0	5
Laminaria bongardiana*	65	50	35
Saccharina lamentisama*	0	0	0
Agarum sp.	5	10	10
Agarum clathratum	0	0	0
Thalassiophyllum sp.	0	0	0
Alaria fistulosa	0	0	0
Nereocysistis luetkeana	0	0	0
Cymathere triplicata	0	0	0
Costaria costata	0	0	0
Desmarestia ligulata	0	0	0
Desmarestia viridis	0	0	0
Desmarestia aculeata	0	0	0

SITE DATE	AKALE06-0026 4-Jul-06		
1 x 1 m Quadrats	1	2	3
UNDERSTORY % COVER	**100**	**100**	**100**
Encrusting Brown	0	1	1
Greens	1	0	0
Bladed Reds	1	2	2
Branching Reds	10	9	9
Filamentous Reds	0	0	0
Encrusting Reds	2	2	5
Upright Coralline	0	2	1
Thin Encrusting Corallines	48	50	48
Thick Encrusting Corallines	0	5	1
Rhodoliths	0	0	0
Holdfast	10	10	9
Sponges	6	7	9
Anemones	0	1	0
Encrusting Bryozoans	0	0	0
Upright Bryozoans	3	5	9
Hydroids	0	0	0
Colonial Ascidians	0	6	5
Barnacles	0	0	0
Tube Worms	0	0	0
Bare Rock	14	0	1
Shell Hash	5	0	0
Sand/silt	0	0	0
Gravel/Pebbles	0	0	0

SITE	AKALE06-0026		
DATE	4-Jul-06		
1 x 1 m Quadrats	1	2	3
BENTHIC COUNTS - Kelps	**61**	**29**	**103**
Laminaria yezoensis	0	0	1
Laminaria longipi	5	0	55
Laminaria bongardiana*	39	21	36
Saccharina lamentisama*	7	3	6
Agarum sp.	5	5	5
Agarum clathratum	3	0	0
Thalassiophyllum sp.	2	0	0
Alaria fistulosa	0	0	0
Nereocysistis luetkeana	0	0	0
Cymathere triplicata	0	0	0
Costaria costata	0	0	0
Desmarestia ligulata	0	0	0
Desmarestia viridis	0	0	0
Desmarestia aculeata	0	0	0
Jv Laminariales	20	9	21

SITE	AKALE06-0026		
DATE	4-Jul-06		
1 x 1 m Quadrats	1	2	3
BENTHIC COUNTS - Animals	**11**	**13**	**8**
Sponges	5	5	5
Anemones	0	2	0
Tube Worms	1	1	0
Snails	1	0	1
Limpets	1	1	0
Nudibranchs	0	0	0
Chitons	1	3	0
Bivalves	0	0	0
Octopus	0	0	0
Urchins	0	0	0
Sand Dollar	0	0	0
Holothurians	0	0	0
Asteriods	1	1	2
Ophiuroids	0	0	0
Solitary Ascidians	1	0	0
Crustaceans	0	0	0
Other	0	0	0
Fish	0	0	0

SITE CHARACTERIZATION

AKALE06-0026

July 4, 2006

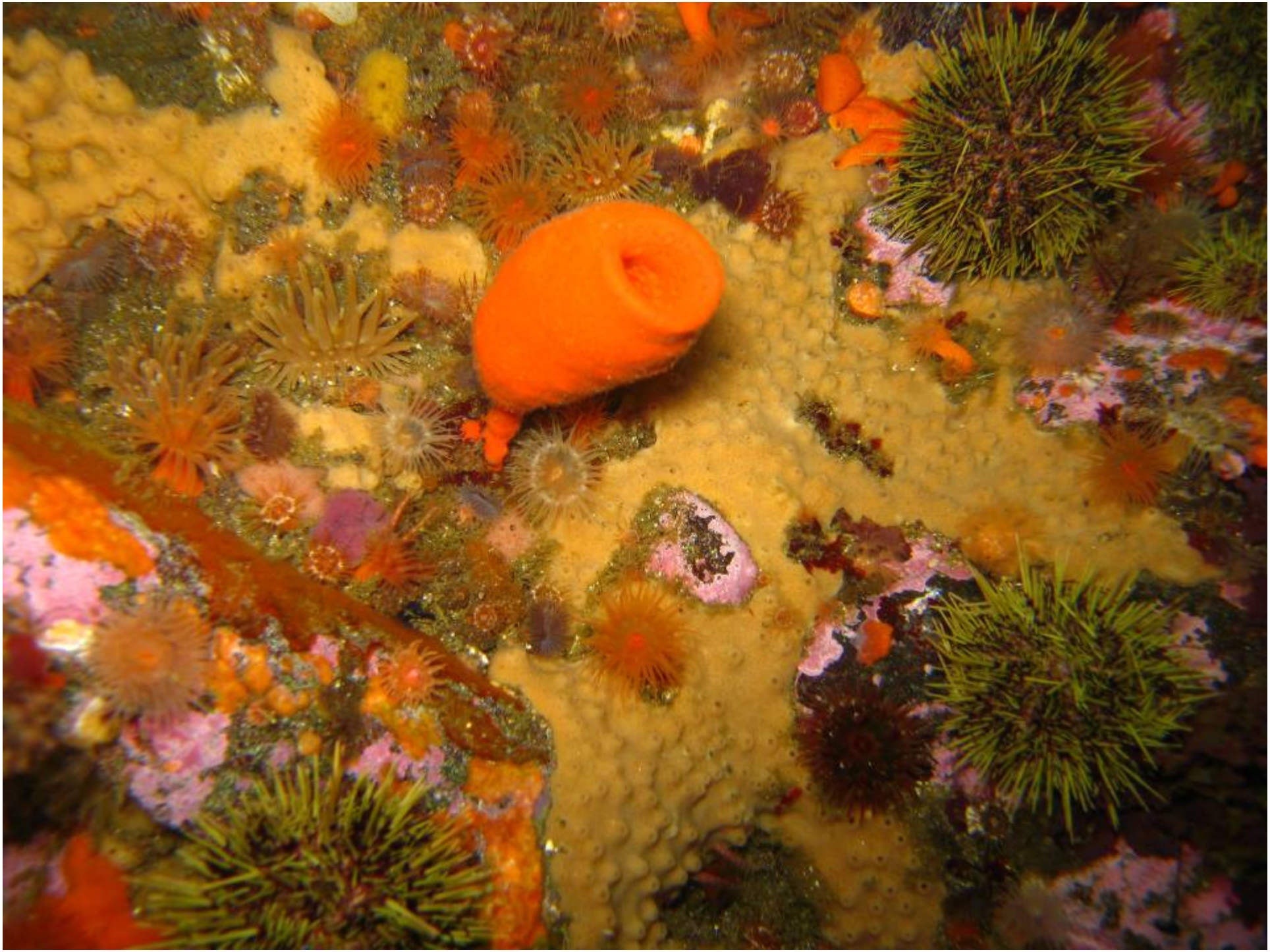
This site is on the northwest side of Tigalda Island. The depth was 15 m on a substrate of kelp-covered boulders. There was no current at depth. Bottom temperature was 6 C. The dominant kelps were *Thalassiophyllum* sp., *Laminaria* spp., and *Agarum* sp. and the dominant macrofauna were *Tonicella lineata*, *Ophiopholus aculeata*, and *Ceramaster arcticus*.

Divers: R. Brewer, R. Clark, H. Chenelot, S. Harper, M. Hoberg, S. Jewett

Aleutian AKMAP 2006 Summary of Samples Collected	
Dissolved Oxygen	25
Nutrients	71
Salinity by refractometer	71
Chlorophyll a	71
Total Suspended Solids (TSS)	71
Tritium	71
Salinity	71
pH	71
Sediment Organics (SO)	7
Sediment Trace Metals (SM)	7
Sediment Radionuclides	7
Sediment Toxicity (ST)	7
Sediment Grain Size (SG)	7
Sediment Total Organic Carbon (TOC)	7
Biomass estimates quadrats	17
Marcroalgae Trace Metals (MTM)	12
Marcroalgae Radionuclides (MAR)	14
Fish	86
Benthic Epifauna & Infauna	66

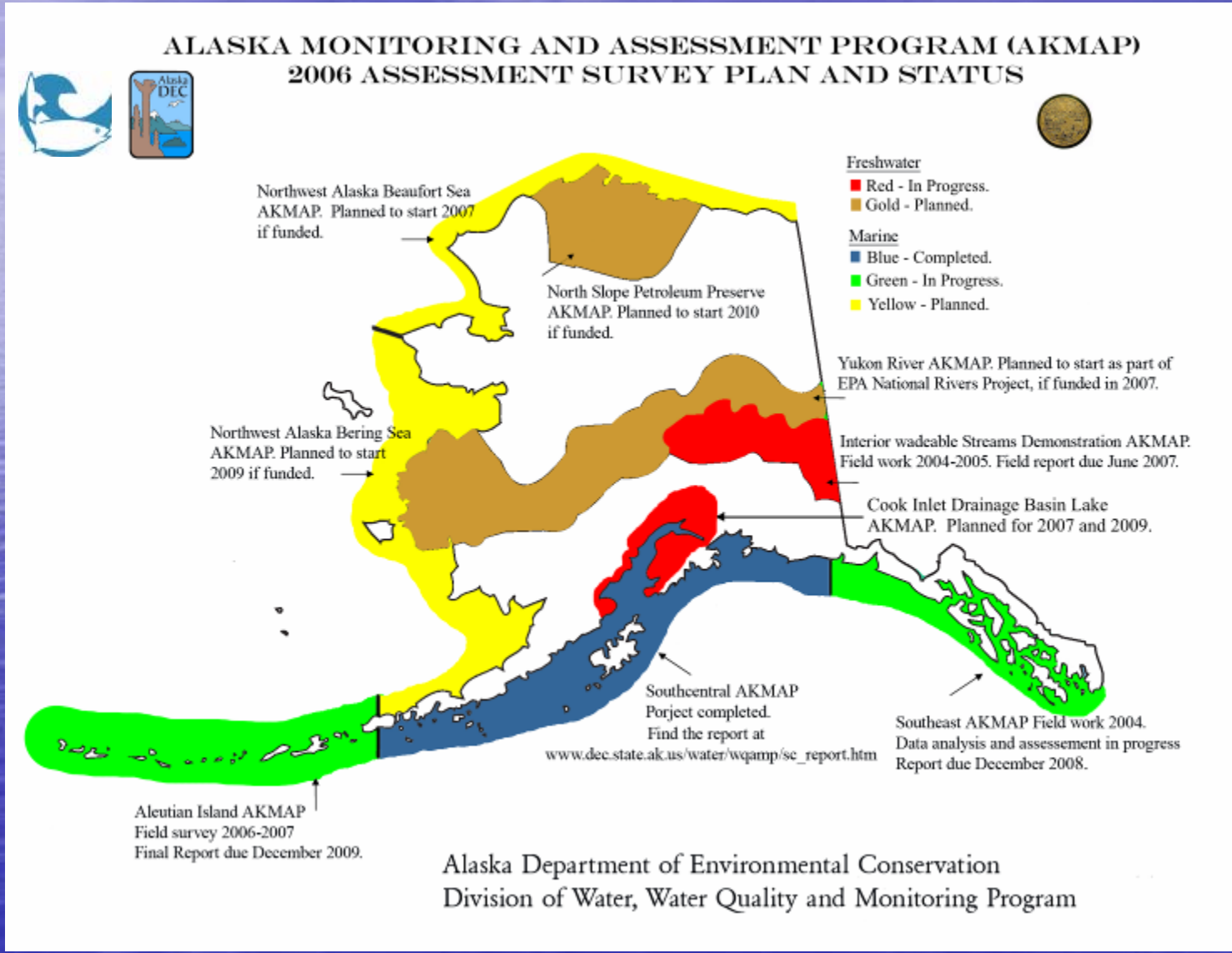
Geothermal Vent

Possible new kelp species: Aleutian Islands 2006 - Family Alariaceae

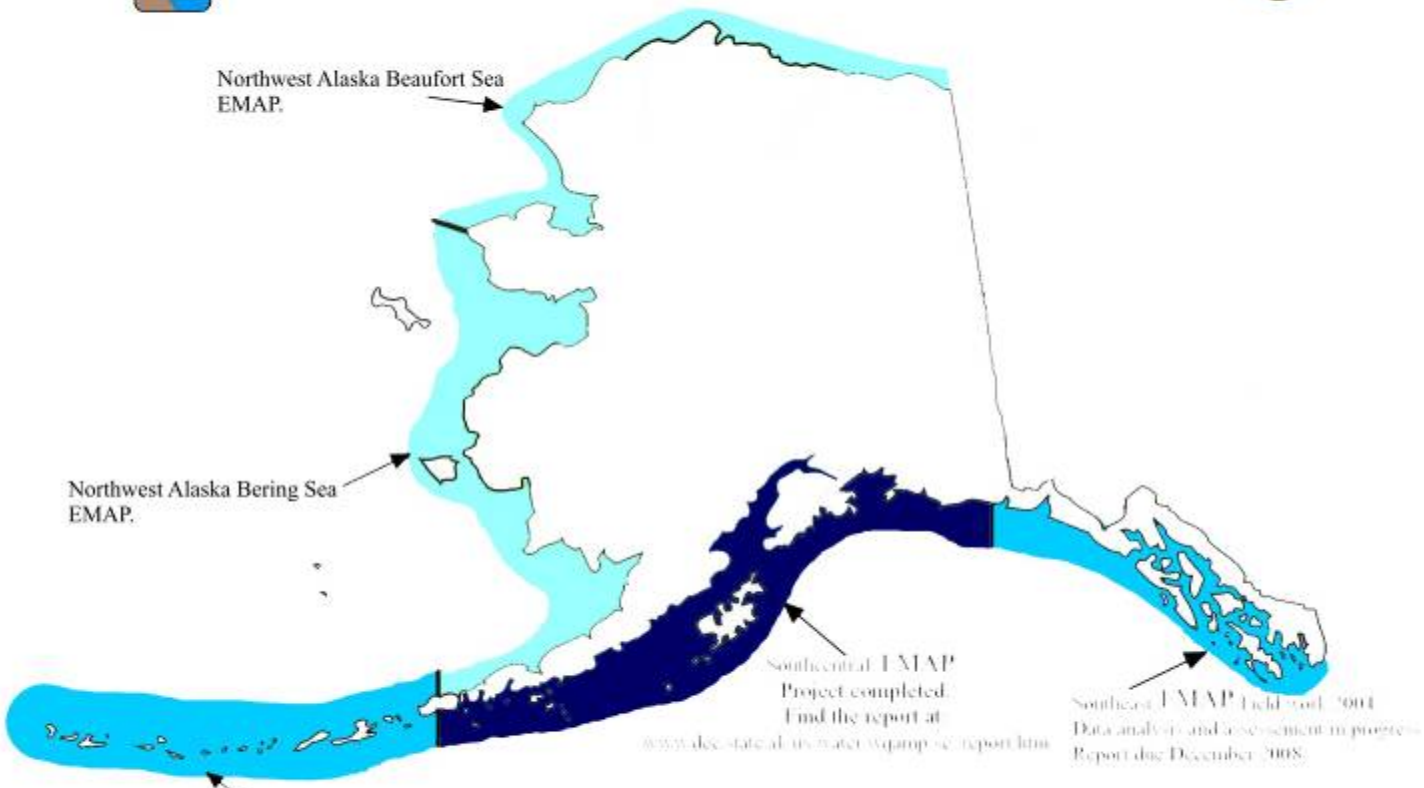


Motley Crew: 2006 E. Aleutian Islands AKMAP

AKMAP 2002 – 2020
Joint ADEC & UA AKMAP Survey Projects

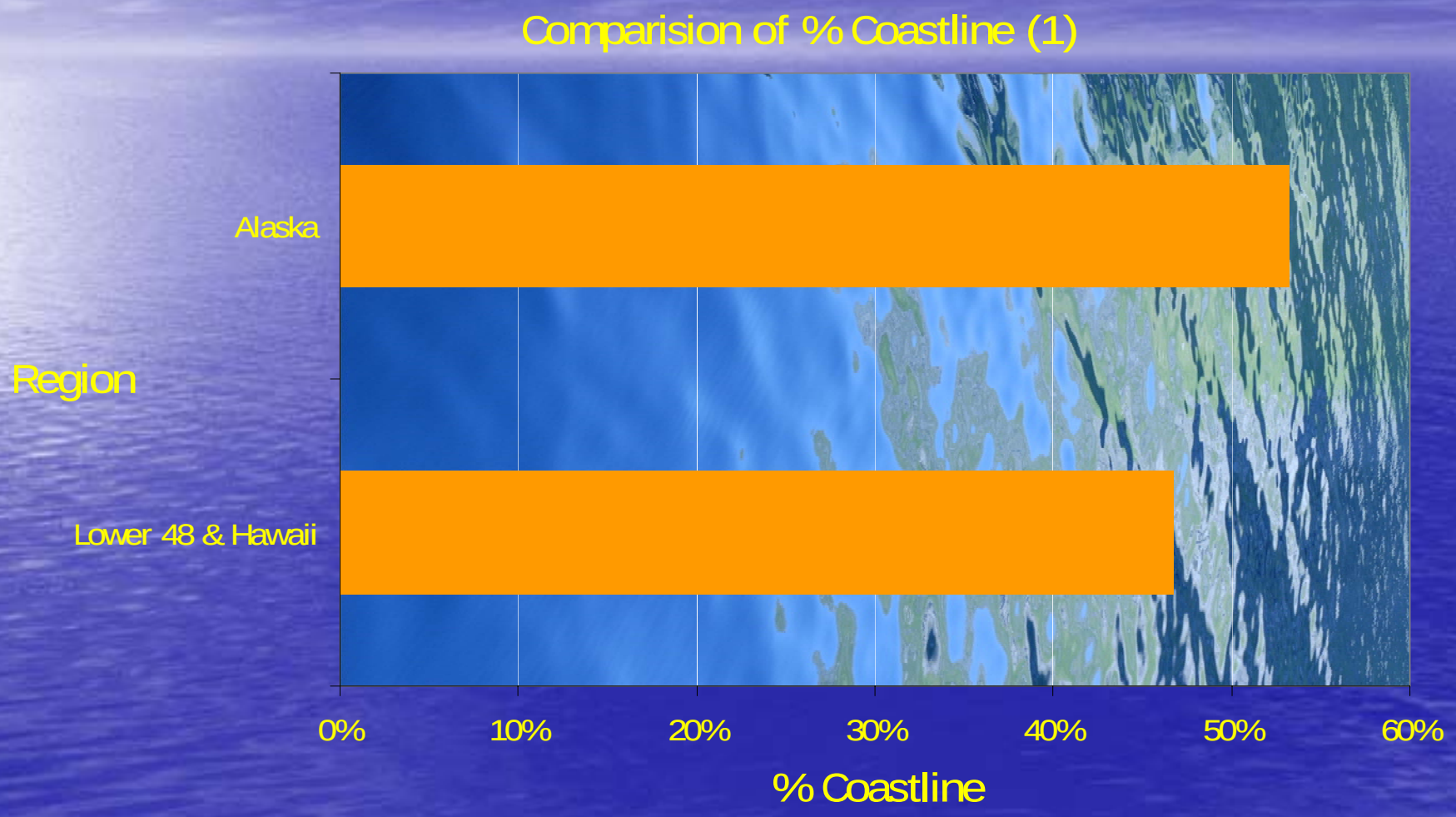


Alaska Monitoring and Assessment Program (AKMAP)
NCA Biogeographical Provinces



Alaska Department of Environmental Conservation
Division of Water, Water Quality Monitoring and Assessment

Is there a NCA without Alaska?



(1) Congressional Research Service, The Library of Congress, 2006

NCA Importance

- Alaska Department of Environmental Conservation is a strong supporter of the NCA program and is incorporating the initial assessments into future 305 (b) reports.
- Yet, ADEC has major concerns in regards to the future viability of the NCA in that:
  - The NCA schedule of every 5 years means a complete survey of Alaska's coastal provinces would not occur to 2020;
  - Currently, inadequate funding means Alaska surveys will not occur;
  - Climate change may represent one of the major impacts to Alaska's water quality; and
  - Concern that NCA stressors and indicators may not be the relevant ones needed to assess climate change impacts.

Need for a Reassessment

- NCA survey (EMAP) methodology has not adequately considered:
  - Alaska's size in relation to the nations coastal resources; and
  - Adequacy of stressors and indicators for understanding climate change impacts.
- EPA needs to undertake a strong research effort to develop a survey methodology that can provide for adequate status and trends assessment of Alaska's coastal resources.

AKMAP Source of Funding

USEPA
Office of Research & Development